PLANNING BOARD
PORTSMOUTH, NEW HAMPSHIRE

EILEEN DONDERO FOLEY COUNCIL CHAMBERS
CITY HALL, MUNICIPAL COMPLEX, 1 JUNKINS AVENUE

7:00 PM Public Hearings begin **June 23, 2022**

AGENDA

REGULAR MEETING 7:00pm

I. APPROVAL OF MINUTES

A. Approval of the April, 21 regular meeting minutes

II. DETERMINATIONS OF COMPLETENESS

SUBDIVISION REVIEW

A. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Preliminary and Final Subdivision

B. The request of **James** and **Gail Sanders (Owners),** for property located at **445 Marcy Street** requesting Preliminary and Final Subdivision

SITE PLAN REVIEW

A. The request of **RIGZ Enterprises LLC (Owner),** for property located at **806 Route 1 Bypass** requesting Site Plan Review

B. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Site Plan Approval

C. The request of **Mastoran Restaurants Inc. (Owner),** and **Granite State Convenience (Applicant),** for property located at **2255 Lafayette Road** requesting Site Plan Review

III. PUBLIC HEARINGS – OLD BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. The request of **Mastoran Restaurants Inc. (Owner),** and **Granite State Convenience (Applicant),** for property located at **2255 Lafayette Road** requesting Site Plan review and Conditional Use Approval for use 19.40 under Section 10.440 to allow a drive-thru facility as an accessory use to a permitted principal use in the Gateway Corridor Zone. Said property is shown on Assessor Map 272 Lot 3 and lies within the Gateway Corridor (G1) District. (LU-22-13)

IV. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. The request of **Mastoran Restaurants Inc. (Owner),** and **Granite State Convenience (Applicant)**, for property located at **2255 Lafayette Road** requesting Wetland Conditional Use Permit Approval according to section 10.1017.5 of the Zoning ordinance to convert an existing fast food restaurant site into a retail fueling station and a convenience store/sandwich shop with drive-through window and a five fuel pump dispenser island and associated paving parking and stormwater system upgrades for the entire site creating an overall disturbance in the wetland buffer of 33,555 square feet. Said property is located on Assessor Map 272 Lot 3 and lies within the Gateway Corridor (G1) District. (LU-22-13)

B. The request of **James** and **Gail Sanders (Owners),** for property located at **445 Marcy Street** requesting Preliminary and Final Subdivision approval to subdivide one lot with 14,947 square feet of lot area and frontage on Marcy Street, Pray Street, and Partridge Street into two lots as follows: Proposed Lot 1 with 6,127 square feet of lot area and 102.43 feet of frontage on Marcy Street and 67.83 feet of frontage on Pray Street, Proposed Lot 2 with 8,820 square feet of lot area and 802 feet of frontage on Pray street and 62.44 feet of frontage on Partridge Street. Said property is located on Assessor Map 101 Lot 3 and lies within the General Residence B (GRB) and Historic Districts. (LU-22-79)

C. The request of **RIGZ Enterprises LLC (Owner),** for property located at **806 Route 1 Bypass** requesting Site Plan Review for construction of 400 square feet of additional commercial space and site improvements. Said property is located on Assessor Map 161 Lot 43 and lies within the Business (B) District. (LU-22-81)

D. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Preliminary and Final Subdivision approval to subdivide one existing lot with 65,365 square feet of lot area and 123.92 of frontage on Lafayette Road and 336.61 feet of frontage on Andrew Jarvis Drive into three lots as follows: Proposed Lot 1 with 18,434 square feet of lot area and 123.92 feet of frontage on Lafayette Road and 129.57 feet of frontage on Andrew Jarvis Drive, Proposed Lot 2 with 16,606 square feet of lot area and 102.04 feet of frontage on Andrew Jarvis Drive, and Proposed Lot 3 with 30,325 square feet of lot area and 107 feet of frontage on Andrew Jarvis Drive. Said property is located

on Assessor Map 229 Lot 1 and lies within the Single Residence B (SRB) District. (LU-22-82)

E. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Site Plan Approval and Conditional Use Permit Approval as permitted under Section 10814.40 of the Zoning Ordinance to subdivide the lot and construct two new single-family dwellings (one includes an attached accessory dwelling unit) in addition to the existing single-family dwelling. Said property is located on Assessor Map 229 Lot 1 and lies within the Single Residence B (SRB) District. (LU-22-82)

F. The request of **City of Portsmouth (Owner),** for property located at **329 Heritage Drive** requesting Wetland Conditional Use Permit approval according to section 10.1017.5 of the Zoning Ordinance to impact 1,490 square feet wetland buffer to replace equipment at an existing sewer pump station. Said property is located on Assessor Map 284 Lot 5 and lies within the Municipal (M) District. (LU-22-96)

G. The request of **Joan S. Rice Revocable Trust (Owner),** for property located at **460 FW Hartford Drive** requesting Wetland Conditional Use Permit Approval according to section 10.1017.5 of the Zoning ordinance to temporarily impact 275 square feet and permanently impact 5.2 square feet of inland wetland buffer to install a new fence where the impact is the wooden fence posts. Said property is located on Assessor Map 249 Lot 17 and lies within the Single Residence B (SRB) District. (LU-22-69)

V. CITY COUNCIL REFERRALS

A. Hold a Public Hearing and consider a recommendation to the City Council for Zoning Ordinance Amendments to Building Height standards.

VI. OTHER BUSINESS

A. Chairman's Update/Discussion

VII. ADJOURNMENT

https://us06web.zoom.us/webinar/register/WN_nZPXzjIaQS6s9n8CtOcGDw

City of Portsmouth
Planning Department
1 Junkins Ave, 3rd Floor
Portsmouth, NH
(603)610-7216

Memorandum

To:	Planning Board
From:	Beverly Mesa-Zendt, Planning Director Stefanie L. Casella, Planner
Date:	June 17, 2022
Re:	Recommendations for the June 23, 2022 Planning Board Meeting

I. APPROVAL OF MINUTES

A. Approval of the April 21, 2022 Minutes

Planning Department Recommendation

1) Board members should determine if the draft minutes include all relevant details for the decision making process that occurred at the April 21, 2022 and vote to approve meeting minutes with edits if needed.

II. DETERMINATION OF COMPLETENESS

SUBDIVISION REVIEW

A. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Preliminary and Final Subdivision
B. The request of **James** and **Gail Sanders (Owners),** for property located at **445 Marcy Street** requesting Preliminary and Final Subdivision

Planning Department Recommendations

1) Vote to determine that these applications are complete according to the Subdivision Regulations, (contingent on the granting of any required waivers under Sections III and IV of the agenda) and to accept the applications for consideration.

SITE PLAN REVIEW

A. The request of **RIGZ Enterprises LLC (Owner),** for property located at **806 Route 1 Bypass** requesting Site Plan Review
B. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Site Plan Approval
C. The request of **Mastoran Restaurants Inc. (Owner),** and **Granite State Convenience (Applicant),** for property located at **2255 Lafayette Road** requesting Site Plan Review

Planning Department Recommendations

1) Vote to determine that these applications are complete according to the Site Plan Review Regulations, (contingent on the granting of any required waivers under Sections III and IV of the agenda) and to accept the application for consideration.

III. PUBLIC HEARINGS – OLD BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. The request of **James** and **Gail Sanders (Owners),** for property located at **445 Marcy Street** requesting Preliminary and Final Subdivision approval to subdivide one lot with 14,947 square feet of lot area and frontage on Marcy Street, Pray Street, and Partridge Street into two lots as follows: Proposed Lot 1 with 6,127 square feet of lot area and 102.43 feet of frontage on Marcy Street and 67.83 feet of frontage on Pray Street, Proposed Lot 2 with 8,820 square feet of lot area and 802 feet of frontage on Pray street and 62.44 feet of frontage on Partridge Street. Said property is located on Assessor Map 101 Lot 3 and lies within the General Residence B (GRB) and Historic Districts. (LU-22-79)

Project Review, Decisions, and Recommendations

This application has been before the Technical Advisory Committee and is currently undergoing review with the Historic District Committee. Please see below for more information.

Technical Advisory Committee (TAC) Review

On May 3, 2022 the Committee voted to recommend approval to the Planning Board with the following stipulations:

Items to be addressed prior to Planning Board approval:

1. Applicant will cut into 8" City sewer in Pray Street and install a wye and use gasketed solid couplings on either side of the wye.
2. Applicant will use a larger pipe for both inserta-tee and sewer connection to culvert than the proposed 8" pipe.
3. 1' water service will be used for property.
4. Applicant will coordinate with City DPW, Eversource, Consolidated Communications, and Comcast and report back on the implications of undergrounding wires as shown. Additional guying or other work may be necessary and not possible/feasible.
5. Driveway for Lot 1 will be at least 30 feet from the intersection of Pray Street and Marcy Street.
6. A note on the plan will be added to articulate Lot 1 has drainage rights across Lot 2.
7. Address for Lot 2 will correspond to Partridge Street until such time when a second driveway is provided on Pray Street.

Stipulations as listed above, have been satisfied with the updated application submission as provided to the Board.

Historic District Committee Review

This application completed its final work session at the HDC on June 8, 2022. The project is expected to submit an application for formal review and a public hearing at either the July or August regularly scheduled meeting.

Should the approved designs alter the dimensions of the proposed lots then applicant will be required to return to the Planning Board for amended subdivision approval.

Planning Department Recommendation

1) Vote to grant preliminary and final subdivision approval with the following stipulations:

Conditions to be satisfied subsequent to final approval of site plan but prior to commencement of any site work or construction activity:

1.1 Address for Lot 2 will correspond to Partridge Street until such time when a second driveway is provided on Pray Street.

1.2 Lot numbers as determined by the Assessor shall be added to the final plat.

1.3 Property monuments shall be set as required by the Department of Public Works prior to the filing of the plat.

1.4 GIS data shall be provided to the Department of Public Works in the form as required by the City.

1.5 The final plat and all easement deeds shall be recorded concurrently at the Registry of Deeds by the City.

1.6 Any easement plans and deeds for which the City is a grantor or grantee shall been reviewed and approved by the Planning and Legal Departments and accepted by City Council.

1.7 Associated recording fees shall be paid to the City prior to recordation.

III. PUBLIC HEARING – OLD BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

B. The request of Mastoran Restaurants Inc. (Owner), and Granite State Convenience (Applicant), for property located at 2255 Lafayette Road requesting Wetland Conditional Use Permit Approval according to section 10.1017.5 of the Zoning ordinance to convert an existing fast food restaurant site into a retail fueling station and a convenience store/sandwich shop with drive-through window and a five fuel pump dispenser island and associated paving parking and stormwater system upgrades for the entire site creating an overall disturbance in the wetland buffer of 33,555 square feet. Said property is located on Assessor Map 272 Lot 3 and lies within the Gateway Corridor (G1) District. (LU-22-13)

IV. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. The request of **Mastoran Restaurants Inc. (Owner) and Granite State Convenience (Applicant),** for property located at **2255 Lafayette Road** requesting Site Plan review and Conditional Use Approval for use 19.40 under Section 10.440 to allow a drive-thru facility as an accessory use to a permitted principal use in the Gateway Corridor Zone with a waiver for distance from order window to the turning. Said property is shown on Assessor Map 272 Lot 3 and lies within the Gateway Corridor (G1) District. (LU-22-13)

It is recommended that Item III.B and IV.A be discussed together and voted on separately.

A motion is required to consider these items together.

Project Review, Decisions, and Recommendations

This application has been before the Technical Advisory Committee, the Zoning Board of Adjustment, and Conservation Commission. Please see below for more information.

Technical Advisory Committee (TAC) Review

On May 3, 2022 the Committee voted to recommend approval to the Planning Board with the following stipulations:

Items to be addressed before Planning Board approval:

1. A note is added to the plan set (near the sewer connections) that states all work regarding to the City sewer is to be witnessed by DPW staff, provided 48 hours' notice.

2. The sidewalk proposed onsite will be moved to the northwest side of the site and removed from the wetland buffer area in the southwest corner.

Post Construction:
3. After connections are terminated and created, the applicant will video inspect the two spots to confirm that no groundwater is infiltrating.

Stipulations 1 and 2, as listed above, have been satisfied with the updated application submission as provided to the Board. Stipulation 3 has been listed below as a recommended condition of site plan approval.

Zoning Board of Adjustment
On February 15, 2022 the BOA considered six (6) variance requests as listed below.

1. A Variance from Section 10.5B33.20 to allow 0% front lot line buildout where 75% is required.
2. A Variance from Section 10.5B22.40 to allow a building to be constructed outside of the 70 - 90 foot setback from the centerline of Lafayette Road.
3. A Variance from Section 10.1113.20 to allow parking to be located between a principal building and a street.
4. A Variance from Section 10.1114.31 to allow more than one driveway.
5. A Variance from Section 10.835.32 to allow a bypass lane for a drive thru to be set back 24 feet from a lot line where 30 feet is required.
6. A Variance from Section 10.1251.20 to allow a 160 square foot freestanding sign where 100 square feet is the maximum allowed.

As a result of this consideration, the BOA granted all variance requests as presented.

Conservation Commission Review
The Conservation Commission reviewed the application at the May 11, 2022 meeting. See below for analysis of criteria as stated in Section 10.1017.50 Of the Zoning Ordinance.

1. The land is reasonably suited to the use activity or alteration.
Given that the site is currently paved and has a structure on it this project seeks to upgrade the site. The site is not seeking to expand the impact in the buffer so the land is reasonably suited to the use.

2. There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.
The site as it exists is paved within and close to the edge of wetland. There is no location on this property where the project could be completed outside of the buffer.

3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.
The applicant is proposing to reduce the amount of impervious surface 9,124 square feet on this previously developed site. This reduction in impervious surface combined with the addition of enhanced stormwater treatment reduces the overall site impacts for this site and surrounding properties.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.
This project is proposing an extensive landscape plan for the interior of the site. The area at the rear of the site which is being converted from pavement to proposed loam and seed could be enhanced further with the addition of wetland buffer plantings and/or a wetland seed mix. Additionally, the applicant should be clear in their application to adhere to the City's regulations for fertilizer use according to section 10.1018.24.

5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.
This site proposes reductions in impervious surfaces and enhanced stormwater treatment as a less impacting alternative than what is existing.

6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.
As stated above the buffer planting stating loam and seed should be revisited to include more appropriate wetland buffer plantings. The plantings could be mowable but staff recommends they look towards a reduced mowing cycle, i.e. annual or twice annual to enhance buffer function. Additionally, the buffer could be enhanced with specific plantings of shrubs which work for this site.

As a result of this consideration the Commission voted to recommend approval with the following stipulations:

1. The applicant will follow NOFA standards for land care. https://nofa.organiclandcare.net/wp-content/uploads/nofa_organic_land_care_standards_6thedition_2017_opt.pdf
2. For snow storage the applicant will utilized the font area as the primary area and the snow storage area shown on the North side as the secondary snow storage area.

3. The applicant shall require all winter maintenance personnel to have a Green Snow Pro certification https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification
4. Applicant shall increase the number of trees to be planted in the area where pavement is proposed for removal.
5. Area shown on plan as to be loam and seeded shall be planted with a wetland buffer seed mix and mowed annually.
6. Applicant shall install signs along the edge of wetland to inform the public that this is a sensitive natural area.
7. The Commission recommends that the applicant use a pervious material for the patio.

All stipulations have been listed under "Planning Department Recommendations" as stipulations of approval.

Staff Analysis Drive-through – Conditional Use Permit Review

As outlined in Section 10.835 of the Zoning Ordinance and Section 3.6 of the Site Plan Review Regulations, an accessory drive-through use in the G1 district must meet the following standards.

Required Standards (Zoning Ordinance 10.835.20, 10.835.30, 10.835.40)	Meets Standard	Does Not Meet Standard	Comments
10.835.21 A drive-through canopy shall not project more than 26 feet from the principal building and shall be consistent with the architectural style of the building.	√		No drive-through canopy proposed
10.835.22 Illuminated menu boards or other signs associated with the drive-through facility shall be shielded from public streets and residential properties.	√		Menu board is located on the side of the structure and is in excess of 175 ft from Lafayette Rd
10.835.31 All outdoor service facilities (including transaction windows, menu boards, speakers, etc.) shall be located a minimum of 100 feet from any residential zoning district, and 50 feet from any lot line.	√		Service window is in the rear of the structure and is located more than 50 feet from any lot line and is not within 100 feet of any residential districts.
10.835.32 All drive-through lanes, bypass lanes, and stacking lanes shall be located a minimum of 50 feet from any residential zoning district, and 30 feet from any lot line.		√	Lanes are not located within 50 feet of any residential district, Bypass lane is located 24 feet of the side lot line- **Variance approved (see above)**

Required Standards (Zoning Ordinance 10.835.20, 10.835.30, 10.835.40)	**Meets Standard**	**Does Not Meet Standard**	**Comments**
10.835.41 In addition to the standards and conditions for special exceptions set forth in Section 10.233, the Planning Board may grant a conditional use permit for a drive-through facility under this section only if it determines that the level of service and traffic safety conditions of all streets and intersections to be impacted by the project will be the same as, or better than, predevelopment conditions.	√		Traffic Impact Analysis provided and reviewed by staff
10.835.42 In making its determination, the Board shall consider the traffic impact analysis and additional available information, including review by independent consultants if deemed necessary.	√		Traffic Impact Analysis provided and reviewed by staff

Additional standards are provided in section 3.6 of the Site Plan Regulations

Required Standards Section 3.6 Drive-Through Facilities	**Meets Standard**	**Does Not Meet Standard**	**Comments**
3.6.1.1 The internal entrance into the drive-through lane shall not conflict with the general access to the site.	√		Drive-through located to the rear of the property does not interfere with site ingress.
3.6.1.2 The distance from any transaction window to the site exit shall be a minimum of sixty (60) feet.	√		Transaction window located in the rear of the building over 163’ back from the exit.
3.6.1.3 Where a turn in the drive-through lane is required between a transaction window and the site exit, the distance from the transaction window to the beginning of the turn shall be a minimum of forty (40) feet with an internal minimum turning radius of seventeen (17) feet		√	34 feet provided
3.6.2 Stacking Lanes and Spaces	√		Meets all standards
3.6.3 Traffic Impact Study	√		Provided and reviewed by staff.
3.6.4 Noise Reduction Sound pressure levels created by devices in the drive-through facility, including but not limited to speakers, shall comply with the standards for noise control in the Zoning Ordinance. Methods of communicating to patrons that do not require the use of speakers shall be used where feasible or where required by the Planning Board.	√		Required as part of the approval
3.6.5 Sceening	√		Meets all standards

In accordance with Section 10.243 Approval Criteria, a conditional use permit shall be granted only if the Planning Board determines that the proposal conforms to all applicable conditional use permit criteria, as set forth below 10.243.20.

(1) The design of proposed structures, their height and scale in relation to the site's surroundings, the nature and intensity of the proposed use or activity, and the layout and design of the site will be compatible with adjacent and nearby properties, buildings and uses, will complement or enhance the character of surrounding development, and will encourage the appropriate and orderly development and use of land and buildings in the surrounding area.

Applicant Response: *The site was previously permitted and used as a restaurant with drive-thru. The proposed development is appropriate in character to the site. The neighboring businesses along Lafayette Road are similar commercial uses and the proposed development will match the spirit of the neighborhood. Increased landscaping will enhance the character of the development, as well as an enhanced building façade.*

(2) All necessary public and private utility infrastructure and services will be available and adequate to serve the proposed use.

Applicant Response: *Eversource, electric service, has confirmed they have enough capacity to serve the proposed development. Municipal water and sewer are available to the site. Until/Northern Utilities Natural Gas Division has confirmed natural gas is available to supply the proposed development at 2255 Lafayette Road.*

(3) The site and surrounding streets will have adequate vehicular and pedestrian infrastructure to serve the proposed use consistent with the City's Master Plan.

Applicant Response: *Due to the site's location along Lafayette Road, Route One, there is no pedestrian access to the site or any of the adjacent properties at this time. A 12 ft NHDOT reserve strip and a 8 ft wide Portsmouth Multiuse Path are proposed along the frontage for future DOT and Municipal use. The site has adequate maneuvering space for the drive thru with sufficient room for 13 stacked vehicles within the drive thru lanes, and adequate space for delivery trucks and emergency vehicles around the site.*

(4) The proposed structures, uses, or activities will not have significant adverse impacts on abutting and surrounding properties on account of traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare.

Applicant Response*: There will be no significant adverse impacts to the surrounding properties as the site is surrounded by similar commercial uses and is consistent with the existing use.*

(5) The proposed structures and uses will not have significant adverse impacts on natural or scenic resources surrounding the site, including wetlands, floodplains, and significant wildlife habitat.

Applicant Response: *The proposed development is consistent with the existing use and adjacent properties, and will not have a negative scenic impact on the neighborhood. The proposed site work has been designed to have the least adverse impact to the wetland buffer. The development will result in a decrease of over 9,000 sf of impervious cover within the wetland buffer zone and will increase wetland buffer widths.*

(6) The proposed use will not cause or contribute to a significant decline in property values of adjacent properties.

Applicant Response: The proposed use will not cause any decrease to property values as the proposed use is consistent with the existing use and the uses of abutting commercial properties.

Planning Department Recommendations

1) Vote to find that the application meets the criteria set forth in 10.1017.50 and to grant the Wetland Conditional Use Permit with the following stipulations:

1.1. The applicant will follow NOFA standards for land care. https://nofa.organiclandcare.net/wp-content/uploads/nofa_organic_land_care_standards_6thedition_2017_opt.pdf

1.2. For snow storage the applicant will utilized the font area as the primary area and the snow storage area shown on the North side as the secondary snow storage area.

1.3. The applicant shall require all winter maintenance personnel to have a Green Snow Pro certification https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification

1.4. Applicant shall increase the number of trees to be planted in the area where pavement is proposed for removal.

1.5. Area shown on plan as to be loam and seeded shall be planted with a wetland buffer seed mix and mowed annually.

1.6. Applicant shall install signs along the edge of wetland to inform the public that this is a sensitive natural area.

1.7. The Commission recommends that the applicant use a pervious material for the patio.

2) Vote to determine the placement of the transaction window as required in section 3.6.1.3 of the Site Plan Review Regulations does not nullify the spirit and intent of the City's Master Plan of the Site Plan Regulations and to grant the a waiver to the distance requirements in section 3.6.1.3 of the Site Plan Review Regulations.

3) Vote to find that the application meets the criteria set forth in section 10.243 of the Zoning Ordinance and grant the Conditional Use Permit for a drive through facility as an accessory use.

4) Vote to approve the Site plan with the following condition:

Conditions to be satisfied subsequent to final approval of site plan but prior to commencement of any site work or construction activity:

4.1 Any easement plans and deeds for which the City is a grantor or grantee shall been reviewed and approved by the Planning and Legal Departments and accepted by City Council.

4.2 The site plan and any easement plans and deeds shall be recorded at the Registry of Deeds by the City or as deemed appropriate by the Planning Department.

4.3 Associated recording fees shall be paid to the City prior to recordation.

4.4 That the turning radius from the transaction window of the driver-through meet the minimum requirements provided in section 3.6.1.3 of the Site Plan Regulations.

<u>Condition Subsequent:</u>
4.5. After connections are terminated and created, the applicant will video inspect the two spots to confirm that no groundwater is infiltrating.

IV. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

B. The request of **RIGZ Enterprises LLC (Owner),** for property located at **806 Route 1 Bypass** requesting Site Plan Review for construction of 400 square feet of additional commercial space and site improvements. Said property is located on Assessor Map 161 Lot 43 and lies within the Business (B) District. (LU-22-81)

Project Review, Decisions, and Recommendations

This application has been before the Technical Advisory Committee. Please see below for more information.

Technical Advisory Committee (TAC) Review

On May 3, 2022 the Committee voted to recommend approval to the Planning Board with the following stipulations:

Items to be addressed prior to Planning Board approval:

1. Dumpsters will be relocated to parking spaces 24 and 23 with a 20 foot setback from rear lot line and at least 10 feet from side lot line. Applicant will request a waiver from the Planning Board for Section 9.3 of the Site Plan regulations to have the dumpsters located within 20' of the side lot line.
2. A note will be added to the plans regarding the use of non-combustible mulch.
3. Applicant will work with DPW to correct the sewer lateral connection and location.
4. Applicant will work with DPW staff (Eric Eby) to reconfigure handicap parking and accessibility (two spaces needed).
5. Applicant will extend landscaping and curbing at the front lot line.
6. Parking spaces 18 and 19 will be relocated and be replaced with landscaping and 3 bike racks.
7. Entryway will be striped.
8. Raised sidewalk will be extended to connect to front entryway.
9. Light Pole 3 (LP3) located at the rear of the building shall be limited to a height of 16' with cut off shields.
10. Lighting on the rear wall will not exceed a height of 9'.
11. Curbing is added to proposed landscape islands.

All items above have been satisfied with the updated plans as submitted to the Planning Board. The requested waiver must be voted on by Planning Board and language has been provided as a recommendation below.

Staff Analysis

Staff has reviewed the waivers requested by the applicant and finds that the applicant will require a waiver for the dumpster location to be closer to the property line than the required 20 feet and that all other waiver requests have been addressed. The proposed dumpster locate is adequately separated from adjacent properties across Stark Street.

Planning Department Recommendation

1) *Vote to determine the requested waiver do not nullify the spirit and intent of the City's Master Plan of the Site Plan Regulations and to grant the following waiver:*
    - *Waiver of Site Plan Review regulations section 4.3.5 to locate a dumpster 12.2 feet from the property line where 20 feet is required.*

    [Waiver requests must granted with six (6) affirmative votes by the Board. See Section 2.10 of the Site Plan Regulations]

2) *Vote to grant Site Plan approval with the following stipulations:*

    Conditions to be satisfied subsequent to final approval of site plan but prior to commencement of any site work or construction activity:

    2.1 The site plan and any easement plans and deeds shall be recorded at the Registry of Deeds by the City or as deemed appropriate by the Planning Department.

    2.2 Associated recording fees shall be paid to the City prior to recordation.

    2.3 Light pole labels on the utility plan will be correct to reflect appropriate numbering and include LP3 and LP5 consistent with stipulation requiring light Pole 3 (LP3) located at the rear of the building to be limited to a height of 16' with cut off shields.

IV. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

C. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Preliminary and Final Subdivision approval to subdivide one existing lot with 65,365 square feet of lot area and 123.92 of frontage on Lafayette Road and 336.61 feet of frontage on Andrew Jarvis Drive into three lots as follows: Proposed Lot 1 with 18,434 square feet of lot area and 123.92 feet of frontage on Lafayette Road and 129.57 feet of frontage on Andrew Jarvis Drive, Proposed Lot 2 with 16,606 square feet of lot area and 102.04 feet of frontage on Andrew Jarvis Drive, and Proposed Lot 3 with 30,325 square feet of lot area and 107 feet of frontage on Andrew Jarvis Drive. Said property is located on Assessor Map 229 Lot 1 and lies within the Single Residence B (SRB) District. (LU-22-82)

D. The request of **Artwill LLC (Owner),** for property located at **437 Lafayette Road** requesting Site Plan Approval and Conditional Use Permit Approval as permitted under Section 10814.40 of the Zoning Ordinance to subdivide the lot and construct two new single-family dwellings (one includes an attached accessory dwelling unit) in addition to the existing single-family dwelling. Said property is located on Assessor Map 229 Lot 1 and lies within the Single Residence B (SRB) District. (LU-22-82)

It is recommended that Item IV.D and IV.E be discussed together and voted on separately.

A motion is required to consider these items together.

Background

This proposal is for the subdivision of a single lot into three proposed lots, and the construction of two single-family dwelling units and an attached accessory dwelling unit. Other improvements associated with this project include, but not limited to grading, utility installation, stormwater management, landscaping, and paving. The existing lot is located at 437 Lafayette Road and is identified on the City of Portsmouth Assessor's Map 229 as Lot 1, and is approximately 65,365 sf (1.50 ac) in size. The site is located in the Single Residence B (SRB) Zone and currently contains one single-family residential building and a detached garage.

Project Review, Decisions, and Recommendations

This application has been before the Technical Advisory Committee. Please see below for more information.

Staff Review

Attached accessory dwelling units must comply with standards set forth in the following sections of the Zoning Ordinance:

- 10.814.10
- 10.814.20
- 10.814.30
- 10.814.40

In granting a conditional use permit for an accessory dwelling unit, the Planning Board may modify a specific standard set forth in Sections 10.814.40 (below) including requiring additional or reconfigured off-street parking spaces, provided that the Board finds such modification will be consistent with the required findings in Section 10.814.60.

Required Standards (10.814.40)	**Meets Standard**	**Does Not Meet Standard**	**Comments**
10.814.41 An interior door shall be provided between the principal dwelling unit and the accessory dwelling unit.	√		Door provided from garage to ADU
10.814.42 The accessory dwelling unit shall not have more than two bedrooms and shall not be larger than 750 sq. ft. gross floor area. For the purpose of this provision, gross floor area shall not include existing storage space, shared entries, or other spaces not exclusive to the accessory dwelling unit	√		One Bedroom Provided / 747 SF
10.814.43 Any exterior changes to the single-family dwelling shall maintain the appearance of a single-family dwelling. If there are two or more doors in the front of the dwelling, one door shall be designed as the principal entrance and the other doors shall be designed to appear to be secondary.	√		Presents as single family dwelling-The appearance of the single-family dwelling is maintained. There is one door located on the front of the dwelling that serves as the primary entrance to the principal dwelling unit. A second door is located on the east side of the AADU, which serves as the primary entrance for the AADU.
10.814.44 No portion of the AADU shall be closer to the front lot line than the existing front wall of the principal dwelling unit.	√		Attached Accessory Dwelling Unit is recessed from garage-No portion of the proposed AADU is located closer to the front lot line than the existing front wall of the principal dwelling unit.
10.814.451 An exterior wall of the AADU that faces a street on which the lot has frontage shall comprise no more than 40 percent of the total visible façade area of the dwelling as seen from that street.	√		The exterior wall of the AADU that faces the street on which the lot has frontage comprises of 18 percent of the total visible façade area of the dwelling.

Required Standards (10.814.40)	Meets Standard	Does Not Meet Standard	Comments
10.814.452 The addition to or expansion of the existing single-family dwelling may include an increase in building height only as an upward expansion of the existing principal building with no increase in building footprint.	√		Both the principal structure and the DADU are new construction
10.814.453 The building height of any addition or expansion that includes an increase in building footprint shall be less than the building height of the existing principal building.	√		Both the principal structure and the DADU are new construction
10.814.454 The AADU shall be architecturally consistent with the existing principal dwelling through the use of similar materials, detailing, roof pitch, and other building design elements.	√		The proposed AADU will be architecturally consistent with the principal dwelling (see architectural plans).

Technical Advisory Committee (TAC) Review

On May 3, 2022 the Committee voted to recommend approval to the Planning Board with the following stipulations:

Subdivision:

Items to be addressed prior to Planning Board approval:

1. Access easements will be will be provided to allow access across all proposed lots for travel along Artwill Ave.

2. A maintenance agreement will be provided for proposed Artwill Ave. maintenance.

3. All easements will be identified with unique identifiers and corresponding easement table that lists all easements and their purpose.

4. Gas line is to be installed under Artwill Ave and service shall come from the new line and explore feasibility of servicing the existing unit from Artwill Ave.

Site Plan and Conditional Use Permit:

Items to be addressed prior to Planning Board approval:

1. All easements will be identified with unique identifiers and corresponding easement table that lists all easements and their purpose.

Prior to Building Permit Issuance:

2. Applicant will coordinate final water and sewer connections with Portsmouth Water.

3. The final water main connection under Andrew Jarvis Dr. will be determined by Portsmouth Water.

TAC Stipulation 1 as listed above has been satisfied with the latest submission as presented to the Planning Board. Stipulations 2 and 3 have been recommended conditions of approval.

Planning Board Review Criteria
Before granting a conditional use permit for an attached or detached ADU, the Planning Board shall make the following findings (10.814.60):

10.814.61 Exterior design of the ADU is consistent with the existing principal dwelling on the lot.

10.814.62 The site plan provides adequate and appropriate open space, landscaping and off-street parking for both the ADU and the primary dwelling.

10.814.63 The ADU will maintain a compatible relationship to adjacent properties in terms of location, design, and off-street parking layout, and will not significantly reduce the privacy of adjacent properties.

10.814.64 The ADU will not result in excessive noise, traffic or parking congestion.

Staff has asked the applicant to be prepared to address the required findings with the Planning Board.

Planning Department Recommendation

1) Vote to grant Preliminary and Final Subdivision Approval with the following stipulations:

Conditions to be satisfied subsequent to final approval of subdivision but prior to commencement of any site work or construction activity:

1.1 Lot numbers as determined by the Assessor shall be added to the final plat.

1.2 Property monuments shall be set as required by the Department of Public Works prior to the filing of the plat.

1.3 GIS data shall be provided to the Department of Public Works in the form as required by the City.

1.4 The final plat and all easement deeds shall be recorded concurrently at the Registry of Deeds by the City.

1.5 .Any easement plans and deeds for which the City is a grantor or grantee shall been reviewed and approved by the Planning and Legal Departments and accepted by City Council.

1.6 Associated recording fees shall be paid to the City prior to recordation.

2) Vote to find that the application meets the requirements set forth in Section 10.814.60 of the Zoning Ordinance and to grant the Conditional Use Permit as presented.

3) Vote to grant Site Plan Approval with the following stipulations:

<u>Conditions to be satisfied subsequent to final approval of site plan but prior to commencement of any site work or construction activity:</u>

3.1 Any easement plans and deeds for which the City is a grantor or grantee shall been reviewed and approved by the Planning and Legal Departments and accepted by City Council.
3.2 The site plan and any easement plans and deeds shall be recorded at the Registry of Deeds by the City or as deemed appropriate by the Planning Department.
3.3 Associated recording fees shall be paid to the City prior to recordation.

IV. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

E. The request of **City of Portsmouth (Owner),** for property located at **329 Heritage Drive** requesting Wetland Conditional Use Permit approval according to section 10.1017.5 of the Zoning Ordinance to impact 1,490 square feet wetland buffer to replace equipment at an existing sewer pump station. Said property is located on Assessor Map 284 Lot 5 and lies within the Municipal (M) District. (LU-22-96)

Project Review, Decisions, and Recommendations

This application has been before the Conservation Committee. Please see below for more information.

Conservation Commission Review

The Conservation Commission reviewed the application at the May 11, 2022 meeting. The See below for analysis of criteria as stated in Section 10.1017.50 Of the Zoning Ordinance.

1. The proposed construction is in the public interest.

The Heritage Avenue Pump Station has reached the end of its useful life and is proposed for replacement along with the diesel generator located at the site. Maintaining the City's wastewater system is in the public interest.

2. Design, construction, and maintenance methods will utilize best management practices to minimize any detrimental impact of such use upon the wetland and will include restoration of the site as nearly as possible to its original grade, condition and vegetated state.

The plan to replace the station moves the driveway to the far side of the proposed new equipment on the site and includes a stormwater treatment swale to treat any runoff from the proposed driveway. Given the entire site is prior fill the proposed restoration of the disturbed area, native shrub plantings and treatment swale should minimize any impacts in the wetland buffer.

3. No alternative feasible route exists which does not cross or alter a wetland or have a less detrimental impact on a wetland.

The location of this infrastructure is not feasible to move without greater impacts and cost. The upgrades proposed should not have a detrimental impact on the adjacent wetland areas.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.

The applicant has proposed restoring the existing site with a wetland seed mix and native shrub plantings which should minimize any impacts to the adjacent wetland.

The Commission voted unanimously to recommend approval of the Wetland Conditional Use Permit to the Planning Board as presented.

Planning Department Recommendation

1) *Vote to find the application satisfies the criteria set forth in Section 10.107.50 of the Zoning Ordinance.*
2) *Vote to grant the Wetland Conditional Use Permit as presented.*

IV. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

F. The request of **Joan S. Rice Revocable Trust (Owner),** for property located at **460 FW Hartford Drive** requesting Wetland Conditional Use Permit Approval according to section 10.1017.5 of the Zoning ordinance to temporarily impact 275 square feet and permanently impact 5.2 square feet of inland wetland buffer to install a new fence where the impact is the wooden fence posts. Said property is located on Assessor Map 249 Lot 17 and lies within the Single Residence B (SRB) District. (LU-22-69)

Project Review, Decisions, and Recommendations

This application has been before the Conservation Committee. Please see below for more information.

Conservation Commission Review

The Conservation Commission reviewed the application at the May 11, 2022 meeting. The See below for analysis of criteria as stated in Section 10.1017.50 Of the Zoning Ordinance.

1. The land is reasonably suited to the use activity or alteration.

The proposed fence posts will be hand dug and except for the gates there will be no footings installed, minimizing the footprint.

2. There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.

The entire backyard is within the wetland buffer so this is the most reasonable location for the fence.

3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.

Given that the fence is outside of the wetland, will surround a lawn area, and will allow the movement of stormwater this project should not have an adverse impact on the wetland functions of the adjacent wetland areas.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.

*The construction of this fence will not impact any of the natural vegetation on the site**.***

5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.

The proposed fence is being hand installed and should not create an adverse impact.

6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.

This project contemplates a fence within a lawn area.

The Commission voted unanimously to recommend approval of the Wetland Conditional Use Permit to the Planning Board as presented.

Planning Department Recommendation

1) Vote to find the application satisfies the criteria set forth in Section 10.107.50 of the Zoning Ordinance.

2) Vote to grant the Wetland Conditional Use Permit as presented.

V. CITY COUNCIL REFERRALS

A. Continue the Public Hearing and consider a recommendation to the City Council for Zoning Ordinance Amendments to Building Height standards.

On February 7, 2022, the City Council established the Land Use Committee to look at diversifying land use regulations within the City. As part of the first package of amendments, the Land Use Committee has focused on advancing the citywide housing goals identified by City Council in their 2022-2023 Goals. These objectives were refined on February 27, 2022 and include:

1. Increase diversity of housing types and price points;
2. Remove regulatory barriers for housing diversification in neighborhoods (ADUS) – context sensitive design and consideration to impacts to traffic, on street parking and other infrastructure impacts;
3. Restructure incentives to deliver greater public benefit in workforce housing construction; and
4. Identify and maximize partnerships, coalitions, and funding opportunities to deliver affordable housing.

Regulatory Amendment Work Plan

On April 9, 2022, the Land Use Committee approved transmittal of the draft 2021 Regulatory Amendment Work Plan to City Council. The work plan consists of three phases:

1. **Phase 1: Code Clean-Up – Building Height Standards.**
   Purpose: Improve regulatory implementation and align with legislative intent. Eliminate ambiguous sections that result in unintended consequences.
2. **Phase 2: Accessory Dwelling Unit Amendments**
   Purpose: Remove barriers and expand the number of eligible properties for ADUs and Senior Housing Facilities.
3. **Phase 3: Incentive Amendments**
   Purpose: Adjust incentives to place a higher emphasis on Workforce Housing.

Phase 1 Amendments Recommendation

On April 18, 202, the City Council approved the work plan and transmitted proposed Phase 1 amendments to the Planning Board for review and a recommendation. On May 05, 2022, the Planning Board held a work session to review proposed Phase 1 amendments. At that time, staff presented a revised document that was developed in consultation with the City Attorney's office. At the May 5th work session, the Planning Board also requested revisions which were subsequently presented at the May 19, 2022 meeting of the Planning Board, when additional comments were provided and additional clarification was requested.

A full annotated copy of proposed amendments is provided with explanatory notes and purpose statements for all the proposed edits. Final proposed revisions are also provided.

Planning Department Recommendation

Recommend approval of the proposed amendments to the Portsmouth Zoning Ordinance as presented.

VIII. OTHER BUSINESS

A. Chairman's Update/Discussion

IX. ADJOURNMENT

REGULAR MEETING
PLANNING BOARD
PORTSMOUTH, NEW HAMPSHIRE

EILEEN DONDERO FOLEY COUNCIL CHAMBERS
CITY HALL, MUNICIPAL COMPLEX, 1 JUNKINS AVENUE

7:00 PM **April 21, 2022**

MINUTES

MEMBERS PRESENT:	Rick Chellman, Chairman; Karen Conard, City Manager; Ray Pezzullo, Assistant City Engineer; Beth Moreau; Greg Mahanna; Peter Harris; James Hewitt; Franco DiRienzo, Alternate;
ALSO PRESENT:	Beverly M. Zendt, Planning Director; Peter Britz, Environmental Planner; Stefanie Casella, Planner 1
MEMBERS ABSENT:	Corey Clark, Vice Chair; Andrew Samonas, Alternate; Jane Begala,

I. APPROVAL OF MINUTES

A. Approval of March 17, 2022 minutes.

Mr. Hewitt commented that the parameters for the West End Yards parking report should include the number of "bedrooms" not "beds." Also, the second to last sentence where it says, "Mr. Hewitt confirmed that would work" should include "if it contained the information that was requested for the report." The heading under the minutes says March 15, 2022, but it should say March 17, 2022.

City Manager Conard moved to approve the minutes from the March 17, 2022, Planning Board Meeting, as amended, seconded by City Council Representative Moreau. The motion passed unanimously.

II. PUBLIC HEARINGS -- OLD BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. REQUEST TO POSTPONE The request of **Donald Lowell Stickney III (Owner),** for property located at **213 Jones Avenue** requesting Conditional Use Permit under section 10.814 of the Zoning Ordinance and modification of the standards set forth in Sections 10.814.40 or 10.814.52 through 10.814.56, to construct a new single family residence and convert the existing residence into a Detached Accessory Dwelling Unit totaling 886

square feet of living area. Said property is shown on Assessor Map 222 Lot 69 and lies within the Single Residence B (SRB) district. (LU-22-34) **REQUEST TO POSTPONE**

DISCUSSION AND DECISION OF THE BOARD

City Council Representative Moreau moved to postpone the application to the May Planning Board Meeting, seconded by City Manager Conard. The motion passed unanimously.

B. The request of **Nerbonne Family Revocable Trust (Owner**), for property located at **189 Gates Street** requesting a Conditional Use Permit under section 10.815 of the Zoning Ordinance and modification of the standards set forth in Section 10.815.30 for the conversion of an existing accessory structure (garage) into a garden cottage with 507 gross square footage of living space. Said property is shown on Assessor Map 103 Lot 6 and lies within the General Residence B (GRB) and Historic Districts. (LU-22-30)

SPEAKING TO THE APPLICATION

Kelly Sanders spoke to the application. Ms. Sanders commented that her parents were requesting a CUP to convert their garage into a DADU. They need the cottage to create housing for Ms. Sanders to be a care giver for her father who has Alzheimer's. The proposal fits in with the character of the neighborhood and supports the City's goals of providing more affordable housing. Ms. Sanders took early retirement to move in with her parents and care for her father. It is important for him to be in a secure and familiar environment. They approached this project with a commitment to the community and worked to keep it in the style and spirit of the South End. Portsmouth has been thinking about how to support people aging in their homes and provide affordable housing. This is the most feasible and affordable option.

Architect Anne Whitney commented that they were asking for a CUP to reuse the garage with a small addition. They went to the ZBA for a variance and were approved. The proposal originally had a bigger addition with a deck. However, after receiving feedback from the abutter they reduced the size of the addition and eliminated the deck. The garage is currently 354 sf, and the addition will make it 507 sf. There will be one skylight on the new addition. They will be adding gutters to the garage and the addition. The addition will be on posts, so there will not be a new foundation. The proposal will bring drainage under the addition and out to the middle of the property to avoid going to the neighbor's property. The current garage is a blank slate, so adding the addition will help to blend it with the other properties. They are requesting a waiver to expand the existing structure. The existing garage is 354 sf, and the proposed addition is 153 sf. The total square footage is smaller than the maximum that is allowed. The ordinance allows for a potential 50-foot entry. The lot size is non-conforming to pursue a DADU, they would need more variances. This is more in line with a garden cottage use. It is under 600 sf and will be a total of 507 sf. The exterior design will be complimentary to the primary structure. There will be minimal impact on the landscaped yard. The existing driveway will not change. There will not be any windows on the right side. The proposed addition will break up the blank wall. The left side is more than 30 feet from the abutting property. This will not result in excessive noise. They did get zoning approval. The existing brick driveway and access to the backyard

would be blocked if the addition was shifted. They have a 25-foot setback from the cemetery. This is the simplest and least intrusive way to put on a small addition. They can't do a lot in this neighborhood without zoning relief. They are asking for a waiver because it is a good use for the property and the benefit outweighs the detriment.

Chairman Chellman questioned if they were putting in drainage. Ms. Whitney responded that right now water runs down the driveway and into the middle of the property now. They will add gutters and create a dry well to infiltrate water. Chairman Chellman clarified that the existing garage had no gutters. Ms. Whitney confirmed that was correct.

Mr. Mahanna commented that the abutter has made a lot of comments. Runoff ends up in the middle of the abutter's backyard. Ms. Whitney commented that it was not just the water from this property. Mr. Mahanna noted that this roof would add more water. Ms. Whitney responded that the additional water would be guttered and then it will go to a dry well. Mr. Mahanna commented that the ordinance says they cannot expand vertically or horizontally. Ms. Whitney responded that is why they are requesting a waiver from the Planning Board. Mr. Mahanna commented that they also needed adequate open space and off-street parking. This proposal is not adding parking. Ms. Whitney responded that the driveway could fit 4 parked cars if they are stacked. There is plenty of open space. It is a bigger backyard comparative to the neighborhood. Mr. Mahanna commented that the ordinance states that it will not significantly reduce the privacy of the adjacent property. Ms. Whitney responded that they did not think it would. There are no windows. The original proposal had a deck, but it was removed it so it would not be overlooking the abutter's property. They have made some concessions, but they are trying to make it functional. There was a question raised about why they can't go vertically. There is a steep pitched roof, but the attic only has 32 inches that is 6'8" in height. Mr. Mahanna questioned why they could not expand toward the main house. Ms. Whitney responded that the main accessway to the backyard is a narrow path between the two properties. It doesn't work. They know they don't have the support of the neighbors, but they have made concessions. A lot more confining variances have been granted in this neighborhood. This is a reasonable request in the context of the neighborhood. Mr. Mahanna commented that it was a hardship on the abutter. Ms. Whitney responded that they understood that.

PUBLIC HEARING

Linda McVey of 42 Hunting St. spoke in favor of the application. The neighborhood has a high number of aging families. They want to age in place. Ms. McVey faced a similar situation 2 years ago and applied to add on a 1 story addition to accommodate her ailing husband. They were grateful they could stay in their home. They felt supported by this committee and community. The Nerbonnes are asking to modify which will allow them to age in place. Granting this petition will demonstrate that this committee and community care for older citizens' needs.

John Rose of 14 Mechanic St. spoke in favor of the petition. Mr. Rose was supportive of the owners and the situation they were in. Mr. Rose did not see it as a hardship. They spent a lot of time and energy to make sure the house fit into the neighborhood. Changing the back wall will

fit more into the aesthetic. This did not change any privacy or cause any distractions for him. It is a good addition and on a personal level it's the right thing to do.

Sandra Dika of 333 Marcy St. commented that this was not the first time a garage has a change of use. It is common in this neighborhood for properties to have historic outbuildings. Many of these secondary buildings were built right on lot lines. The Nerbonnes renovated their property in 1989 and have lived there ever since. Many people in the audience know the contributions the Nerbonnes have made to the community through Friends of the South End and the Fairy House Tours. They need to make efficient use of their property and that's what ADU's do. Please grant the permit and allow them to age in place.

Nancy Eichner lives in New Castle and has worked with the Nerbonnes on the Seacoast Village Project, which advocates for people to age in place. Ms. Eichner is a professional care manager. She helped the Nerbonnes look at every way they could use their home to support changing mobility and cognitive needs and the caregivers required. The willingness of family to step in and live on site is critical. Temporary changes were made in the house, and it was very difficult for Mr. Nerbonne to adjust. Construction in the house is not possible for him to navigate. They looked at flexible ways to allow them to age in place. Ms. Eichner urged the Board to support this application.

Eric Mayer from DTC Lawyers represented the Butlers who live at 199 Gate St. which is the property immediately adjacent to the Nerbonnes and closest to the proposed garden cottage. The ordinance states that a garden cottage needs to go into an existing building. It cannot expand horizontally or vertically. They can have a 300-sf rear deck or a 50-sf entrance. The modification mechanism can modify specific dimensional standards. The ordinance exists to allow for the existing structure to be constructed and relaxes some standards when there is no new structure on the property. This is a 60% expansion. The modification should not be applied to an addition. It's for a specific dimensional standard. Their request is contrary to the mechanism of the ordinance. The proper course of action would be to file for a DADU not a garden cottage.

James Butler and Devon Quinn owners of 199 Gate St. spoke against the application. They bought their home in 2020 and liked the relative privacy and larger yard. They are also involved in the community and supportive of aging in place. They knew the Nerbonnes wanted to turn their garage into the apartment and were supportive of that. They didn't expect the plans to be different. They found out from the abutter's notice that the addition would be on the property line. It will impact the shade on their garden, and their privacy. This is too close to the property line. They have not been able collaborate to come up with a better solution. The Butlers want to support the Nerbonne's and this project. The previous owners of the Butler's house added on 15 years ago and were denied a variance from the ZBA because it was proposed to be within 5 feet of the setback. They moved it over a little to accommodate the setback. This proposal can be moved over some to accommodate the setbacks, or it can go in between the homes. Also, ADU's usually have a fence or trees for a privacy barrier. There is no barrier proposed here. They want to support the Nerbonnes but they opposed the location of this addition.

Carol Bird of 170 Mechanic St. spoke in support of the owners. Ms. Bird was not a direct abutter but has lived in the neighborhood for years. Portsmouth is working to accommodate seniors who want to age in place and are living on a fixed income. The Nerbonnes have designed a practical and functional addition. At the ZBA meeting last month, they made 3 modifications to their plans in hopes of making a compromise with the abutter. The Board should support this proposal.

Susan Lassen of 34 Blossom St. read a letter from Walter and Patricia Baunbum who live at 183 Gate St. They were in support of the CUP for a garden cottage with addition. The plans should be non-controversial. There is a rationale for converting and expanding the garage. This is what the community should encourage. It is harmonious with the surrounding architecture and neighborhood. The proposal is consistent with the dwelling on the lot and provides adequate open space and parking. It does not reduce privacy or result in excessive noise. Every effort should be made within reason to accommodate this family's effort to modify their home and age in place. The plans should be approved as submitted. Ms. Lassen also spoke in support of the owners as well. The Planning Board values community and they are all very grateful for that.

Lacy Bangs of 245 Marcy St. commented that they have lived in the neighborhood a long time and it was a neighborhood where they could depend on each other. Ms. Bangs applauded the plan as presented and hoped the Board would consider their proposal favorably.

Second round:

Eric Mayer from DTC Lawyer commented that their client's position was that they were not opposed to the use of the garage as a dwelling unit. They are opposed to the current proposal because it will adversely impact the use, enjoyment, and value of their property. They are open to alternatives. The proposal must satisfy the criteria to grant a CUP. The site plan must provide adequate open space for both structures. This lot is .12 acres and the Butler's is .1 acres. They do have a large backyard. However, just because other lots don't have as big of yards doesn't mean they should be deprived of theirs. They paid a premium to purchase the house for those attributes. As proposed, they are not providing adequate open space. The land slopes down 2 feet toward the Butler property. They have raised issues associated with drainage and it sounds like there has been accommodation for that. The Board should consider the drainage plan and ensure it is addressed prior to building permit. The second criteria is that the property must be compatible with the adjacent property. The design and location of this is 4 feet off the property line, which will tower over the Butler's backyard. The Butler's are open to alternatives, and they did try to reach out to the owners but have not been able to discuss any with them. The most obvious alternative is to limit the dwelling to the existing contours of the existing garage. It would not cause adverse impacts to the abutter. Another alternative would be to shift the addition over to comply with the setback. If the Board approves this, then they should include a condition to build a privacy fence between the properties. The Butler's do support the efforts but do not support this current plan.

Anne Whitney clarified that this was a 43% expansion of the garage not 60%. They have reached out to the abutters to make them aware of the addition. The addition from the edge of the porch is 9 feet under 120 sf impacted. This all comes down to where is the bigger hardship.

It is their position that the hardship to the abutter's backyard is not as great as the hardship to make it a livable space. They have looked at other options but the height of the garage vs. house makes it complicated. They need to keep access to the backyard.

Third time speakers

Pete Moren of 170 Mechanic St. commented that this was a reasonable request. There has to be a little give and take to accommodate the property and allow the owners to age in place. Mr. Moren was in full support.

Chairman Chellman asked if anyone was present from the public wishing to speak to, for, or against the petition. Seeing no one rise, the Chair closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

Mr. Hewitt requested clarification on the ordinance. The letter stated clearly, they cannot expand vertically or horizontally other than for an entry or rear deck. However, the next page gives cart blanch to modify any dimensional standard. Chairman Chellman responded that statement in the ordinance allows for this sort of modification. Ms. Zendt agreed with that interpretation. The modification section broadly refers to the garden cottage. It is interpreted to mean any of those listed standards were subject to Planning Board modification.

City Council Representative Moreau commented that Portsmouth has a lot of existing old structures. When they were creating the ordinance, they wanted to allow people to create an ADU out of an existing structure, and that is how they came up with the garden cottage criteria. They made the square footage smaller to prevent someone from putting in a new building. The modification section was intended to give the Board flexibility to modify something if it was reasonable.

Chairman Chellman commented that it was worth nothing that a deck and entryway expansion were allowed. The dimensional flexibility does apply to the vertical and horizontal dimensions.

City Council Representative Moreau commented that her biggest concern was keeping this under 600 sf. If it was going beyond that, then she would be against it. This is a reasonable request. If they want to live in harmony with neighbors, then they could move it over 1 or 2 feet and that would still fit in with the approval.

1) City Council Representative Moreau moved to find that the application meets the requirements set forth in Section 10.815.40 of the Zoning Ordinance and to grant the Conditional Use Permit, seconded by City Manager Conard with the following stipulations:

1.a) Any change, required as part of the Historic District and approval, that results in a change to the stipulations approved here or any change that is not substantially compliant with the

approved Conditional Use Permit, as determined by the Planning Director, shall be resubmitted to the Planning Board for review and approval.

1.b) A gutter system and drywell are installed to catch all drainage and runoff from the garage and garage addition.

1.c) A fence is constructed on the property line between 189 Gates St and 199 Gates street that is in accordance with the Zoning Regulations.

The motion passed by a 7-1 vote. Mr. Mahanna opposed.

2) City Council Representative Moreau moved to grant a modification to the requirements set forth in section 10.815.31 to allow for an expansion that includes a 152 SF addition, seconded by City Manager Conard.

The motion passed by a 7-1 vote. Mr. Mahanna opposed.

III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature.
If any person believes any member of the Board has a conflict of interest,
that issue should be raised at this point or it will be deemed waived.

A. The request of **Society for the Protection of NH Forests (Owner),** for property located at **400 Little Harbor Road** requesting a Wetland Conditional Use Permit under Section 10.1017 of the Zoning Ordinance for the installation of new public bathrooms resulting in 303 S.F. of permanent impacts for the building and 275 S.F. of temporary impact to the 100 ft wetland buffer area. Said property is located on Assessor Map 203 Lot 8 and lies within the Rural (R) District. (LU-22-31)

SPEAKING TO THE APPLICATION

Eric Weinrieb from Altus Engineering spoke to the application. The Society purchased the property in 2000. The Cottage was in disrepair and slated to be raised, but it was restored instead. They were permitted to build a new water line to service the building and improved the parking. They also put in a new septic for the Carriage House. The building was renovated in 2000 to be used for summer programs and other public use. Pre-Covid the property saw a lot of public use and now the grounds are used even more. There are no public restrooms on the site or anywhere else in that part of the City. The proposal is for a detached public facility that will tie into the septic. The building will be 81.7 feet away from the buffer that is already impacted form the abutting property. They are proposing a 16' by 26' building and there will be 413 sf in the buffer area. That includes the covered bench waiting area. The septic is designed to handle 300 gallons per day. The bathroom will have low flow flush and water for hand washing. There is capacity for 160 people per day. They are not anticipating that level of use. The building will have drip edges.

Mr. Mahanna questioned why they weren't using the existing foundation that was on site. Mr. Weinrieb responded that it was just rubble not a foundation. Mr. Mahanna questioned why they couldn't move it over 19 feet to be out of the buffer. Mr. Weinrieb responded that this location balances it on the existing building. It would be more expensive to move. They worked hard to compliment site. They are mitigating the placement with drip edges. Mr. Mahanna noted that there was an alternate location. Mr. Weinrieb responded that there were multiple locations on site, but they chose this location because of the proximity, balance with the building, and providing a public benefit.

Chairman Chellman questioned if the proposed building would have a foundation. Mr. Weinrieb confirmed it would. Chairman Chellman questioned if they had done test pits. Mr. Weinrieb responded that they had not. The base may be partially pinned. It may not be a full foundation. Chairman Chellman commented that shifting the building would put it closer to the exposed ledge and there may be more ledge underground. Mr. Weinrieb agreed. They also wanted to balance the peaks. If it was shifted, then it would look awkward on the approach. The Society wanted it adjacent to the existing building to tie in with the utilities more easily. Moving it further would require ledge removal and the project is more expensive than expected already.

Chairman Chellman questioned why it was near the existing building and not by itself. Mr. Weinrieb responded that that they wanted to provide closer access to the summer programs. Mr. Mahanna questioned why they could not put it in the big grass area. Mr. Weinrieb responded that they could not put it there because of a deed restriction.

Mr. Hewitt commented that it was a reasonable request to be in the buffer because of the ledge and aesthetics. This is a minimal impact and Mr. Hewitt noted that he would vote in favor. Mr. Hewitt questioned if the restrooms would be open year-round. Mr. Weinrieb responded that they would, but they would not be open 24/7. They will have a timer on doors to lock at dusk.

PUBLIC HEARING

Robert Najar of 10 Martine Cottage Rd. commented that The Society has be wonderful stewards of the area. This proposal is a definite public benefit that they have no obligation to provide. There has been an increase of pedestrian activity in the area, and there are no other public bathrooms. Mr. Najar is a steward for the Little Harbor Loop Trail, and he walks it at least every other day to pick up litter. It would be nice to see less tissues behind trees. A structure with permanent bathrooms is a better option than porta potties. Mr. Najar was in full support of the proposal.

Chairman Chellman asked if anyone was present from the public wishing to speak to, for, or against the petition. Seeing no one rise, the Chair closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

City Council Representative Moreau moved to find that the application satisfied the criteria set forth in Section 10.1017.50 of the Zoning Ordinance, seconded by Mr. Harris.

City Council Representative Moreau commented that she was glad this property has come back to life, and this would be a good addition.

Mr. Harris agreed it would be a good addition.

City Council Representative Moreau moved to grant the Wetland Conditional Use permit, seconded by Mr. Harris with the following stipulations:

2.a) Blueberry bushes or other native shrubs are planted along the buffer area near the wetland edge.
2.b) The property is maintained according to NOFA standards.

The motion passed unanimously.

B. The request of **ADL 325 Little Harbor Road Trust (Owner),** for property located at **325 Little Harbor Road** requesting Wetland Conditional Use Permit under Section 10.1017 of the Zoning Ordinance to replace the existing single family structure, carriage house, shed, barn, and paddock; construct a garage, pool, pool cabana playground; and renovate the existing barn and shed with all associated electric, gas, water, and sewer updates as required on private property and within the public right of way resulting in 195,656 S.F. of impact in the tidal buffer area and 17, 189 S.F. of temporary impact to in the tidal wetland area. Said property is shown on Assessor Map 205 Lot 2 and is located within the Rural (R) and Single Residence A (SRA) Districts. (LU-22-23)

SPEAKING TO THE APPLICATION

Corey Colwell from TF Moran, Matthew Cunningham and Josh Bourgery of Cunningham landscape design, and builder Jim Youngblood were present to speak to the application. Mr. Colwell commented that in January the Board granted permission for a DADU. The property is a 12.3 acre island with access via a paved drive from Little Harbor Rd. The drive is 2,100 feet in length. It has a 100-foot steel bridge. The easterly half of the island has dwellings, docks, and a tennis court. The western half is entirely forested. Any work on the island requires a CUP. The proposal is to remove the existing house and construct a new home in approximately the same location. The new home is slightly larger. The proposal also includes a pool house, pool, and one-story garage. The existing shed to the north will be replaced by a larger shed. The barn adjacent to the tennis court will undergo interior renovations and have two decks added on. Five years ago, they presented a similar plan to the Board. A CUP was granted for 154,000 sf of buffer impact. Additionally, in February of 2018, they got a wetland permit from DES and Shoreland Impact Permit for an additional 41,000 sf of impact to the protected shoreland. These State permits expire in 2023 and are still valid today. The CUP issued in 2018 has expired. Some work for the previously approved CUP was accomplished. They repaired the sea wall, installed the tennis court, and removed 3 accessory buildings. The remaining improvements

were delayed because the applicants chose a different style home and hired a new architecture firm. Also, their builder at that time passed away. The home design is now completed. It is a similar application. The only difference is a new home design and adding a 1,475-sf garage. This time they are removing the carriage house. The pool and pool house are smaller and in a different location. They are now renovating the historic cottage and adding 2 decks to horse barn. All the proposed work is taking place on previously developed upland soils. There will be 195,000 sf of total impact in the tidal buffer zone but 90,000 sf of that is adding plantings into the buffer. Mechanical equipment is necessary for planting, so they are counting it as impact. Post construction there will be more vegetation than exists today. Currently there is 8% impervious area in the 100-foot tidal buffer. Post construction it will be reduced to 7.5%. That is a net reduction of over 1,900 sf. There will be a 3.1% reduction of impervious over the entire island. The site has a 6% impervious area where zoning allows up to 25%. In addition to reducing the impervious they are also reducing the amount of lawn. Today there is 267,000 sf of grass and this proposal will have a 146,000-sf reduction. The natural woodland will be increased by 1.5 acres. The plan focuses on landscape improvement in the 100-foot tidal buffer. They are improving the island's utilities. It is currently heated with oil, connected to City water, and the septic is 20 feet away from the river. The proposed plan would bring in natural gas and geothermal for heat, put in a new water, and connect to City sewer along Little Harbor Rd. They will remove the septic system. They are improving the storm water management by reducing the impervious area, adding vegetation, and capturing and treating all roof runoff. It reduces the storm water flow to the river. The land management plan describes how they intend to eliminate or reduce the invasive plants on the island. The revised project was presented to the Conservation Commission in October and November of 2021. They also did a site walk with this Board and the Commission. In November the Commission provided a favorable recommendation. They were also asked to go to TAC because of the complexity of the utilities. TAC recommended approval in April. Running new utilities to the island will require resurfacing. The bridge to the island will also need to be replaced. They returned to the Conservation Commission to demonstrate the impacts for resurfacing the driveway and bridge replacement. The Commission provided an additional recommendation for approval. They have also gotten an AOT permit.

Mr. Cunningham commented they created a plan that had environmentally considerate landscaping. Overall, the master plan vision was to transform a relatively lifeless area into a vibrant new landscape with large areas of native plants. It will improve water quality and prevent erosion. They coordinated the landscape plan to address invasive species removal. The goal is to preserve the existing tree canopy. The project involves the removal of a total of 13 trees and replacing them with 101 new trees. They will be converting vast areas of lawn into shrub and perennial beds. 90% of the plants are native or indigenous. They will be converting lawn areas to drought resistant clover fescue blends. The new landscaping will restore vibrant seasonal colonies. The clients desire to be good stewards of the property.

Mr. Colwell commented that there will be more vegetation in the buffer and reduction in impervious less lawn. Mr. Colwell reviewed the wetland CUP criteria. 1. The first is that the land is reasonably suited to the use, activity or alteration. Mr. Colwell commented that the property is zoned for single family use and that it is reasonably suited to the

island. All alternatives are in the previously disturbed uplands. The western half will not be touched other than for invasive plant management. Other possible uses for the open space could be a PUD or other less preferable uses with a larger footprint. The homeowners will be stewards of the land and want to maintain it for future generations. The provided landscaping is beyond zoning requirements. There will be a land management plan for invasive species removal and the landscaping will provide habitat. The second is that there is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration. Mr. Colwell commented that the alternate locations for development have been considered in previous years. They did the layout primarily outside of the buffer on the west side. That limited the buffer impact, but it required removal of the vegetate area. The Conservation Commission preferred that they maintain more woods on the west and locate the development in the previously disturbed area. The third is that there will be no adverse impact on the wetland functional values of the site or surrounding properties. Mr. Colwell commented that most of the impacted areas will be converting pavement to lawn and open space drought tolerant meadows. There are no permanent wetland impacts. The only tidal wetland impacts are associated with the replacement of the bridge. There is a reduction in impervious and an increase in infiltration. There is no adverse impact to the surrounding wetland. The fourth is that the alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals. Mr. Colwell commented that most of the disturbance to the natural vegetated state is to the lawn areas and much of it is to add vegetation to enhance the buffer. Post construction there will be more vegetation in the buffer. The fifth is that the proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this Section. Mr. Colwell commented that they were significantly reducing the impervious surface and increasing the vegetation. They are managing the invasives and implementing a storm water management. They are also removing the septic. The quality of the storm water going to the river will be improved and the quantity will be reduced. The sixth is that any area within the vegetated buffer strip will be returned to a natural state to the extent feasible. Mr. Colwell commented that the areas on the western half of the island is all vegetated up to the wetland. The eastern half will have increased vegetation in the buffer. A significant portion of the buffer will be restored to natural vegetation. The vegetation will provide better nutrients, shoreline stabilization, and habitat. They will increase the integrity of the tidal resource.

Mr. Hewitt commented that the plan showed 9 structures that encroached on the 100-foot buffer, and he wanted to review those. They include a 1475 sf 4 car garage, a 2,000-sf parking area, then a 384-sf shed, a 900-sf playground, a 660-sf cottage. Mr. Colwell noted that the cottage existed today. Mr. Hewitt commented that there was an 800-sf spa, and a 35 by 60 barn. Mr. Colwell commented that the barn existed today as well. Mr. Hewitt commented that the last was the 6,220 sf home. Mr. Hewitt questioned if they were ever asked to look at these encroachments individually with the 6 criteria. Mr. Colwell responded that they were not. They looked at them collectively. The new buildings are going in the lawn are of the buffer. It's on previously developed upland soils. There will not be any vegetation removal proposed for these buildings. They looked at the site from the standpoint of there are more structures on it today

than there will be post construction. They already removed 3 structures a few years ago. It is a net reduction.

City Council Representative Moreau commented that she appreciated all the hard work on the invasive species removal and the maintenance around that. City Council Representative Moreau questioned how they could ensure that maintenance continues. There could be some sort of self-imposed restriction for forest land maintenance. Mr. Bourgery responded that they were planning to remove the invasives over a 3-year period. Then they would reevaluate the management plan to determine if it was successful or if they need to extend it. City Council Representative Moreau questioned what they could do to legally require all future owners to maintain the land to that level of care. Mr. Colwell responded that they were not opposed to providing the City with an environmental report. City Council Representative commented that they can work something with the Planning and Legal Department to ensure there is a long-term care. Mr. Colwell responded that the previous owner did a subdivision plan that is no longer valid, but one of the conditions was to submit a monitoring report on the bridge every 5 years. They just learned the bridge needs to be replaced. They could submit a report every 5 years on the invasive species.

Mr. Harris commented that a condition of the CUP is that new buildings in the buffer has to meet the 6 criteria. Mr. Harris was not sure some of the new buildings met that. Mr. Colwell commented that he was not aware of anywhere that said they cannot have structure in the buffer. The ordinance says there can be provided they get a permit from the Planning Board. Chairman Chellman commented that the ordinance was a bad fit for what they are trying to do. If this was a setback issue, they could go to the ZBA. Chairman Chellman did support the application. Mr. Colwell commented that nothing stuck out that said they could not do that without a CUP. The CUP is the mechanism for expanding the house footprint. Chairman Chellman noted that a single-family home was a permitted use in the buffer. Mr. Colwell commented that 5 years ago they proposed a house with an expansion that was more than 25%. The permit was issued in 2018 and this has been thoroughly reviewed by the Planning Department and other boards. There was no indication that a variance was required for that. Chairman Chellman questioned why they didn't shift the garage out of the buffer. Mr. Colwell responded that there were 4-5 locations it could go. They chose an to put it in an open lawn area. They located all the major trees on the island. If they moved the garage south, then it would impact large spruce trees on the property.

PUBLIC HEARING

Lisa Oaks of 315 Little Harbor Rd. commented that the sea wall looked amazing. Ms. Oaks questioned if the new bridge would be aesthetically pleasing and if the utilities would be run under the bridge or through the mud flats. Ms. Oaks questioned what the carriage house would be replaced with. Ms. Oaks questioned what the horse barn would be used for. Little Harbor Rd. just got repaved and Ms. Oaks questioned if the applicants would be repaving it again after connecting the sewer.

Second time:

Corey Colwell commented that the bridge will be replaced with a timber bridge. It will be more aesthetically pleasing. It will be constructed off site. That is the last part of project. There will be 3 years of construction before the bridge is replaced. The carriage house will be replaced with landscaping or a clover meadow. The horse barn will be primarily used for storage. It will have an office and kitchen. They cannot use it as a guest house. When they were approved for a DADU they agreed there would not be any other units on the property. They will repave Little Harbor Rd. after the sewer is installed, and the utilities will be hidden under bridge.

Chairman Chellman asked if anyone was present from the public wishing to speak to, for, or against the petition. Seeing no one rise, the Chair closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

City Council Representative Moreau moved to find that the application satisfied the criteria set forth in Section 10.1017.50 of the Zoning Ordinance, seconded by City Manager Conard.

City Council Representative Moreau commented that she was on the Board when the first approvals were granted. There was a lot of discussion about this being a unique property. All in all, this plan is improving the water flow and sea wall vegetation. The improvements will be a positive. It's a good project.

Mr. Hewitt commented that he would not be supporting the motion. A lot of good things are happening here, and Mr. Hewitt noted that it may be that he has not been on the Board long enough to appreciate those efforts. Mr. Hewitt was not convinced that this project had minimum impacts to the shoreline buffer. It would have been good to have seen the individual buildings evaluated that way.

The motion passed by a 6-2 vote. Mr. Hewitt and Mr. Harris opposed.

Mr. Pezzullo questioned if the bridge inspection condition from the previous approval still applied. City Council Representative Moreau responded that they could ensure that was included in the stipulations.

City Council Representative Moreau moved to grant the Wetland Conditional Use Permit, seconded by City Manager Conard with the following stipulations:

2.a) For each review identified and provided for in the Land Management Plan, an update and report of findings will also be provided to the Planning Board.

2.b) There will be an inspection and report submitted to the Planning Board on the bridge status and safety every 5 years.

The motion passed by a 7-1 vote. Mr. Hewitt opposed.

C. The request of **Sharolyn McDermith (Owner),** for property located at **1054 Banfield Road** requesting Wetland Conditional Use Permit under Section 10.1017 of the Zoning Ordinance to increase the amount of building in the buffer by 270 S.F. for the breezeway and 72 S.F. for the garage for a total building in size increase of 342 S.F. Said property is located on Assessor Map 283 Lot 38 and lies within the Single Residence A (SRA) District. (LU-22-5)

SPEAKING TO THE APPLICATION

Contractor Mark White spoke to the application. The owner is asking for a CUP to increase the size of the breezeway and the garage. Both are in the 100-foot buffer. The existing breezeway is 15' by 10.6'. There is an existing front and rear deck. The proposal is to expand the breezeway to 15' by 28.6'. It would be the same width of the house. The garage is currently 1 bay and 18' by 20.6'. The proposal is to increase the size to add one by making it 28' by 32'. The new addition will utilize the existing asphalt near the garage. The impervious will remain 55 feet from the buffer. 25 feet of that is lawn then it is a natural buffer of trees and plants. The mowed grass area is closer to Banfield Road and the small brook and culvert. They will transform that back to a more natural state. They will not mow it and plant blueberry bushes. They are proposing to install gutters and a dry well in the low section of the lawn. It will have a 1,000-gallon holding capacity and then disperse into the ground.

Mr. Hewitt commented that the blueberry bushes on the plan appear to be off of this property. Mr. White responded that the line of blueberries will be on the owner's property. The City owns the property next door. Chairman Chellman commented that the plan did show them on the other side of the property line. Mr. White responded that the previous owners mowed that area. They will stop mowing that and will add blueberry bushes.

Chairman Chellman questioned if they determined the buffer based on GIS map from the City. Mr. White confirmed that was correct.

PUBLIC HEARING

Chairman Chellman asked if anyone was present from the public wishing to speak to, for, or against the petition. Seeing no one rise, the Chair closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

City Council Representative Moreau moved to find the application satisfied the criteria set forth in Section 10.1017.50 of the Zoning Ordinance, seconded by Mr. Harris.

City Council Representative Moreau commented that this was a small change, and they were doing a lot to improve the wetlands.

The motion passed unanimously.

Mr. Pezzullo requested that they include the detail for the dry well.

City Council Representative Moreau moved to grant the Wetland Conditional Use permit, seconded by Mr. Hewitt with following stipulations:

2.a) The applicant will add new plantings along the fence closest to the wetland in addition

to those shown at the front of the property.
2.b) The applicant will install appropriate erosion control measures during construction.

2.c) The applicant will follow NOFA standards for Lawn care in the wetland buffer.

2.d) The applicant will provide a plantings plan showing the spacing, type, and location of the new plantings for review by Staff.

2.e) The applicant will show the construction detail of the drywell on the plans for review by staff.

The motion passed unanimously.

D. The request of **Charles Dudas (Owner),** for property located at **32 Monteith Street** requesting a Conditional Use Permit under Section 10.814 of the Zoning Ordinance for the construction of an Attached Accessory Dwelling Unit totaling 576 S.F. in gross floor area. Said property is located on Assessor Map 143 Lot 22 and lies within the General Residence A (GRA) district. (LU-22-44)

SPEAKING TO THE APPLICATION

Chuck Dudas spoke to the application. The project may look familiar. They applied for a wetlands CUP in May 2020 to do improvements on their primary dwelling. They tore down the old garage and existing shed. They added a 2-story addition and new garage further away from the wetlands. This proposal is to build an ADU on the second story of the proposed garage. The only change in the site plan since the wetland permit is that they went to the ZBA and asked for an additional 2 feet for the garage. That was granted this week. The ADU is being driven by economics. The addition is quite expensive. This proposal would provide housing and financial relief. It meets the requirements for the ADU. It will be a 576 sf one bedroom unit that will be accessed through a connecting breezeway. The ADU is setback from the property line. The aesthetics match the house. It fits with the character of the neighborhood and house. Mr. Dudas and his family will live in the principle dwelling unit. The driveway can park 4 cars and 2 cars can fit in the garage. Any occupant will be parking in the driveway. The abutter had no issues with the proposal. There should not be any excessive noise.

Mr. Hewitt questioned if the ZBA granted their request. Mr. Dudas confirmed that they did. Mr. Hewitt commented that hopefully this ADU would help with housing supply and questioned if

they anticipated that rent would be between $2,500 - $3,000. Mr. Dudas responded that it would probably be something in that range. Having the right tenant will be as important as what they get in rent.

PUBLIC HEARING

Chairman Chellman asked if anyone was present from the public wishing to speak to, for, or against the petition. Seeing no one rise, the Chair closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

Mr. Mahanna noted that they already had a CUP and questioned how they should proceed with a motion.

Ms. Zendt clarified that this application was for a new CUP. The other active CUP was for wetland impact, and this is for the ADU.

Mr. Mahanna questioned if they were moving two feet toward the wetland. City Council Representative Moreau responded that it was moving away from the wetland toward the setback.

City Council Representative Moreau moved to find that the application meets the requirements set forth in Section 10.814 of the Zoning Ordinance and to grant the Conditional Use Permit as presented, seconded by Mr. Mahanna.

The motion passed unanimously.

City Council Representative Moreau moved to grant a modification to the requirements as set forth in section 10.814.60 to allow for an expansion that includes a 576 SF addition, seconded by City Manager Conard.

The motion passed unanimously.

IV. DESIGN REVIEW APPLICATION – PUBLIC HEARING

A. The request of **One Market Square LLC (Owner),** for the property located at **1 Congress Street** requesting Design Review approval to partially demolish existing buildings and construct a new 3 story structure with a short 4th story. Said property is shown on Assessor Map 117 Lot 14 and lies within Character District 4 (CD-4), Character District 5 (CD-5) and the Historic District. (LUPD-22-6)

SPEAKING TO THE APPLICATION

John Chagnon, Mark McNabb, Terrence Parker, FX Bruton, Tracy Kozak, and Marie Brodie spoke to the presentation. Mr. Chagnon commented that they would be demolishing the

structures that were added on over time in the back. The proposal is for a 3-story building with a short 4th. The parking area will be lowered to below grade with a car elevator. The proposed building is meeting the zoning requirements as much as possible. The building is partially in the CD-4 and CD-5 zones. Two lots were combined to make the development parcel. They will be adding to the Congress St. buildings up to Haven Court. There will be a 10-foot alley at the back of the building. They did a concept meeting a month ago and talked about opportunities to energize the streetscapes and turning Haven Court into a pedestrian friendly alley out to Fleet St. At the concept meeting there was negative feedback about the garage connector so that was eliminated from the proposal. There will be restaurant on the first floor. Then an office/retail use or a boutique hotel above.

Mr. Parker commented that his work was to animate the Haven Court area. They are working with the City to advance the pedestrian corridor. Part of animating space is picking up the 1980s iron and glass theme. There is a 14-foot grade difference from Fleet St. to Market St. They are proposing stairs and working on stretching out a labyrinth with a theme of mindfulness. The corridor will be filled with lighting and incorporate the themes form the surrounding buildings. There will be glass, prisms, and iron. They will make it a lively pedestrian area.

Tracy Kozak commented that the building would be 3 stories with a short 4th. There will be commercial on the ground floor with offices above. The idea is to transition from the old architecture on the corner of Congress St. to more contemporary architecture on the other side. They are playing off materials found on the front of Congress St.

Mr. Mahanna questioned if Haven Court was a City St. Mr. Bruton responded that they were still discussing that issue and how it relates to the project. There has not been a final resolution yet. Research suggests it is not a City street and the City is working to verify if that is true. Mr. Mahanna questioned how they would use it if it was a City street. Mr. Bruton responded that they think it is a private way and there is a lot of research behind that. Either way they will work with the City. Mr. Mahanna commented that there were dumpsters back there. Mr. Bruton responded that those were the abutter's dumpsters. They have had a discussion with them on how to address that. Mr. Mahanna questioned if the entrance to the car elevator would be there. Mr. Bruton responded that it would not be on Haven Court. It is a fairly limited area. They are working with the City and abutter on this area, but nothing is formalized yet.

Mr. Chagnon commented that the garage entrance was on the corner. Mr. Mahanna commented that it did not look like a large vehicle could get in there. Mr. Chagnon responded that all passenger vehicles could do it. They can move the angle if needed. Whether or not the road is public or private, they still want to invest in that. Mr. Mahanna commented that it doesn't currently connect to Fleet St. Mr. Chagnon responded that it did. There is a corridor, but it is interrupted by jersey barriers. The idea is to reconnect that. They are working with the abutter on providing access to a chute for trash in the basement of the building. That arrangement has not been formalized yet.

Chairman Chellman commented that this was an exciting application with a lot of interesting things going on. There are a lot of moving parts had it may be helpful to have a few workshop sessions to talk through things. Mr. Chagnon responded that they have talked to City Staff and

tried to separate the design on the site and the public improvements beyond the site. The thought from the Planning Department is that they should have a stake holders' group and start some discussion in that regard. The Board can be involved in that. It's a collaborative design. Chairman Chellman commented that it would be helpful to have a less stilted conversation with interactive questions and answers. Mr. Mahanna commented that it would be helpful to have a work session too.

City Council Representative Moreau commented that there is a 3-story historic building on High St., and it would be good to have the new building set back a little. That would prevent this one from getting lost. Ms. Kozak responded that they set the building back about 6-7 feet. People will be able to see the coins from the building on the corner. City Council Representative Moreau questioned if there was a connection between the two buildings. Ms. Kozak confirmed that there was, and it was set back 25 feet.

City Manager Conard questioned what obligation the applicant had in providing ADA access through the open walkway and does that change depending on who owned that area. Mr. McNabb responded that they were not providing ADA access in that area. The grade change is 14 feet. They would need to build a couple hundred-foot-long ramp, and that is not feasible. Chairman Chellman questioned if there was ledge in that area. Mr. McNabb responded that they think there is some ledge. However, they cannot change the grade because it would change the entire entry system on abutting buildings.

Mr. Hewitt commented that he thought the design was aesthetically pleasing overall, but he was still trying to understand the process of adding the prism. Ms. Kozak responded that the prism serves as a wayfinding device to help pull people down the alley to Fleet St. It would serve as a memorable landmark to help people know where they are. It would be reflecting some architecture in the glass. It was modeled after the shape of the steeple. It is also playing off the angular architecture that is seen on Congress St. Mr. Hewitt questioned if it was custom designed for this corner. Ms. Kozak confirmed that was correct.

Mr. DiRienzo commented that he liked the idea of connecting Fleet St. and Haven Court but was concerned about the garage entrance and pedestrians sharing space. Mr. DiRienzo questioned how much parking would be under the structure. Mr. McNabb responded that the car elevator would bring cars to the lower level, which would have 25 spaces. The spaces will not be for the public. They are private spaces for the occupants of the building or valet. The 25 cars are negligible over the period of the day because it is the same set user. They are proposing to drop the curbs like at the Music Hall, so it is not as awkward. The area is not friendly to pedestrians now with the curbs. They are also in favor and recommending closing that entrance to High Hanover Garage. Most garages don't have 3 entrances. Ultimately it is up to the City but they are in discussion about it. The glass prism has received HDC feedback. It will be reduced in size and incorporated more into the building.

Chairman Chellman commented that the ordinance supported enhancing the historical components of the City. The prism would be better if it was completely inside the building. Ms. Kozak responded that it was reduced in scale and size. They had previously talked about it being a linear feature. Now it will have some program. The windows are essentially a bay window

and those over town. This arrangement references to the dormers on Congress St. They will be removing the old fire escapes on the building on the side on High St. They had their place in history, so these windows will cast shadow of thin lines across the façade like the escapes do now. Chairman Chellman questioned why they weren't just bay windows. Ms. Kozak responded that they were half a hexagon. They already have 90-degree shapes and will form them in the building. Mr. McNabb commented that another point in the ordinance encouraged contemporary design. The building at 60 Penhallow St. has heavy timbers and serpentine bands. Sometimes it is appropriate to do something a little more modern. It gives significance to the old historic building and allows for modern architecture. There is a difference between fake historic and real historic.

PUBLIC HEARING

Elizabeth Bratter of 159 McDonough St. commented on the idea of the dumpster situation. Ms. Bratter commented that there was a small restaurant in one of her buildings and that dumpster is emptied 2 times a week. They are planning to put a restaurant on the first floor. There will be a lot of trash and it may be unreasonable. Someone will have to bring a small container from the basement out to the road. They will be overrun with trash cans on pick up day. The prism and lights go against the dark sky compliance. The goal should be to be create less light and it should be pointing to the ground. Ms. Bratter had issues with the stairs because it was supposed to be a public access. They can remove the jersey barriers and people can walk through there now.

Second time speakers:

Elizabeth Bratter of 159 McDonough St. commented that the building used to be a National Hotel, which has long burned down. There are original windows and storefront from the original bus building. It almost looks the same today. The rest of the buildings on Congress St. are two stories. This stands higher than the 4-story building on High St. Those lower buildings on Congress will have this building behind it. The current heights on High St. and Haven Court are 2-3 stories. This property has a 4th story on top. The building is maxed out on the allowed massing and will be out of place with the core of Portsmouth. Almost everything in downtown Portsmouth looks like an original structure. This building is completely out of character and is more intense massing. The site plan review is about size, inter relationships, and impacts on the surrounding areas. The modern garage door style windows and hologram light will distract from the charm of downtown Portsmouth. They should reconsider the rear of the building.

Chairman Chellman asked if anyone was present from the public wishing to speak to, for, or against the petition. Seeing no one rise, the Chair closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

City Council Representative Moreau moved to find design review process complete, seconded by City Manager Conard.

City Council Representative Moreau commented that they have looked at it a lot. The point of this phase is to give feedback on what the Board wants to see down the road. They have done two sessions of that. The Board has given them feedback, and this is complete.

Chairman Chellman commented that the idea of a site walk came up. City Council Representative Moreau commented that they may want a more detailed plan to know what they are looking at before going to a site walk. Ms. Zendt commented that the design review does not encompass architecture elements like design facades, roof lines, and windows. They focus on the site plan, open spaces, and parking. The Board has some offered feedback. If there are additional things that fall under this review that the Board feels like they need to delve into more deeply, then they can keep this open. If the Board chooses to do that, then it would be beneficial to talk about where there were still questions related to those topics. They can schedule a site walk now or closer to the application. Mr. Mahanna commented that things could change depending on who owns the abutting land. City Council Representative Moreau commented that the HDC can impact the design as well.

Chairman Chellman commented that the Tilton case got into the idea of aesthetics for a site plan review. That is part of the Board's purview. They can look beyond just massing. It is up to the Board to advance this or keep it open.

The motion passed unanimously.

V. PRELIMINARY CONCEPTUAL CONSULTATION

A. The request of **EightKPH LLC (Owner**), for property located at **161 Deer Street** *to be known as* **88 Maplewood Avenue** requesting Preliminary Conceptual Consultation for the demolition of the existing one story commercial building and the construction of a four story building with a pent house. Said property is shown on Assessor Map Lot and lies within the Character District 5 (CD5). (LUPD-22-7)

SPEAKING TO THE APPLICATION

Thomas Hamilton Balon Jr. commented that this was currently on the tax roll for 161 Deer St. referred to as lot 5. The change of address is to differentiate from the past project. They are also moving the lobby to the corner. They look forward to moving this long-delayed project forward. John Chagnon, Carla Goodnight, and Terrence Parker were present to speak to the presentation.

Mr. Chagnon commented that the 2016 subdivision plan created this lot. This project is for a building on the north side lot 5. There is an easement from the railroad with a restrictive covenant. The railroad cannot build within the 10-foot strip. The plan is to demolish the existing building along with all the pavement and construct a 3-story building with a penthouse 4th story. The first floor will be commercial, and the upper floors will contain 19 res units. The expanded sidewalks will be redone in brick with landscaping strips. They protected the parking spaces along Deer St. There will be 30 stacked parking spaces and some parking that doesn't

stack as well. Water and sewer will connect on Maplewood Ave. They are adding a grease trap and electrical service on the back. They are following the street grade as it exists now and are going to the HDC for the first time on May 4, 2022. The height ordinance allows for 2-4 stories and a penthouse. The basement parking level will be set at an elevation that will avoid the water table. That will set the tone for the rest of the building height. They are proposing 10.8' floor to floor. The ordinance allows for a 12' first floor and 10' for the upper floors. It allows for a 52' height building with the penthouse. They are proposing a 58' building, which will require relief. The 10.8' allows for more efficiency for the utilities. There is another height conformance for the grade plain. They will be asking for height relief there as well. This is a sloping site. The garage is at elevation 8 because of the water table. They are dropping the corner of the building at the intersection. They will be seeking relief for height above the sidewalk grade. The ordinance has standards on door spacing every 50 feet. That fits well with small tenant uses. In order to get to the floor elevation, they are creating some raised walkways to meet ADA requirements. They will be asking for relief on the door spacing to accommodate that. They will be asking for some setback relief. They may need relief for the front lot build out. First floor parking is not required. The 19 units would require 29 spaces with visitor. They are providing 30.

Ms. Goodnight commented that there was not a lot to discuss in way of architecture this evening. The property located on the corner of Deer St. and Maplewood Ave. has a rich history and was greatly influenced by the rail corridor. The property currently has an HDC approval in place. It supports a 5-story building set back 5 feet from the railway that contained 55 units. They are using historical inspiration and working with the Commission to develop a 4-story building with a stepped back penthouse that contains 19 units.

Mr. Parker commented that they were highlighting the space in green with the exception of the back corridor along the railroad. There is an opportunity to create scaled planting on the northwest corner coming down Maplewood Ave. They may put in a fence around the transformers then plant materials that border the property line. They can plant trees around the property or cluster them in the wide bump outs. There is an opportunity to put in a mural on the southwest corner façade. There will be more attention to detail in the front of the lobby.

City Council Representative Moreau questioned if they already had easement access rights over lot 4. Mr. Chagnon confirmed that they did. The property owner also owns lot 4. City Council Representative Moreau questioned if the transformer could go somewhere else. Mr. Chagnon responded that it could not. They will do their best to hide it. City Council Representative Moreau questioned if the 19 units would be for sale or rent. Mr. Balon responded that the 19 units would initially be for lease depending on interest rates, but they are designed to be condo converted. City Council Representative Moreau questioned if there would be any workforce housing. Mr. Balon responded that there would not be any.

Chairman Chellman questioned if the water table was driving a lot of this design. Mr. Chagnon responded that the current drainage system was at capacity. They can't pump water into it and wanted to be above it.

Mr. Hewitt commented that the plans say they are allowed 35 feet and they hope to go to 58 feet. Mr. Chagnon responded that the ordinance allows for 50 feet or 52 feet with a penthouse. They are seeking relief for 58 feet. Mr. Hewitt questioned if the 6-foot difference was partially because of the water table issue. Mr. Chagnon responded that they measured from the average grade plain and have a sloping site. It is partially because they are requesting 10.8' floor to floor. Mr. Hewitt commented that they had plenty of parking compared to what was require. There are only 19 units only but 52 parking spaces. Mr. Hewitt questioned why they were providing so much parking. Mr. Chagnon responded that there was always a need. They don't have to provide parking for the first floor but it's there. They want to have adequate parking for the building. The ordinance does have a maximum allowed for parking, so they may need a waiver. The parking will be covered by the building anyway. Mr. Hewitt commented that the future tenants may desire more than 1.3 spaces. It is likely that they will want 2 spaces per unit. Mr. Hewitt commented that the previous approval had 5 workforce housing units and questioned if any future approvals were contingent on that. City Council Representative Moreau commented that the previous approval got an extra floor by providing workforce housing. Mr. Hewitt questioned if the previous approval was null and void. Mr. Balon responded they got an extra height incentive. This building had 19 units with 30 head in parking spaces, and 22 tandems. 19 of the tandems would be for residential parking and 3 tandems would be for commercial.

Chairman Chellman closed the Preliminary Conceptual Consultation.

VI. DESIGN REVIEW APPLICATION ACCEPTANCE

A. The request of **EightKPH LLC (Owner**), for property located at **161 Deer Street** *to be known as* **88 Maplewood Avenue** requesting Preliminary Conceptual Consultation for the demolition of the existing one story commercial building and the construction of a four story building with a pent house. Said property is shown on Assessor Map Lot and lies within the Character District 5 (CD5)**.** (LUPD-22-7)

DISCUSSION AND DECISION OF THE BOARD

City Manager Conard moved to find that the Design Review application was complete and to schedule the Public Hearing to take place at the May 19, 2022, Planning Board meeting, seconded by City Council Representative Moreau. The motion passed unanimously.

VII. OTHER BUSINESS

A. Review and discuss presentation on Land Use Committee Existing Conditions and Strategy Report and Regulatory Amendment Work Plan

Ms. Zendt suggested that the presentation tonight would be to kick this off. Mr. Cracknell could briefly discuss the amendments and do a full presentation at the May 5, 2022, work session.

Mr. Cracknell summarized what they were trying to accomplish in phase 1. There will be a lot of code clean up, administrative updates, and a couple minor changes to the code. They will address the building height requirements, standards for the character districts, and a few broad-based updates. The goals are to provide consistency and translate their interpretation of the vision plan into the code. They will fix some mistakes around code that was adopted that has not been working and needs revision. They will also make clarifications in respect to the building height. Right now, people put fill around the first floor and it becomes the basement. That increases the height. It is out of compliance of the vision plan but in compliance of the code. They are trying to make changes for the building height map to provide consistency and add in new streets. They will also clarify the corner lots height standards. They need to clean up the language to clarify how they preserve the street edge. They are proposing to add development standards to the civic districts. Currently they don't have any. They will also change the height measurement from finished grade to existing grade. That needs to be clear in the code. Ms. Zendt commented that they could discuss the amendments in the work session and then move it along for public hearing at the regular May meeting.

Chairman Chellman congratulated Mr. Pezzullo on his retirement.

IX. ADJOURNMENT

Mr. Pezzullo moved to adjourn the meeting at 11:24 p.m., seconded by City Manager Conard. The motion passed unanimously.

Respectfully submitted,

Becky Frey,
Secretary for the Planning Board

ALTUS ENGINEERING, INC.

Civil
Site Planning
Environmental
Engineering

133 Court Street
Portsmouth, NH
03801-4413

May 23, 2022

Beverly Zendt, Planning Director
Planning Department, City of Portsmouth
1 Junkins Avenue
Porsmouth, NH 03801

Re: Application for Planning Board Approval
445 Marcy Street, LLC
Tax Map 101, Lot 03
445 Marcy Street
P5217

Dear Ms. Zendt:

On behalf of Gail and James Sanders and 445 Marcy Street, LLC, Altus Engineering, Inc. (Altus) is pleased to submit a subdivision application to the Portsmouth Planning Board. This project received Technical Advisory Committee (TAC) approval on May 3, 2022.

The parcel is 14,947 SF in area and has frontage on three streets. There are no wetlands on the property. A portion of the property lies within the 100-year flood zone and is within 250-feet of the highest observable tide line which will require a Shoreland Permit from NHDES. The Sanders' intend to construct their new home on Lot 2. As such, we know the development scenario for the lot and have included it with the Subdivision Application.

The following items were addressed as part of TAC approval:

1. Applicant will cut into 8" City sewer in Pray Street and install a wye and use gasketed solid couplings on either side of the wye. **Altus: Revised Sheet C-2 indicating "Install 4" PVC sewer service, connection to municipal system w/wye connection & solid gasketed couplings.**
2. Applicant will use a larger pipe for both inserta-tee and sewer connection to culvert than the proposed 8" pipe. **Altus: The wall underdrain to the 8" culvert will be a wye connection.**
3. 1' water service will be used for property. **Altus: Water service size corrected.**
4. Applicant will coordinate with City DPW, Eversource, Consolidated Communications, and Comcast and report back on the implications of undergrounding wires as shown. Additional guying or other work may be necessary and not possible/feasible. **Altus: Altus met with Dave Defosses and Eversource to determine the location of the new pole to correct the alignment. Underground installation is not feasible along Pray Street.**
5. Driveway for Lot 1 will be at least 30 feet from the intersection of Pray Street and Marcy Street. **Altus: Note added to subdivision plan.**
6. A note on the plan will be added to articulate Lot 1 has drainage rights across Lot 2. **Altus: Note added to subdivision plan.**

7. Address for Lot 2 will correspond to Partridge Street until such time when a second driveway is provided on Pray Street. **Altus: Note added to Site Plan.**

We look forward to presenting this application at the June 16, 2022 Planning Board meeting. Please feel free to contact me directly if you have any questions or require any additional supporting documentation.

Sincerely,

Eric D. Weinrieb, P.E.
President

5217 Cover.ltr.docx

Enclosure

ecopy: Gail and Jim Sanders
Tracy Kozak, Arcove
Jim Verra, James Verra and Associates, Inc.

City of Portsmouth, New Hampshire

Subdivision Application Checklist

This subdivision application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all subdivision review requirements. Please refer to the Subdivision review regulations for full details.

Applicant Responsibilities (Section III.C): Applicable fees are due upon application submittal along with required number of copies of the Preliminary or final plat and supporting documents and studies. Please consult with Planning staff for submittal requirements.

Owner: 445 Marcy Street, LLC Date Submitted: 4/19/22

Applicant: 445 Marcy Street, LLC

Phone Number: 603-498-2636 E-mail: jim@sanderslobster.com

Site Address 1: 445 Marcy Street Map: 101 Lot: 3

Site Address 2: _____ Map: _____ Lot: 3

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
✔	Completed Application form. **(III.C.2-3)**	on line	N/A
✔	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF) on compact disc, DVD or flash drive. **(III.C.4)**	submitted on line	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✔	Name and address of record owner, any option holders, descriptive name of subdivision, engineer and/or surveyor or name of person who prepared the plat. **(Section IV.1/V.1)**	Title block	☑ Preliminary Plat ☑ Final Plat	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✔	**Preliminary Plat** Names and addresses of all adjoining property owners. **(Section IV.2)** **Final Plat** Names and addresses of all abutting property owners, locations of buildings within one hundred (100) feet of the parcel, and any new house numbers within the subdivision. **(Section V.2)**	Existing Conditions, Subdivision Plan, & Site Plan	☑ Preliminary Plat ☑ Final Plat	N/A
✔	North point, date, and bar scale. **(Section IV.3/V3)**	Required on all Plan Sheets	☑ Preliminary Plat ☑ Final Plat	N/A
✔	Zoning classification and minimum yard dimensions required. **(Section IV.4/V.4)**	Existing Conditions, Subdivision Plan, & Site Plan	☑ Preliminary Plat ☑ Final Plat	N/A
✔	**Preliminary Plat** Scale (not to be smaller than one hundred (100) feet = 1 inch) and location map (at a scale of 1" = 1000'). **(Section IV.5)** **Final Plat** Scale (not to be smaller than 1"=100'), Location map (at a scale of 1"=1,000') showing the property being subdivided and its relation to the surrounding area within a radius of 2,000 feet. Said location map shall delineate all streets and other major physical features that my either affect or be affected by the proposed development. **(Section V.5)**	Existing Conditions, Subdivision Plan, & Site Plan	☑ Preliminary Plat ☑ Final Plat	N/A
✔	Location and approximate dimensions of all existing and proposed property lines including the entire area proposed to be subdivided, the areas of proposed lots, and any adjacent parcels in the same ownership. **(Section IV.6)**	Existing Conditions, Subdivision Plan, & Site Plan	☑ Preliminary Plat ☑ Final Plat	
✔	Dimensions and areas of all lots and any and all property to be dedicated or reserved for schools, parks, playgrounds, or other public purpose. Dimensions shall include radii and length of all arcs and calculated bearing for all straight lines. **(Section V.6/ IV.7)**	Existing Conditions, Subdivision Plan, & Site Plan	☑ Preliminary Plat ☑ Final Plat	N/A
✔	Location, names, and present widths of all adjacent streets, with a designation as to whether public or private and approximate location of existing utilities to be used. Curbs and sidewalks shall be shown. **(Section IV.8/V.7)**	Existing Conditions, Subdivision Plan, & Site Plan	☑ Preliminary Plat ☑ Final Plat	

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✔	Location of significant physical features, including bodies of water, watercourses, wetlands, railroads, important vegetation, stone walls and soils types that my influence the design of the subdivision. **(Section IV.9/V.8)**	Existing Conditions Plans	☑ Preliminary Plat ☑ Final Plat	
✔	**Preliminary Plat** Proposed locations, widths and other dimensions of all new streets and utilities, including water mains, storm and sanitary sewer mains, catch basins and culverts, street lights, fire hydrants, sewerage pump stations, etc. **(Section IV.10)** **Final Plat** Proposed locations and profiles of all proposed streets and utilities, including water mains, storm and sanitary sewer mains, catchbasins and culverts, together with typical cross sections. Profiles shall be drawn to a horizontal scale of 1"=50' and a vertical scale of 1"=5', showing existing centerline grade, existing left and right sideline grades, and proposed centerline grade. **(Section V.9)**	Site and Utilities Plan	☑ Preliminary Plat ☑ Final Plat	
✔	When required by the Board, the plat shall be accompanied by profiles of proposed street grades, including extensions for a reasonable distance beyond the subject land; also grades and sizes of proposed utilities. **(Section IV.10)**		☑ Preliminary Plat ☑ Final Plat	
✔	Base flood elevation (BFE) for subdivisions involving greater than five (5) acres or fifty (50) lots. **(Section IV.11)**		☑ Preliminary Plat ☑ Final Plat	
✔	For subdivisions of five (5) lots or more, or at the discretion of the Board otherwise, the preliminary plat shall show contours at intervals no greater than two (2) feet. Contours shall be shown in dotted lines for existing natural surface and in solid lines for proposed final grade, together with the final grade elevations shown in figures at all lot corners. If existing grades are not to be changed, then the contours in these areas shall be solid lines. **(Section IV.12/ V.12)**		☑ Preliminary Plat ☑ Final Plat	

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✔	Dates and permit numbers of all necessary permits from governmental agencies from which approval is required by Federal or State law. **(Section V.10)**	NHDES Shoreland Permit to be submitted	☐ Preliminary Plat ☑ Final Plat	
✔	For subdivisions involving greater than five (5) acres or fifty (50) lots, the final plat shall show hazard zones and shall include elevation data for flood hazard zones. **(Section V.11)**	NA	☐ Preliminary Plat ☑ Final Plat	
✔	Location of all permanent monuments. **(Section V.12)**	Depicted on subdivision plan	☐ Preliminary Plat ☑ Final Plat	

General Requirements[1]			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	**1. Basic Requirements: (VI.1)**	Subdivision Plan	
☑	a. Conformity to Official Plan or Map		
☑	b. Hazards		
☑	c. Relation to Topography		
☑	d. Planned Unit Development		
☑	**2. Lots: (VI.2)**	Subdivision plan	
☑	a. Lot Arrangement		
☑	b. Lot sizes		
☐	c. Commercial and Industrial Lots		
☑	**3. Streets: (VI.3)**	NA	
☐	a. Relation to adjoining Street System		
☐	b. Street Rights-of-Way		
☐	c. Access		
☐	d. Parallel Service Roads		
☐	e. Street Intersection Angles		
☐	f. Merging Streets		
☐	g. Street Deflections and Vertical Alignment		
☐	h. Marginal Access Streets		
☐	i. Cul-de-Sacs		
☐	j. Rounding Street Corners		
☐	k. Street Name Signs		
☐	l. Street Names		
☐	m. Block Lengths		
☐	n. Block Widths		
☐	o. Grade of Streets		
☐	p. Grass Strips		
☑	**4. Curbing: (VI.4)**	NA	
☑	**5. Driveways: (VI.5)**	Site Plan	
☑	**6. Drainage Improvements: (VI.6)**	Drainage Plan	
☑	**7. Municipal Water Service: (VI.7)**	Utilities Plan	
☑	**8. Municipal Sewer Service: (VI.8)**		
☑	**9. Installation of Utilities: (VI.9)**	Utilities Plan	
☑	a. All Districts		
☑	b. Indicator Tape		
☑	**10. On-Site Water Supply: (VI.10)**	Utilities Plan	
☑	**11. On-Site Sewage Disposal Systems: (VI.11)**	NA	
☑	**12. Open Space: (VI.12)**	NA	
☐	a. Natural Features		
☐	b. Buffer Strips		
☐	c. Parks		
☐	d. Tree Planting		
☑	**13. Flood Hazard Areas: (VI.13)**	Grading Plan & Architectural drawings	
☑	a. Permits		
☑	b. Minimization of Flood Damage		
☑	c. Elevation and Flood-Proofing Records		
☑	d. Alteration of Watercourses		
☑	**14. Erosion and Sedimentation Control (VI.14)**		

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
✔ ✔ ✔	**15. Easements (VI.15)** a. Utilities b. Drainage	NA	
✔	**16. Monuments: (VI.16)**	Subdivision Plan	
✔	**17. Benchmarks: (VI.17)**	Existing Conditions Plans	
✔	**18. House Numbers (VI.18)**	to be provided	

Design Standards			
	Required Items for Submittal	**Indicate compliance and/or provide explanation as to alternative design**	**Waiver Requested**
✔	**1. Streets have been designed according to the design standards required under Section (VII.1).** a. Clearing b. Excavation c. Rough Grade and Preparation of Sub-Grade d. Base Course e. Street Paving f. Side Slopes g. Approval Specifications h. Curbing i. Sidewalks j. Inspection and Methods	NA	
✔	**2. Storm water Sewers and Other Drainage Appurtenances have been designed according to the design standards required under Section (VII.2).** a. Design b. Standards of Construction	Grading Plan	
✔	**3. Sanitary Sewers have been designed according to the design standards required under Section (VII.3).** a. Design b. Lift Stations c. Materials d. Construction Standards	Water Service, Utilities Plan	
✔	**4. Water Mains and Fire Hydrants have been designed according to the design standards required under Section (VII.4).** a. Connections to Lots b. Design and Construction c. Materials d. Notification Prior to Construction	Water service, Utilities plan	

Applicant's/Representative's Signature: Eric D. Weinrieb PE **Date:** 4/19/22

[1] See City of Portsmouth, NH Subdivision Rules and Regulations for details.

Letter of Authorization

We, Gail and James Sanders of 30 Walden Street, Portsmouth, NH 03801, hereby authorize Altus Engineering, Inc. of Portsmouth, New Hampshire to represent us as the Applicant in all matters concerning engineering and related land use permitting for Portsmouth Tax Map 101, Lot 03 located at 445 Marcy Street in Portsmouth, NH. This authorization shall include any signatures required for Federal, State and Municipal permit applications.

Gail H. Sanders	Gail H. Sanders	4-18-2022
Signature	Print Name	Date
	James H Sanders	4/18/2022
Signature	Print Name	Date
Witness	Print Name	Date

THIS DRAWING SET HAS NOT BEEN RELEASED FOR CONSTRUCTION

445 MARCY STREET RESIDENCE

445 Marcy Street
Portsmouth, NH 03801

Assessor's Parcel 101, Lot 03

Owner/Applicant:
445 Marcy Street, LLC
(Gail & James Sanders)
30 Walden Street
Portsmouth, NH 03801
(603) 498-2636

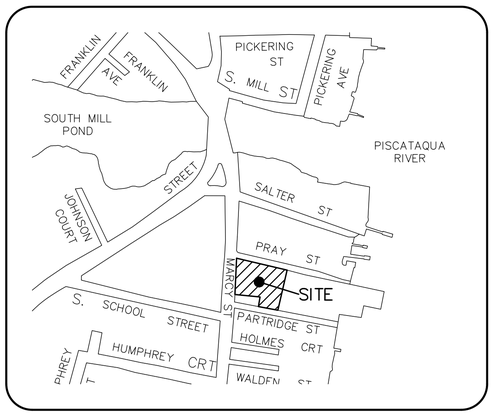
Architect:
ARCOVE ARCHITECTS
3 Congress Street, Suite 1
Portsmouth, NH 03801
(603) 731-5187

Civil Engineer:
ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

Surveyor:
James Verra
& Associates Inc.
LAND SURVEYORS
101 SHATTUCK WAY, SUITE 8
Newington, New Hampshire
03801-7876
Tel 603-436-3557

Plan Issue Date:

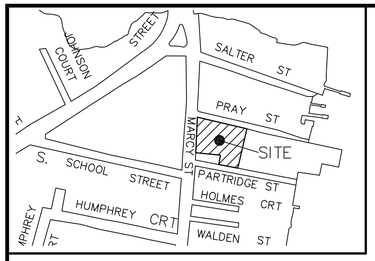
APRIL 15, 2022 TAC Review
MAY 24, 2022 PB Submission



LOCUS NOT TO SCALE

Sheet Index Title	*Sheet No.:*	*Rev.*	*Date*
Existing Conditions Plan	EX-1	2	10/06/21
Subdivision Plan	S-1	1	04/01/22
Site Plan	C-1	1	05/24/22
Grading, Drainage and Utility Plan	C-2	2	05/24/22
Details Sheet	C-3	1	05/24/22
Details Sheet	C-4	1	05/24/22
Details Sheet	C-5	1	05/24/22
Floor Plans	H.12	0	05/22/22
Elevation - Front (North)	H.21	0	05/22/22
Elevation - West Side	H.22	0	05/22/22
Elevation - Rear (South)	H.23	0	05/22/22
Elevation - East Side	H.24	0	05/22/22

P5217



LOCUS
(N.T.S.)

OWNERS

APN 101–3
445 MARCY STREET LLC
30 WALDEN ST
PORTSMOUTH, NH 03801
5829/1409

APN 101–2 (40 PRAY ST)
SANDERS LOBSTER CO INC
54 PRAY ST
PORTSMOUTH, NH 03801
2042/0383

APN 101–4
MICHELE E. MCLAUGHLIN
469 MARCY ST
PORTSMOUTH, NH 03801
2803/1555

APN 101–5
MARCY STREET INVESTMENTS
54 PRAY ST
PORTSMOUTH, NH 03801
2862/1897

NOTES:

1. OWNER OF RECORD.....445 MARCY STREET, LLC.
   ADDRESS.....30 WALDEN STREET, PORTSMOUTH, NH 03801
   DEED REFERENCE.....5829/1409
   TAX SHEET / LOT.....101–03
   PARCEL AREA.....14,947 S.F, 0.34 ACRES
2. ZONED:.....*GENERAL RESIDENCE B* FRONT YARD SETBACK ....*5'*
   MINIMUM LOT AREA..*5,000 S.F.* SIDE YARD SETBACK .....*10'*
   FRONTAGE.....*80'* REAR YARD SETBACK .....*25'*
3. THE RELATIVE ERROR OF CLOSURE WAS LESS THAN 1 FOOT IN 15,000 FEET.
4. *THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG–SAFE @ 1–888–DIG–SAFE.*
5. *HORIZONTAL DATUM: NAD 1983 ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND NGS "OPUS" SOLUTION. REFERENCE FRAME: NAD83 (2011)(EPOCH: 2010.0000), US SURVEY FOOT.*
   VERTICAL DATUM: NAVD 1988. PRIMARY BENCHMARK: CITY OF PORTSMOUTH "ROBE"
6. *CONTRACTOR TO VERIFY SITE BENCHMARKS BY LEVELING BETWEEN 2 BENCHMARKS PRIOR TO THE ESTABLISHMENT OF ANY GRADES OR ELEVATIONS. DISCREPANCIES ARE TO BE REPORTED TO JAMES VERRA AND ASSOCIATES, INC..*
7. *A PORTION OF THE PARCEL SHOWN HEREON LIES WITHIN ZONE AE (ELEVATION 8.3) & ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0259F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.*
8. *APPROXIMATE 250' SETBACK TO THE HIGHEST OBSERVABLE TIDE LINE PER THE CITY OF PORTSMOUTH TAX MAPS.*

REFERENCE PLANS:

1. *PLAT OF LAND, #445 MARCY STREET, PORTSMOUTH, NEW HAMPSHIRE FOR JAMES H. SANDERS, DATED 9/1/94. RECORDED AS RCRD PLAN #D–23172.*

NH STATE PLANE COORDINATE SYSTEM
NAD 1983

RIM AND INVERT DATA

CB #1535
RIM EL= 9.08
(1) INV IN 12"RCP=5.58
(2) INV IN 12"RCP=5.48
(3) INV OUT 12"RCP=5.32

CB #1531
RIM EL= 9.18
(1) INV OUT 12"PVC=6.93

INV "A"
INV IN (6" RCP)= 6.74

SMH #1006
RIM EL= 14.09
(1) INV IN (8"?)=–0.79
(2) INV OUT (8"?)=–0.79

SMH #1533
RIM EL=9.19
(1) INV IN (8"?)=–2.41
(2) INV IN (8"?)=–2.41
(3) INV (OUT 8"?)=–2.45

SMH #1382
RIM EL=7.07
INACCESSIBLE

SMH #1180
RIM EL= 10.60
(1) INV OUT (6"?)=3.70

SMH #1183
RIM EL=7.87
INACCESSIBLE

BOUNDARY LINE TABLE

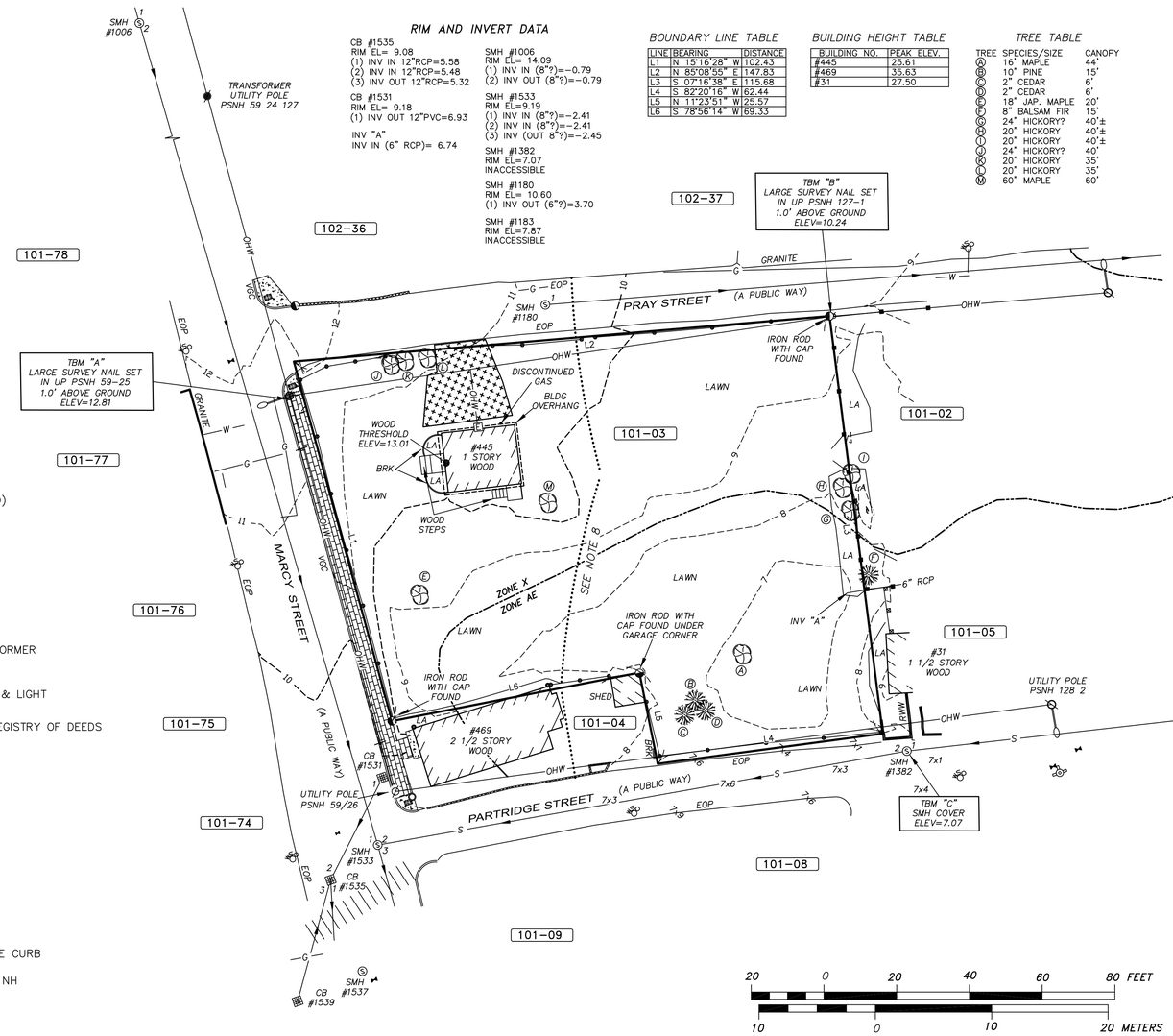
LINE	BEARING	DISTANCE
L1	N 15°16'28" W	102.43
L2	N 85°08'55" E	147.83
L3	S 07°16'38" E	115.68
L4	S 82°20'16" W	62.44
L5	N 11°23'51" W	25.57
L6	S 78°56'14" W	69.33

BUILDING HEIGHT TABLE

BUILDING NO.	PEAK ELEV.
#445	25.61
#469	35.63
#31	27.50

TREE TABLE

TREE	SPECIES/SIZE	CANOPY
Ⓐ	16" MAPLE	44'
Ⓑ	10" PINE	15'
Ⓒ	2" CEDAR	6'
Ⓓ	2" CEDAR	6'
Ⓔ	18" JAP. MAPLE	20'
Ⓕ	8" BALSAM FIR	15'
Ⓖ	24" HICKORY?	40'±
Ⓗ	20" HICKORY	40'±
Ⓘ	20" HICKORY	40'±
Ⓙ	24" HICKORY?	40'
Ⓚ	20" HICKORY	35'
Ⓛ	20" HICKORY	35'
Ⓜ	60" MAPLE	60'



LEGEND:

- IRON ROD (AS NOTED)
- SURVEY NAIL (AS NOTED)
- POST & RAIL FENCE
- *WOOD FENCE*
- BRICK SIDEWALK
- CONCRETE
- STONE RETAINING WALL
- CRUSHED STONE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- GUY
- —OHW— OVERHEAD WIRES
- UTILITY POLE WITH ARM & LIGHT
- ELECTRIC METER
- *RCRD* ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 101–03 TAX SHEET / LOT NO.
- *EOP* EDGE OF PAVEMENT
- *LA* LANDSCAPED AREA
- CATCH BASIN
- SEWER MANHOLE
- SEWER CLEAN OUT
- — W — WATER LINE
- — S — SEWER LINE
- —D— DRAIN LINE
- — G — GAS LINE
- WATER GATE VALVE
- WATER SHUT OFF VALVE
- HYDRANT
- VGC VERTICAL FACED GRANITE CURB
- RWW WOOD RETAINING WALL
- PSNH PUBLIC SERVICE CO. OF NH
- PP/PL PLASTIC GAS LINE
- GJ GAS METER
- DECIDUOUS TREE
- CONIFEROUS TREE
- DOWN SPOUT

PURSUANT TO RSA 676:18,III AND RSA 672:14

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

James Verra 5–24–2022
JAMES VERRA DATE

STATE OF NEW HAMPSHIRE — No. 625 JAMES VERRA — LICENSED LAND SURVEYOR — SIGNATURE

P5217

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

JAMES VERRA & ASSOCIATES, INC.
LAND SURVEYORS
101 SHATTUCK WAY – SUITE 8
NEWINGTON, N.H. 03801– 7876
603–436–3557

JOB NO: 20460–A

ISSUED FOR: APPROVAL

ISSUE DATE: 5–24–2022

REVISIONS

NO.	DESCRIPTION	BY	DATE

DRAWN BY: GTD
APPROVED BY: GTD
DRAWING FILE: 20460–A.DWG

SCALE:
22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

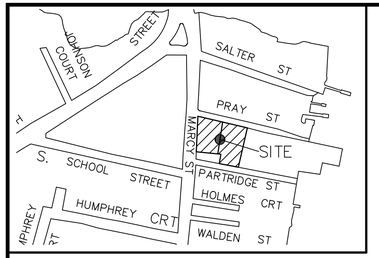
APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

OWNER:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
EXISTING CONDITIONS PLAN
445 MARCY STREET
PORTSMOUTH, NH

SHEET NUMBER:
EX–1



LOCUS
(N.T.S.)

OWNERS

APN 101–2 (40 PRAY ST)
SANDERS LOBSTER CO. INC.
54 PRAY STREET
PORTSMOUTH, NH 03801
2042/0383

APN 101–3
445 MARCY STREET LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801
5829/1409

APN 101–4
MICHELE E. MCLAUGHLIN
469 MARCY STREET
PORTSMOUTH, NH 03801
2803/1555

APN 101–5
MARCY STREET INVESTMENTS
54 PRAY STREET
PORTSMOUTH, NH 03801
2862/1897

APN 101–8
ROBERT W. MORIN, III REV. TRUST
20 PARTRIDGE STREET
PORTSMOUTH, NH 03801
3460/747

APN 101–9
MARCY STREET REV. TRUST
JOHN TYLER MARKLEY, TRUSTEE
KRISTINE CUDAHY, TRUSTEE
PO BOX 268
CENTER HARBOR, NH 03226
6299/1657

APN 101–74
KRISTEN L. BENSON
478 MARCY STREET
PORTSMOUTH, NH 03801
5799/040

APN 101–75
RALPH J. MONTGOMERY REV. TRUST
RALPH J. MONTGOMERY, TRUSTEE
466 MARCY STREET
PORTSMOUTH, NH 03801
6122/014

APN 101–76
SARAH J. MINOR REV. TRUST
SARAH J. MINOR, TRUSTEE
65 LAUREL COURT
PORTSMOUTH, NH 03801
5222/1652

APN 101–77
JOHN & CAROL EBERLEIN
454 MARCY STREET
PORTSMOUTH, NH 03801
6199/1736

APN 101–78
JANINE CONTILLO
MICHAEL J. VITALE
442 MARCY STREET
PORTSMOUTH, NH 03801
3491/568

APN 102–36
MARK & NANCY MININBERG
7 PORTWALK PLACE, #1523
PORTSMOUTH, NH 03801
6204/2930

APN 101–37
BRUCE L. ADDISON REV. TRUST
SALLY E. ELSHOUT REV. TRUST
17 PRAY STREET
PORTSMOUTH, NH 03801
6254/2072

NH STATE PLANE COORDINATE SYSTEM
NAD 1983

LEGEND:

- IRON ROD (AS NOTED)
- SURVEY NAIL (AS NOTED)
- POST & RAIL FENCE
- *WOOD FENCE*
- BRICK SIDEWALK
- CONCRETE
- STONE RETAINING WALL
- CRUSHED STONE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- GUY
- —OHW— OVERHEAD WIRES
- UTILITY POLE WITH ARM & LIGHT
- [E] ELECTRIC METER
- *RCRD* ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 101–03 TAX SHEET / LOT NO.
- *EOP* EDGE OF PAVEMENT
- *LA* LANDSCAPED AREA
- CATCH BASIN
- SEWER MANHOLE
- SEWER CLEAN OUT
- — W — WATER LINE
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- — G — GAS LINE
- WATER GATE VALVE
- WATER SHUT OFF VALVE
- HYDRANT
- VGC VERTICAL FACED GRANITE CURB
- RWW WOOD RETAINING WALL
- PSNH PUBLIC SERVICE CO. OF NH
- PP/PL PLASTIC GAS LINE
- [G] GAS METER
- DECIDUOUS TREE
- CONIFEROUS TREE
- DOWN SPOUT
- D–GAS DISCONTINUED GAS SERVICE

PROPOSED LOT AREAS

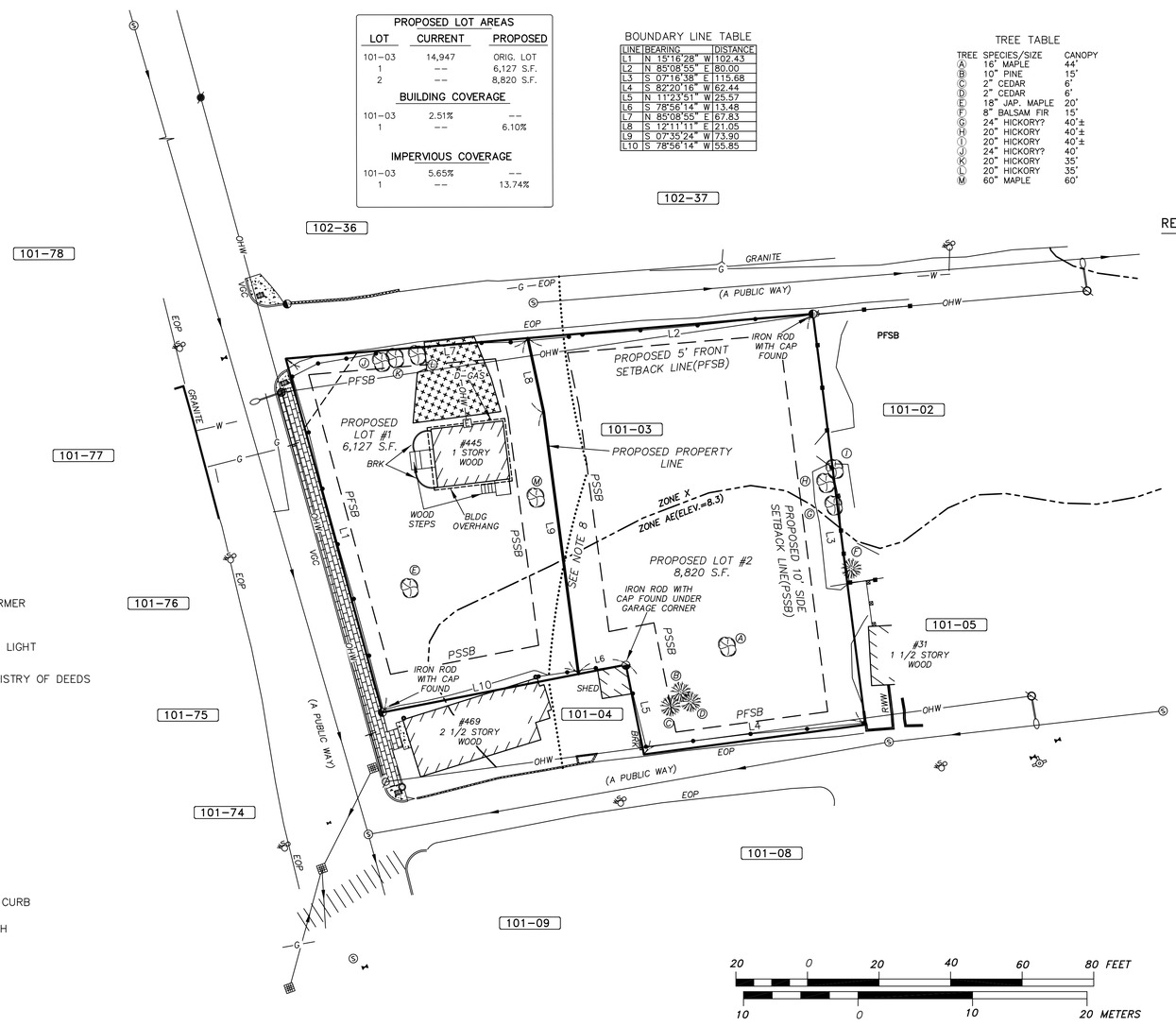
LOT	CURRENT	PROPOSED
101–03	14,947	ORIG. LOT
1	––	6,127 S.F.
2	––	8,820 S.F.
BUILDING COVERAGE		
101–03	2.51%	––
1	––	6.10%
IMPERVIOUS COVERAGE		
101–03	5.65%	––
1	––	13.74%

BOUNDARY LINE TABLE

LINE	BEARING	DISTANCE
L1	N 15°16'28" W	102.43
L2	N 85°08'55" E	80.00
L3	S 07°16'38" E	115.68
L4	S 82°20'16" W	62.44
L5	N 11°23'51" W	25.57
L6	S 78°56'14" W	13.48
L7	N 85°08'55" E	67.83
L8	S 12°11'11" E	21.05
L9	S 07°35'24" W	73.90
L10	S 78°56'14" W	55.85

TREE TABLE

TREE	SPECIES/SIZE	CANOPY
(A)	16" MAPLE	44'
(B)	10" PINE	15'
(C)	2" CEDAR	6'
(D)	2" CEDAR	6'
(E)	18" JAP. MAPLE	20'
(F)	8" BALSAM FIR	15'
(G)	24" HICKORY?	40'±
(H)	20" HICKORY	40'±
(I)	20" HICKORY	40'±
(J)	24" HICKORY?	40'
(K)	20" HICKORY	35'
(L)	20" HICKORY	35'
(M)	60" MAPLE	60'



NOTES:

1. OWNER OF RECORD.....445 MARCY STREET, LLC.
   ADDRESS.....30 WALDEN STREET, PORTSMOUTH, NH 03801
   DEED REFERENCE.....5829/1409
   TAX SHEET / LOT.....101–03
   PARCEL AREA.....14,947 S.F. 0.34 ACRES
2. ZONED:.....*GENERAL RESIDENCE B* FRONT YARD SETBACK .....5'
   MINIMUM LOT AREA..5,000 S.F. SIDE YARD SETBACK .....10'
   FRONTAGE.....80' REAR YARD SETBACK .....25'
3. THE RELATIVE ERROR OF CLOSURE WAS LESS THAN 1 FOOT IN 15,000 FEET.
4. *THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG–SAFE @ 1–888–DIG–SAFE.*
5. *HORIZONTAL DATUM: NAD 1983 ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND NGS "OPUS" SOLUTION. REFERENCE FRAME: NAD83 (2011)(EPOCH: 2010.0000), US SURVEY FOOT.*
   VERTICAL DATUM: NAVD 1988. PRIMARY BENCHMARK: CITY OF PORTSMOUTH "ROBE"
6. *PORTIONS OF PROPOSED LOTS 1 & 2 LIE WITHIN THE FLOODPLAIN DISTRICT (FP) AS DEFINED BY SECTION 10.613.10 OF THE PORTSMOUTH ZONING ORDINANCE. A PORTION OF THE PROPOSED LOT 1 AND ALL OF PROPOSED LOT 2 LIE WITHIN THE EXTENDED FLOOD HAZARD AREA AS DEFINED BY SECTION 10.622.20 OF THE PORTSMOUTH ZONING ORDINANCE.*
7. *A PORTION OF THE PARCEL SHOWN HEREON LIES WITHIN ZONE AE (ELEVATION 8.3) & ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0278F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.*
8. *APPROXIMATE 250' SETBACK TO THE HIGHEST OBSERVABLE TIDE LINE PER THE CITY OF PORTSMOUTH TAX MAPS.*
9. *THE DRIVEWAY FOR LOT 1 SHALL BE AT LEAST 30' FROM THE INTERSECTION OF PRAY & MARCY STREETS.*
10. *LOT 1 HAS STORM WATER DRAINAGE RIGHTS OVER LOT 2.*

REFERENCE PLANS:

1. *EXISTING CONDITIONS PLAN 445 MARCY STREET RESIDENCE, TAX MAP 101, LOT 03, DATED 10–11–2021 BY ALTUS ENGINEERING, INC. NOT RECORDED.*
2. *PLAT OF LAND, #445 MARCY STREET, PORTSMOUTH, NEW HAMPSHIRE FOR JAMES H. SANDERS, DATED 9/1/94. RECORDED AS RCRD PLAN #D–23172.*

APPROVED FOR THE RECORD:

CHAIRMAN PORTSMOUTH PLANNING BOARD *DATE*

STATE OF NEW HAMPSHIRE — No. 625 JAMES VERRA — LICENSED LAND SURVEYOR — SIGNATURE

P5217

JAMES VERRA & ASSOCIATES, INC.
LAND SURVEYORS
101 SHATTUCK WAY – SUITE 8
NEWINGTON, N.H. 03801– 7876
603–436–3557

JOB NO: 20460–A

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

ISSUED FOR: APPROVAL

ISSUE DATE: 5–24–2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
1	REVISE PROP. LOTS & SETBACKS	GTD	4–1–22
2	PER TAC COMMENTS	GTD	5–20–22

DRAWN BY: GTD
APPROVED BY: JV
DRAWING FILE: 20460–A2.DWG

SCALE:
22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

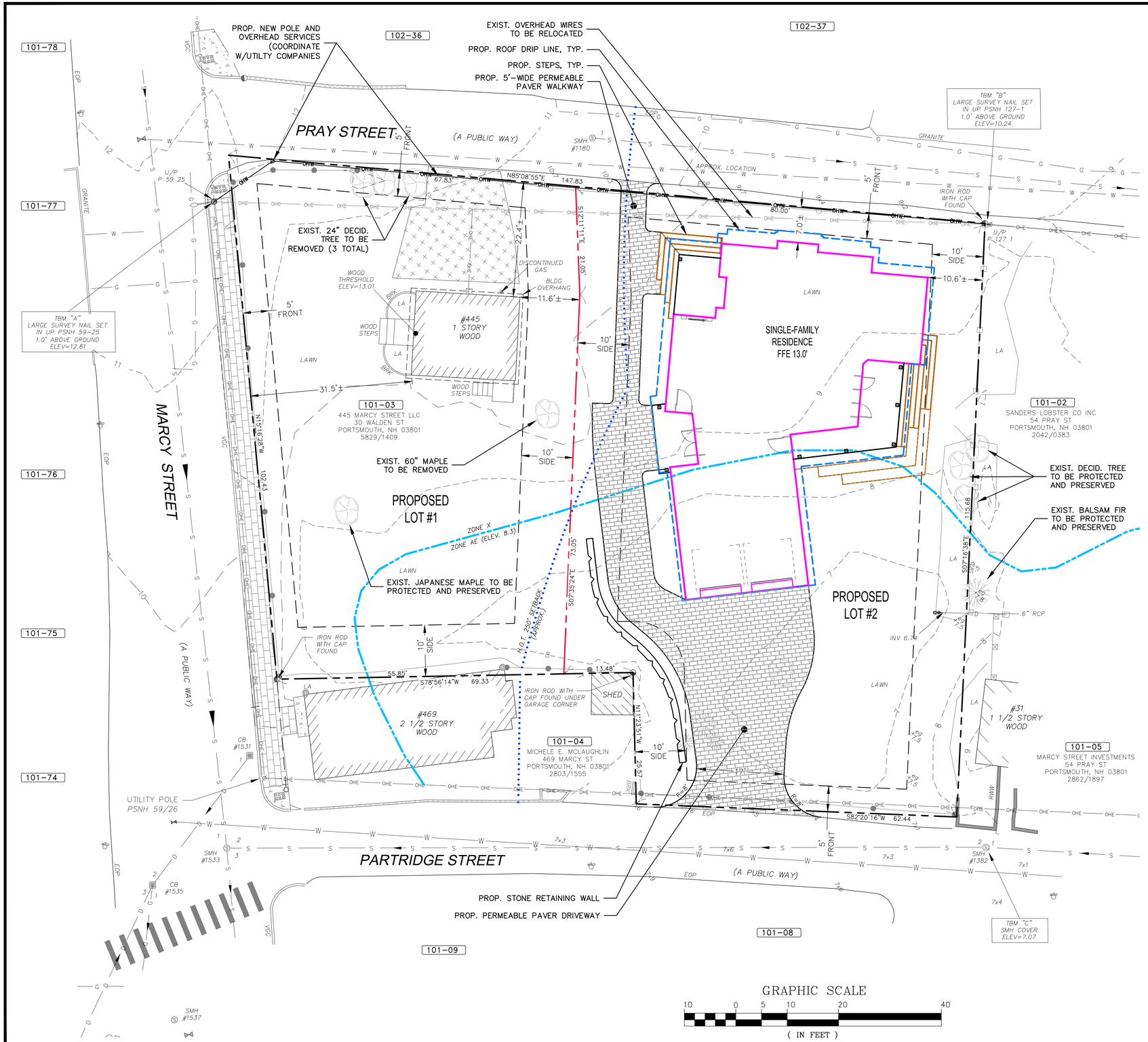
APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

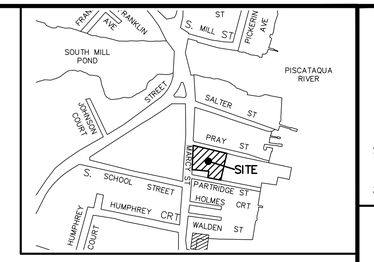
OWNER:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
SUBDIVISION PLAN
445 MARCY STREET
PORTSMOUTH, NH

SHEET NUMBER:
S-1





LOCUS
(N.T.S.)

NH STATE PLANE COORDINATE SYSTEM
NAD 1983

SITE NOTES

1. DESIGN INTENT – THIS PLAN IS INTENDED TO DEPICT A SUBDIVISION AND SITE PLAN FOR PROPOSED NEW SINGLE-FAMILY RESIDENCE.
2. APPROXIMATE LOT AREA: 14,947 S.F.± (0.34 AC.±)
3. ZONE: GENERAL RESIDENCE B (GRB)
4. DIMENSIONAL REQUIREMENTS:

	REQUIRED	EXISTING	PROPOSED LOT #1	PROPOSED LOT #2
MIN. LOT AREA:	5,000 SF	14,947 SF	6,127 SF	8,820 SF
MIN. STREET FRONTAGE:	80'	102.43'	102.43'	80.00'
MIN. LOT DEPTH:	60'	133.7'±	94.9'±	115.6'±
FRONT SETBACK:	5'	22.4'±	22.4'±	7.0'±
SIDE SETBACK:	10'	89.7'±	11.6'±	10.6'±
REAR SETBACK:	25'	N/A	N/A	N/A
MAX. BLDG. HEIGHT	35' (SLOPE)	<20'	<20'	32.5'±
MAX. BLDG. COVERAGE:	30%	2.5%	6.1%	28.7%
MIN. OPEN SPACE:	25%	94.3%	86.2%	47.0%

5. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE @ 1-888-DIG-SAFE.
6. THE EXISTING SITE CONDITION DETAILS SHOWN ARE THE RESULTS OF AN ON THE GROUND INSTRUMENT FIELD SURVEY PERFORMED BY JAMES VERRA & ASSOCIATES, INC. OCTOBER 2021. THE CLOSED TRAVERSE ROUGH CLOSURE PRECISION WAS 1/15,000.
7. HORIZONTAL DATUM: NAD 1983 ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND NGS "OPUS" SOLUTION. REFERENCE FRAME: NAD83 2010.0000), US SURVEY FOOT.
   VERTICAL DATUM: NAVD 1988. PRIMARY BENCHMARK: CITY OF PORTSMOUTH "ROBE"
8. A PORTION OF THE PROPOSED LOTS SHOWN HEREON LIES WITHIN ZONE AE (ELEVATION 8) & ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0259F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
9. APPROXIMATE 250' SETBACK TO THE HIGHEST OBSERVABLE TIDE LINE PER THE CITY OF PORTSMOUTH TAX MAPS.
10. ADDRESS FOR LOT 2 WILL CORRESPOND TO PARTRIDGE STREET UNTIL SUCH TIME WHEN A SECOND DRIVEWAY IS PROVIDED ON PRAY STREET.

PLAN REFERENCE

1. "EXISTING CONDITIONS PLAN, 445 MARCY STREET, PORTSMOUTH, NEW HAMPSHIRE", REVISED DATED APRIL 1, 2022, PREPARED BY JAMES VERRA & ASSOCIATES, INC.

P5217

ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE
5/24/22

NOT FOR CONSTRUCTION

ISSUED FOR:
CLIENT REVIEW

ISSUE DATE:
MAY 24, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/15/22
1	PER TAC COMMENTS	EDW	05/24/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

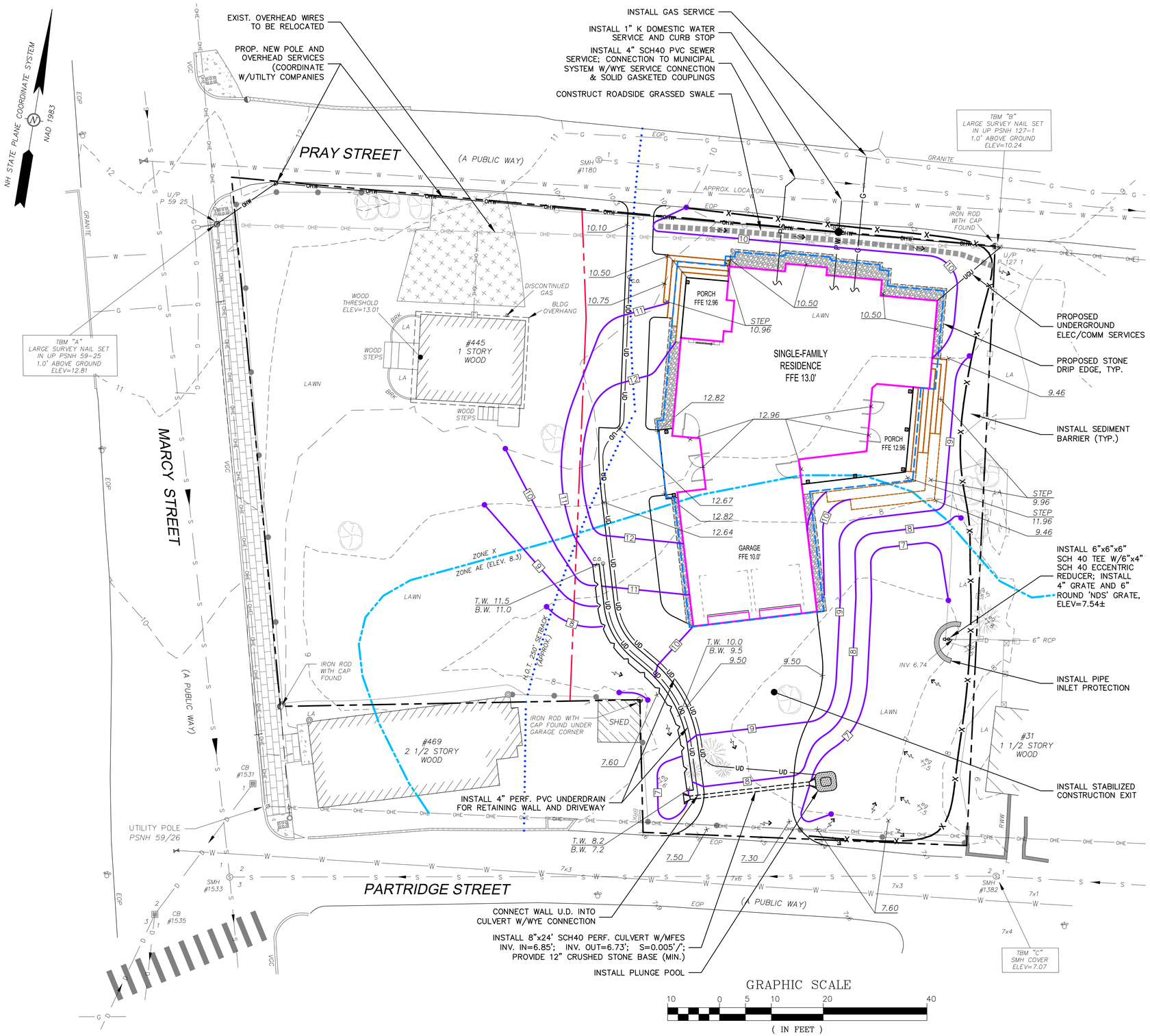
APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
SITE PLAN

SHEET NUMBER:
C - 1



GRADING AND DRAINAGE NOTES

1. DO NOT BEGIN CONSTRUCTION UNTIL ALL STATE AND LOCAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED.
2. CONTRACTOR SHALL OBTAIN A "DIGSAFE" NUMBER AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION.
3. ALL CONSTRUCTION SHALL MEET THE MINIMUM CONSTRUCTION STANDARDS OF THE CITY OF PORTSMOUTH AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL GOVERN.
4. ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO INITIATING CONSTRUCTION.
5. UNLESS OTHERWISE AGREED IN WRITING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING TEMPORARY BENCHMARKS (TBM) AND PERFORMING ALL CONSTRUCTION SURVEY LAYOUT.
6. PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES FOR FOUNDATIONS, PAVEMENT AREAS, UTILITY TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL. IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER, EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATIONS. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.
7. IF SUITABLE, EXCAVATED MATERIALS SHALL BE PLACED AS FILL WITHIN UPLAND AREAS ONLY AND SHALL NOT BE PLACED WITHIN WETLANDS. PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION.
8. IN ORDER TO PROVIDE VISUAL CLARITY ON THE PLANS, DRAINAGE AND OTHER UTILITY STRUCTURES MAY NOT BE DRAWN TO SCALE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SIZING AND LOCATION OF ALL STRUCTURES AND IS DIRECTED TO RESOLVE ANY POTENTIAL DISCREPANCY WITH THE ENGINEER PRIOR TO CONSTRUCTION.

UTILITY NOTES

1. ALL EXISTING UTILITIES SHOWN ARE PER PLAN REFERENCE #1. LOCATIONS AND COMPLETENESS ARE NOT GUARANTEED BY ENGINEER OR OWNER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES.
2. SITE WILL BE SERVED BY MUNICIPAL WATER & SEWER.
3. COORDINATE ALL WATER LINE CONSTRUCTION ACTIVITIES WITH PORTSMOUTH DPW, JIM TOW, (603) 427-1530.
4. COORDINATE ALL SEWER LINE CONSTRUCTION ACTIVITIES WITH PORTSMOUTH DPW, JIM TOW, (603) 427-1530.

ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE
5/24/22

NOT FOR CONSTRUCTION

ISSUED FOR: CLIENT REVIEW

ISSUE DATE: MAY 24, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/15/22
1	PER TAC COMMENTS	EDW	05/24/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
GRADING, DRAINAGE AND UTILITY PLAN

SHEET NUMBER:
C - 2

P5217

SEDIMENT AND EROSION CONTROL NOTES

PROJECT NAME AND LOCATION

SINGLE FAMILY RESIDENCE
GAIL AND JAMES SANDERS
445 MARCY STREET
PORTSMOUTH, NEW HAMPSHIRE
TAX MAP 101 LOT 3

LONGITUDE: 70°44'58" W
LATITUDE: 43°04'19" N

OWNER / APPLICANT:

445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 038001

DESCRIPTION

The project consists of the development of the lot for the construction of a single–family residential home along with associated site improvements.

DISTURBED AREA

The total area to be disturbed for the redevelopment improvements is approximately 7,300 S.F. (±0.17 acres).

PROJECT PHASING

The proposed project will be completed in one phase.

NAME OF RECEIVING WATER

The site drains overland to the Piscataqua River.

SEQUENCE OF MAJOR ACTIVITIES

1. Install temporary erosion control measures including silt fences, stabilized construction entrance and inlet sediment filters as noted on the plan. All temporary erosion control measures shall be maintained in good working condition for the duration of the project.
2. Strip loam and stockpile.
3. Site features as shown on plan.
4. Rough grade site including placement of borrow materials.
5. Construct drainage structures, culverts, utilities, swales & pavement base course materials.
6. Loam (6" min) and seed all disturbed areas not paved or otherwise stabilized.
7. Install pavers.
8. When all construction activity is complete and site is stabilized, remove all temporary erosion control measures and any sediment that has been trapped by these devices.

TEMPORARY EROSION & SEDIMENT CONTROL AND STABILIZATION PRACTICES

All work shall be in accordance with state and local permits. Work shall conform to the practices described in the "New Hampshire Stormwater Manual, Volumes 1 – 3", issued December 2008, as amended. As indicated in the sequence of Major Activities, the silt fences shall be installed prior to commencing any clearing or grading of the site. Structural controls shall be installed concurrently with the applicable activity. Once construction activity ceases permanently in an area, silt fences and any earth/dikes will be removed once permanent measures are established.

During construction, runoff will be diverted around the site with stabilized channels where possible. Sheet runoff from the site shall be filtered through hay bale barriers, stone check dams, and silt fences. All storm drain inlets shall be provided with hay bale filters or stone check dams. Stone rip rap shall be provided at the outlets of drain pipes and culverts where shown on the drawings.

Stabilize all ditches, swales, & level spreaders prior to directing flow to them.

Temporary and permanent vegetation and mulching is an integral component of the erosion and sedimentation control plan. All areas shall be inspected and maintained until vegetative cover is established. These control measures are essential to erosion prevention and also reduce costly rework of graded and shaped areas.

Temporary vegetation shall be maintained in these areas until permanent seeding is applied. Additionally, erosion and sediment control measures shall be maintained until permanent vegetation is established.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

A. GENERAL

These are general inspection and maintenance practices that shall be used to implement the plan:

1. The smallest practical portion of the site shall be denuded at one time.
2. All control measures shall be inspected at least once each week and following any storm event of 0.5 inches or greater.
3. All measures shall be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours.
4. Built–up sediment shall be removed from silt fence or other barriers when it has reached one–third the height of the fence or bale, or when "bulges" occur.
5. All diversion dikes shall be inspected and any breaches promptly repaired.
6. Temporary seeding and planting shall be inspected for bare spots, washouts, and unhealthy growth.
7. The owner's authorized engineer shall inspect the site on a periodic basis to review compliance with the Plans.
8. An area shall be considered stable if one of the following has occurred:
   a. Base coarse gravels have been installed in areas to be paved;
   b. A minimum of 85% vegetated growth as been established;
   c. A minimum of 3 inches of non–erosive material such as stone of riprap has been installed; – or –
   d. Erosion control blankets have been properly installed.
9. The length of time of exposure of area disturbed during construction shall not exceed 45 days.

B. MULCHING

Mulch shall be used on highly erodible soils, on critically eroding areas, on areas where conservation of moisture will facilitate plant establishment, and where shown on the plans.

1. Timing – In order for mulch to be effective, it must be in place prior to major storm events. There are two (2) types of standards which shall be used to assure this:
   a. Apply mulch prior to any storm event. This is applicable when working within 100 feet of wetlands. It will be necessary to closely monitor weather predictions, usually by contacting the National Weather Service in Concord, to have adequate warning of significant storms.
   b. Required Mulching within a specified time period. The time period can range from 21 to 28 days of inactivity on a area, the length of time varying with site conditions. Professional judgment shall be used to evaluate the interaction of site conditions (soil erodibility, season of year, extent of disturbance, proximity to sensitive resources, etc.) and the potential impact of erosion on adjacent areas to choose an appropriate time restriction.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (CON'T)

2. Guidelines for Winter Mulch Application –

Type	Rate per 1,000 s.f.	Use and Comments
Hay or Straw	70 to 90 lbs.	Must be dry and free from mold. May be used with plantings.
Wood Chips or Bark Mulch	460 to 920 lbs.	Used mostly with trees and shrub plantings.
Jute and Fibrous Matting (Erosion Blanket	As per manufacturer Specifications	Used in slope areas, water courses and other Control areas.
Crushed Stone 1/4" to 1–1/2" dia.	Spread more than 1/2" thick	Effective in controlling wind and water erosion.
Erosion Control Mix	2" thick (min)	* The organic matter content is between 80 and 100%, dry weight basis. * Particle size by weight is 100% passing a 6" screen and a minimum of 70 % maximum of 85% passing a 0.75" screen. * The organic portion needs to be fibrous and elongated. * Large portions of silts, clays or fine sands are not acceptable in the mix. * Soluble salts content is less than 4.0 mmhos/cm. * The pH should fall between 5.0 and 8.0.

3. Maintenance – All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. If less than 90% of the soil surface is covered by mulch, additional mulch shall be immediately applied.

C. TEMPORARY GRASS COVER

1. Seedbed Preparation –
   Apply fertilizer at the rate of 600 pounds per acre of 10–10–10. Apply limestone (equivalent to 50 percent calcium plus magnesium oxide) at a rate of three (3) tons per acre.

2. Seeding –
   a. Utilize annual rye grass at a rate of 40 lbs/acre.
   b. Where the soil has been compacted by construction operations, loosen soil to a depth of two (2) inches before applying fertilizer, lime and seed.
   c. Apply seed uniformly by hand, cyclone seeder, or hydroseeder (slurry including seed and fertilizer). Hydroseedings, which include mulch, may be left on soil surface. Seeding rates must be increased 10% when hydroseeding.

3. Maintenance –
   Temporary seedings shall be periodically inspected. At a minimum, 95% of the soil surface should be covered by vegetation. If any evidence of erosion or sedimentation is apparent, repairs shall be made and other temporary measures used in the interim (mulch, filter barriers, check dams, etc.).

D. FILTERS

1. Sequence of Installation –
   Sediment barriers shall be installed prior to any soil disturbance of the contributing upslope drainage area.

2. Maintenance –
   a. Silt fence barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. They shall be repaired if there are any signs of erosion or sedimentation below them. Any required repairs shall be made immediately. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water, the sediment barriers shall be replaced with a temporary stone check dam.
   b. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still is necessary, the fabric shall be replaced promptly.
   a. Sediment deposits must be removed when deposits reach approximately one–third (1/3) the height of the barrier.
   b. Any sediment deposits remaining in place after the silt fence or other barrier is no longer required shall be removed. The area shall be prepared and seeded.
   c. Additional stone may have to be added to the construction entrance, rock barrier and riprap lined swales, etc., periodically to maintain proper function of the erosion control structure.

E. PERMANENT SEEDING –

1. Bedding – stones larger than 1½", trash, roots, and other debris that will interfere with seeding and future maintenance of the area should be removed. Where feasible, the soil should be tilled to a depth of 5" to prepare a seedbed and mix fertilizer into the soil.

2. Fertilizer – lime and fertilizer should be applied evenly over the area prior to or at the time of seeding and incorporated into the soil. Kinds and amounts of lime and fertilizer should be based on an evaluation of soil tests. When a soil test is not available, the following minimum amounts should be applied:

   Agricultural Limestone @ 100 lbs. per 1,000 s.f.
   10–20–20 fertilizer @ 12 lbs. per 1,000 s.f.

3. Seed Mixture (recommended):

Type	Lbs. / Acre	Lbs. / 1,000 sf
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	48	1.10

Seed Mixture (For slope embankments):
Grass Seed: Provide fresh, clean, new–crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed mixture composed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified:

Type	Min. Purity (%)	Min. Germination (%)	Kg./Hectare (Lbs/Acre)
Creeping Red Fescue (c)	96	85	45 (40)
Perennial Rye Grass (a)	98	90	35 (30)
Redtop	95	80	5 (5)
Alsike Clover	97	90(e)	5 (5)
		Total	90 (80)

a. Ryegrass shall be a certified fine–textured variety such as Pennfine, Fiesta, Yorktown, Diplomat, or equal.
b. Fescue varieties shall include – Creeping Red and/or Hard Reliant, Scaldis, Koket, or Jamestown.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (CON'T)

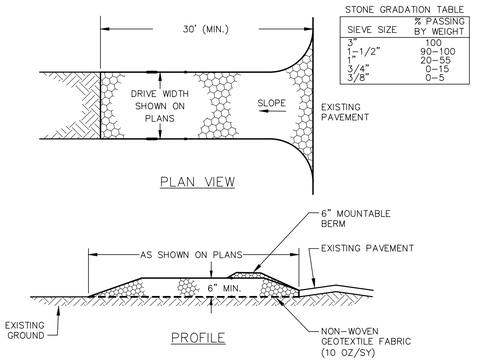
4. Sodding – sodding is done where it is desirable to rapidly establish cover on a disturbed area. Sodding an area may be substituted for permanent seeding procedures anywhere on site. Bed preparation, fertilizing, and placement of sod shall be performed according to the S.C.S. Handbook. Sodding is recommended for steep sloped areas, areas immediately adjacent to sensitive water courses, easily erodible soils (fine sand/silt), etc.

WINTER CONSTRUCTION NOTES

1. All proposed vegetated areas which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and elsewhere seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events;

2. All ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions; and

3. After November 15th, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT Item 304.3.



STONE GRADATION TABLE

SIEVE SIZE	% PASSING BY WEIGHT
3"	100
1–1/2"	90–100
1"	20–55
3/4"	0–15
3/8"	0–5

CONSTRUCTION SPECIFICATIONS

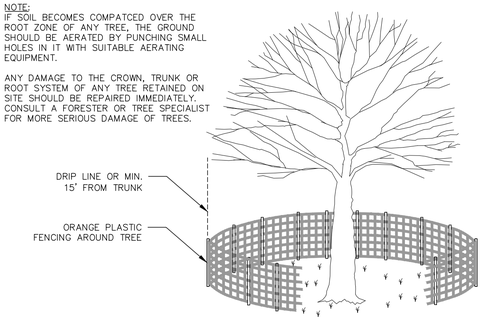
1. STONE SIZE – NHDOT STANDARD STONE SIZE #4 – SECTION 703 OF NHDOT STANDARD.
2. LENGTH – DETAILED ON PLANS (50 FOOT MINIMUM).
3. THICKNESS – SIX (6) INCHES (MINIMUM).
4. WIDTH – FULL DRIVE WIDTH UNLESS OTHERWISE SPECIFIED.
5. FILTER FABRIC – MIRAFI 600X OR EQUAL APPROVED BY ENGINEER.
6. SURFACE WATER CONTROL – ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WHEELS SHALL BE CLEANED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AT ALL ENTRANCES TO PUBLIC RIGHTS–OF–WAY, AT LOCATIONS SHOWN ON THE PLANS, AND/OR WHERE AS DIRECTED BY THE ENGINEER.

STABILIZED CONSTRUCTION EXIT

NOT TO SCALE

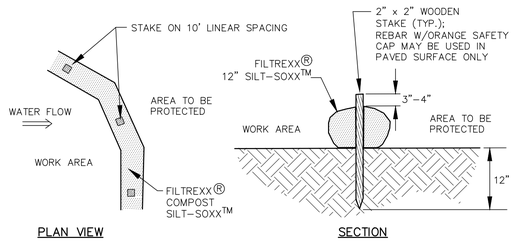
NOTE:
IF SOIL BECOMES COMPATCED OVER THE ROOT ZONE OF ANY TREE, THE GROUND SHOULD BE AERATED BY PUNCHING SMALL HOLES IN IT WITH SUITABLE AERATING EQUIPMENT.

ANY DAMAGE TO THE CROWN, TRUNK OR ROOT SYSTEM OF ANY TREE RETAINED ON SITE SHOULD BE REPAIRED IMMEDIATELY. CONSULT A FORESTER OR TREE SPECIALIST FOR MORE SERIOUS DAMAGE OF TREES.



TREE PROTECTION DETAIL

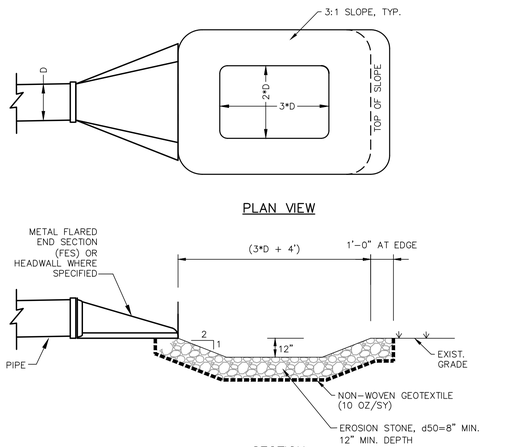
NOT TO SCALE



NOTES:
1. SILTSOXX MAY BY USED IN PLACE OF SILT FENCE OR OTHER SEDIMENT BARRIERS.
2. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
3. SILTSOXX COMPOST/SOIL/ROCK/SEED FILL MATERIAL SHALL BE ADJUSTED AS NECESSARY TO MEET THE REQUIREMENTS OF THE SPECIFIC APPLICATION.
4. ALL SEDIMENT TRAPPED BY SILTSOXX SHALL BE DISPOSED OF PROPERLY.

TUBULAR SEDIMENT BARRIER

NOT TO SCALE



1. CONSTRUCT PLUNGE POOL TO THE WIDTHS AND LENGTHS SHOWN ON THE PLAN.
2. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIPRAP SHALL BE PREPARED TO LINES AND GRADES SHOWN ON THE PLANS.
3. EROSION STONE USED FOR THE PLUNGE POOL SHALL MEET THE FOLLOWING GRADATION.
4. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE EROSION STONE. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 18 INCHES.
5. THE EROSION STONE MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

PLUNGE POOL

NOT TO SCALE

P5217

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ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE
5/24/22

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

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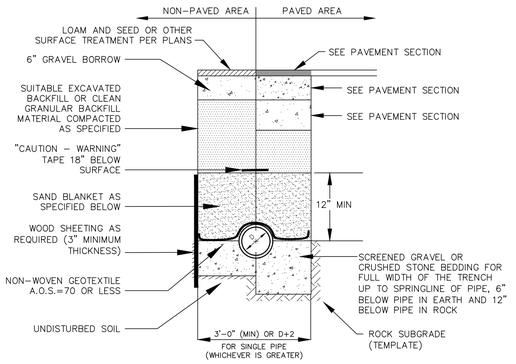
TITLE:
DETAILS SHEET

SHEET NUMBER:
C - 3



NOTES

1. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
2. INSULATE GRAVITY SEWER AND FORCEMAINS WHERE THERE IS LESS THAN 5'-0" OF COVER WITH 2" THICK CLOSED CELL RIGID BOARD INSULATION, 18" ON EACH SIDE OF PIPE.
3. MAINTAIN 12" MINIMUM HORIZONTAL SEPARATION AND WIDEN TRENCH ACCORDINGLY IF MULTIPLE PIPES ARE IN TRENCH.

SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

SCREENED GRAVEL OR CRUSHED STONE BEDDING*

SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90 – 100
3/8"	20 – 55
# 4	0 – 10
# 8	0 – 5

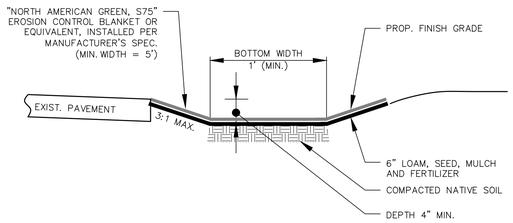
* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

DRAINAGE, SEWER & FORCEMAIN TRENCH

NOT TO SCALE

STANDARD TRENCH NOTES

1. ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE: BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWING.
2. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING THE GRADATION SHOWN IN THE TRENCH DETAIL. WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1-1/2 INCH TO 1/2 INCH SHALL BE USED.
3. SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER MEETING THE GRADATION SHOWN IN THE TRENCH DETAIL. BLANKET MAY BE REPLACED WITH BEDDING MATERIAL FOR CAST-IRON, DUCTILE IRON, AND REINFORCED CONCRETE PIPE PROVIDED THAT NO STONE LARGER THAN 2" IS IN CONTACT WITH THE PIPE AND THE GEOTEXTILE IS RELOCATED ACCORDINGLY.
4. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT, OR CLAY, ALL EXCAVATED LEDGE MATERIAL, ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION, AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN CROSS COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK, OR PEAT, IF SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLE RECONSTRUCTION WILL BE PRESERVED.
5. BASE COURSE AND PAVEMENT SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES – DIVISIONS 300 AND 400 RESPECTIVELY.
6. SHEETING, IF REQUIRED: WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAT 1 FOOT ABOVE THE TOP OF THE PIPE.
7. W = MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 15 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.) ALSO, W SHALL BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE.
8. FOR CROSS COUNTRY CONSTRUCTION, BACKFILL, FILL AND/OR LOAM SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
9. CONCRETE FOR ENCASEMENT SHALL CONFORM TO THE NEW HAMPSHIRE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS STANDARD SPECIFICATION REQUIREMENTS FOR CLASS A (3000#)
   CONCRETE AS FOLLOWS:
   CEMENT: 6.0 BAGS PER CUBIC YARD
   WATER: 5.75 GALLONS PER BAG
   CEMENT MAXIMUM SIZE OF AGGREGATE: 1 INCH
   CONCRETE ENCASEMENT IS NOT ALLOWED FOR PVC PIPE.
10. CONCRETE FULL ENCASEMENT: IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I.D. (4" MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.
11. NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES DESIGN STANDARDS REQUIRE TEN FEET (10') SEPARATION BETWEEN WATER AND SEWER. REFER TO TOWN'S STANDARD SPECIFICATIONS FOR METHODS OF PROTECTION IN AREAS THAT CANNOT MEET THESE REQUIREMENTS.

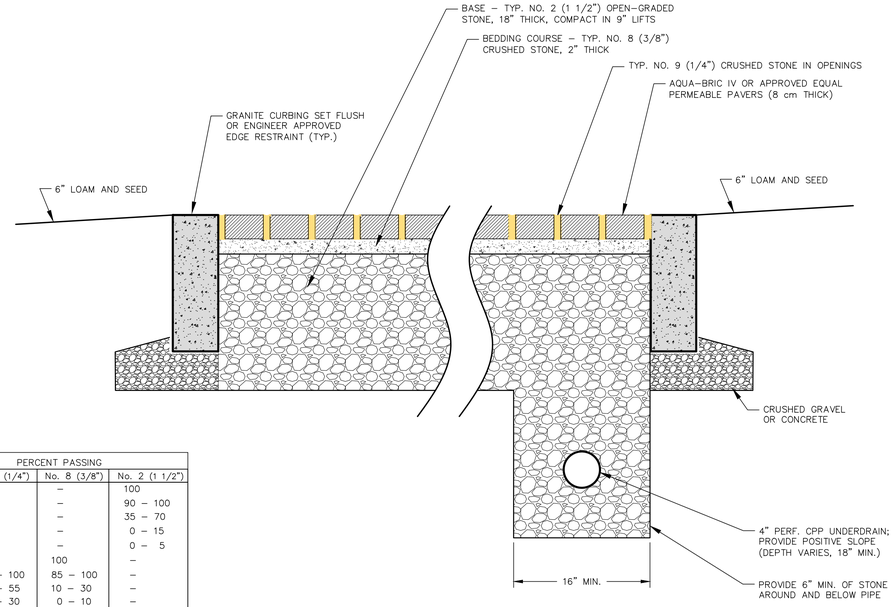


NOTES:

1. THE FOUNDATION AREA OF THE WATERWAY SHALL BE CLEARED AND GRUBBED OF ALL TREES, BRUSH, STUMPS, AND OTHER OBJECTIONABLE MATERIAL. MATERIALS REMOVED SHALL BE DISPOSED OF SO THEY WILL NOT INTERFERE WITH THE CONSTRUCTION OR PROPER FUNCTIONING OF THE WATERWAY.
2. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE AND CROSS SECTION AS REQUIRED TO MEET THE DESIGN CRITERIA. THE WATERWAY SHALL BE FREE OF IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. EARTH FILLS REQUIRED TO MEET SUBGRADE REQUIREMENTS BECAUSE OF OVER EXCAVATION OR TOPOGRAPHY SHALL BE COMPACTED TO THE SAME DENSITY AS THE SURROUNDING SOIL TO PREVENT UNEQUAL SETTLEMENT THAT COULD CAUSE DAMAGE TO THE COMPLETED WATERWAY. EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER AS TO MINIMIZE EROSION AND AIR AND WATER POLLUTION. ALL APPROPRIATE STATE AND LOCAL LAWS AND REGULATIONS SHALL BE COMPLIED WITH FOR INSTALLATION.
5. VEGETATION SHALL BE ESTABLISHED IN THE SWALE OR AN EROSION CONTROL MATTING INSTALLED PRIOR TO ALLOWING STORMWATER RUNOFF TO FLOW THROUGH THE SWALE.
6. MAINTENANCE OF THE VEGETATION IN THE GRASSED WATERWAY IS EXTREMELY IMPORTANT IN ORDER TO PREVENT RILLING, EROSION, AND FAILURE OF THE WATERWAY. MOWING SHALL BE DONE FREQUENTLY ENOUGH TO CONTROL ENCROACHMENT OF WEEDS AND WOODY VEGETATION AND TO KEEP THE GRASSES IN A VIGOROUS CONDITION. THE VEGETATION SHALL NOT BE MOWED TOO CLOSELY SO AS TO REDUCE THE EROSION RESISTANCE IN THE WATERWAY.
7. THE WATERWAY SHOULD BE INSPECTED PERIODICALLY AND AFTER ANY STORM GREATER THAN 0.5" OF RAINFALL IN 24 HOURS TO DETERMINE THE CONDITION OF THE WATERWAY. RILLS AND DAMAGED AREAS SHOULD BE PROMPTLY REPAIRED AND REVEGETATED AS NECESSARY TO PREVENT FURTHER DETERIORATION.
8. APPLY LIME AND FERTILIZER AS NEEDED TO MAINTAIN VIGOROUS GROWTH.

ROADSIDE SWALE

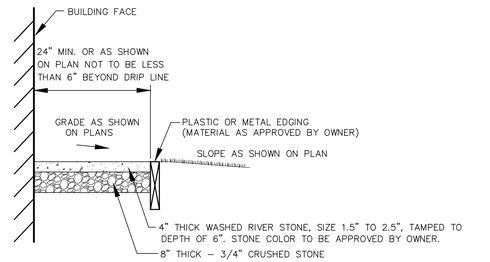
NOT TO SCALE



SIEVE SIZE	PERCENT PASSING		
	No. 9 (1/4")	No. 8 (3/8")	No. 2 (1 1/2")
3 in	–	–	100
2 1/2 in	–	–	90 – 100
2 in	–	–	35 – 70
1 1/2 in	–	–	0 – 15
3/4 in	–	–	0 – 5
1/2 in	100	100	–
3/8 in	90 – 100	85 – 100	–
No. 4	20 – 55	10 – 30	–
No. 8	5 – 30	0 – 10	–
No. 16	0 – 10	0 – 5	–
No. 50	0 – 5	–	–

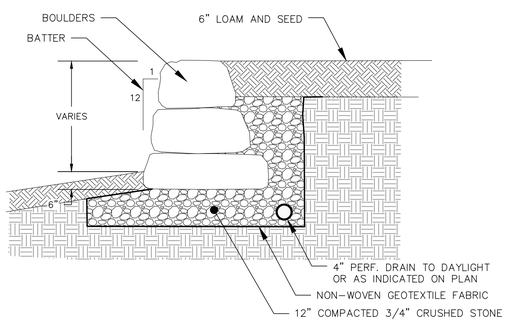
PERMEABLE PAVERS DETAIL

NOT TO SCALE



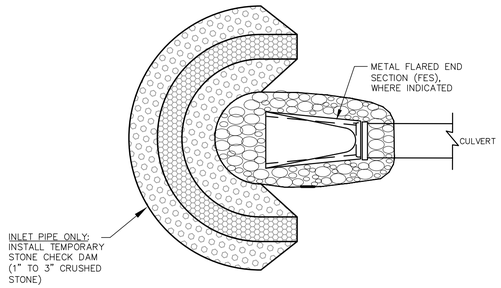
DRIP EDGE DETAIL

NOT TO SCALE

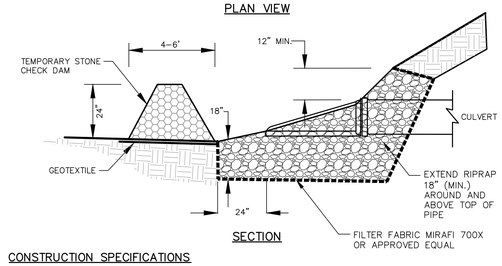


TYPICAL BOULDER WALL DETAIL

NOT TO SCALE



PLAN VIEW



SECTION

CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIPRAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIPRAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

PIPE INLET PROTECTION

NOT TO SCALE

P5217

ALTUS ENGINEERING, INC.
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

STATE OF NEW HAMPSHIRE – ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER

5/24/22

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: MAY 24, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/15/22
1	PER TAC COMMENTS	EDW	05/24/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

APPLICANT:
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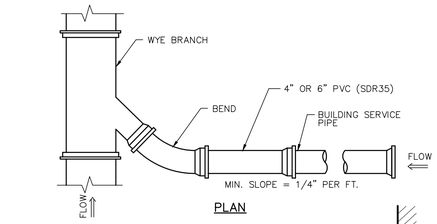
30 WALDEN STREET
PORTSMOUTH, NH 03801

OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

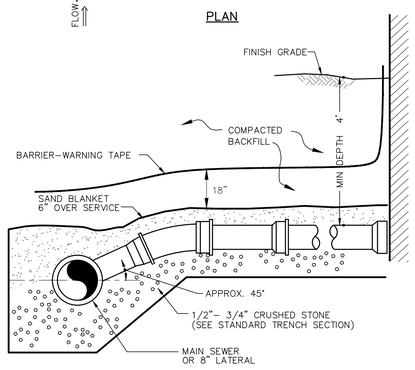
PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
DETAILS SHEET

SHEET NUMBER:
C - 4



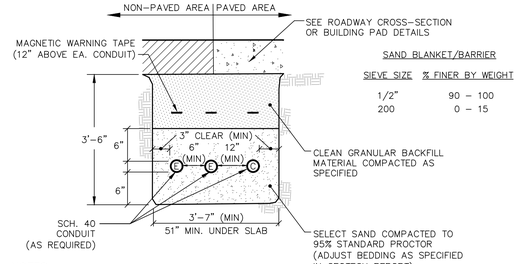
PLAN



NOTE: SERVICE CONNECTION SHALL BE INSTALLED BELOW WATER MAIN WHERE POSSIBLE.

ELEVATION

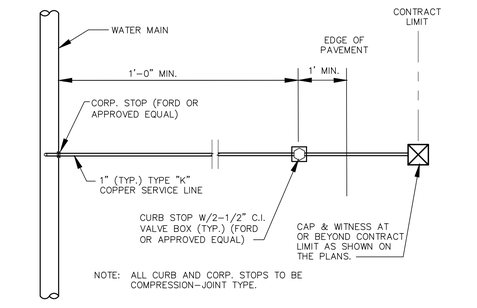
SEWER SERVICE CONNECTION NOT TO SCALE



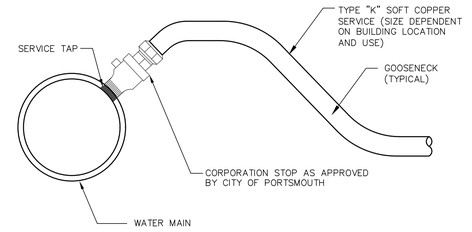
NOTES

1. ALL CONDUIT IS TO BE SCHEDULE 40 PVC, ELECTRICAL GRADE, GRAY IN COLOR AND INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS. A 10-FOOT HORIZONTAL SECTION OF RIGID GALVANIZED STEEL CONDUIT WILL BE REQUIRED AT EACH SWEEP, UNLESS IN THE OPINION OF THE SERVICE PROVIDER DESIGNER, THE SWEEP-PVC JOINT IS NOT SUBJECT TO FAILURE DURING PULLING OF THE CABLE. ALL JOINTS ARE TO BE WATERTIGHT.
2. ALL 90 DEGREE SWEEPS WILL BE MADE WITH RIGID GALVANIZED STEEL WITH A MINIMUM RADIUS OF 36 INCHES FOR PRIMARY CABLES AND 24 INCHES FOR SECONDARY CABLES.
3. BACKFILL MAY BE MADE WITH EXCAVATED MATERIAL OR COMPARABLE, UNLESS MATERIAL IS DEEMED UNSUITABLE BY SERVICE PROVIDER. BACKFILL SHALL BE FREE OF FROZEN LUMPS, ROCKS, DEBRIS, AND RUBBISH. ORGANIC MATERIAL SHALL NOT BE USED AS BACKFILL. BACKFILL SHALL BE IN 6-INCH LAYERS AND THOROUGHLY COMPACTED.
4. A SUITABLE PULLING STRING, CAPABLE OF 300 POUNDS OF PULL, MUST BE INSTALLED IN THE CONDUIT BEFORE SERVICE PROVIDER IS NOTIFIED TO INSTALL CABLE. THE STRING SHOULD BE BLOWN INTO THE CONDUIT AFTER THE RUN IS ASSEMBLED TO AVOID BONDING THE STRING TO THE CONDUIT. A MINIMUM OF TWENTY-FOUR (24") INCHES OF ROPE SLACK SHALL REMAIN AT THE END OF EACH DUCT. PULL ROPE SHALL BE INSTALLED IN ALL CONDUIT FOR FUTURE PULLS. PULL ROPE SHALL BE NYLON ROPE HAVING A MINIMUM TENSILE STRENGTH OF THREE HUNDRED (300#) LBS.
5. SERVICE PROVIDER SHALL BE GIVEN THE OPPORTUNITY TO INSPECT ALL CONDUIT PRIOR TO BACKFILL. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS SHOULD SERVICE PROVIDER BE UNABLE TO INSTALL ITS CABLE IN A SUITABLE MANNER.
6. TYPICAL CONDUIT SIZES ARE 3-INCH FOR SINGLE PHASE PRIMARY AND SECONDARY VOLTAGE CABLES, 4-INCH FOR THREE PHASE SECONDARY, AND 5-INCH FOR THREE PHASE PRIMARY. HOWEVER, SERVICE PROVIDERS MAY REQUIRE DIFFERENT NUMBERS, TYPES AND SIZES OF CONDUIT THAN THOSE SHOWN HERE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL CONDUIT SIZES, TYPES AND NUMBERS WITH EACH SERVICE PROVIDER PRIOR TO ORDERING THEM.
7. ROUTING OF CONDUIT, LOCATION OF MANHOLES, TRANSFORMERS, CABINETS, HANDHOLES, ETC., SHALL BE DETERMINED BY SERVICE PROVIDER DESIGN PERSONNEL. THE CONTRACTOR SHALL COORDINATE WITH ALL SERVICE PROVIDERS PRIOR TO THE INSTALLATION OF ANY CONDUIT.
8. ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND WHERE APPLICABLE, THE NATIONAL ELECTRIC CODE. WHERE REQUIRED BY UTILITY PROVIDER, CONDUIT SHALL BE SUPPORTED IN PLACE USING PIPE STANCHIONS PLACED EVERY FIVE (5') FEET ALONG THE CONDUIT RUN.
9. UNDER A BUILDING SLAB THE CONDUIT SHALL BE ENCASED IN 8" OF CONCRETE ON ALL SIDES.
10. ALL CONDUIT TERMINATIONS SHALL BE CAPPED TO PREVENT DEBRIS FROM ENTERING CONDUIT.

ELECTRIC / COMMUNICATION TRENCH NOT TO SCALE



NOTE: ALL MATERIALS AND SPECIFICATIONS SHALL CONFORM TO CITY OF PORTSMOUTH WATER DEPARTMENT STANDARDS AND REQUIREMENTS. VERIFY PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES.



WATER SERVICE CONNECTION NOT TO SCALE

P5217

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STATE OF NEW HAMPSHIRE – ERIC D. WEINREB No. 7634 LICENSED PROFESSIONAL ENGINEER –

5/24/22

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

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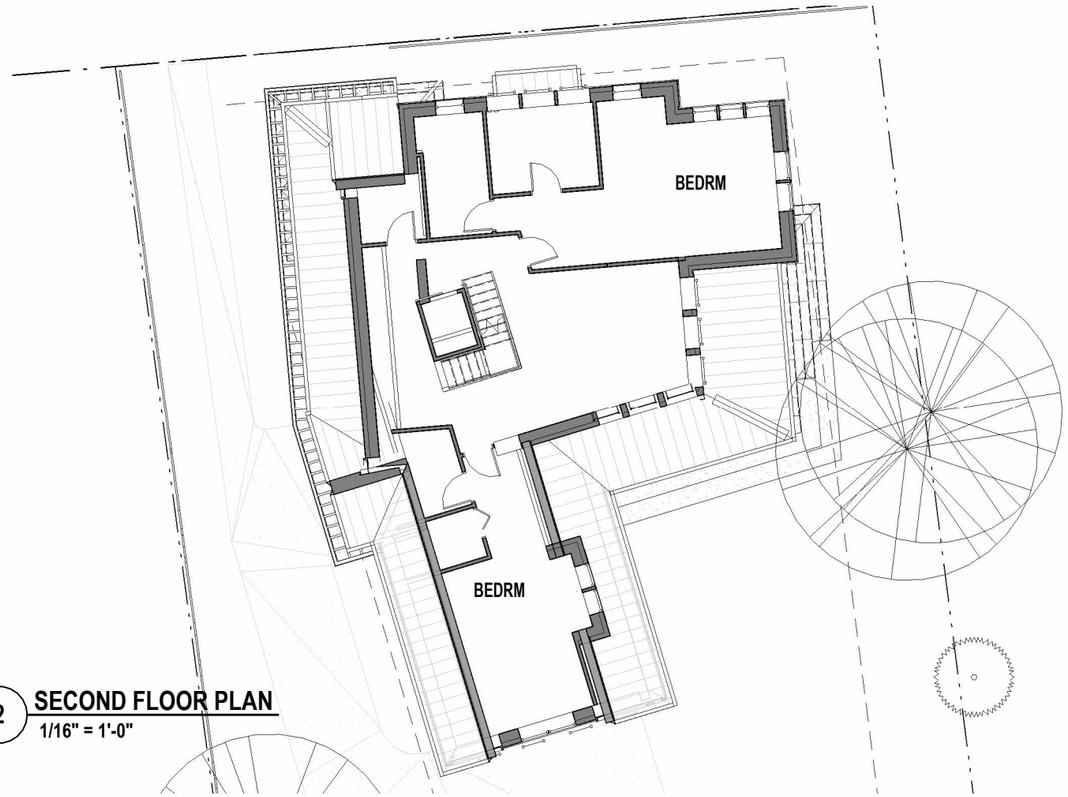
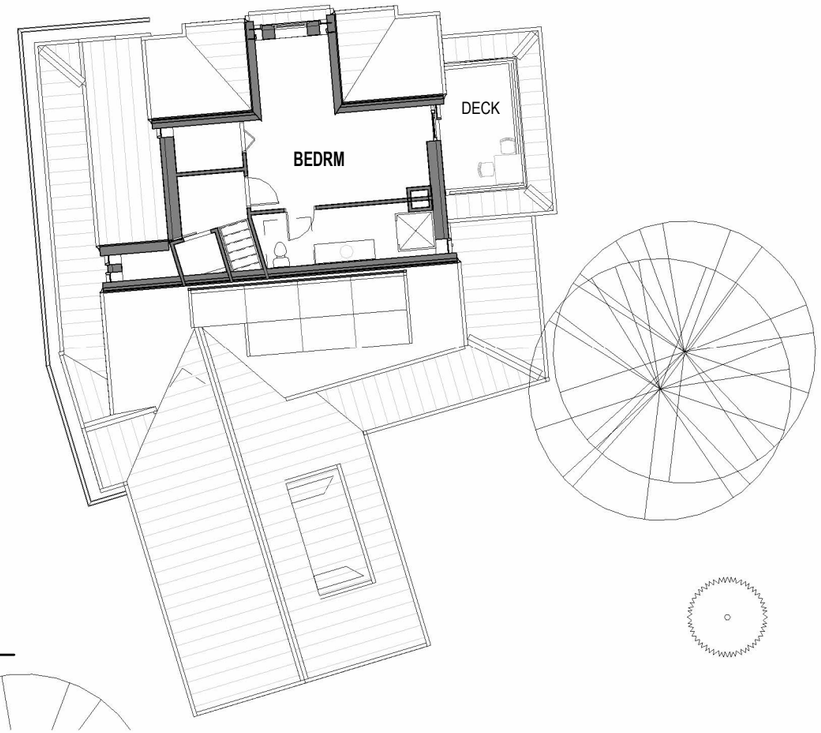
TITLE:
DETAILS SHEET

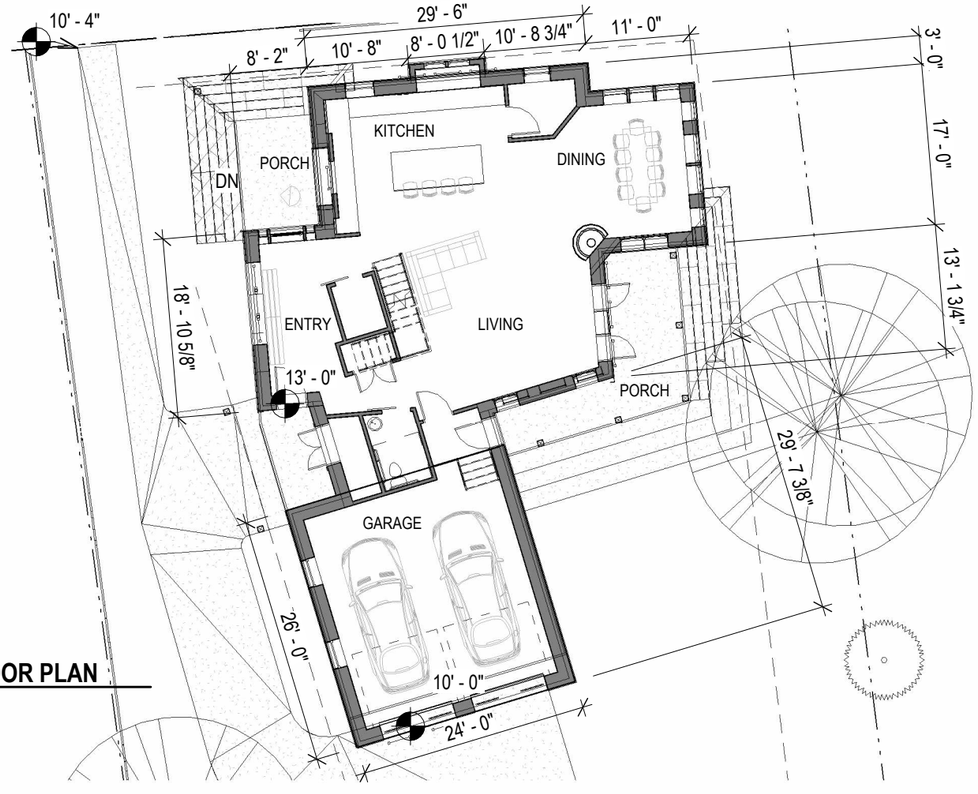
SHEET NUMBER:
C - 5



2 **SECOND FLOOR PLAN**
1/16" = 1'-0"



3 **ATTIC PLAN**
1/16" = 1'-0"



1 **FIRST FLOOR PLAN**
1/16" = 1'-0"

H.12

FLOOR PLANS
445 MARCY ST

SCALE: 1/16" = 1'-0"
5/22/2022

ARCOVE ARCHITECTS

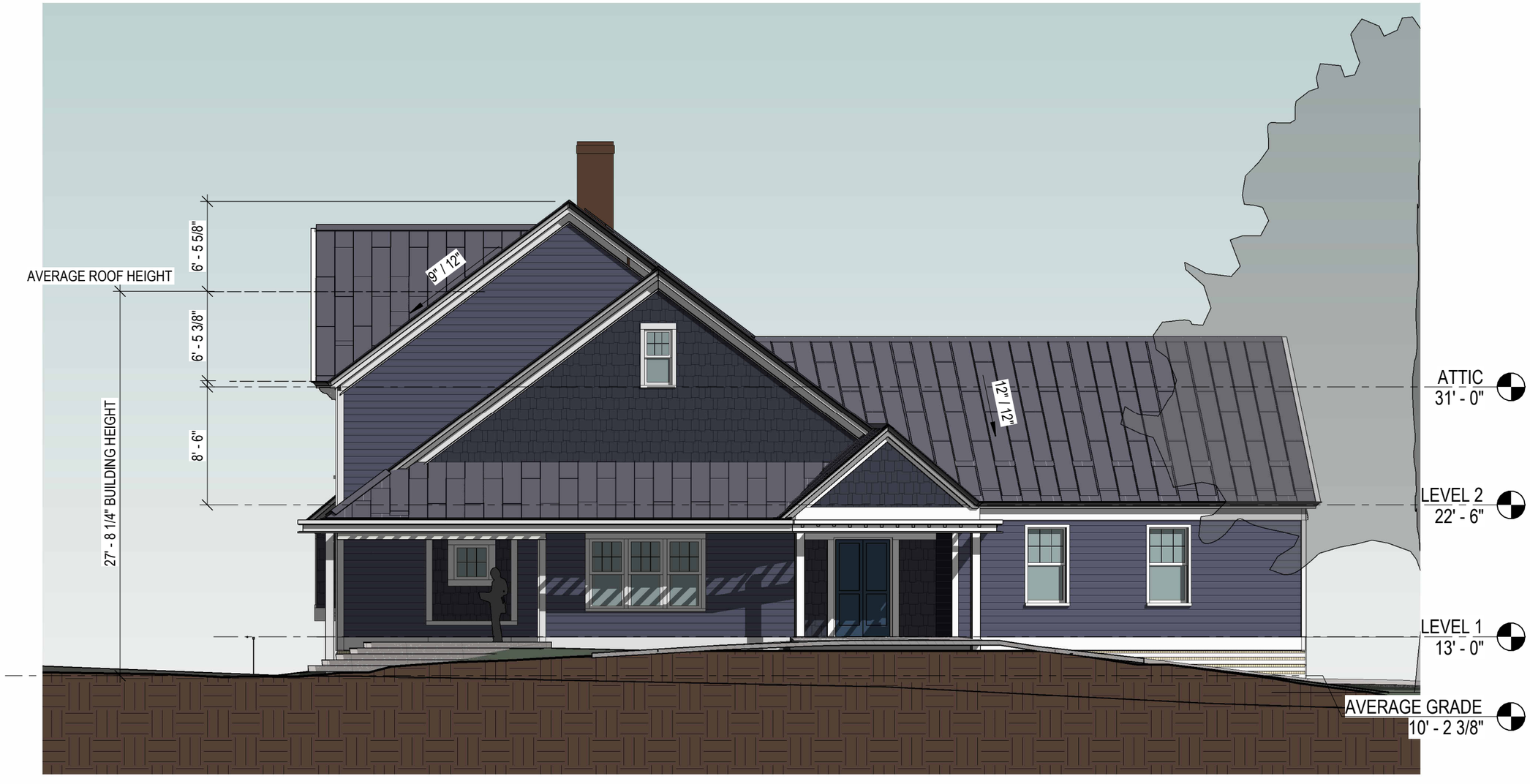
H.21

ELEVATION - FRONT (NORTH)

445 MARCY ST

SCALE: 1/8" = 1'-0"
5/22/2022

ARCOVE ARCHITECTS



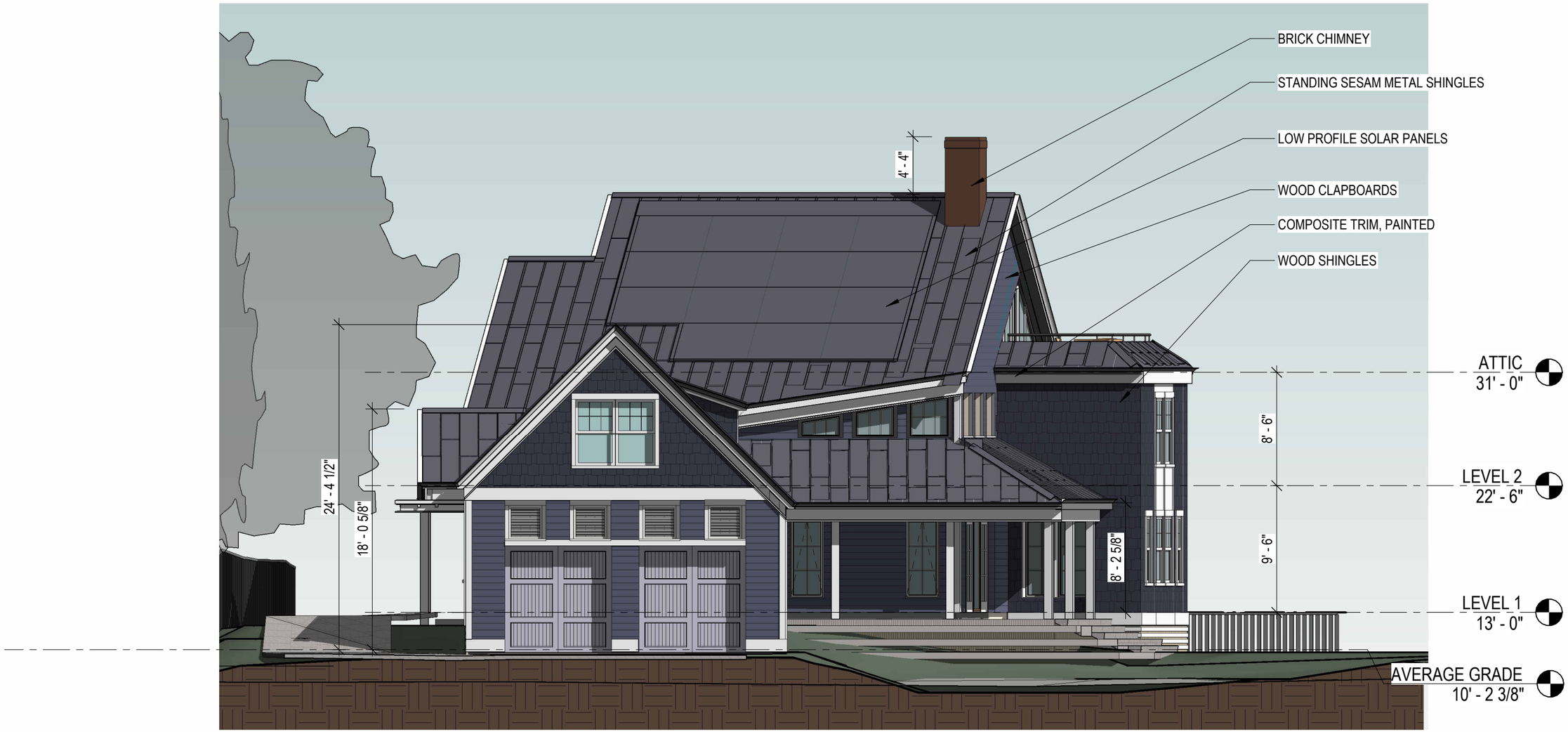
H.22

ELEVATION - WEST SIDE

445 MARCY ST

SCALE: 1/8" = 1'-0"
5/22/2022

ARCOVE ARCHITECTS



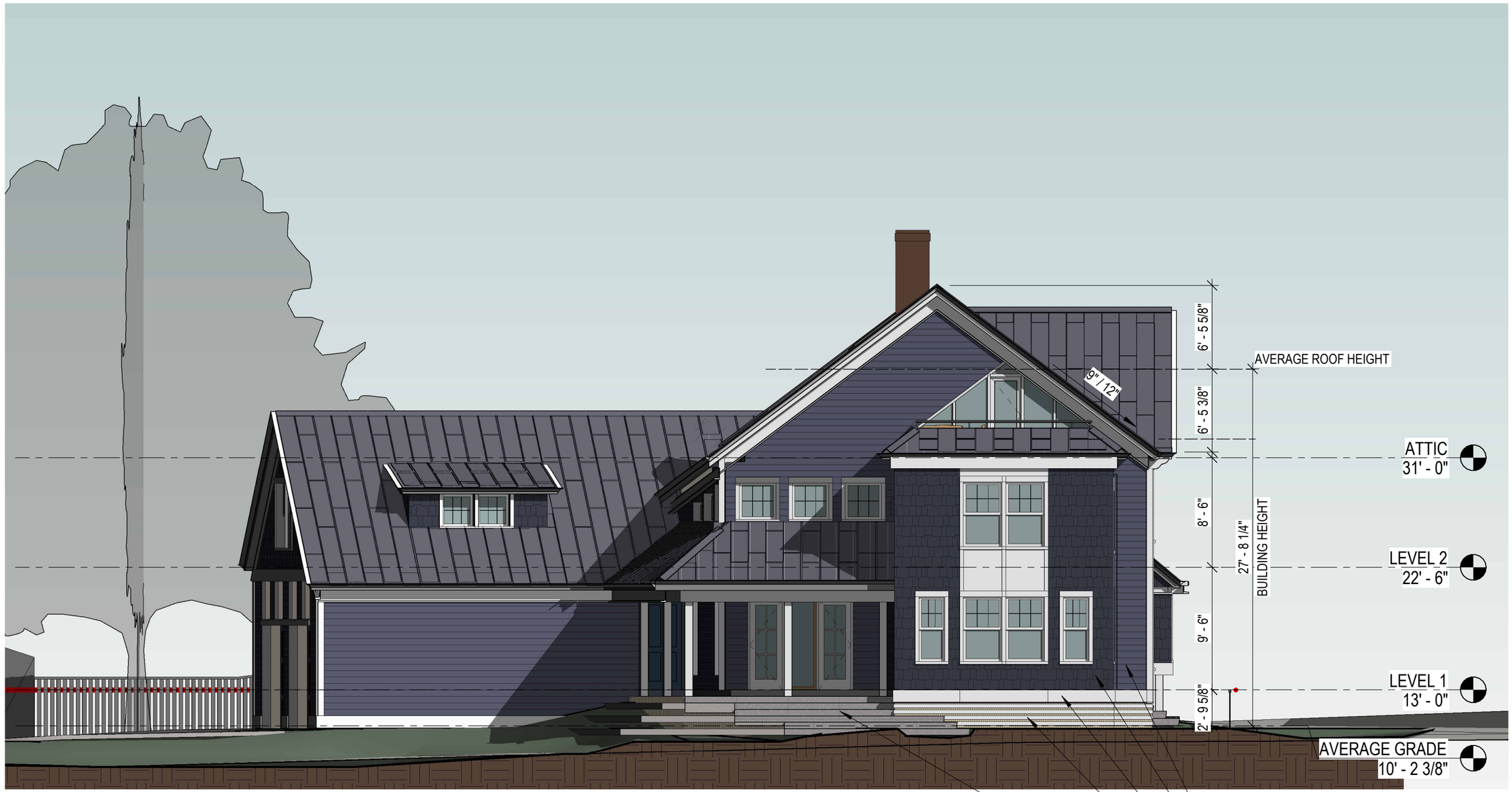
H.23

ELEVATION - REAR (SOUTH)

445 MARCY ST

SCALE: 1/8" = 1'-0"
5/22/2022

ARCOVE ARCHITECTS



H.24

ELEVATION - EAST SIDE

445 MARCY ST

SCALE: 1/8" = 1'-0"
5/22/2022

ARCOVE ARCHITECTS

Drainage Analysis

445 Marcy Street Residence

Tax Map 101, Lot 03

445 Marcy Street
Portsmouth, NH

April 2022

Prepared For:

445 Marcy Street, LLC
(Gail & James Sanders)
30 Walden Street
Portsmouth, NH 03801

Prepared By:

Altus Engineering, Inc.
133 Court Street
Portsmouth, NH 03801
Phone: (603) 433-2335
Fax: (603) 433-4194

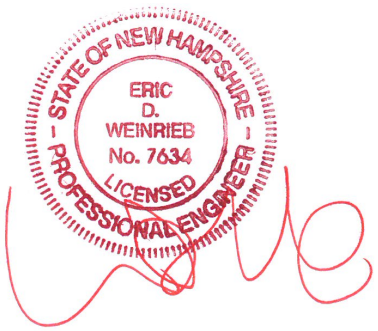
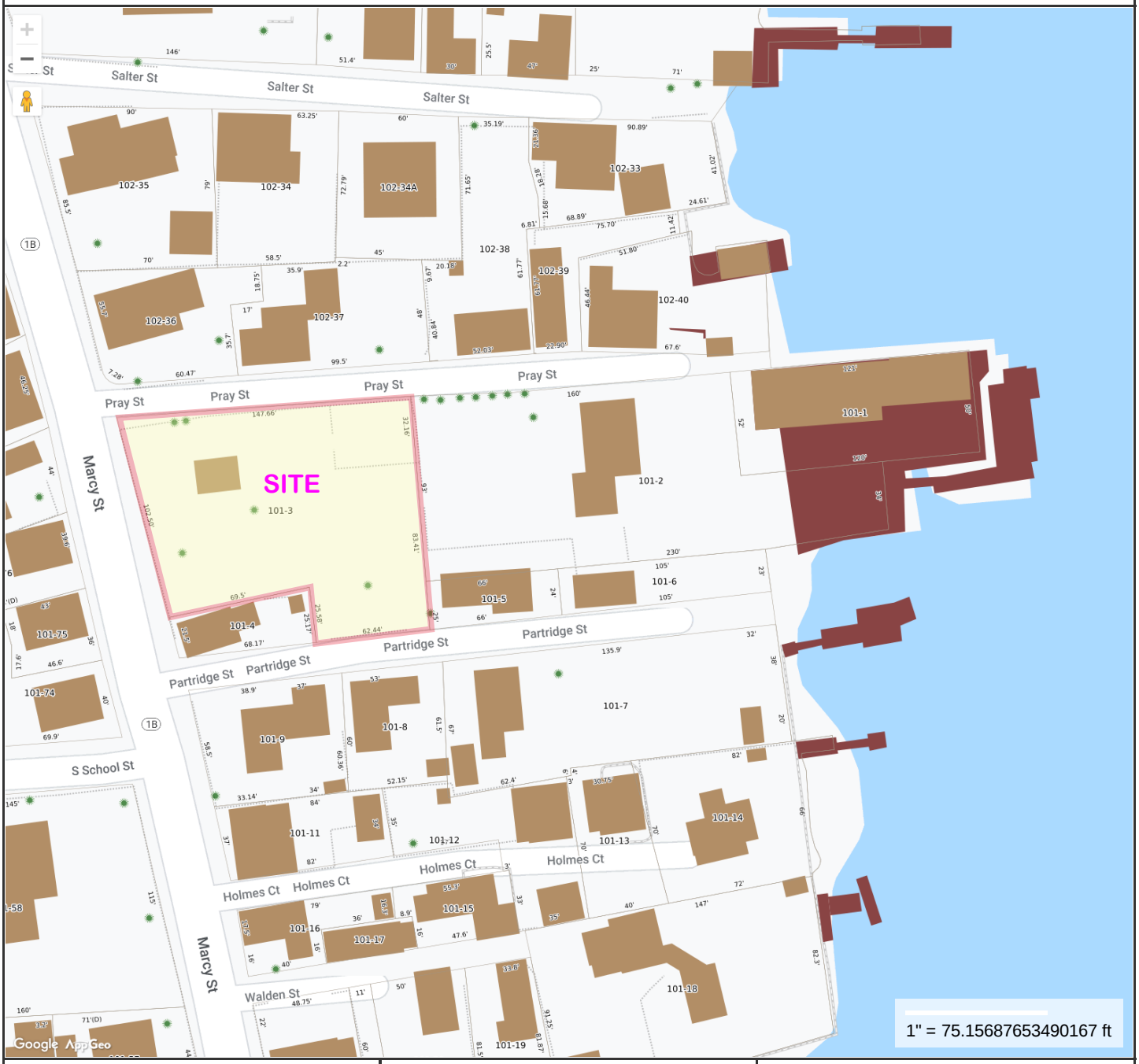


TABLE OF CONTENTS



MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Portsmouth, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 3/9/2022
Data updated 3/9/2022

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

PROJECT DESCRIPTION

The project consists of a two (2) lot subdivision of Marcy Road in Portsmouth, New Hampshire. The applicant proposes to construct a single-family residence with site improvements one of the lots. While this 8,820-sf. lot will have frontage on both Pray Street and Partridge Street, the proposed curb cut will be located off Partridge Street. The proposed lot is a vacant grassed lot surrounding by single-family residences, some which are owned by the applicant.

The site is partially located with the Flood Hazard Zone AE (elev. 8.3). The owner/applicant proposes to construct a single-family residence for their personal residence. The proposed finished floor elevation will be set at elevation 13.0 feet well above the known Flood Hazard Zone. The driveway and walkway will consist of permeable pavers with underdrain system. The project has been designed to fit harmoniously into the landscape and the neighborhood.

The lot will be serviced by municipal sewer and water.

Stormwater from impervious and other developed areas on the property will be treated by the use of stormwater best management practices (BMPs) designed to remove fine particulates and suspended sediments. Permeable pavers, grassed roadside swale, roof dripline filters, plunge pool, and other practices will be utilized to achieve the required stormwater management. Vegetative control measures are utilized to the greatest extent possible to address the stormwater quality requirements.

The project team believes that this development concept has been developed with significant sensitivity to the environment.

CALCULATION METHODS

The drainage analysis was completed using HydroCAD v.10. The program generates runoff hydrographs for specified storm distributions and performs reservoir routing using the storage indication method. The criteria used for this drainage analysis are the 2-year, 10-year, 25-year, and 50-year 24-hour Type III frequency storm events based on 1.15% of the Northeast Regional Climate Center "extreme precipitation tables" for the Portsmouth, New Hampshire.

Recommended erosion control measures are based upon the "*New Hampshire Stormwater Manual"*, developed in 2008.

The following modeling conservative data and assumptions were incorporated into the analysis:

- Model based on 1.15% of the extreme precipitation values published by Cornell/UNH for coastal communities.
- Project area soils and hydrological group are based on NRCS Web Soil Survey mapping.
- Minimum Tc of 6 minutes SCS TR-55 Urban Hydrology for Small Watersheds indicates that the minimum Tc is 0.1 hour or 6 minutes. The Federal Highway Administration Hydraulic Engineering and NHDOT Drainage Design for Highways states that minimum time of concentration (Tc) for urbanized areas should not be less than 5-minutes. Extremely short Tc times can lead to improbable runoff values and is not appropriate for design.
- Analysis is based on the development of Proposed Lot #2 only.

Altus Engineering notes that stormwater modeling is limited in its capacity to precisely predict peak flow rates and flood elevations. Results should not be considered absolute due to the number of variables and assumptions involved in the modeling effort. Surface roughness coefficients (n), entrance loss coefficients (ke), velocity factors (kv), time of concentration (Tc), and tail water conditions are based on subjective field observations and engineering judgment. For design purposes, curve numbers (CN) describe the average conditions. However, curve numbers will vary from storm to storm depending on the antecedent runoff conditions (ARC). Modeling to simulate an actual storm event requires measurement of the pre-storm ARC to adjust the CN for the event. Also, higher flood elevations than predicted by modeling could occur if drainage channels and culverts are not maintained and become blocked by debris before or during the storm event. Siltation, blockage or damage to culverts or storm drains will impact flow capacity of the structures. Structures should be re-evaluated if future changes occur within drainage basins.

SUMMARY

Drainage Analysis

The NRCS web soils survey indicates the site consists of Urban land-Canton complex soils, a well-drained soil. It is known that this area of the city was built up over time during the colonial period. There is evidence that the soil has restrictive layers and is poorly draining, therefore the soil is best described as Hydrological Group C.

The pre-development watershed is delineated on the accompanying Sheet W-1, Pre-Development Watershed Plan. The runoff flows to the depression in the southeast corner of the parcel. The point of analysis (POA) is a 6" pipe, daylights onto paved surface before flowing to the Piscataqua River. In larger storm events, the depression overflows onto Partridge Street. The flow runs easterly along the north side of the street and other parcels owned by the applicant to the river.

The post-development conditions were analyzed at the same discharge points as the pre-development conditions. The post-development watersheds are delineated on the accompanying Sheet WS-2, Post-Development Watershed Plan. Modifications to the delineated areas and associated ground cover were made to sub-catchments to account for the improvements to the property. In the 10-year storm event and greater, the magnitude of flooding is decreased in Partridge Street (e.g., a 10-year storm event 0.49 cfs goes down to 0.42 cfs).

A complete summary of the flow conditions and modeling is included in Appendix A. The following compares pre- and post-development peak flow rates at the point of analysis:

		2-Year Storm (3.69 in.)	**10-Year Storm (5.60 in.)**	**25-Year Storm (7.10 in.)**	**50-Year Storm (8.50 in.)**
		Qout (cfs)	**Qout (cfs)**	**Qout (cfs)**	**Qout (cfs)**
Discharge 6" pipe	Pre	0.25	0.41	0.46	0.48
	Post	0.24	0.63	0.79	0.91
Overflow from Pond 1P	Pre	0.00	0.49	1.09	1.58
	Post	0.00	0.42	0.87	1.18
Combined Flow	Pre	0.25	0.90	1.55	2.06
	Post	0.24	1.05	1.66	2.03
	Net Change	**-0.01**	**0.15**	**0.11**	**0.03**

Conclusions

As shown in the summary table, the analysis indicates a minor increase in runoff leaving the site which flows directly to the Piscataqua River. Additionally, the development shows a reduce volume of water or flooding potential along Partridge Street. Altus believes that no down gradient abutters will be negatively impacted by the proposed development.

This analysis is based on the development of Proposed Lot #2 only. Any development of Proposed Lot #1 is expected to address drainage on-site without increasing flow onto Proposed Lot #2.

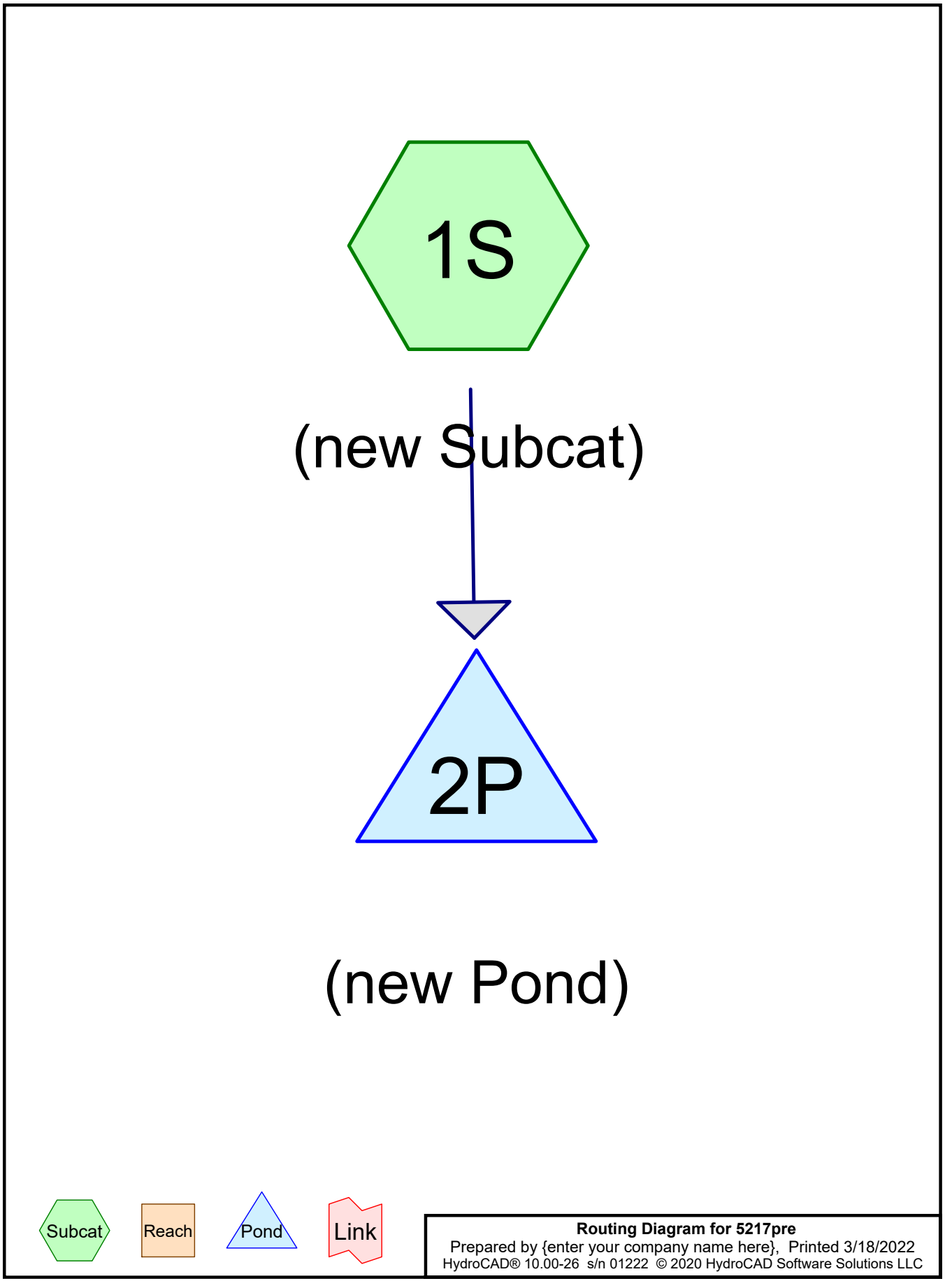
Stormwater Treatment

Stormwater from impervious and other developed areas on the property will be treated by the use of stormwater best management practices (BMPs) designed to remove fine particulates and suspended sediments. Permeable pavers, grassed roadside swale, roof dripline filters, plunge pool, and other practices will be utilized to achieve the required stormwater management. Vegetative control measures are utilized to the greatest extent possible to address the stormwater quality requirements.

APPENDIX A:

SUPPORTING CALCULATIONS

PRE-DEVELOPMENT CALCULATIONS



Routing Diagram for 5217pre
Prepared by {enter your company name here}, Printed 3/18/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.324	74	>75% Grass cover, Good, HSG C (1S)
0.010	89	Gravel roads, HSG C (1S)
0.009	98	Paved parking, HSG C (1S)
0.343	**75**	**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (new Subcat) Runoff Area=14,947 sf 2.73% Impervious Runoff Depth>1.32"
Flow Length=185' Tc=6.0 min CN=75 Runoff=0.56 cfs 0.038 af

Pond 2P: (new Pond) Peak Elev=7.12' Storage=405 cf Inflow=0.56 cfs 0.038 af
Outflow=0.25 cfs 0.036 af

Total Runoff Area = 0.343 ac Runoff Volume = 0.038 af Average Runoff Depth = 1.32"
97.27% Pervious = 0.334 ac 2.73% Impervious = 0.009 ac

Summary for Subcatchment 1S: (new Subcat)

Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.038 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.69"

Area (sf)	CN	Description
428	89	Gravel roads, HSG C
408	98	Paved parking, HSG C
14,111	74	>75% Grass cover, Good, HSG C
14,947	75	Weighted Average
14,539		97.27% Pervious Area
408		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
1.0	135	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.8	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Pond 2P: (new Pond)

Inflow Area = 0.343 ac, 2.73% Impervious, Inflow Depth > 1.32" for 2-yr event
Inflow = 0.56 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.25 cfs @ 12.34 hrs, Volume= 0.036 af, Atten= 55%, Lag= 14.3 min
Primary = 0.25 cfs @ 12.34 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.12' @ 12.34 hrs Surf.Area= 1,618 sf Storage= 405 cf

Plug-Flow detention time= 37.3 min calculated for 0.036 af (96% of inflow)
Center-of-Mass det. time= 24.0 min (833.6 - 809.7)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	713 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	300	0	0
7.00	1,230	199	199
7.30	2,200	514	713

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#2	Primary	7.20'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.25 cfs @ 12.34 hrs HW=7.12' (Free Discharge)
1=Culvert (Barrel Controls 0.25 cfs @ 2.15 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (new Subcat) Runoff Area=14,947 sf 2.73% Impervious Runoff Depth>2.74"
Flow Length=185' Tc=6.0 min CN=75 Runoff=1.16 cfs 0.078 af

Pond 2P: (new Pond) Peak Elev=7.28' Storage=672 cf Inflow=1.16 cfs 0.078 af
Outflow=0.92 cfs 0.077 af

Total Runoff Area = 0.343 ac Runoff Volume = 0.078 af Average Runoff Depth = 2.74"
97.27% Pervious = 0.334 ac 2.73% Impervious = 0.009 ac

Summary for Subcatchment 1S: (new Subcat)

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.078 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.60"

Area (sf)	CN	Description
428	89	Gravel roads, HSG C
408	98	Paved parking, HSG C
14,111	74	>75% Grass cover, Good, HSG C
14,947	75	Weighted Average
14,539		97.27% Pervious Area
408		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
1.0	135	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.8	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Pond 2P: (new Pond)

Inflow Area = 0.343 ac, 2.73% Impervious, Inflow Depth > 2.74" for 10-yr event
Inflow = 1.16 cfs @ 12.09 hrs, Volume= 0.078 af
Outflow = 0.92 cfs @ 12.17 hrs, Volume= 0.077 af, Atten= 21%, Lag= 4.6 min
Primary = 0.92 cfs @ 12.17 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.28' @ 12.17 hrs Surf.Area= 2,122 sf Storage= 672 cf

Plug-Flow detention time= 29.0 min calculated for 0.077 af (98% of inflow)
Center-of-Mass det. time= 20.1 min (813.4 - 793.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	713 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	300	0	0
7.00	1,230	199	199
7.30	2,200	514	713

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#2	Primary	7.20'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.87 cfs @ 12.17 hrs HW=7.27' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.41 cfs @ 2.43 fps)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.46 cfs @ 0.65 fps)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (new Subcat) Runoff Area=14,947 sf 2.73% Impervious Runoff Depth>3.96"
Flow Length=185' Tc=6.0 min CN=75 Runoff=1.67 cfs 0.113 af

Pond 2P: (new Pond) Peak Elev=7.34' Storage=713 cf Inflow=1.67 cfs 0.113 af
Outflow=1.79 cfs 0.111 af

Total Runoff Area = 0.343 ac Runoff Volume = 0.113 af Average Runoff Depth = 3.96"
97.27% Pervious = 0.334 ac 2.73% Impervious = 0.009 ac

Summary for Subcatchment 1S: (new Subcat)

Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.113 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=7.10"

Area (sf)	CN	Description
428	89	Gravel roads, HSG C
408	98	Paved parking, HSG C
14,111	74	>75% Grass cover, Good, HSG C
14,947	75	Weighted Average
14,539		97.27% Pervious Area
408		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
1.0	135	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.8	185	Total, Increased to minimum Tc = 6.0 min			

Summary for Pond 2P: (new Pond)

Inflow Area = 0.343 ac, 2.73% Impervious, Inflow Depth > 3.96" for 25-yr event
Inflow = 1.67 cfs @ 12.09 hrs, Volume= 0.113 af
Outflow = 1.79 cfs @ 12.11 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.8 min
Primary = 1.79 cfs @ 12.11 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.34' @ 12.11 hrs Surf.Area= 2,200 sf Storage= 713 cf

Plug-Flow detention time= 24.7 min calculated for 0.111 af (98% of inflow)
Center-of-Mass det. time= 17.5 min (802.3 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	713 cf	**Custom Stage Data (Prismatic)** Listed below

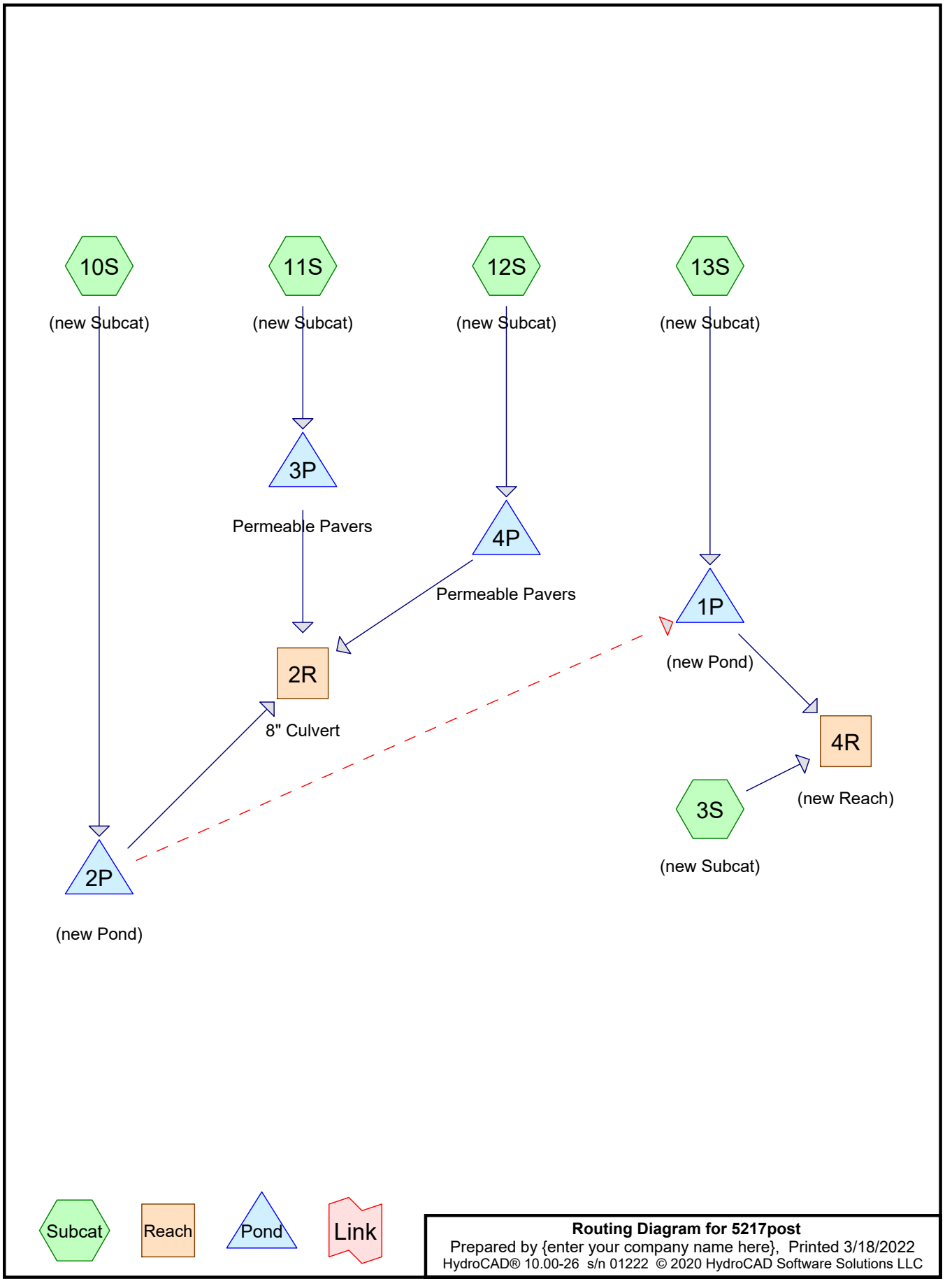
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	300	0	0
7.00	1,230	199	199
7.30	2,200	514	713

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.20 sf
#2	Primary	7.20'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=1.71 cfs @ 12.11 hrs HW=7.34' (Free Discharge)
1=Culvert (Barrel Controls 0.46 cfs @ 2.50 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 1.25 cfs @ 0.90 fps)

POST-DEVELOPMENT CALCULATIONS



Routing Diagram for 5217post
Prepared by {enter your company name here}, Printed 3/18/2022
HydroCAD® 10.00-26 s/n 01222 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.221	74	>75% Grass cover, Good, HSG C (3S, 10S, 11S, 12S, 13S)
0.010	89	Gravel roads, HSG C (3S, 10S)
0.076	98	Roofs, HSG C (3S, 10S, 11S, 12S, 13S)
0.036	98	Unconnected pavers, HSG C (3S, 11S, 12S, 13S)
0.343	**82**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2R	6.85	6.75	20.0	0.0050	0.013	8.0	0.0	0.0
2	1P	6.74	6.64	20.0	0.0050	0.012	6.0	0.0	0.0
3	3P	7.50	7.00	50.0	0.0100	0.012	4.0	0.0	0.0
4	4P	7.25	7.00	25.0	0.0100	0.012	4.0	0.0	0.0

Summary for Subcatchment 3S: (new Subcat)

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
	171	89	Gravel roads, HSG C
	1,435	98	Roofs, HSG C
	1,622	74	>75% Grass cover, Good, HSG C
*	172	98	Unconnected pavers, HSG C
	3,400	86	Weighted Average
	1,793		52.74% Pervious Area
	1,607		47.26% Impervious Area
	172		10.70% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S: (new Subcat)

Runoff = 0.24 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.69"

Area (sf)	CN	Description
257	89	Gravel roads, HSG C
294	98	Roofs, HSG C
5,689	74	>75% Grass cover, Good, HSG C
6,240	76	Weighted Average
5,946		95.29% Pervious Area
294		4.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S: (new Subcat)

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
*	610	98	Unconnected pavers, HSG C
	220	98	Roofs, HSG C
	113	74	>75% Grass cover, Good, HSG C
	943	95	Weighted Average
	113		11.98% Pervious Area
	830		88.02% Impervious Area
	610		73.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 12S: (new Subcat)

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
*	708	98	Unconnected pavers, HSG C
	195	98	Roofs, HSG C
	126	74	>75% Grass cover, Good, HSG C
	1,029	95	Weighted Average
	126		12.24% Pervious Area
	903		87.76% Impervious Area
	708		78.41% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 13S: (new Subcat)

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.69"

	Area (sf)	CN	Description
*	93	98	Unconnected pavers, HSG C
	1,092	98	Roofs, HSG C
	2,074	74	>75% Grass cover, Good, HSG C
	77	98	Roofs, HSG C
	3,336	83	Weighted Average
	2,074		62.17% Pervious Area
	1,262		37.83% Impervious Area
	93		7.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 2R: 8" Culvert

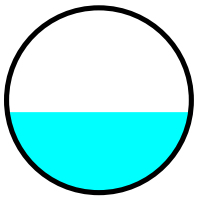
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[80] Warning: Exceeded Pond 2P by 0.04' @ 9.75 hrs (0.01 cfs 0.001 af)

Inflow Area = 0.189 ac, 24.68% Impervious, Inflow Depth > 1.75" for 2-yr event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.027 af
Outflow = 0.33 cfs @ 12.12 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.29 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.85 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0050 '/'
Inlet Invert= 6.85', Outlet Invert= 6.75'



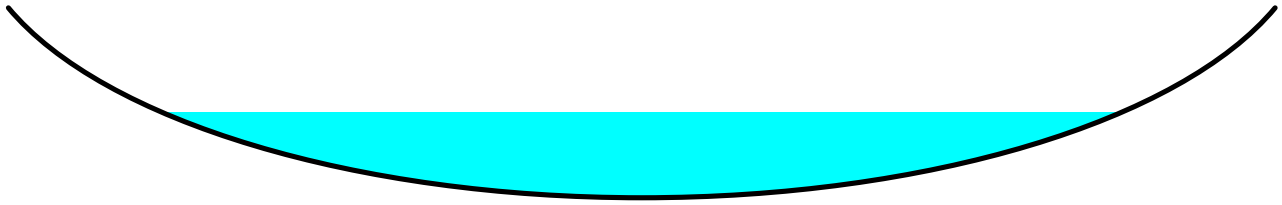
Summary for Reach 4R: (new Reach)

Inflow Area = 0.155 ac, 42.59% Impervious, Inflow Depth > 1.99" for 2-yr event
Inflow = 0.29 cfs @ 12.11 hrs, Volume= 0.026 af
Outflow = 0.29 cfs @ 12.11 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.43 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.33' Flow Area= 0.7 sf, Capacity= 1.59 cfs

3.00' x 0.33' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 1.0' Slope= 0.0100 '/'
Inlet Invert= 6.66', Outlet Invert= 6.65'



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Summary for Pond 1P: (new Pond)

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.077 ac, 37.83% Impervious, Inflow Depth > 1.88" for 2-yr event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.11 cfs @ 12.22 hrs, Volume= 0.012 af, Atten= 41%, Lag= 7.5 min
Primary = 0.11 cfs @ 12.22 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 6.98' @ 12.22 hrs Surf.Area= 660 sf Storage= 103 cf

Plug-Flow detention time= 26.0 min calculated for 0.012 af (98% of inflow)
Center-of-Mass det. time= 18.2 min (809.0 - 790.7)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	567 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	200	0	0
7.00	700	117	117
7.50	1,100	450	567

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Device 1	6.74'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	7.54'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=6.98' TW=6.79' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.10 cfs @ 1.65 fps)
  └─**2=Orifice/Grate** (Passes 0.10 cfs of 0.11 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: (new Pond)

Inflow Area = 0.143 ac, 4.71% Impervious, Inflow Depth > 1.39" for 2-yr event
Inflow = 0.24 cfs @ 12.10 hrs, Volume= 0.017 af
Outflow = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af, Atten= 14%, Lag= 1.7 min
Primary = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.19' @ 12.16 hrs Surf.Area= 134 sf Storage= 40 cf

Plug-Flow detention time= 4.9 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 3.3 min (810.7 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1	6.85'	108 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.85	35	0	0
7.00	80	9	9
7.60	250	99	108

Device	Routing	Invert	Outlet Devices
#1	Primary	6.85'	**8.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	7.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.18 cfs @ 12.12 hrs HW=7.18' TW=7.13' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=6.85' TW=6.74' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.022 ac, 88.02% Impervious, Inflow Depth > 2.95" for 2-yr event
Inflow = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af
Outflow = 0.05 cfs @ 12.17 hrs, Volume= 0.005 af, Atten= 26%, Lag= 4.7 min
Primary = 0.05 cfs @ 12.17 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 7.66' @ 12.17 hrs Surf.Area= 610 sf Storage= 39 cf

Plug-Flow detention time= 33.5 min calculated for 0.005 af (97% of inflow)
Center-of-Mass det. time= 23.2 min (773.6 - 750.4)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	366 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	610	0.0	0	0
9.00	610	40.0	366	366

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	**4.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.50' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.05 cfs @ 12.17 hrs HW=7.66' TW=7.13' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.05 cfs @ 1.90 fps)

Summary for Pond 4P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span
[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.024 ac, 87.76% Impervious, Inflow Depth > 2.95" for 2-yr event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.50' @ 12.10 hrs Surf.Area= 708 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	425 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	708	0.0	0	0
9.00	708	40.0	425	425

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**4.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.25' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.11 cfs @ 12.09 hrs HW=7.50' TW=7.13' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.11 cfs @ 2.21 fps)

Summary for Subcatchment 3S: (new Subcat)

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.60"

	Area (sf)	CN	Description
	171	89	Gravel roads, HSG C
	1,435	98	Roofs, HSG C
	1,622	74	>75% Grass cover, Good, HSG C
*	172	98	Unconnected pavers, HSG C
	3,400	86	Weighted Average
	1,793		52.74% Pervious Area
	1,607		47.26% Impervious Area
	172		10.70% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S: (new Subcat)

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.60"

Area (sf)	CN	Description
257	89	Gravel roads, HSG C
294	98	Roofs, HSG C
5,689	74	>75% Grass cover, Good, HSG C
6,240	76	Weighted Average
5,946		95.29% Pervious Area
294		4.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S: (new Subcat)

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.60"

	Area (sf)	CN	Description
*	610	98	Unconnected pavers, HSG C
	220	98	Roofs, HSG C
	113	74	>75% Grass cover, Good, HSG C
	943	95	Weighted Average
	113		11.98% Pervious Area
	830		88.02% Impervious Area
	610		73.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 12S: (new Subcat)

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.60"

	Area (sf)	CN	Description
*	708	98	Unconnected pavers, HSG C
	195	98	Roofs, HSG C
	126	74	>75% Grass cover, Good, HSG C
	1,029	95	Weighted Average
	126		12.24% Pervious Area
	903		87.76% Impervious Area
	708		78.41% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 13S: (new Subcat)

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.60"

	Area (sf)	CN	Description
*	93	98	Unconnected pavers, HSG C
	1,092	98	Roofs, HSG C
	2,074	74	>75% Grass cover, Good, HSG C
	77	98	Roofs, HSG C
	3,336	83	Weighted Average
	2,074		62.17% Pervious Area
	1,262		37.83% Impervious Area
	93		7.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 2R: 8" Culvert

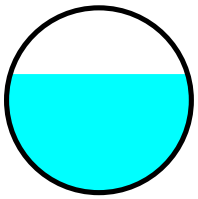
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[80] Warning: Exceeded Pond 2P by 0.03' @ 8.10 hrs (0.00 cfs 0.001 af)

Inflow Area = 0.189 ac, 24.68% Impervious, Inflow Depth > 3.27" for 10-yr event
Inflow = 0.63 cfs @ 12.11 hrs, Volume= 0.051 af
Outflow = 0.63 cfs @ 12.12 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.68 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.85 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0050 '/'
Inlet Invert= 6.85', Outlet Invert= 6.75'



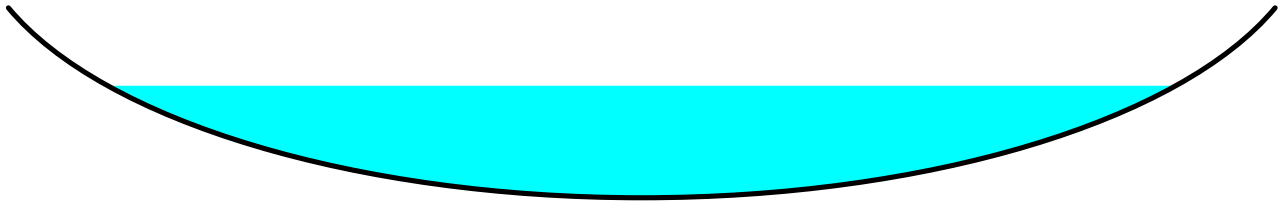
Summary for Reach 4R: (new Reach)

Inflow Area = 0.155 ac, 42.59% Impervious, Inflow Depth > 3.62" for 10-yr event
Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.047 af
Outflow = 0.51 cfs @ 12.10 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.33' Flow Area= 0.7 sf, Capacity= 1.59 cfs

3.00' x 0.33' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 1.0' Slope= 0.0100 '/'
Inlet Invert= 6.66', Outlet Invert= 6.65'



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Summary for Pond 1P: (new Pond)

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.077 ac, 37.83% Impervious, Inflow Depth > 3.50" for 10-yr event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.18 cfs @ 12.22 hrs, Volume= 0.022 af, Atten= 45%, Lag= 8.0 min
Primary = 0.18 cfs @ 12.22 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.09' @ 12.22 hrs Surf.Area= 772 sf Storage= 183 cf

Plug-Flow detention time= 22.5 min calculated for 0.022 af (99% of inflow)
Center-of-Mass det. time= 16.8 min (793.1 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	567 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	200	0	0
7.00	700	117	117
7.50	1,100	450	567

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Device 1	6.74'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	7.54'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 12.22 hrs HW=7.09' TW=6.83' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.18 cfs of 0.20 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 2.05 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: (new Pond)

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)

Inflow Area = 0.143 ac, 4.71% Impervious, Inflow Depth > 2.83" for 10-yr event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.034 af
Outflow = 0.45 cfs @ 12.11 hrs, Volume= 0.034 af, Atten= 11%, Lag= 1.2 min
Primary = 0.45 cfs @ 12.11 hrs, Volume= 0.034 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.36' @ 12.15 hrs Surf.Area= 183 sf Storage= 69 cf

Plug-Flow detention time= 3.9 min calculated for 0.034 af (99% of inflow)
Center-of-Mass det. time= 2.9 min (794.2 - 791.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6.85'	108 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.85	35	0	0
7.00	80	9	9
7.60	250	99	108

Device	Routing	Invert	Outlet Devices
#1	Primary	6.85'	**8.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	7.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.37 cfs @ 12.11 hrs HW=7.35' TW=7.27' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.32 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=6.85' TW=6.74' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.022 ac, 88.02% Impervious, Inflow Depth > 4.71" for 10-yr event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.08 cfs @ 12.16 hrs, Volume= 0.008 af, Atten= 26%, Lag= 4.6 min
Primary = 0.08 cfs @ 12.16 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.72' @ 12.16 hrs Surf.Area= 610 sf Storage= 53 cf

Plug-Flow detention time= 27.3 min calculated for 0.008 af (98% of inflow)
Center-of-Mass det. time= 19.1 min (762.3 - 743.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	366 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	610	0.0	0	0
9.00	610	40.0	366	366

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	**4.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.50' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.08 cfs @ 12.16 hrs HW=7.72' TW=7.25' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.08 cfs @ 2.00 fps)

Summary for Pond 4P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span
[44] Hint: Outlet device #1 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=75)

Inflow Area =	0.024 ac, 87.76% Impervious, Inflow Depth > 4.71"	for 10-yr event		
Inflow =	0.12 cfs @	12.09 hrs, Volume=	0.009 af	
Outflow =	0.11 cfs @	12.07 hrs, Volume=	0.009 af, Atten= 8%, Lag= 0.0 min	
Primary =	0.11 cfs @	12.07 hrs, Volume=	0.009 af	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.51' @ 12.14 hrs Surf.Area= 708 sf Storage= 3 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (743.8 - 743.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	425 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	708	0.0	0	0
9.00	708	40.0	425	425

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**4.0" Round Culvert**

L= 25.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 7.25' / 7.00' S= 0.0100 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.10 cfs @ 12.07 hrs HW=7.50' TW=7.25' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.10 cfs @ 2.00 fps)

Summary for Subcatchment 3S: (new Subcat)

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=7.10"

	Area (sf)	CN	Description
	171	89	Gravel roads, HSG C
	1,435	98	Roofs, HSG C
	1,622	74	>75% Grass cover, Good, HSG C
*	172	98	Unconnected pavers, HSG C
	3,400	86	Weighted Average
	1,793		52.74% Pervious Area
	1,607		47.26% Impervious Area
	172		10.70% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S: (new Subcat)

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.049 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=7.10"

Area (sf)	CN	Description
257	89	Gravel roads, HSG C
294	98	Roofs, HSG C
5,689	74	>75% Grass cover, Good, HSG C
6,240	76	Weighted Average
5,946		95.29% Pervious Area
294		4.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0440	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.69"
0.7	100	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.5	150	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S: (new Subcat)

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=7.10"

	Area (sf)	CN	Description
*	610	98	Unconnected pavers, HSG C
	220	98	Roofs, HSG C
	113	74	>75% Grass cover, Good, HSG C
	943	95	Weighted Average
	113		11.98% Pervious Area
	830		88.02% Impervious Area
	610		73.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 12S: (new Subcat)

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=7.10"

	Area (sf)	CN	Description
*	708	98	Unconnected pavers, HSG C
	195	98	Roofs, HSG C
	126	74	>75% Grass cover, Good, HSG C
	1,029	95	Weighted Average
	126		12.24% Pervious Area
	903		87.76% Impervious Area
	708		78.41% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 13S: (new Subcat)

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=7.10"

	Area (sf)	CN	Description
*	93	98	Unconnected pavers, HSG C
	1,092	98	Roofs, HSG C
	2,074	74	>75% Grass cover, Good, HSG C
	77	98	Roofs, HSG C
	3,336	83	Weighted Average
	2,074		62.17% Pervious Area
	1,262		37.83% Impervious Area
	93		7.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Reach 2R: 8" Culvert

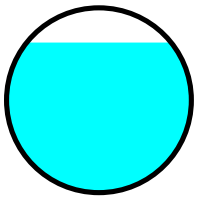
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[80] Warning: Exceeded Pond 2P by 0.03' @ 7.05 hrs (0.00 cfs 0.001 af)

Inflow Area = 0.189 ac, 24.68% Impervious, Inflow Depth > 4.54" for 25-yr event
Inflow = 0.85 cfs @ 12.11 hrs, Volume= 0.071 af
Outflow = 0.85 cfs @ 12.11 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.79 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.3 min

Peak Storage= 6 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.85 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0050 '/'
Inlet Invert= 6.85', Outlet Invert= 6.75'



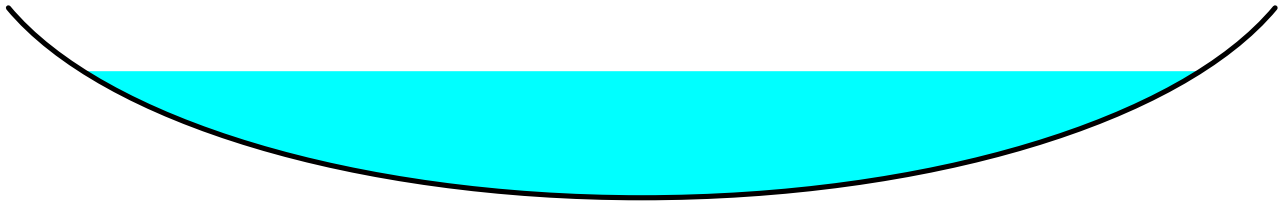
Summary for Reach 4R: (new Reach)

Inflow Area = 0.155 ac, 42.59% Impervious, Inflow Depth > 4.97" for 25-yr event
Inflow = 0.66 cfs @ 12.10 hrs, Volume= 0.064 af
Outflow = 0.66 cfs @ 12.10 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.33' Flow Area= 0.7 sf, Capacity= 1.59 cfs

3.00' x 0.33' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 1.0' Slope= 0.0100 '/'
Inlet Invert= 6.66', Outlet Invert= 6.65'



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Summary for Pond 1P: (new Pond)

[92] Warning: Device #3 is above defined storage

Inflow Area = 0.077 ac, 37.83% Impervious, Inflow Depth > 4.84" for 25-yr event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.22 cfs @ 12.25 hrs, Volume= 0.030 af, Atten= 50%, Lag= 9.4 min
Primary = 0.22 cfs @ 12.25 hrs, Volume= 0.030 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.19' @ 12.25 hrs Surf.Area= 849 sf Storage= 261 cf

Plug-Flow detention time= 21.7 min calculated for 0.030 af (98% of inflow)
Center-of-Mass det. time= 16.9 min (785.4 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1	6.74'	567 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.74	200	0	0
7.00	700	117	117
7.50	1,100	450	567

Device	Routing	Invert	Outlet Devices
#1	Primary	6.74'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.74' / 6.64' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Device 1	6.74'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	7.54'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 12.25 hrs HW=7.19' TW=6.84' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.22 cfs of 0.30 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.54 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: (new Pond)

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=5)

Inflow Area = 0.143 ac, 4.71% Impervious, Inflow Depth > 4.07" for 25-yr event
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 0.049 af
Outflow = 0.64 cfs @ 12.11 hrs, Volume= 0.048 af, Atten= 10%, Lag= 1.0 min
Primary = 0.64 cfs @ 12.11 hrs, Volume= 0.048 af
Secondary = 0.01 cfs @ 12.15 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.51' @ 12.15 hrs Surf.Area= 223 sf Storage= 92 cf

Plug-Flow detention time= 3.5 min calculated for 0.048 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (785.6 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1	6.85'	108 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.85	35	0	0
7.00	80	9	9
7.60	250	99	108

Device	Routing	Invert	Outlet Devices
#1	Primary	6.85'	**8.0" Vert. Orifice/Grate** C= 0.600
#2	Secondary	7.50'	**10.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=0.49 cfs @ 12.11 hrs HW=7.47' TW=7.39' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.49 cfs @ 1.44 fps)

Secondary OutFlow Max=0.01 cfs @ 12.15 hrs HW=7.51' TW=7.16' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.19 fps)

Summary for Pond 3P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.022 ac, 88.02% Impervious, Inflow Depth > 6.09" for 25-yr event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.11 cfs @ 12.18 hrs, Volume= 0.011 af, Atten= 27%, Lag= 5.7 min
Primary = 0.11 cfs @ 12.18 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.76' @ 12.17 hrs Surf.Area= 610 sf Storage= 65 cf

Plug-Flow detention time= 24.4 min calculated for 0.011 af (98% of inflow)
Center-of-Mass det. time= 17.2 min (757.4 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	366 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	610	0.0	0	0
9.00	610	40.0	366	366

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	**4.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 7.50' / 7.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.11 cfs @ 12.18 hrs HW=7.76' TW=7.34' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.11 cfs @ 2.04 fps)

Summary for Pond 4P: Permeable Pavers

[82] Warning: Early inflow requires earlier time span
[44] Hint: Outlet device #1 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=75)

Inflow Area = 0.024 ac, 87.76% Impervious, Inflow Depth > 6.09" for 25-yr event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.12 cfs @ 12.20 hrs, Volume= 0.012 af, Atten= 27%, Lag= 7.1 min
Primary = 0.12 cfs @ 12.20 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.56' @ 12.17 hrs Surf.Area= 708 sf Storage= 16 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (740.9 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1	7.50'	425 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.50	708	0.0	0	0
9.00	708	40.0	425	425

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**4.0" Round Culvert**

L= 25.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 7.25' / 7.00' S= 0.0100 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.09 sf

Primary OutFlow Max=0.12 cfs @ 12.20 hrs HW=7.55' TW=7.32' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.12 cfs @ 1.98 fps)

APPENDIX B:

HYDROLOGICAL DATA

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	
Location	
Longitude	70.714 degrees West
Latitude	43.061 degrees North
Elevation	0 feet
Date/Time	Fri, 30 Jul 2021 14:38:04 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr	add 15%	1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.66	2.93	3.06	2.35	2.82	3.23	3.95	4.56	**1yr**
2yr	0.32	0.50	0.62	0.82	1.03	1.30	**2yr**	0.89	1.19	1.52	1.94	2.49	3.21	3.58	3.69	2.84	3.44	3.94	4.69	5.33	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.14	4.07	4.58	4.68	3.60	4.41	5.05	5.94	6.71	**5yr**
10yr	0.42	0.65	0.83	1.12	1.46	1.90	**10yr**	1.26	1.74	2.24	2.90	3.76	4.87	5.53	5.60	4.31	5.32	6.10	7.12	7.98	**10yr**
25yr	0.48	0.77	0.98	1.35	1.79	2.36	**25yr**	1.55	2.16	2.80	3.65	4.75	6.17	7.10	7.10	5.46	6.83	7.82	9.04	10.05	**25yr**
50yr	0.54	0.87	1.11	1.56	2.10	2.79	**50yr**	1.81	2.55	3.32	4.35	5.68	7.39	8.59	8.50	6.54	8.26	9.45	10.83	11.97	**50yr**
100yr	0.60	0.98	1.26	1.79	2.45	3.30	**100yr**	2.12	3.01	3.95	5.20	6.80	8.85	10.38	9.88	7.83	9.98	11.41	12.98	14.27	**100yr**
200yr	0.69	1.12	1.45	2.08	2.87	3.89	**200yr**	2.48	3.56	4.67	6.18	8.11	10.60	12.55		9.38	12.07	13.79	15.57	17.01	**200yr**
500yr	0.82	1.34	1.75	2.53	3.54	4.84	**500yr**	3.05	4.44	5.84	7.78	10.27	13.48	16.14		11.93	15.52	17.73	19.81	21.47	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	**1yr**	0.62	0.86	0.93	1.34	1.71	2.27	2.46	**1yr**	2.01	2.36	2.88	3.24	3.95	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.81	2.33	3.07	3.45	**2yr**	2.72	3.31	3.83	4.55	5.11	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.11	2.72	3.78	4.17	**5yr**	3.34	4.01	4.72	5.52	6.22	**5yr**
10yr	0.39	0.59	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.80	2.37	3.04	4.36	4.83	**10yr**	3.86	4.64	5.42	6.39	7.17	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.90	**25yr**	1.35	1.86	2.10	2.73	3.50	4.80	5.83	**25yr**	4.25	5.61	6.60	7.75	8.64	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.16	**50yr**	1.52	2.11	2.35	3.04	3.88	5.44	6.72	**50yr**	4.82	6.46	7.65	8.98	9.97	**50yr**
100yr	0.53	0.81	1.01	1.46	2.00	2.46	**100yr**	1.73	2.41	2.63	3.36	4.28	6.14	7.73	**100yr**	5.44	7.44	8.85	10.43	11.51	**100yr**
200yr	0.59	0.88	1.12	1.62	2.26	2.80	**200yr**	1.95	2.74	2.94	3.72	4.69	6.92	8.90	**200yr**	6.12	8.56	10.23	12.13	13.31	**200yr**
500yr	0.68	1.01	1.30	1.89	2.68	3.35	**500yr**	2.32	3.27	3.42	4.22	5.31	8.09	10.71	**500yr**	7.16	10.30	12.39	14.84	16.14	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.73	0.89	1.09	**1yr**	0.77	1.06	1.27	1.74	2.20	2.96	3.19	**1yr**	2.62	3.06	3.57	4.36	5.02	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.27	**2yr**	0.93	1.25	1.48	1.96	2.52	3.41	3.72	**2yr**	3.02	3.58	4.11	4.85	5.61	**2yr**
5yr	0.40	0.62	0.77	1.06	1.34	1.63	**5yr**	1.16	1.60	1.89	2.55	3.27	4.35	5.00	**5yr**	3.85	4.81	5.39	6.41	7.19	**5yr**
10yr	0.47	0.72	0.90	1.25	1.62	1.99	**10yr**	1.40	1.95	2.30	3.13	3.99	5.34	6.25	**10yr**	4.73	6.01	6.89	7.89	8.81	**10yr**
25yr	0.58	0.89	1.10	1.57	2.07	2.60	**25yr**	1.79	2.54	2.98	4.10	5.22	7.67	8.43	**25yr**	6.79	8.10	9.28	10.41	11.48	**25yr**
50yr	0.68	1.04	1.29	1.85	2.50	3.17	**50yr**	2.15	3.10	3.63	5.05	6.43	9.59	10.58	**50yr**	8.48	10.17	11.64	12.82	14.06	**50yr**
100yr	0.80	1.21	1.52	2.20	3.01	3.87	**100yr**	2.60	3.78	4.42	6.23	7.92	11.97	13.28	**100yr**	10.59	12.77	14.60	15.83	17.21	**100yr**
200yr	0.94	1.42	1.80	2.60	3.63	4.73	**200yr**	3.13	4.63	5.41	7.69	9.77	14.99	16.68	**200yr**	13.26	16.04	18.35	19.54	21.06	**200yr**
500yr	1.18	1.75	2.25	3.27	4.65	6.16	**500yr**	4.01	6.02	7.03	10.19	12.92	20.19	22.57	**500yr**	17.87	21.71	24.83	25.78	27.52	**500yr**

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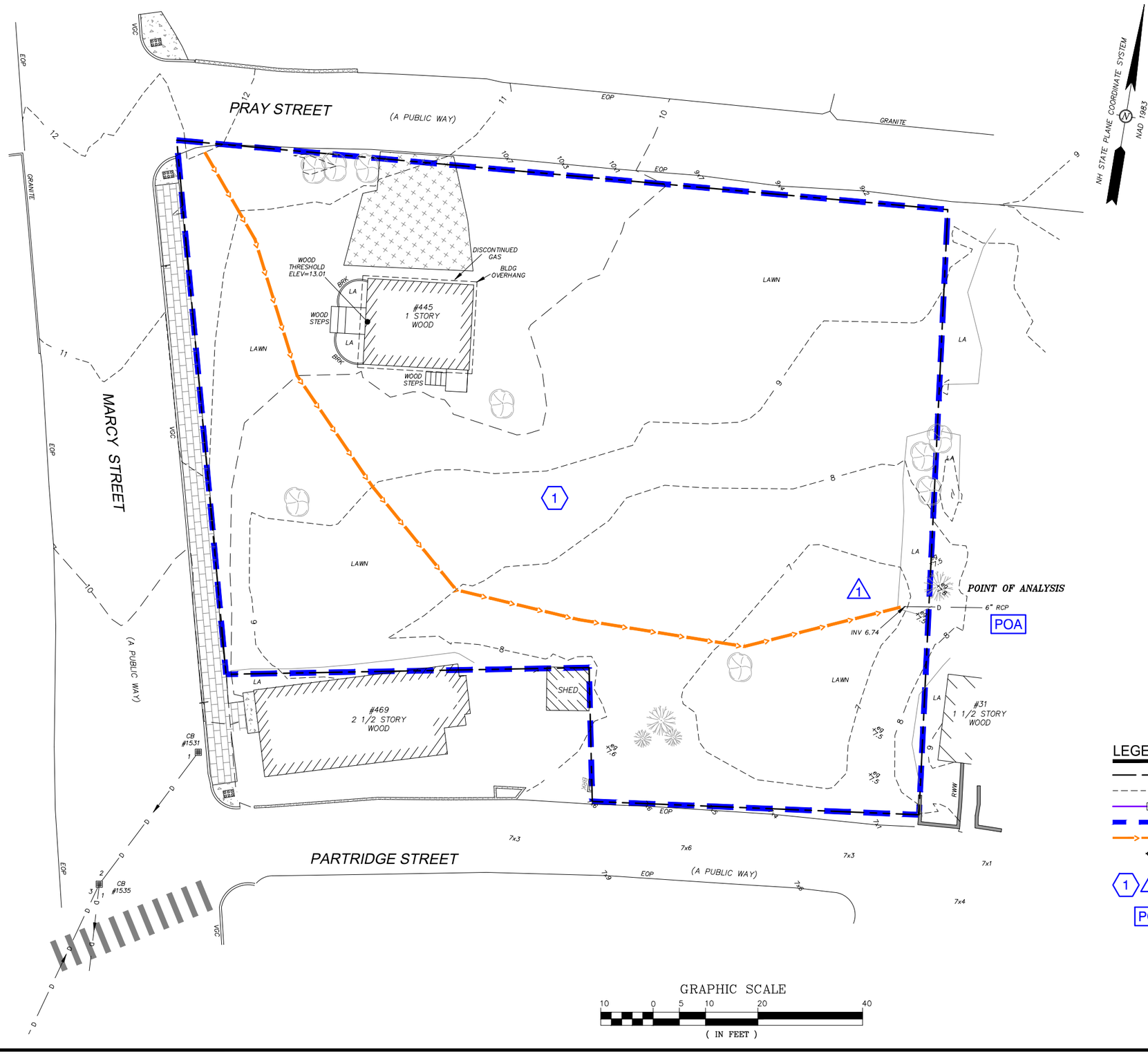
Northeast Regional Climate Center

APPENDIX C:

WATERSHED PLANS



LEGEND

- PROPERTY LINE
- 60 EXISTING CONTOUR
- 60 PROPOSED CONTOUR
- WATERSHED BOUNDARY
- Tc PATH
- PROPOSED GROUND SLOPE DIRECTION
- 1 1 1 SUBCATCHMENT/POND/REACH
- POA POINT OF ANALYSIS

ALTUS ENGINEERING, INC.

133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

STATE OF NEW HAMPSHIRE – ERIC D. WEINREIB No. 7634 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: APRIL 12, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/12/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
(11"x17") 1" = 20'

APPLICANT:
445 MARCY STREET, LLC.
30 WALDEN STREET
PORTSMOUTH, NH 03801

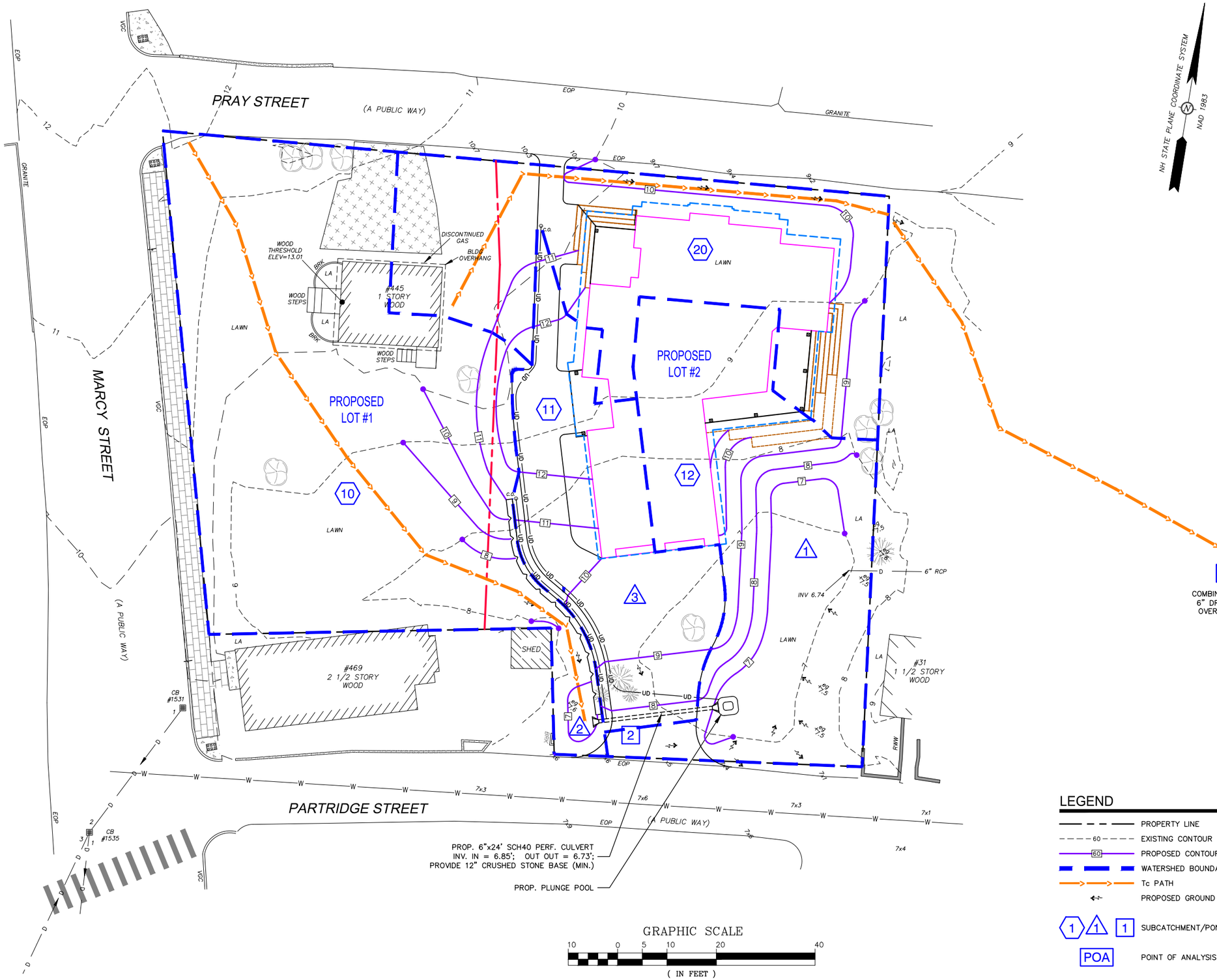
OWNER:
445 MARCY STREET, LLC.
(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
PRE-DEVELLOPMENT WATERSHED PLAN

SHEET NUMBER:
WS - 1

P5217



LEGEND

- PROPERTY LINE
- 60 EXISTING CONTOUR
- 60 PROPOSED CONTOUR
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- Tc PATH
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- 1 1 1 SUBCATCHMENT/POND/REACH
- POA POINT OF ANALYSIS

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133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE

NOT FOR CONSTRUCTION

ISSUED FOR: APPROVAL

ISSUE DATE: APRIL 12, 2022

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	04/12/22

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5217SUB.DWG

SCALE:
(22"x34") 1" = 10'
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APPLICANT:
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(GAIL AND JAMES SANDERS)
30 WALDEN STREET
PORTSMOUTH, NH 03801

PROJECT:
445 MARCY STREET RESIDENCE
TAX MAP 101, LOT 03
445 MARCY STREET
PORTSMOUTH, NH

TITLE:
POST-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER:
WS - 2

P5217

APPENDIX D:

Stormwater Management Facility Operation and Maintenance (O&M) Manual

445 Marcy Street, LLC
(Gail and James Sanders)
445 Marcy Street
Portsmouth, NH

Stormwater Management Program

Stormwater Management / BMP Facilities Maintenance Plan

Proper construction, inspection, maintenance, and repair are key elements in maintaining a successful stormwater management program on a developed property. Routine inspections ensure permit compliance and reduces the potential for deterioration of infrastructure or reduced water quality. Maintenance personnel must be qualified to properly maintain stormwater management facilities. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

For the purpose of this Stormwater Management Program, a significant rainfall event is considered an event of three (3) inches in a 24-hour period or 0.5 inches in a one-hour period. It is anticipated that a short, intense event is likely to have a higher potential of erosion for this site than a longer, high volume event.

The following provides a list of recommendations and guidelines for managing the stormwater facilities.

MANICURED LANDSCAPED AREAS - LITTER CONTROL

Function – Landscaped areas tend to filter debris and contaminates that may block drainage systems and pollute the surface and ground waters.

Maintenance

- Litter Control and lawn maintenance involves removing litter such as trash, leaves, lawn clippings, pet wastes, oil and chemicals from streets, parking lots, and lawns before materials are transported into surface waters.
- Litter control shall be implemented as part of the ground's maintenance program.

MANICURED LANDSCAPED AREAS - FERTILIZER MANAGEMENT

Function – Fertilizer management involves controlling the rate, timing, and method of fertilizer application so that the nutrients are taken up by the plants thereby reducing the chance of polluting the surface and ground waters. Fertilizer management can be effective in reducing the amounts of phosphorus and nitrogen in runoff from landscaped areas, particularly lawns. Soil tests shall be conducted to determine fertilizer application rates.

Maintenance

- Have the soil tested by your landscaper or local Soil Conservation Service for nutrient requirements and follow the recommendations.
- Do not apply fertilizer to frozen ground.
- Clean up any fertilizer spills.
- Do not allow fertilizer to be broadcast into water bodies.
- When fertilizing a lawn, water thoroughly, but do not create a situation where water runs off the surface of the lawn.

PERMEABLE PAVERS

Function – Pavers are designed to capture rainwater runoff containing suspended solids, nutrients and pollutants. These systems require periodic maintenance to insure infiltration and storage capacity.

Maintenance

- Permeable pavers should be observed periodically during rain events for proper water infiltration into the system and inspected at least once per year to verify water flow and exfiltration. Sediment and debris should be removed from the joint/void opening to increase infiltration through light vacuuming on a semi-annual basic.

DE-ICING CHEMICAL USE AND STORAGE

Function – Salt and sand is used for de-icing of walkways, parking lots and drives. Care shall be taken to prevent the over-application of salt for melting ice.

Maintenance

- Proper storage of salt is critical. Salt is highly water-soluble. Contamination of wetlands and other sensitive areas can occur when salt is stored in open areas. Salt shall always be stored in a building
- When parking lots and walkways are free of snow and ice, they shall be swept clean. Disposal of sweepings shall be at a solid waste disposal facility.

CULVERTS AND DRAINAGE PIPES

Function – Culverts and drainage pipes convey stormwater away from buildings, walkways, and parking areas.

Maintenance
Culverts and drainage pipes shall be inspected semi-annually, or more often as needed, for accumulation of debris and structural integrity. Leaves and other debris shall be removed from the inlet and outlet to insure the functionality of drainage structures. Debris shall be disposed of on site where it will not concentrate back at the drainage structures or at a solid waste disposal facility.

GENERAL CLEAN UP

Upon completion of the project, the contractor shall remove all temporary stormwater structures (i.e., temporary stone check dams, silt fence, temporary diversion swales, catch basin inlet basket, etc.). Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared, and seeded. Remove any sediment in catch basins and clean drain pipes that may have accumulated during construction.

Once in operation, all paved areas of the site should be swept at least once annually, preferably at the end of winter prior to significant spring rains.

February 14, 2022

Portsmouth Planning Board
1 Junkins Ave
Portsmouth, NH 03801

SUBJECT: Drive-Thru Conditional Use Request
Granite State Convenience
Proposed Retail Motor Fuel Outlet
2255 Lafayette Road
Map 272 Lot 3

Dear Members of the Portsmouth Planning Board:

On behalf of Granite State Convenience **Greenman-Pedersen, Inc. (GPI)** is hereby requesting a Conditional Use Permit from the Portsmouth Planning Board for the following:

- **Section 10.440** to allow a drive-thru in the Gateway Corridor (G1) Zone

The project site consists of one parcel identified as Map 272 Lot 3 which totals approximately 2.571 acres. The site is bordered by Lafayette Road (Route 1) to the northwest, commercial properties to the northeast and southwest and wooded areas containing wetlands to the south and southeast. The site is previously developed and contains a Burger King restaurant with drive-thru, which is currently not in use, and associated paved parking lot and driveways to Lafayette Road. The majority of the lot is paved and on-site drainage structures are limited to a single catch basin in the landscaped area northwest of the existing building which had no visible pipe outlet at the time of survey. Granite State Convenience is proposing to raze the existing restaurant and construct a retail motor fuel outlet consisting of a 5,555 sf convenience store/sandwich shop with drive-through service and a fueling canopy with 5 retail fuel dispenser islands (10 fueling locations), and associated paved driveways and parking.

This request is made in accordance with the provisions contained in Article 10.243.20 of the City of Portsmouth Zoning Ordinance. GPI is providing the following information in support of the criteria listed in that Section:

Conditional uses designated in Section 10.440 – Table of Uses, as well as other conditional uses for which no specific criteria are set forth in the Ordinance, shall comply with all of the following criteria:

(1) The design of proposed structures, their height and scale in relation to the site's surroundings, the nature and intensity of the proposed use or activity, and the layout and design of the site will be compatible with adjacent and nearby properties, buildings and uses, will complement or enhance the character of surrounding development, and will encourage the appropriate and orderly development and use of land and buildings in the surrounding area.

The site was previously permitted and used as a restaurant with drive-thru. The proposed development is appropriate in character to the site. The neighboring businesses along Lafayette Road are similar commercial uses and the proposed development will match the spirit of the neighborhood. Increased landscaping will enhance the character of the development, as well as an enhanced building façade.

(2) All necessary public and private utility infrastructure and services will be available and adequate to serve the proposed use.

Eversource, electric service, has confirmed they have enough capacity to serve the proposed development. Municipal water and sewer are available to the site. Until/Northern Utilities Natural Gas Division has confirmed natural gas is available to supply the proposed development at 2255 Lafayette Road.

(3) The site and surrounding streets will have adequate vehicular and pedestrian infrastructure to serve the proposed use consistent with the City's Master Plan.

Due to the site's location along Lafayette Road, Route One, there is no pedestrian access to the site or any of the adjacent properties at this time. A 12 ft NHDOT reserve strip and a 8 ft wide Portsmouth Multiuse Path are proposed along the frontage for future DOT and Municipal use.

The site has adequate maneuvering space for the drive thru with sufficient room for 13 stacked vehicles within the drive thru lanes, and adequate space for delivery trucks and emergency vehicles around the site.

(4) The proposed structures, uses, or activities will not have significant adverse impacts on abutting and surrounding properties on account of traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare.

There will be no significant adverse impacts to the surrounding properties as the site is surrounded by similar commercial uses and is consistent with the existing use.

(5) The proposed structures and uses will not have significant adverse impacts on natural or scenic resources surrounding the site, including wetlands, floodplains, and significant wildlife habitat.

The proposed development is consistent with the existing use and adjacent properties, and will not have a negative scenic impact on the neighborhood. The proposed site work has been designed to have the least adverse impact to the wetland buffer. The development will result in a decrease of over 9,000 sf of impervious cover within the wetland buffer zone and will increase wetland buffer widths.

(6) The proposed use will not cause or contribute to a significant decline in property values of adjacent properties.

The proposed use will not cause any decrease to property values as the proposed use is consistent with the existing use and the uses of abutting commercial properties.

If you have any questions or need additional information, please feel free to contact me directly at 603-374-7906 or by email at nduquette@gpinet.com

Sincerely,

Nicole Duquette

Nicole Duquette, LEED AP
Project Manager

enclosure(s)

cc: Brad Pernaw, Granite State Convenience

February 14, 2022

Portsmouth Conservation Commission
1 Junkins Ave
Portsmouth, NH 03801

SUBJECT: Wetland Buffer Conditional Use Request
Granite State Convenience
Proposed Retail Motor Fuel Outlet
2255 Lafayette Road
Map 272 Lot 3

Dear Members of the Portsmouth Conservation Commission:

On behalf of Granite State Convenience **Greenman-Pedersen, Inc. (GPI)** is hereby requesting a Wetland Buffer Conditional Use Permit from the Portsmouth Conservation Commission for the following:

- **Article 10.1016** to allow development within the wetland buffer zone

The project site consists of one parcel identified as Map 272 Lot 3 which totals approximately 2.571 acres. The site is bordered by Lafayette Road (Route 1) to the northwest, commercial properties to the northeast and southwest and wooded areas containing wetlands to the south and southeast. The site is previously developed and contains a Burger King restaurant with drive-thru, which is currently not in use, and associated paved parking lot and driveways to Lafayette Road. The majority of the lot is paved and on-site drainage structures are limited to a single catch basin in the landscaped area northwest of the existing building which had no visible pipe outlet at the time of survey. Granite State Convenience is proposing to raze the existing restaurant and construct a retail motor fuel outlet consisting of a 5,555 sf convenience store/sandwich shop with drive-through service and a fueling canopy with 5 retail fuel dispenser islands (10 fueling locations), and associated paved driveways and parking.

This request is made in accordance with the provisions contained in Article 10.1017.50 of the City of Portsmouth Zoning Ordinance. GPI is providing the following information in support of the criteria listed in that Section:

Any proposed development, other than installation of utilities within a right-of-way, shall comply with all of the following criteria:

(1) The land is reasonably suited to the use, activity or alteration.

The land has previously been disturbed for a similar use.

The proposed development will consist of razing the existing fast food restaurant and removing 59,940 sf of impervious pavement and concrete, and constructing a development with a smaller development footprint. In addition, approximately 9,000 sf of current impervious area will be restored to its natural state with the proposed development.

The majority of the wetland buffer disturbance area is within the buffer to a swale between the site and the neighboring property to the east. This swale conveys water from the NH DOT drainage system.

(2) There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.

The site has been designed in a way that minimizes activity in the wetland buffer area. The total impervious area within the wetland buffer will be decreased by over 9,000 sf between the existing and proposed use. The distance between the developed area will increase from 10 ft to the dumpster and 14 ft to paved surfaces in the existing condition to 25 ft in the proposed condition.

(3) There will be no adverse impact on the wetland functional values of the site or surrounding properties;

As stated in criterion 3, the proposed development will decrease impervious cover within the wetland buffer area and increase wetland buffer widths. The proposed development also includes a comprehensive stormwater management system which will decrease the pollutant load to the wetland by installing deep sump catch basins with "Eliminator" oil hoods, first defense hydrodynamic separator unit, and an oil/water separator tank.

(4) Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals; and

There will be no alteration to natural vegetative state in the wetland buffer as all work will occur in previously disturbed areas.

(5) The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this Section.

The proposed site work has been designed to have the least adverse impact to the wetland buffer. Per Conservation Commission comments on the Preliminary Site Plan, the underground storage tanks have been shifted to the west side of the lot furthest away from the wetland and outside the wetland buffer, the loading zone has been relocated to the westerly side of the property so the southern edge of the development can shift further out of the wetland buffer, and parking spaces have been eliminated on the eastern side of the development. In addition, as recommended by the Conservation Commission, a depressed area has been created along the northeast of the site to collect and filter snowmelt from snow storage to snowmelt from directly entering the wetland.

(6) Any area within the vegetated buffer strip will be returned to a natural state to extent feasible.

A portion of the previously disturbed area within the wetland buffer will be restored to a natural state as a part of this project.

If you have any questions or need additional information, please feel free to contact me directly at 603-374-7906 or by email at nduquette@gpinet.com

Sincerely,

Nicole Duquette

Nicole Duquette, LEED AP
Project Manager

enclosure(s)

cc: Brad Pernaw, Granite State Convenience

ABUTTERS & NOTIFICATION LIST
For
GRANITE STATE CONVENIENCE
2255 LAYFAYETTE ROAD
PARCEL ID: 0272-0003
PORTSMOUTH, NH
GPI # NEX-2021163
AS OF 5/25/22

PARCEL ID #	**NAME & ADDRESS**
0272-0003 (SUBJECT PARCEL)	MASTORAN RESTAURANTS, INC. 822 LEXINGTON STREET 2ND FLOOR WALTHAM, MA 02154
0272-0002	2225 LAFAYETTE LLC 125 AVIATION AVENUE # 202 PORTSMOUTH, NH 03801
0272-0001	2219 LAFAYETTE ROAD, LLC 549 US HIGHWAY 1 BYPASS PORTSMOUTH, NH 03801
0272-0004	RYE PORT PROPERTIES, LLC P.O. BOX 345 STRATHAM, NH 03885
0272-0006	SPRINGBROOK CIRCLE CONDOMINIUMS
OFFICERS:	DAVID WAJDA, PRESIDENT SPRINGBROOK CIRCLE CONDO ASSOCIATION 2000 SPRINGBROOK CIRCLE PORTSMOUTH, NH 03801
	DEAN SAVRAMIS, VICE PRESIDENT SPRINGBROOK CIRCLE CONDO ASSOCIATION 2000 SPRINGBROOK CIRCLE PORTSMOUTH, NH 03801
	JAMES MATTHEWS, TREASURER SPRINGBROOK CIRCLE CONDO ASSOCIATION 2000 SPRINGBROOK CIRCLE PORTSMOUTH, NH 03801
	TOM PUIIA, TRUSTEE SPRINGBROOK CIRCLE CONDO ASSOCIATION 2000 SPRINGBROOK CIRCLE PORTSMOUTH, NH 03801

ABUTTERS & NOTIFICATION LIST
For
GRANITE STATE CONVENIENCE
2255 LAYFAYETTE ROAD
PARCEL ID: 0272-0003
PORTSMOUTH, NH
GPI # NEX-2021163
AS OF 5/25/22

	SABINE DESHAZO, TRUSTEE SPRINGBROOK CIRCLE CONDO ASSOCIATION 2000 SPRINGBROOK CIRCLE PORTSMOUTH, NH 03801
0273-0007-0001	FESTIVAL FUN PARKS, LLC C/O PROPERTY TAX SERVICE CO. P.O. BOX 543185 DALLAS, TX 75354
ENGINEER/SURVEYOR	GREENMAN-PEDERSEN, INC. 44 STILES ROAD, SUITE ONE SALEM, NH 03079
WETLAND/SOIL SCIENTIST	MARK WEST WEST ENVIRONMENTAL, INC. 48 STEVENS HILL ROAD NOTTINGHAM, NH 03290
APPLICANT	GRANITE STATE CONVENIENCE 25 SPRINGER ROAD HOOKSETT, NH 03106
ATTORNEY	JOHN K. BOSEN, ESQ BOSEN & ASSOCIATES, P.L.L.C 266 MIDDLE STREET PORTSMOUTH, NH 03801

REF: NEX-2021163

DATE: February 14, 2022

TO: City of Portsmouth Planning Board

FROM: Nicole Duquette, Greenman-Pedersen, Inc.

RE: 2255 Lafayette Road – Land Use Application
Green Building Initiatives

The applicant is proposing to demolish the existing Burger King restaurant and construct a retail motor fuel outlet consisting of a 5,555 square foot convenience store/sandwich shop and drive-thru and a fueling area with 5 retail fueling islands (10 fueling locations). The proposed site work includes many "green" building components and systems, making the project toxic free, allergy & asthma friendly, and will lower the environmental impact during construction and operation. "Green" components are listed and described below.

Structure
- Wood studs are 100% recyclable
- Plywood sheathing is 100% recyclable

Doors and Windows
- Aluminum entrance doors with recycled materials
- Wood windows with Low-E insulating glass, Energy Star

Flooring
- Vinyl Composition tile with recycled content

Walls and Ceilings
- Salvaged barnboard walls and ceilings
- Salvaged timber beams and rafters
- Salvaged corrugated roof panels used as ceilings
- Suspended acoustic ceiling tiles with 100% recyclable materials
- Aluminum ceiling grids with recycled content

Paints, Coatings & Sealants, non-toxic
- Zero VOC paints & sealants

Stone
- Stone veneer on exterior walls

Wood Products
- Cabinets – recycled wood, formaldehyde-free
- Adhesives with low or zero VOC

Building Insulation
- Cellulose insulation with recycled content

Plumbing

- Low flow toilets
- Automatic shutoff faucets

Electrical

- L.E.D. light fixtures
- Electrical switches with automatic shut on-off (motion sensors)
- Future EV charging stations

HVAC

- Duct wrap with recycled materials
- Ground based heat pump system
- Exhaust fans with automatic shut off

Roofing

- Asphalt shingles are 100% recyclable

Site Work and Landscaping

- Indigenous/native planting for less lawn coverage & irrigation

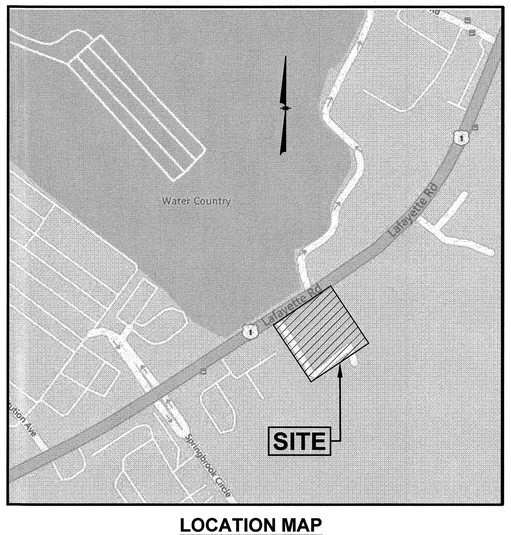
PROPOSED RETAIL MOTOR FUEL OUTLET
SITE REDEVELOPMENT PLANS

for

ASSESSORS MAP 272 LOT 3
2255 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

Prepared for:

GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH 03106



LOCATION MAP
(NOT TO SCALE)

INDEX TO DRAWINGS

GPI
Engineering
Design
Planning
Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE
CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD
PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY C. MASON
No. 17099
LICENSED
PROFESSIONAL ENGINEER
5/24/22

REVISIONS		
4	REV. SHEETS 4-8, TT	5/10/22
3	REV. SHEETS 4-8, 12, 14, TT, ADD SHEET 13	4/19/22
2	REV. SHEETS 2-9, 11, TT	3/22/22
1	REV. SHEET 4	2/9/22
NO.	REVISION	DATE

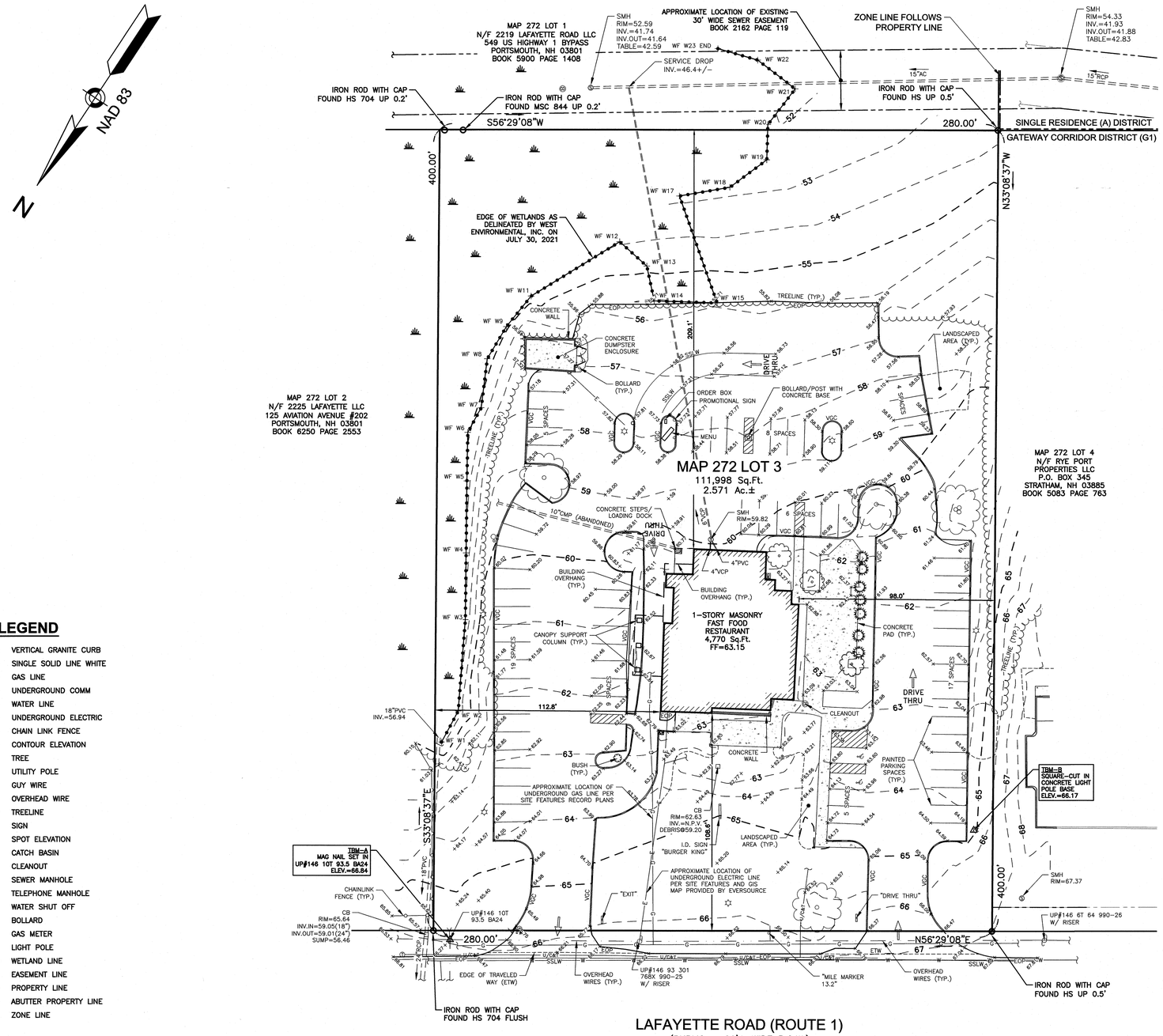
JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

TITLE SHEET

SCALE: NOT TO SCALE

PROJECT NO. NEX-2021163



LEGEND

- VGC — VERTICAL GRANITE CURB
- SSLW — SINGLE SOLID LINE WHITE
- G — GAS LINE
- U/G&T — UNDERGROUND COMM
- W — WATER LINE
- E — UNDERGROUND ELECTRIC
- CHAIN LINK FENCE
- 90 — CONTOUR ELEVATION
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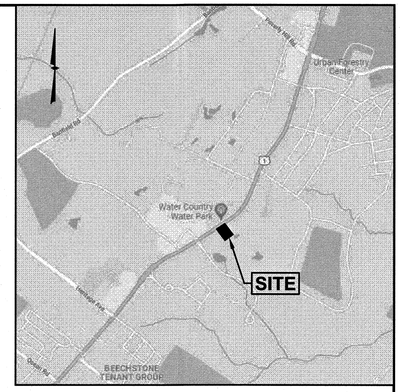
- GM — GAS METER
- LIGHT POLE
- WETLAND LINE
- EASEMENT LINE
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- ZONE LINE

PLAN REFERENCES:

ROCKINGHAM COUNTY REGISTRY OF DEEDS

1) R.C.R.D. PLAN D-33166
2) R.C.R.D. PLAN D-37134
3) R.C.R.D. PLAN D-20705
4) R.C.R.D. PLAN D-15321
5) R.C.R.D. PLAN C-3702
6) R.C.R.D. PLAN C-7649
7) R.C.R.D. PLAN D-41895



LOCATION MAP

(NOT TO SCALE)

NOTES:

1) ZONE: GATEWAY CORRIDOR DISTRICT (G1)
   MIN. LOT SIZE: 1 ACRE
   SETBACKS:
   FRONT 70' TO 90' FROM CENTER OF LAFAYETTE RD
   SIDE 10 Ft.
   REAR 15 Ft.
   REFER TO THE CITY OF PORTSMOUTH ZONING ORDINANCE FOR VERIFICATION, ADDITIONAL RESTRICTIONS AND PERMITTED USES. THE ZONING INFORMATION SHOWN HEREON IS BASED ON A REVIEW OF THE PORTSMOUTH ZONING ORDINANCE.
2) THIS PLAN IS THE RESULT OF AN ON-THE-GROUND FIELD SURVEY PERFORMED BY THIS OFFICE BETWEEN AUGUST 10 AND NOVEMBER 3, 2021.
3) WETLAND FLAGS WERE DELINEATED BY WEST ENVIRONMENTAL, INC. ON JULY 30, 2021 AND LOCATED BY THIS OFFICE.
4) BEARINGS SHOWN HEREON ARE BASED ON NAD83 PER GPS OBSERVATIONS PERFORMED BY THIS OFFICE ON AUGUST 16, 2021.
5) ELEVATIONS SHOWN HEREON ARE BASED ON NAVD88 PER GPS OBSERVATIONS PERFORMED BY THIS OFFICE ON AUGUST 16, 2021.
6) LOCATION OF UNDERGROUND UTILITIES IS APPROXIMATE ONLY. ADDITIONAL UNDERGROUND UTILITIES OTHER THAN THOSE SHOWN MAY BE ENCOUNTERED. INVERTS ARE LISTED IN A CLOCKWISE DIRECTION ENDING WITH THE INVERT OUT (UNLESS OTHERWISE NOTED).
7) THE SURVEY TRACT IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA (100 YEAR FLOOD) PER FLOOD INSURANCE RATE MAP NUMBER 33015C0270F, WITH AN EFFECTIVE DATE OF JANUARY 29, 2021.
8) A TOTAL OF 73 (71 REGULAR, 2 ACCESSIBLE) CLEARLY IDENTIFIABLE PARKING SPACES WERE OBSERVED IN CONDUCTING THIS SURVEY.

WETLAND NOTES

WETLANDS WERE DELINEATED BY WEST ENVIRONMENTAL, INC. ON JULY 30, 2021 UTILIZING THE FOLLOWING STANDARDS:

1) US ARMY CORPS OF ENGINEERS INTERIM REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, TECHNICAL REPORT ERDC/EL TR-09-19 (OCT 2009).
2) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, A GUIDE FOR IDENTIFYING AND DELINEATING HYDRIC SOILS, VERSION 7.0. UNITED STATES DEPARTMENT OF AGRICULTURE (2010).
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.2.1 (2009).
4) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. USFW MANUAL FWS/OBS-79/31 (1979).

STATE OF NEW HAMPSHIRE
MARK WEST
1-25-22
No. 010
CERTIFIED WETLAND SCIENTIST

OWNER OF RECORD:

MAP 272 LOT 3
MASTORAN RESTAURANTS, INC.
822 LEXINGTON STREET
WALTHAM, MA 02154
BOOK 3572 PAGE 199

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
No. 838
DAVID R. JORDAN
SIGNATURE
LAND SURVEYOR
4/19/22

REVISIONS		
1	REVISE SEWER	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
AKC	DRJ

EXISTING CONDITIONS PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

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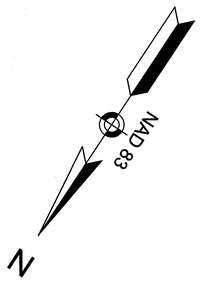

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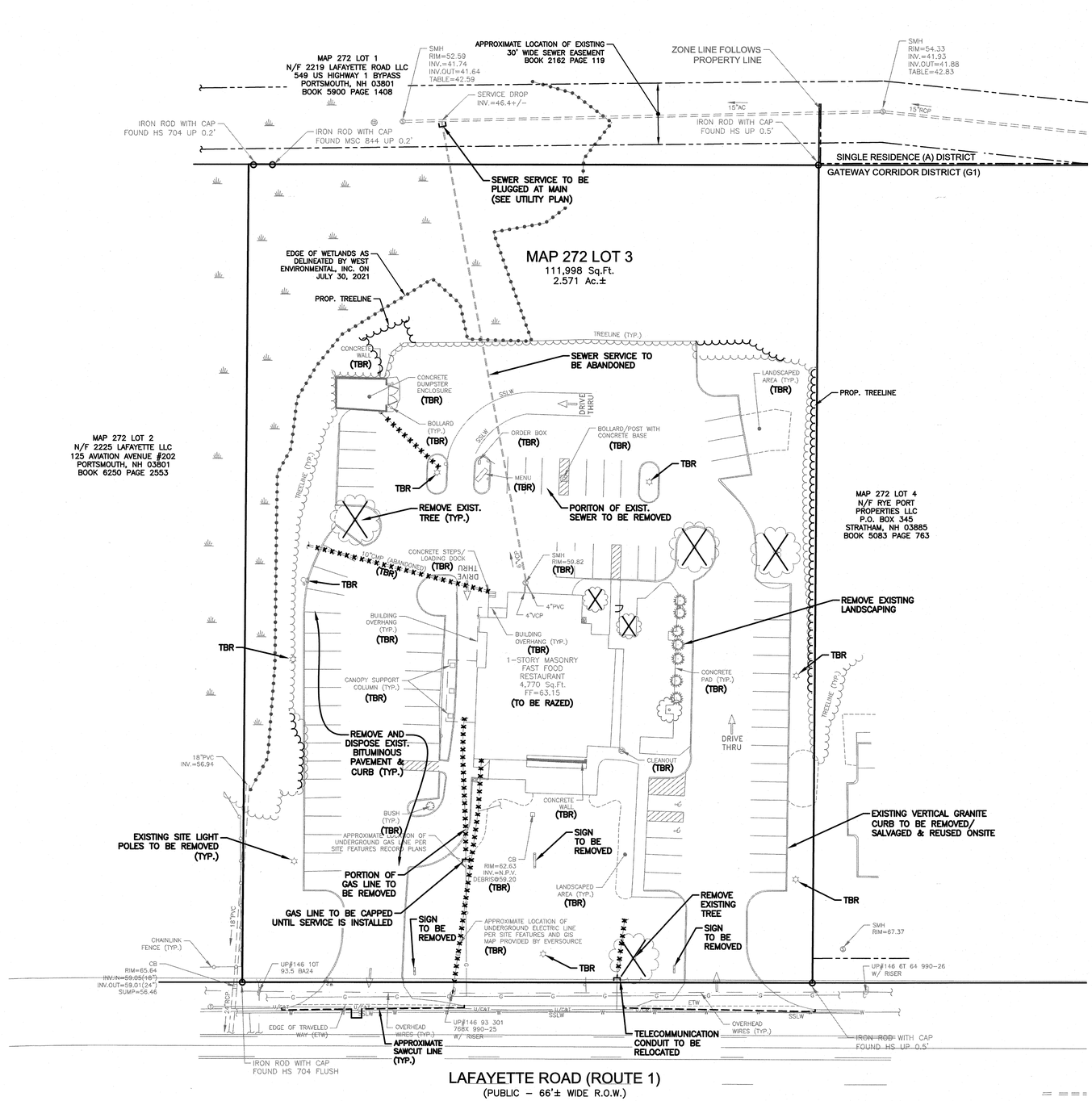
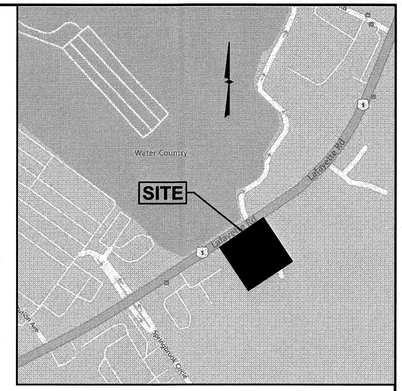
- EASEMENT LINE
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- ZONE LINE
- TBR — TO BE REMOVED
- XXXXXX — TO BE REMOVED



0 30 60 100

SCALE: 1" = 30'



LOCATION MAP
(NOT TO SCALE)

NOTES:

1) A DEMOLITION PERMIT MUST BE OBTAINED FROM THE CITY OF PORTSMOUTH PRIOR TO COMMENCEMENT OF WORK. ALL EXISTING UTILITY DISCONNECTIONS MUST BE COORDINATED WITH RESPECTIVE UTILITY COMPANIES.
2) ALL DEMOLITION ACTIVITIES ARE TO BE PERFORMED IN STRICT ADHERENCE TO ALL FEDERAL, STATE AND LOCAL REGULATIONS. CONTRACTOR TO INSTALL EROSION CONTROL DEVICES IN ACCORDANCE WITH EROSION AND SEDIMENT CONTROL PLAN PRIOR TO BEGINNING DEMOLITION ACTIVITIES.
3) PROCEED WITH DEMOLITION IN A SYSTEMATIC MANNER, FROM THE TOP OF THE STRUCTURE(S) TO THE GROUND.
4) DEMOLISH CONCRETE IN ALL SECTIONS
5) BREAK UP CONCRETE SLABS-ON-GRADE, UNLESS OTHERWISE DIRECTED BY THE CONSTRUCTION MANAGER.
6) CONDUCT ALL DEMOLITION OPERATIONS IN A MANNER THAT WILL PREVENT INJURY, DAMAGE TO STRUCTURES, ADJACENT BUILDINGS AND ALL PERSONS.
7) REFRAIN FROM USING EXPLOSIVES WITHOUT PRIOR WRITTEN CONSENT OF THE DEVELOPER AND APPLICABLE GOVERNMENTAL AUTHORITIES.
8) CONDUCT DEMOLITION SERVICES IN SUCH A MANNER TO INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS AND OTHER ADJACENT FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS OR OTHER OCCUPIED FACILITIES WITHOUT PRIOR WRITTEN PERMISSION OF THE DEVELOPER AND APPLICABLE GOVERNMENTAL AUTHORITIES. PROVIDE ALTERNATIVE ROUTES AROUND CLOSED OR OBSTRUCTED TRAFFIC WAYS IF REQUIRED BY APPLICABLE GOVERNMENTAL REGULATIONS.
9) USE WATERING, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS, AS NECESSARY TO LIMIT THE AMOUNT OF DUST AND DIRT RISING AND SCATTERING IN THE AIR. CLEAN ADJACENT STRUCTURE AND IMPROVEMENTS OF ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. RETURN ALL ADJACENT AREAS TO THE CONDITIONS EXISTING PRIOR TO THE START OF WORK.
10) ACCOMPLISH AND PERFORM THE DEMOLITION IN SUCH A MANNER AS TO PREVENT THE UNAUTHORIZED ENTRY OF PERSONS AT ANY TIME.
11) COMPLETELY FILL BELOW GRADE AREAS AND VOIDS RESULTING FROM THE DEMOLITION OF STRUCTURES AND FOUNDATIONS WITH SOIL MATERIALS CONSISTING OF STONE, GRAVEL AND SAND, FREE FROM DEBRIS, TRASH, FROZEN MATERIALS, ROOTS AND OTHER ORGANIC MATTER. STONES USED WILL NOT BE LARGER THAT 6 INCHES IN DIMENSION. MATERIAL FROM DEMOLITION MAY NOT BE USED AS FILL. PRIOR TO PLACEMENT OF FILL MATERIALS, UNDERTAKE ALL NECESSARY ACTION IN ORDER TO INSURE THAT AREAS TO BE FILLED ARE FREE OF STANDING WATER, FROZEN MATERIAL, TRASH, DEBRIS. PLACE FILL MATERIALS LAYERS NOT EXCEEDING 6 INCHES IN LOOSE DEPTH AND COMPACT EACH LAYER AT PLACEMENT TO 95% OPTIMUM DENSITY, GRADE SURFACE TO MEET ADJACENT CONTOURS AND TO PROVIDE SURFACE DRAINAGE.
12) REMOVE FROM THE DESIGNATED SITE, AT THE EARLIEST POSSIBLE TIME, ALL DEBRIS RUBBISH, SALVAGEABLE ITEMS, HAZARDOUS AND COMBUSTIBLE SERVICES. REMOVED MATERIALS MAY NOT BE STORED, SOLD OR BURNED ON SITE. REMOVAL OF HAZARDOUS AND COMBUSTIBLE MATERIALS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PROCEDURES AS AUTHORIZED BY THE FIRE DEPARTMENT OR OTHER APPROPRIATE REGULATORY AGENCIES AND DEPARTMENTS.
13) DISCONNECT, SHUT OFF AND SEAL ALL UTILITIES SERVING THE STRUCTURE(S) TO BE DEMOLISHED BEFORE THE COMMENCEMENT OF THE DESIGNATED DEMOLITION. MARK FOR POSITION ALL UTILITY DRAINAGE AND SANITARY LINES AND PROTECT ALL ACTIVE LINES. CLEARLY IDENTIFY BEFORE THE COMMENCEMENT OF DEMOLITION SERVICES THE REQUIRED INTERRUPTION OF ACTIVE SYSTEMS THAT MAY AFFECT OTHER PARTIES, AND NOTIFY ALL APPLICABLE UTILITY COMPANIES TO INSURE THE CONTINUATION OF SERVICE.
14) PROTECT EXISTING DRAINAGE SYSTEM(S) AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING DURING CONSTRUCTION. SEE DETAIL SHEETS FOR EROSION CONTROL DEVICES.
15) ALL WORK WITHIN ROADWAY RIGHT-OF-WAYS TO CONFORM TO CITY STANDARDS.
16) THE LIMITS OF WORK SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO THE START OF CONSTRUCTION OR SITE CLEARING.
17) IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO NOTIFY DIG SAFE (DIAL 811) 72 HOURS PRIOR TO ANY EXCAVATION ON THIS SITE. CONTRACTOR SHALL ALSO NOTIFY LOCAL WATER DEPARTMENT TO MARK OUT THEIR UTILITIES.
18) NOTES ON THIS PLAN THAT READ "TBR" REPRESENT FEATURES TO BE REMOVED. ANY FEATURES NOT LABELED "TBR" OR "TO BE REMOVED" SHALL BE CONSIDERED EXISTING TO REMAIN.
19) EXISTING WATER SERVICE LOCATION IS UNKNOWN. CONTRACTOR TO LOCATE AND DISCONTINUE SERVICE AT THE MAIN.

SEE EROSION & SEDIMENT CONTROL PLAN FOR CONSTRUCTION SEQUENCE, TEMPORARY EROSION CONTROL MEASURES, AND LOCATION OF EROSION CONTROL DEVICES. SEE LANDSCAPE PLAN FOR LIMITS OF CLEARING.

811 DigSafe MA-ME-NH-RI-VT

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY N. MASON No.17099
LICENSED PROFESSIONAL ENGINEER
4/19/22

REVISIONS		
2	MISC. REVISIONS	4/19/22
1	REV. PER CITY COMMENTS	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

DEMOLITION PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

3 OF 15

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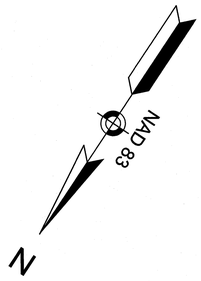


SIGN KEY

SIGN I.D. NUMBER	TEXT/COLOR	SIZE/REMARKS
R1-1	STOP R/W	30" x 30" NEW SIGN WITH POST
R5-1	DO NOT ENTER R/W	30" x 30" NEW SIGN WITH POST
R7-8	RESERVED PARKING G/B/W	12" x 18" NEW SIGN WITH POST
R7-8A	VAN ACCESSIBLE G/W	6" X 12"

SITE COMPARISON TABLE

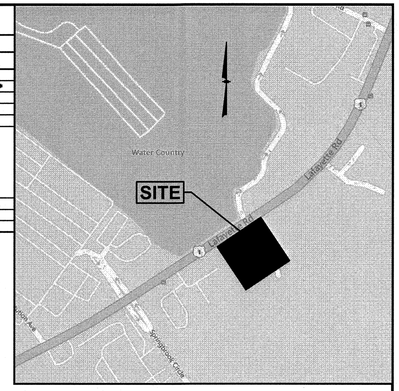
DESCRIPTION	EXISTING	PROPOSED
SURFACE PARKING & DRIVEWAY	59,940 SF	57,064 SF
OTHER IMPERVIOUS SURFACES	5,358 SF	5,750 SF
NUMBER OF PARKING SPACES	73	35
IMPERVIOUS AREA WITHIN WETLAND BUFFER	29,452 SF	20,328 SF

TABLE OF ZONING REGULATIONS - PORTSMOUTH, NH

ZONE: GATEWAY CORRIDOR (G1)

DESCRIPTION	REQUIRED	PROVIDED
MINIMUM LOT AREA	1 ACRE	2.57 ACRES
MINIMUM FRONT YARD BUILDING SETBACK	70' TO 90' FROM CENTER OF LAFAYETTE RD	120' (CANOPY), 204' (C-STORE) *
MINIMUM SIDE YARD BUILDING SETBACK	10'	63' (CANOPY), 89' (C-STORE)
MINIMUM REAR YARD BUILDING SETBACK	15'	173' (C-STORE)
PARKING DIMENSIONS	8.5'x19', 24' DRIVE AISLE	9'x19', 24' DRIVE AISLE
MINIMUM NUMBER PARKING SPACES	RETAIL = 4,555 SF x 1 SPACE/300 SF GFA = 15.18 SPACES RESTAURANT = 1,000 SF x 1 SPACE/100 SF = 10 SPACES RETAIL FUEL = 2 SPACES + 0 SF x 1 SPACE/400 SF GFA = 2 SPACES TOTAL SPACES REQUIRED = 28 SPACES	36 SPACES (14 PARKING SPACES + 12 PARKING SPACES/CHARGING STATION SPACES + 10 PARKING SPACES AT THE PUMPS) *
MAXIMUM COVERAGE	70%	555,660 SF/111,998 SF = 49.7%
MINIMUM OPEN SPACE	10%	56,338 SF/111,998 SF = 50.3%
MAXIMUM BUILDING HEIGHT	40 FT OR 3 STORIES	<40 FT, 1 STORY

* SEE NOTE 17



LOCATION MAP
(NOT TO SCALE)

LEGEND

- VGC — VERTICAL GRANITE CURB
- SSLW — SINGLE SOLID LINE WHITE
- G — GAS LINE
- U/G/T — UNDERGROUND COMM
- W — WATER LINE
- E — UNDERGROUND ELECTRIC
- CHAIN LINK FENCE
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- OVERHEAD WIRE
- TREELINE
- SIGN
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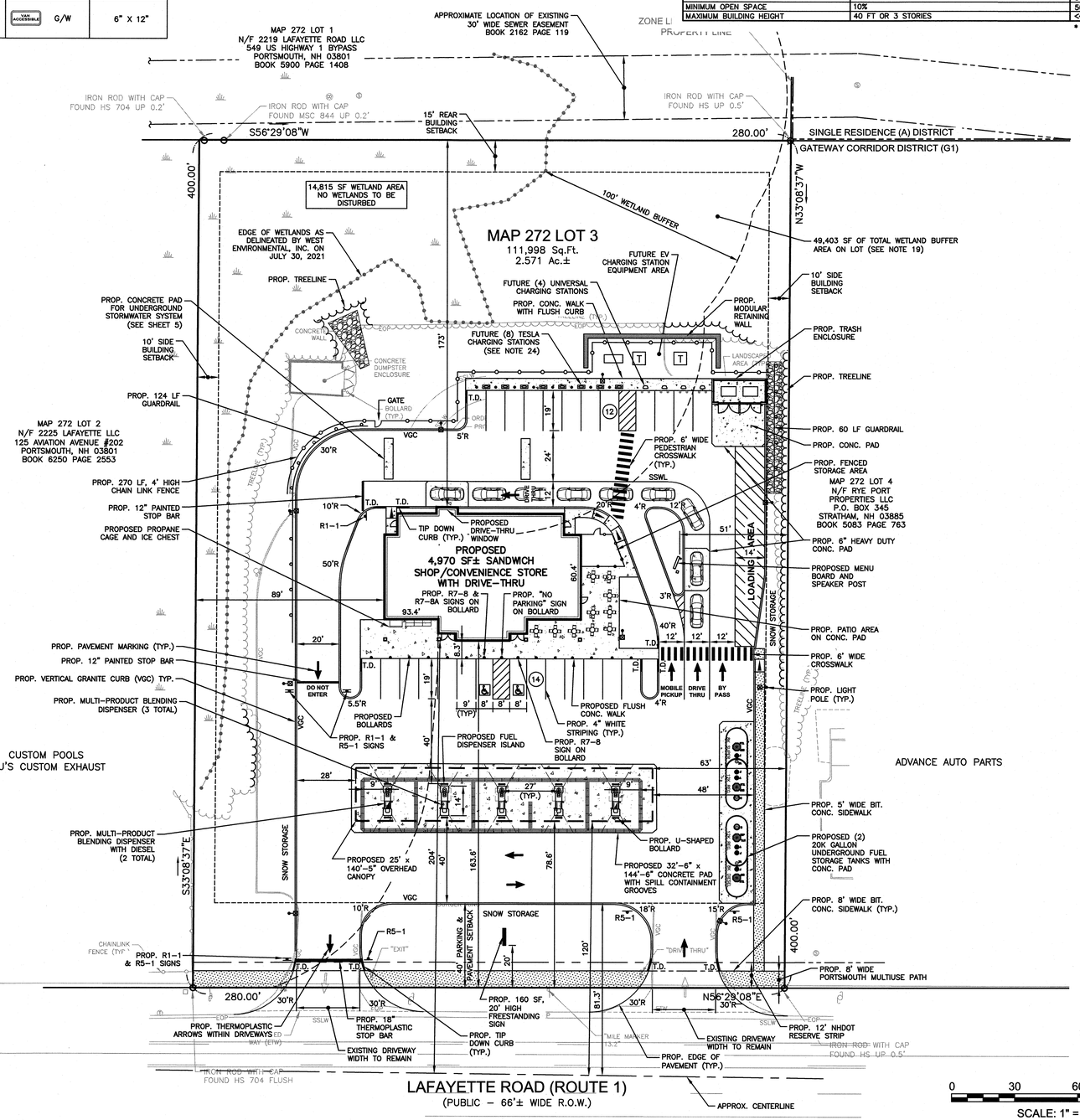
- CATCH BASIN
- CLEANOUT
- SEWER MANHOLE
- TELEPHONE MANHOLE
- WATER SHUT OFF
- BOLLARD
- GM — GAS METER
- LIGHT POLE
- WETLAND LINE
- EASEMENT LINE
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- ZONE LINE
- (1) — NUMBER OF PARKING SPACES



NOTES:

1) TAX MAP 272 LOT 3

2) ZONING DISTRICT: GATEWAY CORRIDOR (G1)

3) LOT AREA = 111,988 Sq.Ft.
= 2.571 Ac.±

4) EXISTING USE: FAST FOOD RESTAURANT WITH DRIVE-THRU

PROPOSED USE: RETAIL MOTOR FUEL OUTLET WITH 5,555 SF CONVENIENCE STORE/SANDWICH SHOP WITH 6 SEATS INTERIOR & UP TO 40 EXTERIOR SEATS AND DRIVE-THRU AND 5 FUEL DISPENSER ISLANDS WITH OVERHEAD CANOPY.

5) ALL BUILDINGS AND SITE CONSTRUCTION SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT (ADA) AS REVISED IN 2010.

6) THE LOCATIONS OF EXISTING SUBSURFACE UTILITIES SHOWN ON THIS PLAN WERE COMPILED FROM AVAILABLE RECORD DRAWINGS AND ARE NOT WARRANTED TO BE CORRECT. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING SUBSURFACE UTILITIES PRIOR TO PERFORMING ANY WORK.

7) WRITTEN DIMENSIONS ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR.

8) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 811 PRIOR TO ANY EXCAVATION.

9) ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS OF THE CITY OF PORTSMOUTH AND THE STATE OF NEW HAMPSHIRE.

10) THE SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA (100 YEAR FLOOD) PER FLOOD INSURANCE RATE MAP NUMBER 33015C0270F, WITH AN EFFECTIVE DATE OF JANUARY 29, 2021.

11) ALL CONSTRUCTION SHALL CONFORM TO THESE PLANS AND THE STANDARD CONSTRUCTION DRAWINGS AS SUPPLIED BY THE DEVELOPER.

12) A SIGN PERMIT SHALL BE OBTAINED PRIOR TO INSTALLATION.

13) PROPOSED SNOW STORAGE AREAS AS SHOWN. ANY EXCESS SNOW TO BE TRUCKED OFF-SITE.

14) THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS AT THE SITE. THESE PLANS, PREPARED BY GREENMAN-PEDERSEN, INC., DO NOT EXTEND TO OR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE SURVEYOR AND/OR ENGINEER AS INCLUDED IN THE PLAN SET DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE AND/OR OBTAIN THE APPROPRIATE SAFETY SYSTEMS WHICH MAY BE REQUIRED BY THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND/OR LOCAL REGULATIONS.

15) ALL UNDERGROUND STORAGE TANKS, PRODUCT PIPING AND VENT LINES SHALL COMPLY WITH CURRENT STATE AND E.P.A. REGULATIONS.

16) SELF-SERVICE APPROVAL IS REQUIRED FROM THE OFFICE OF THE STATE FIRE MARSHAL. SEE APPROVED FIRE SUPPRESSION PLAN FOR LAYOUT OF SPILL CONTAINMENT GROOVES (POSITIVE LIMING BARRIER).

17) RELIEF WAS GRANTED BY THE ZONING BOARD OF ADJUSTMENT ON FEBRUARY 15, 2022 TO ALLOW THE FOLLOWING:
- PARKING SPACES BETWEEN PRINCIPAL BUILDING AND ROAD (ZONING 10.1113.20)
- GREATER THAN 90' BUILDING SETBACK FROM LAFAYETTE ROAD (ZONING 10.5.B.22.40)
- LESS THAN 75% FRONT LOT LINE BUILDOUT (SECTION 10.5.B.33.20)
- MORE THAN ONE DRIVEWAY PER LOT (SECTION 10.1114.31)
- TO ALLOW A 160 SF FREESTANDING SIGN (SECTION 10.1251.20)

18) RELIEF IS REQUESTED FROM THE PLANNING BOARD TO ALLOW THE FOLLOWING:
- GREATER THAN ONE DRIVEWAY PER LOT. (SITE PLAN 3.3.2). EXISTING SITE HAS TWO DRIVEWAYS

19) A CONDITIONAL USE PERMIT IS REQUIRED FROM THE PLANNING BOARD TO ALLOW THE FOLLOWING:
- A WETLAND BUFFER DISTURBANCE OF 33,555 SF PER SECTION 10.241.23. THIS TOTAL INCLUDES DISTURBANCE REQUIRED TO REMOVE EXISTING DISTURBANCES AND RETURN THEM TO A MORE NATURAL STATE.
- A DRIVE-THRU FACILITY PER SECTION 10.440

20) APPROPRIATE EROSION CONTROL MEASURES (HAY BALES, SILT FENCE) SHALL BE INSTALLED PRIOR TO INITIATION OF ANY SITE WORK & SHALL BE MAINTAINED BY THE DEVELOPER UNTIL ADEQUATE VEGETATIVE COVER IS ESTABLISHED ON ALL GRADED AREAS. SEE EROSION & SEDIMENT CONTROL PLAN.

21) ELECTRIC CONDUIT TO BE INSTALLED FOR FUTURE CHARGING STATIONS.

22) ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

23) PERMITS REQUIRED:
- NHDOT DRIVEWAY PERMIT
- USEPA NPDES CONSTRUCTION GENERAL PERMIT

24) PARKING AT CHARGING STATIONS SHALL NOT BE RESTRICTED TO ONLY ELECTRIC VEHICLES.

OWNER OF RECORD:

MAP 272 LOT 3
MASTORAN RESTAURANTS, INC.
822 LEXINGTON STREET
WALTHAM, MA 02154
BOOK 3572 PAGE 199

GPI
Engineering
Design
Planning
Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD
PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE – CORY N. MASON No.17099 – LICENSED PROFESSIONAL ENGINEER
5/24/22

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4	REV. PER TAC	5/10/22
3	MISC. REVISIONS	4/19/22
2	REV. PER CITY COMMENTS	3/22/22
1	REV. FOR SITE PLAN APPROVAL	2/9/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

SITE PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

811 DigSafe MA-ME-NH-RI-VT

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DRAINAGE PIPE SCHEDULE					
FROM: STRUCTURE NUMBER	PIPE SIZE (INCHES)	TYPE OF PIPE	APPROX. PIPE LENGTH (FEET)	SLOPE OF PIPE (FT./FT.)	TO: STRUCTURE NUMBER
CB-1	12	HDPE	51	0.011	DMH-1
CB-2	12	HDPE	139	0.005	CB-6
CB-3(FD)	12	HDPE	29	0.063	DET IN-1
CB-4(FD)	18	HDPE	81	0.005	DMH-2
CB-5	18	HDPE	70	0.005	CB-4(FD)
CB-6	15	HDPE	93	0.005	CB-5
DET OUT	24	HDPE	7	0.000	OCS-1
DMH-1	12	HDPE	66	0.014	CB-6
DMH-2	6	HDPE	10	0.010	OWS-IN
DMH-2	18	HDPE	29	0.032	DET IN-2
DMH-3	12	HDPE	30	0.010	CB-3(FD)
JELLYFISH OUT	18	HDPE	12	0.012	FES-1
OCS-1	18	HDPE	3	0.029	JELLYFISH IN
OWS-OUT	6	HDPE	7	0.013	DET IN-3

DRAINAGE STRUCTURES

CB-1
RIM=64.55
INV.OUT=61.05

CB-2
RIM=63.70
INV.OUT=60.10

CB-3(FD)
RIM=62.80
INV.IN=58.90(DMH-3)
INV.OUT=58.80

CB-4(FD)(DG)
RIM=61.70
INV.IN=58.05(CB-5)
INV.OUT=57.95

CB-5
RIM=63.05
INV.IN=58.65(CB-6)
INV.OUT=58.40

CB-6
RIM=63.90
INV.IN=59.40(CB-2)
INV.IN=59.50(DMH-1)
INV.OUT=59.15

DMH-1
RIM=65.30
INV.IN=60.50(CB-1)
INV.OUT=60.40

DMH-2
RIM=63.30
INV.IN=57.55(CB-4(FD))
INV.OUT=57.95 (18" BYPASS)
INV.OUT=57.45 (6" LOW FLOW)

DMH-3
RIM=64.00
INV.IN=59.25(RD)
INV.OUT=59.20

FES-1
INV.=56.25

4,000 GAL OIL/WATER SEPARATOR-1 (OWS-1)
RIM=63.75±
INV.IN=57.35
INV.OUT=57.10

UNDERGROUND DETENTION SYSTEM (UG DET)
36"ø SOLID (WT) PIPES
4 ROWS + 2 HEADERS
67.00'L x 19.25'W
S=0.000 FT/FT
INV.PIPE=57.00
INV'S.IN=57.00
INV.OUT=57.00
(SEE DETAIL)

OUTLET CONTROL STRUCTURE (OCS-1)
RIM=63.70
INV.IN=57.00
INV.OUT=57.00
(SEE DETAIL)

JELLYFISH FILTER
(CONTECH JFPD0806 OR APPROVED EQUAL)
RIM=62.00
INV.IN=56.90
INV.OUT=56.40
(SEE DETAIL)

(FD) DENOTES FIRST DEFENSE FD-4HC HYRODYNAMIC PARTICLE SEPARATOR OR APPROVED EQUAL.

(WT) DENOTES WATERTIGHT PIPE JOINTS

(DG) DENOTES DOUBLE CATCH BASIN FRAME AND GRATE

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- TREELINE
- SIGN
- +98.65 — SPOT ELEVATION
- CATCH BASIN
- CLEANOUT
- S — SEWER MANHOLE
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- BOLLARD
- GM — GAS METER
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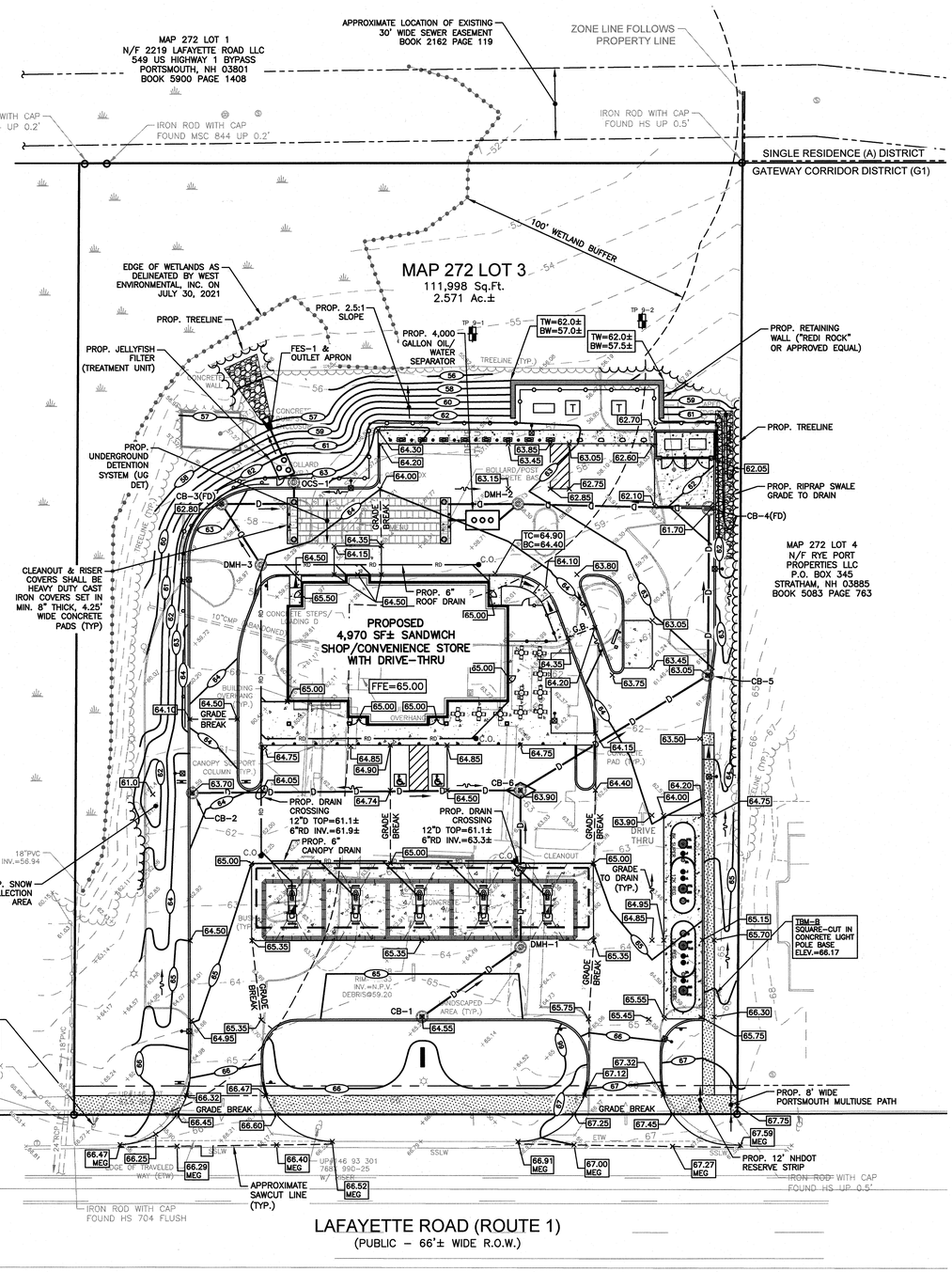
- EASEMENT LINE
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- ZONE LINE
- C.O. — PROP. CLEANOUT
- CB-1 — PROP. CATCH BASIN
- DMH-1 — PROP. DRAIN MANHOLE
- MEG — MEET EXISTING GRADE
- 331.25 — PROP. SPOT ELEVATION
- 55 — PROP. CONTOUR ELEVATION
- TW= — TOP OF WALL ELEV.
- BW= — BOTTOM OF WALL ELEV.
- G.B. — GRADE BREAK
- TP — TEST PIT



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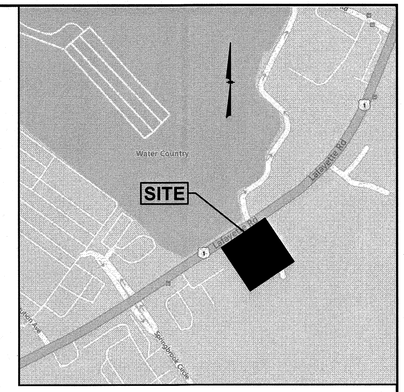
SCALE: 1" = 30'



LOCATION MAP

(NOT TO SCALE)

NOTES:

1) ALL SITE DRAINAGE PIPE SHALL BE CORRUGATED HIGH-DENSITY POLYETHYLENE PIPE WITH STANDARD JOINTS, DUAL-WALL, SMOOTH INTERIOR, AS MANUFACTURED BY ADS, INC., OR APPROVED EQUAL, UNLESS OTHERWISE NOTED ON PLAN. THE UNDERGROUND DETENTION SYSTEM SHALL HAVE WATER TIGHT JOINTS MEETING ASTM D3212 SPECIFICATIONS.
2) ALL ROOF AND CANOPY DRAIN PIPE SHALL BE 6" PVC (SDR-35).
3) ELEVATIONS ARE BASED ON NAVD88 DATUM.
4) ALL PROPOSED ELEVATIONS AS SHOWN ARE BOTTOM OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
5) ANY UTILITY FIELD ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER OF RECORD AND COORDINATED WITH THE APPROPRIATE LOCAL UTILITY COMPANY.
6) THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. THE CONTRACTOR IS TO VERIFY EXACT LOCATION PRIOR TO CONSTRUCTION. THE CONTRACTOR IS TO NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES. CONSTRUCTION SHALL COMMENCE BEGINNING AT THE LOWEST INVERT (POINT OF CONNECTION) AND PROGRESS UP GRADIENT. PROPOSED INTERFACE POINTS (CROSSINGS) WITH EXISTING UNDERGROUND INSTALLATIONS SHALL BE FIELD VERIFIED BY TEST PIT PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7) ALL CONSTRUCTION SHALL CONFORM TO MUNICIPAL DPW AND ALL APPLICABLE STATE AND FEDERAL STANDARDS.
8) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIG-SAFE (DIAL 811) PRIOR TO COMMENCING ANY EXCAVATION.
9) THIS SITE WILL REQUIRE A USEPA NPDES PERMIT FOR STORMWATER DISCHARGE FOR THE SITE CONSTRUCTION SINCE THE DISTURBANCE EXCEEDS ONE ACRE (ACTUAL DISTURBANCE = 75,000 SF±). THE CONSTRUCTION SITE OPERATOR SHALL DEVELOP AND IMPLEMENT A CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN (SWPPP), WHICH SHALL REMAIN ON SITE AND MADE ACCESSIBLE TO THE PUBLIC. A COMPLETED NOTICE OF TERMINATION (NOT) SHALL BE SUBMITTED TO NPDES PERMITTING AUTHORITY WITHIN 30 DAYS AFTER EITHER OF THE FOLLOWING CONDITIONS HAVE BEEN MET: FINAL STABILIZATION HAS BEEN ACHIEVED ON ALL PORTIONS OF THE SITE FOR WHICH THE PERMITTEE IS RESPONSIBLE; OR ANOTHER OPERATOR/PERMITTEE HAS ASSUMED CONTROL OVER ALL AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
10) ANY UTILITIES TO BE TAKEN OUT OF SERVICE SHALL BE DISCONNECTED AS DIRECTED BY UTILITY COMPANY AND LOCAL DPW.
11) ALL TRAFFIC CONTROL AND TEMPORARY CONSTRUCTION SIGNAGE ARRANGEMENTS, ACCEPTABLE TO NHDOT AND THE CITY DEPARTMENT OF PUBLIC WORKS, SHALL BE EMPLOYED DURING OPERATIONS WITHIN THE PUBLIC RIGHT-OF-WAY.
12) ALL ADA ACCESSIBLE WALKWAYS CANNOT EXCEED 5% RUNNING SLOPE AND 2% CROSS SLOPE. RAMPS CANNOT EXCEED 8.33% RUNNING SLOPE AND 2% CROSS SLOPE, AND ACCESSIBLE PARKING STALLS AND ACCESS AISLES CANNOT EXCEED 2% SLOPE IN ANY DIRECTION. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES.
13) SEE UTILITY PLAN FOR DETAILED UTILITY LAYOUT.
14) ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS AND OUTLETS EQUIPPED WITH "ELIMINATOR" OIL HOODS OR APPROVED EQUAL.
15) ALL PIPE DATA IS CALCULATED TO CENTER OF STRUCTURE, TYP.
16) CONTRACTOR TO REFER TO THE INSPECTION & MAINTENANCE (I&M) MANUAL FOR STORMWATER MANAGEMENT SYSTEMS & SITE MAINTENANCE DURING AND AFTER CONSTRUCTION.
17) CONTRACTOR TO INSTALL RISER STRUCTURES AT EACH CORNER OF UNDERGROUND DETENTION SYSTEMS AND CLEANOUTS AT EACH END OF EACH ROW TO PROVIDE ACCESS POINTS FOR CLEANING AND MAINTENANCE.
    - TOTAL RISERS PROPOSED = 4
    - TOTAL CLEANOUTS PROPOSED = 4

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

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CORY N. MASON No.17099 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE
5/24/22

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GRADING & DRAINAGE PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

5 OF 15

811 DigSafe MA-ME-NH-RI-VT

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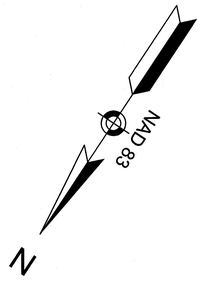

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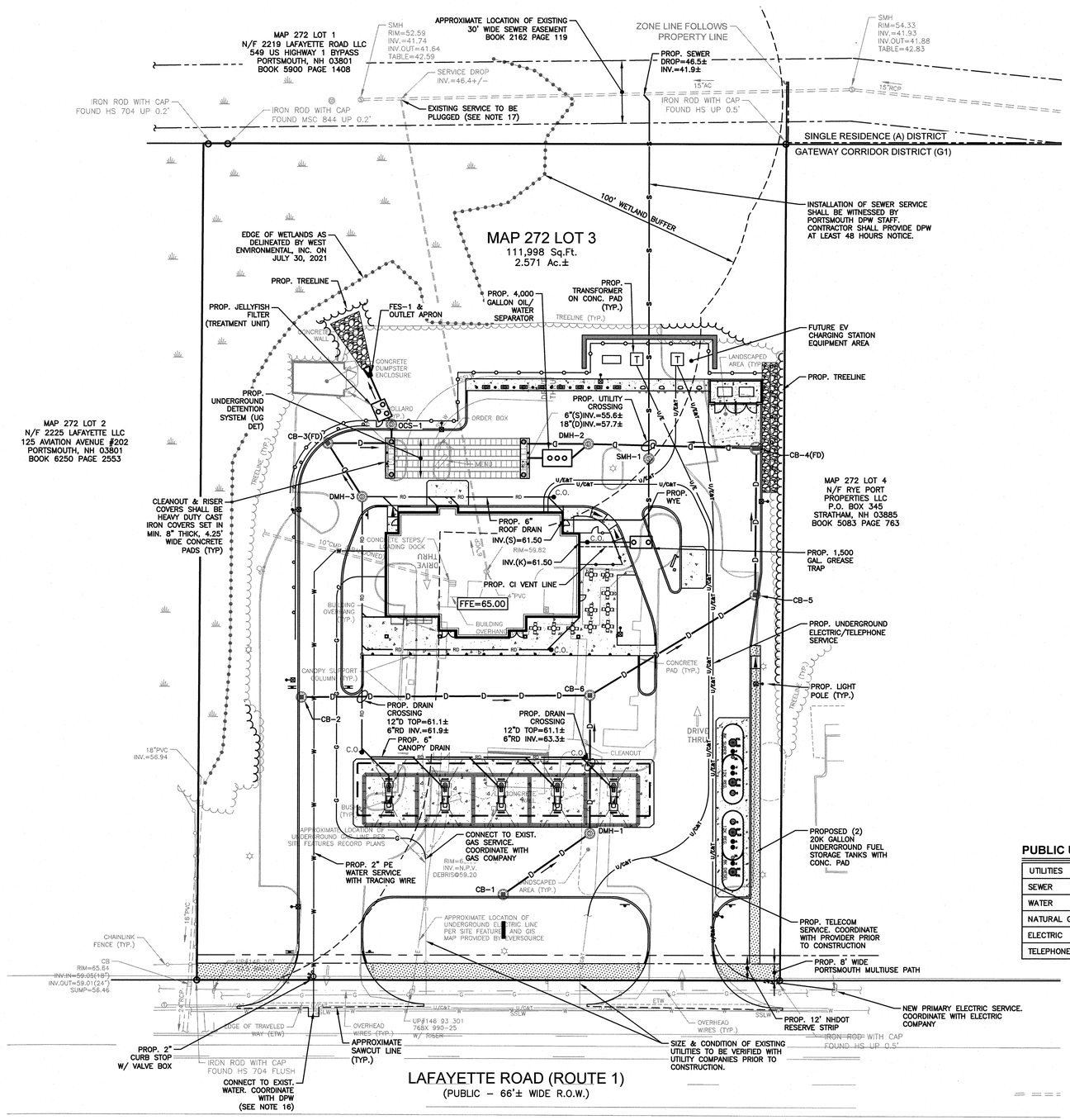
- DMH–1 — PROP. DRAIN MANHOLE
- SMH–1 — PROP. SEWER MANHOLE
- PROP. GATE VALVE



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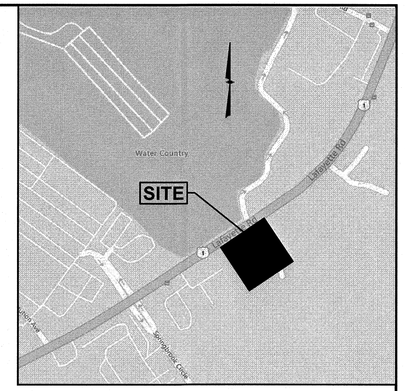

LOCATION MAP
(NOT TO SCALE)

NOTES:

1) ALL SANITARY SEWER PIPE SHALL BE PVC (SDR–35), UNLESS OTHERWISE NOTED.
2) ALL WATER PIPE SHALL BE POLYETHYLENE, UNLESS OTHERWISE NOTED.
3) ANY UTILITY FIELD ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER OF RECORD AND COORDINATED WITH THE APPROPRIATE LOCAL UTILITY COMPANY.
4) THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. THE CONTRACTOR IS TO VERIFY EXACT LOCATION PRIOR TO CONSTRUCTION. THE CONTRACTOR IS TO NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES.
5) ALL CONSTRUCTION SHALL CONFORM TO MUNICIPAL DPW AND ALL APPLICABLE STATE AND FEDERAL STANDARDS.
6) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIG–SAFE (1–888–344–7233) PRIOR TO COMMENCING ANY EXCAVATION.
7) ALL WATER AND SEWER CONSTRUCTION SHALL CONFORM TO DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS.
8) THIS SITE IS SERVED BY MUNICIPAL SEWER AND WATER.
9) ALL ELECTRIC, TELEPHONE AND CABLE TV LINES ARE TO BE UNDERGROUND AND INSTALLED IN CONFORMANCE WITH APPLICABLE UTILITY CO. SPECIFICATIONS.
10) ANY UTILITIES TO BE TAKEN OUT OF SERVICE SHALL BE DISCONNECTED AS DIRECTED BY UTILITY COMPANY AND LOCAL DPW.
11) ALL TRAFFIC CONTROL AND TEMPORARY CONSTRUCTION SIGNAGE ARRANGEMENTS, ACCEPTABLE TO NHDOT AND CITY DEPARTMENT OF PUBLIC WORKS, SHALL BE EMPLOYED DURING OPERATIONS WITHIN THE PUBLIC RIGHT–OF–WAY.
12) SEE GRADING & DRAINAGE PLAN FOR DETAILED DRAINAGE INFORMATION.
13) ELECTRICAL CONDUIT WITHIN 20' OF TANKS OR DISPENSERS MAY NEED TO BE RIGID METAL CONDUIT WITH CONCRETE ENCASEMENT. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY AND/OR TOWN ELECTRICAL INSPECTOR AS REQUIRED.
14) REFER TO DETAIL SHEETS FOR ALL UTILITY AND DRAINAGE STRUCTURE DETAILS AND ADDITIONAL INFORMATION.
15) ELECTRIC CONDUIT TO BE PROVIDED FOR FUTURE EV CHARGING STATIONS.
16) EXISTING WATER SERVICE LOCATION IS UNKNOWN. CONTRACTOR TO LOCATE AND DISCONTINUE SERVICE AT THE MAIN.
17) CONTRACTOR TO CONTACT EASTERN PIPE SERVICES TO PLUG THE SERVICE FROM THE MAIN WITHOUT DISTURBING THE WETLAND. AFTER PLUGGED, CONTRACTOR SHALL FILL THE EXISTING SERVICE WITH FLOWABLE FILL.
18) CONTRACTOR SHALL CONTACT PORTSMOUTH DPW AT LEAST 48 HOURS PRIOR TO SEWER CONSTRUCTION TO WITNESS SEWER SERVICE INSTALLATION.

PUBLIC UTILITIES

UTILITIES		AVAILABLE
SEWER	CITY OF PORTSMOUTH PUBLIC WORKS DEPT., PETER RICE 603–427–1530	YES
WATER	CITY OF PORTSMOUTH PUBLIC WORKS DEPT., PETER RICE 603–427–1530	YES
NATURAL GAS	UNITIL, DAVE MACLEAN 603–294–5261	YES
ELECTRIC	EVERSOURCE, CASEY MCDONALD 603–519–0924	YES
TELEPHONE	CONSOLIDATED COMMUNICATIONS	YES

SEWER PIPE SCHEDULE

FROM: STRUCTURE NUMBER	PIPE SIZE (inches)	TYPE OF PIPE	APPROX. PIPE LENGTH (feet)	SLOPE OF PIPE (ft./ft.)	TO: STRUCTURE NUMBER
BLDG.	6	CI	20	0.056	GR. TRAP
GR. TRAP	6	PVC	35	0.081	SMH–1
BLDG.	6	PVC	41	0.062	WYE
SMH–1	6	PVC	178	0.052	SEWER MAIN

SEWER STRUCTURES

1,500 GAL. GREASE TRAP
RIM=64.10
INV.IN=60.10
INV.OUT=59.85

SMH–1 (DROP)
RIM=63.00
INV.IN=57.00
INV.OUT=55.70

PROP. WYE
INV.=58.95±

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Construction Management
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Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY N. MASON No.17099
LICENSED PROFESSIONAL ENGINEER
5/24/22

REVISIONS		
4	REV. PER TAC	5/10/22
3	REV. PER TAC	5/10/22
2	MISC. REVISIONS	4/19/22
1	REV. PER CITY COMMENTS	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

UTILITY PLAN

SCALE: 1"=30'

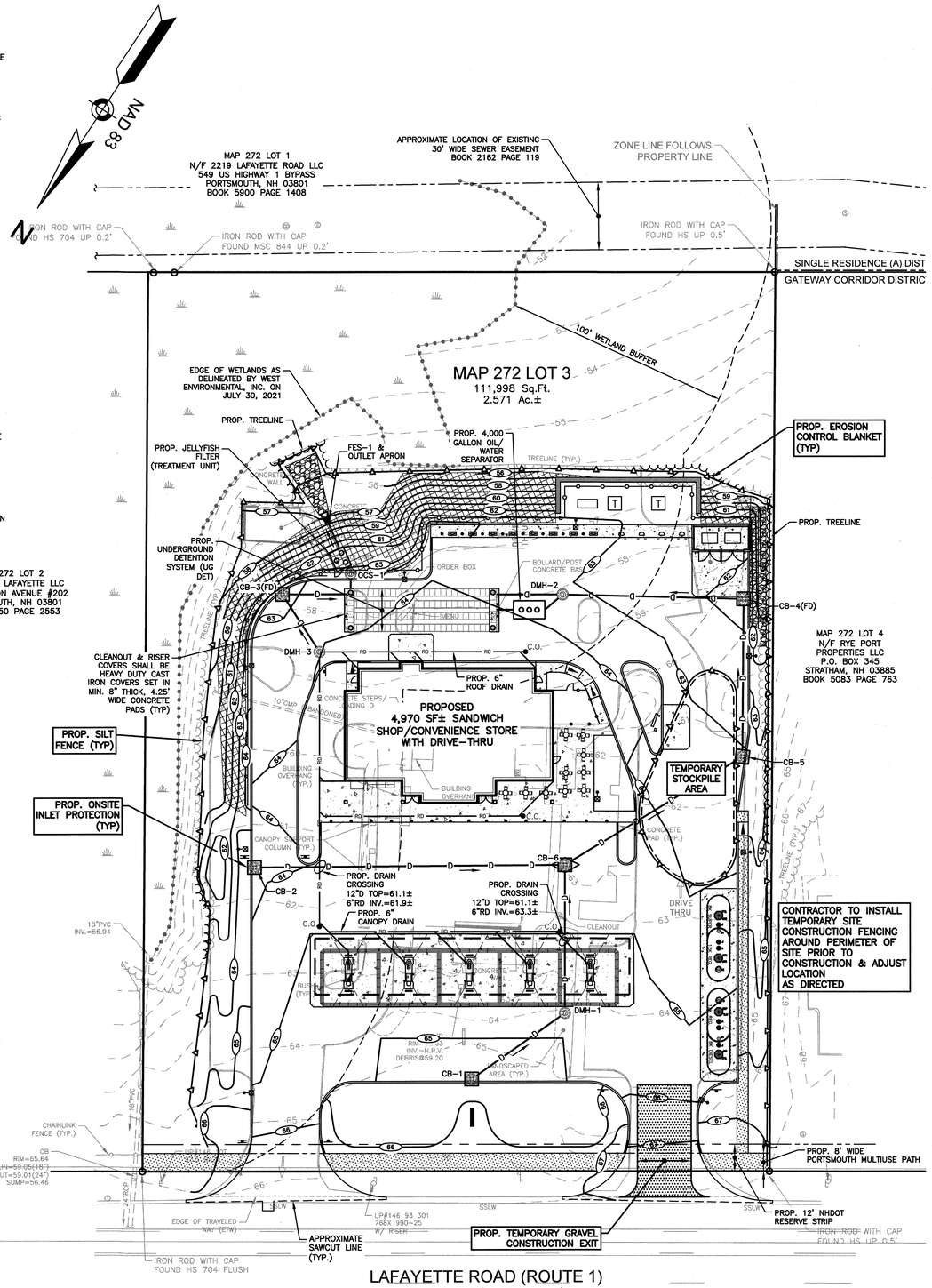
PROJECT NO. NEX-2021163

6 OF 15

811 DigSafe MA-ME-NH-RI-VT

LEGEND

- VGC — VERTICAL GRANITE CURB
- SSLW — SINGLE SOLID LINE WHITE
- G — GAS LINE
- U/GAT — UNDERGROUND COMM
- W — WATER LINE
- E — UNDERGROUND ELECTRIC
- CHAIN LINK FENCE
- 90 — CONTOUR ELEVATION
- TREE
- UTILITY POLE
- GUY WIRE
- OVERHEAD WIRE
- TREELINE
- SIGN
- SPOT ELEVATION
- CATCH BASIN
- CLEANOUT
- SEWER MANHOLE
- TELEPHONE MANHOLE
- WATER SHUT OFF
- BOLLARD
- GM — GAS METER
- LIGHT POLE
- WETLAND LINE
- EASEMENT LINE
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- ZONE LINE
- C.O. — PROP. CLEANOUT
- CB-1 — PROP. CATCH BASIN
- DMH-1 — PROP. DRAIN MANHOLE
- PROP. CONTOUR ELEVATION
- PROP. SILT FENCE

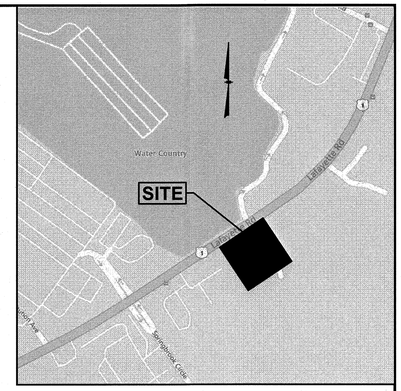


CONSTRUCTION SEQUENCE:

1) SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY ON-SITE CONSTRUCTION AS SHOWN. ADDITIONAL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED AS SOON AS PRACTICAL.
2) REMOVE AND STOCKPILE SOIL AS REQUIRED. STOCKPILE SHALL BE SURROUNDED WITH HAYBALES TO PREVENT EROSION.
3) CONSTRUCT DRIVEWAYS AND PERFORM SITE GRADING.
4) INSTALL UNDERGROUND UTILITIES & DRAINAGE.
5) BEGIN TEMPORARY AND PERMANENT SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED OR MULCHED IMMEDIATELY AFTER THEIR CONSTRUCTION.
6) DAILY, OR AS REQUIRED, CONSTRUCT, INSPECT, AND IF NECESSARY, RECONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, SILT FENCES, HAYBALES AND SEDIMENT TRAPS INCLUDING MULCHING AND SEEDING.
7) BEGIN EXCAVATION FOR AND CONSTRUCTION OF BUILDINGS.
8) FINISH PAVING ALL DRIVES AND PARKING AREAS. CLEAN ALL DRAINAGE STRUCTURES.
9) COMPLETE PERMANENT SEEDING AND LANDSCAPING.
10) AFTER GRASS HAS BEEN FULLY GERMINATED IN ALL SEEDED AREAS, REMOVE ALL TEMPORARY EROSION CONTROL MEASURES.

WINTER STABILIZATION NOTES:

MAINTENANCE REQUIREMENTS:
MAINTENANCE MEASURES SHOULD CONTINUE AS NEEDED THROUGHOUT CONSTRUCTION, INCLUDING THE OVER-WINTER PERIOD. AFTER EACH RAINFALL, SNOWSTORM, OR PERIOD OF THAWING AND RUNOFF, THE SITE CONTRACTOR SHOULD CONDUCT AN INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES AND PERFORM REPAIRS AS NEEDED TO INSURE THEIR CONTINUING FUNCTION. FOR ANY AREA STABILIZED BY TEMPORARY OR PERMANENT SEEDING PRIOR TO THE ONSET OF THE WINTER SEASON, THE CONTRACTOR SHOULD CONDUCT AN INSPECTION IN THE SPRING TO ASCERTAIN THE CONDITION OF VEGETATION COVER, AND REPAIR ANY DAMAGE AREAS OR BARE SPOTS AND RESEED AS REQUIRED TO ACHIEVE AN ESTABLISHED VEGETATIVE COVER (AT LEAST 85% OF AREA VEGETATED WITH HEALTHY, VIGOROUS GROWTH).
SPECIFICATIONS:
TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE FOLLOWING STABILIZATION TECHNIQUES SHOULD BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15TH THROUGH MAY 15TH.
1) THE AREA OF EXPOSED, UNSTABILIZED SOIL SHOULD BE LIMITED TO ONE ACRE AND SHOULD BE PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT. SUBJECT TO APPLICABLE REGULATIONS, THE ALLOWABLE AREA OF EXPOSED SOIL MAY BE INCREASED IF ACTIVITIES ARE CONDUCTED ACCORDING TO A WINTER CONSTRUCTION PLAN, DEVELOPED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF NEW HAMPSHIRE OR A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL AS CERTIFIED BY THE CSPESC COUNCIL OF ENVIROCERT INTERNATIONAL, INC.
2) STABILIZATION AS FOLLOWS SHOULD BE COMPLETED WITHIN A DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS:
A. ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF LESS THAN 15% WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHOULD BE SEEDED AND COVERED WITH 3 TO 4 TONS OF HAY OR STRAW MULCH PER ACRED SECURED WITH ANCHORED NETTING, OR 2 INCHES OF EROSION CONTROL MIX (SEE DESCRIPTION OF EROSION CONTROL MIX BERMS FOR MATERIAL SPECIFICATION).
B. ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF GREATER OOTHAN 15% WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHOULD BE SEEDED AND COVERED WITH A PROPERLY INSTALLED AND ANCHORED EROSION CONTROL BLANKET OR WITH A MINIMUM 4 INCH THICKNESS OF EROSION CONTROL MIX, UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER. NOTE THAT COMPOST BLANKETS SHOULD NOT EXCEED 2 INCHES IN THICKNESS OR THEY MAY OVERHEAT.
3) ALL STONE-COVERED SLOPES MUST BE CONSTRUCTED AND STABILIZED BY OCTOBER 15.
4) INSTALLATION OF ANCHORED HAY MULCH OR EROSION CONTROL MIX SHOULD NOT OCCUR OVER SNOW OF GREATER THAN ONE INCH IN DEPTH.
5) ALL MULCH APPLIED DURING WINTER SHOULD BE ANCHORED (E.G., BY NETTING, TRACKING, WOOD CELLULOSE FIBER).
6) STOCKPILES OF SOIL MATERIALS SHOULD BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL RATE OR WITH A FOUR-INCH LAYER OF EROSION CONTROL MIX. MULCHING SHOULD BE DONE WITHIN 24 HOURS OF STOCKING, AND RE-ESTABLISHED PRIOR TO ANY RAINFALL OR SNOWFALL. NO SOIL STOCKPILE SHOULD BE PLACED (EVEN COVERED WITH MULCH) WITHIN 100 FEET FROM ANY WETLAND OR OTHER WATER RESOURCE AREA.
7) FROZEN MATERIALS, (E.G., FROST LAYER THAT IS REMOVED DURING WINTER CONSTRUCTION), SHOULD BE STOCKPILED SEPARATELY AND IN A LOCATION THAT IS AWAY FROM ANY AREA NEEDING TO BE PROTECTED. STOCKPILES OF FROZEN MATERIAL CAN MELT IN THE SPRING AND BECOME UNWORKABLE AND DIFFICULT TO TRANSPORT DUE TO THE HIGH MOISTURE CONTENT IN THE SOIL.
8) INSTALLATION OF EROSION CONTROL BLANKETS SHOULD NOT OCCUR OVER SNOW OF GREATER THAN ONE INCH IN DEPTH OR ON FROZEN GROUND.
9) ALL GRASS-LINED DITCHES AND CHANNELS SHOULD BE CONSTRUCTED AND STABILIZED BY SEPTEMBER 1. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHOULD BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, AS DETERMINED BY A QUALIFIED PROFESSIONAL ENGINEER OR A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL AS CERTIFIED BY THE CSPESC COUNCIL OF ENVIROCERT INTERNATIONAL, INC. IF A STONE LINING IS NECESSARY, THE CONTRACTOR MAY NEED TO RE-GRADE THE DITCH AS REQUIRED TO PROVIDE ADEQUATE CROSS-SECTION AFTER ALLOWING FOR PLACEMENT OF THE STONE.
10) ALL STONE-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED BY OCTOBER 15.
11) AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
12) SEDIMENT BARRIERS THAT ARE INSTALLED DURING FROZEN CONDITIONS SHOULD CONSIST OF EROSION CONTROL MIX BERMS, OR CONTINUOUS CONTAINED BERMS. SILT FENCES AND HAY BALES SHOULD NOT BE INSTALLED WHEN FROZEN CONDITIONS PREVENT PROPER EMBEDMENT OF THESE BARRIERS.



LOCATION MAP
(NOT TO SCALE)

EROSION CONTROL NOTES:

1) THE EROSION CONTROL PROCEDURES SHALL CONFORM TO THE NH STORMWATER MANUAL, VOLUME 3, EROSION & SEDIMENT CONTROLS DURING CONSTRUCTION, DECEMBER 2008, OR LATEST EDITION.
2) DURING CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED: THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING DEVELOPMENT. WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME AS APPROVED BY THE ENGINEER. LAND SHOULD NOT BE LEFT EXPOSED DURING THE WINTER MONTHS.
3) LIMIT OF MAXIMUM AREA OF EXPOSED SOIL AT ANY ONE TIME TO LESS THAN 5 ACRES. THE EXPOSED AREA THAT IS BEING ACTIVELY WORKED DURING WINTER IS TO BE LESS THAN 3 ACRES DURING THE WINTER SEASON.
4) ALL PERMANENT STORM WATER STRUCTURES SHALL BE STABILIZED PRIOR TO DIRECTING FLOW INTO THEM. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURED:
A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED.
B) A MINIMUM OF 85 PERCENT VEGETATED GROWTH HAS BEEN ESTABLISHED.
C) A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED.
D) OR, EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
5) SILT FENCE SHALL BE INSTALLED AND MAINTAINED DURING AND AFTER DEVELOPMENT TO REMOVE SEDIMENT FROM RUNOFF WATER AND FROM LAND UNDERGOING DEVELOPMENT. WHERE POSSIBLE, NATURAL DRAINAGE WAYS SHOULD BE UTILIZED AND LEFT OPEN TO REMOVE EXCESS SURFACE WATER. SILT FENCE TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE A HEALTHY STAND OF GRASS.
6) ALL DISTURBED AREAS AND SIDE SLOPES WHICH ARE FINISHED GRADED, WITH NO FURTHER CONSTRUCTION TO TAKE PLACE, SHALL BE LOAMED AND SEEDED WITHIN 72 HOURS AFTER FINAL GRADING. A MINIMUM OF 4" OF LOAM SHALL BE INSTALLED WITH NOT LESS THAN ONE POUND OF SEED PER 50 SQUARE YARDS OF AREA. THE SEED MIX SHALL BE AS DESIGNATED BELOW.
7) ANY DISTURBED AREAS WHICH ARE TO BE LEFT TEMPORARILY, AND WHICH WILL BE REGRADED LATER DURING CONSTRUCTION SHALL BE MACHINE HAY MULCHED AND SEEDED WITH RYE GRASS TO PREVENT EROSION. THE MAXIMUM LENGTH OF TIME FOR THE EXPOSURE OF DISTURBED SOILS SHALL BE 45 DAYS. HAY OR STRAW MULCH SHALL BE APPLIED TO ALL FRESHLY SEEDED AREAS AT THE RATE OF 2 TONS PER ACRE. BALES SHALL BE UNSPOILED, AIR DRIED, AND FREE FROM WEED, SEEDS AND ANY COARSE MATERIAL.
8) DURING GRADING OPERATIONS INSTALL HAY BALE BARRIERS ALONG TOE OF SLOPE OF FILL AREAS WHERE SHOWN. BARRIERS ARE TO BE MAINTAINED UNTIL DISTURBED AREAS ARE PAVED OR GRASSED.
9) THE FILL MATERIAL SHALL BE OF APPROVED SOIL TYPE FREE FROM STUMPS, ROOTS, WOOD, ETC. TO BE PLACED IN 12" LIFTS OR AS SPECIFIED. BULLDOZERS, TRUCKS, TRACTORS, OR ROLLERS MAY BE USED FOR COMPACTION BY ROUTING THE EQUIPMENT TO ALL AREAS OR EACH LAYER.
10) AVOID THE USE OF FUTURE OPEN SPACES (LOAM & SEED) WHEREVER POSSIBLE DURING CONSTRUCTION. CONSTRUCTION TRAFFIC SHALL USE THE ROADBEDS OF FUTURE ROADS.

TEMPORARY EROSION CONTROL MEASURES:

1) THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
2) HAY BALE BARRIERS AND SEDIMENT CONTROL FENCE SHALL BE INSTALLED AS REQUIRED. BARRIERS AND FENCE ARE TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE A HEALTHY STAND OF GRASS.
3) BALED HAY AND MULCH SHALL BE MOWINGS OF ACCEPTABLE HERBACEOUS GROWTH; FREE FROM NOXIOUS WEEDS OR WOODY STEMS, AND SHALL BE DRY. NO SALT HAY SHALL BE USED.
4) FILL MATERIAL SHALL BE FREE FROM STUMPS, WOOD, ROOTS, ETC.
5) STOCKPILED MATERIALS SHALL BE PLACED ONLY IN AREAS SHOWN ON THE PLANS. STOCKPILES SHALL BE PROTECTED BY HAY BALE BARRIERS AND SEEDED TO PREVENT EROSION. THESE MEASURES SHALL REMAIN UNTIL ALL MATERIAL HAS BEEN PLACED OR DISPOSED OFF SITE.
6) ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED. A MINIMUM OF 4 INCHES OF LOAM SHALL BE INSTALLED WITH NOT LESS THAN ONE POUND OF SEED PER 50 SQUARE YARDS OF AREA.
7) SEED MIX SHALL BE EQUAL PARTS OF RED FESCUE (CREEPING), KENTUCKY BLUE GRASS, REDTOP, PERENNIAL RYEGRASS.
8) AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED.
9) PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES.
10) ALL CATCH BASIN INLETS WILL BE PROTECTED WITH INLET PROTECTION.
11) ALL STORM DRAINAGE OUTLETS WILL BE STABILIZED AND CLEANED AS REQUIRED, BEFORE THE DISCHARGE POINTS BECOME OPERATIONAL.
12) ALL DEWATERING OPERATIONS MUST DISCHARGE DIRECTLY INTO A SEDIMENT FILTER AREA.
13) TO PREVENT TRACKING OF SEDIMENT ONTO THE EXISTING ROADS, ALL CONSTRUCTION TRAFFIC CAN ONLY EXIT THE SITE OVER THE CONSTRUCTION ENTRANCES SHOWN ON THIS PLAN.

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LICENSED PROFESSIONAL ENGINEER
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NO.	REVISION	DATE

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DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

EROSION & SEDIMENT CONTROL PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

811 DigSafe MA-ME-NH-RI-VT

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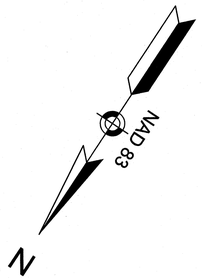
PLANTING SCHEDULE

PLANT	QNTY	BOTANICAL NAME	COMMON NAME	MIN. INSTALL SIZE	REMARKS
TREES					
GT	3	GLEDITSIA TRIACANTHOS 'SHADEMASTER'	SHADEMASTER HONEY LOCUST	2"–2 1/2" CAL., B&B	THORNLESS VARIETY
MG	1	MALUS 'SPRING SNOW'	SPRING SNOW CRABAPPLE	2"–2 1/2" CAL., B&B	
QR	4	QUERCUS ROBUR 'KINDRED SPIRIT'	KINDRED SPIRIT ENGLISH OAK	3"–3 1/2" CAL., B&B	
SHRUBS					
CS	5	CORNUS SERICEA 'ALLEMAN'S COMPACTA'	COMPACT REDTWIG DOGWOOD	18"–24"HT., 3 GAL.	
IG	5	ILEX GLABRA 'COMPACTA'	COMPACT INKBERRY	2'–3' HT., 3 GAL.	
PF	24	POTENTILLA FRUTICOSA 'GOLDSTAR'	GOLDSTAR POTENTILLA	18"–24"HT., 3 GAL.	
SJ	19	SPIREA JAPONICA 'MAGIC CARPET'	MAGIC CARPET SPIREA	15"–18" SPR., 3 GAL.	
TE	5	TAXUS X MEDIA 'EVER–LOW'	EVER–LOW YEW	18"–24" SPR., B&B	
PERENNIALS & GRASSES					
HD	40	HEMEROCALLIS 'STELLA DE ORO'	DWARF YELLOW DAYLILY	1 GAL.	
FE	22	FESTUCA GLAUCA 'ELIJAH BLUE'	ELIJAH BLUE FESCUE GRASS	1 GAL.	
PH	23	PENNISETUM ALOPECUROIDES 'HAMELN'	DWARF FOUNTAIN GRASS	1 GAL.	

(1 / XX) PLANT QUANTITY / PLANT DESIGNATION — PROPOSED LANDSCAPE STONE WITH WEED BARRIER (SEE NOTES)



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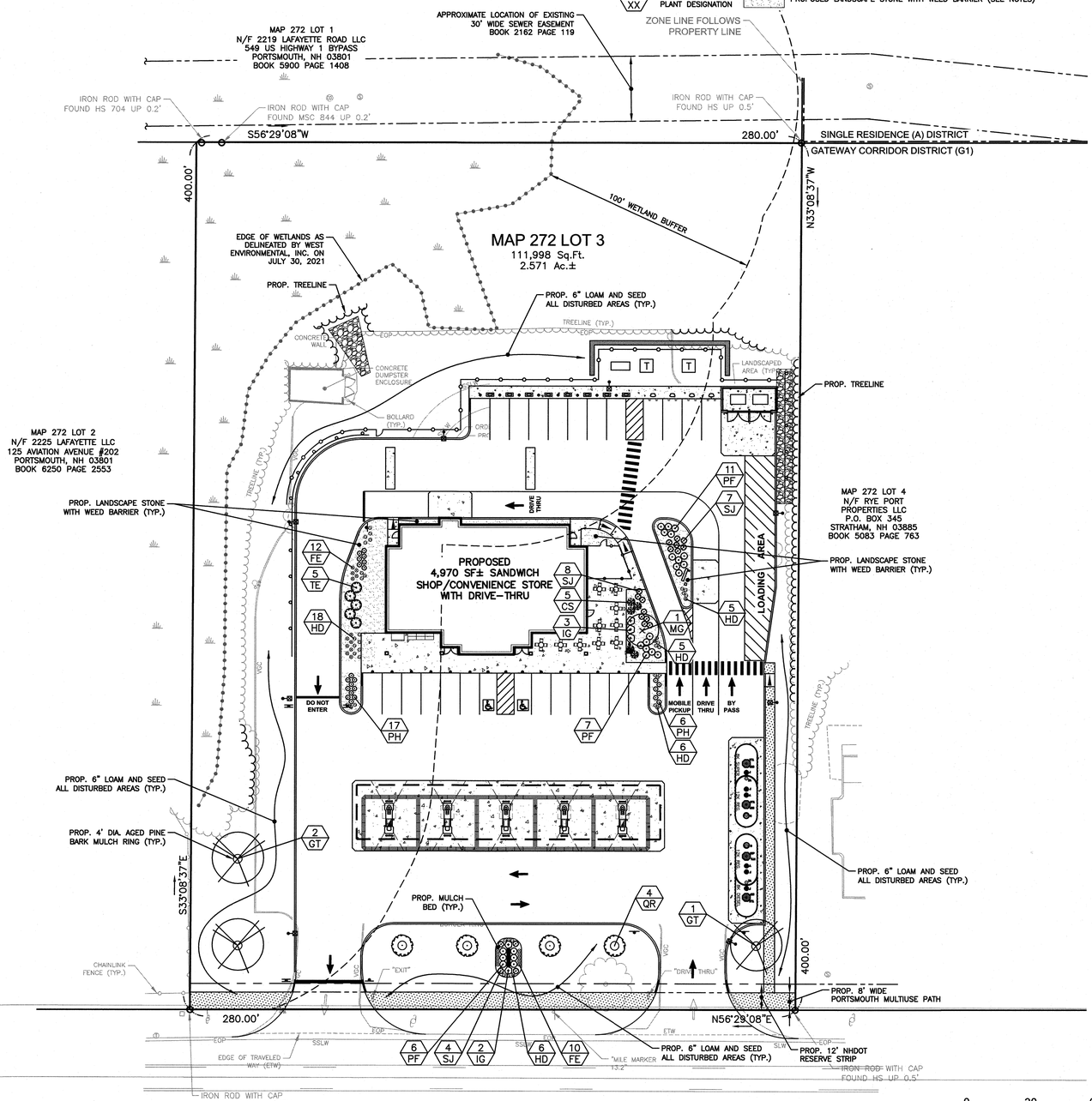

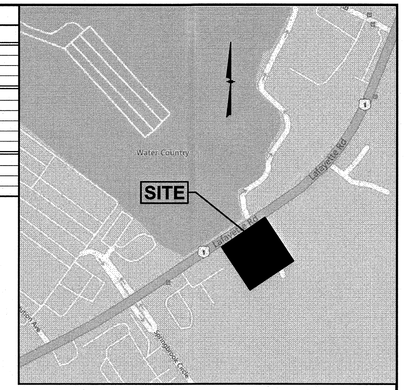

LOCATION MAP
(NOT TO SCALE)

NOTES:

1) ALL PLANT STOCK SHALL CONFORM TO ANSI Z260.1 – NURSERY STOCK, LATEST EDITION (AMERICAN ASSOCIATION OF NURSERYMEN, INC.).
2) A 4' DIA. TREE RING WITH 3" AGED PINE BARK MULCH TO BE INSTALLED AT BASE OF ALL TREES IN LAWN AREAS.
3) 3" AGED PINEBARK MULCH SHALL BE APPLIED TO ALL SHRUB AND GROUNDCOVER BEDS.
4) LANDSCAPE STONE SHALL BE TAN RIVERBED STONE. STONE SHALL BE (1½) INCHES IN DIAMETER AND APPLIED AT A THICKNESS OF (4) INCHES DEEP. ALL FINES SHALL BE SCREENED FROM THE AGGREGATE. THE MATERIAL SHALL BE FREE OF ORGANIC AND INORGANIC DEBRIS AND TRASH. SUBMIT SAMPLE IN A 5–GALLON BUCKET TO THE DEVELOPER FOR APPROVAL.
5) A WEED BARRIER (TY–PAR FABRIC OR APPROVED EQUAL) SHALL BE APPLIED TO ALL SHRUB AND GROUNDCOVER BEDS. INSTALL WEED BARRIER AS PER MANUFACTURERS RECOMMENDATIONS.
6) THE CONTRACTOR SHALL PROVIDE TESTING OF SOILS IN PLANTING LOCATIONS. THE CONTRACTOR SHALL PROVIDE TEST RESULTS AND RECOMMENDATIONS AS NECESSARY FOR SOIL AMENDMENT TO THE ENGINEER FOR THEIR APPROVAL. BACKFILL SHALL BE A BLEND OF ONE–PART LOAM BORROW, ONE PART ORGANIC MATERIAL AND TWO–PARTS EXISTING SUBSOIL.
7) ALL LANDSCAPED AREAS NOT PLANTED WITH TREES, SHRUBS OR GROUNDCOVER SHALL BE RESTORED WITH SEED AS INDICATED ON PLANS.
8) ALL SEED, SHRUB AND TREE AREAS SHALL RECEIVE 6" PH CORRECTED TOPSOIL. AFTER TOPSOIL IS SPREAD EVENLY OVER ENTIRE AREA, ALL CLODS, LUMPS, STONES AND OTHER DELETERIOUS MATERIAL SHALL BE RAKED UP AND REMOVED.
9) APPLICATION OF GRASS SEED, FERTILIZERS AND STRAW MULCH SHALL BE ACCOMPLISHED BY BROADCAST SEEDING OR HYDROSEEDING AT THE RATES OUTLINED BELOW:

LIMESTONE: 100 LBS./1,000 SQUARE FEET.
FERTILIZER: 500 LBS/ACRE OF 10–20–20 OR 1000 LBS/ACRE OF 5–10–10.
STRAW MULCH: APPROXIMATELY 3 TONS/ACRE

SEED MIX (SLOPES LESS THAN 4:1)	LBS/ACRE
CREEPING RED FESCUE	20
TALL FESCUE	15
PERENNIAL RYEGRASS	5
REDTOP	2
	42

SLOPE MIX (SLOPES GREATER THAN 4:1)	LBS/ACRE
CREEPING RED FESCUE	20
TALL FESCUE	20
BIRDSFOOT TREEFOIL	8
	48

10) FOR TEMPORARY EROSION CONTROL NOTES, SEE DETAIL SHEET.
11) NEWLY GRADED AREAS REQUIRING SLOPE PROTECTION OUTSIDE OF NORMAL SEEDING SEASON SHALL RECEIVE STRAW MULCH AT THE APPROXIMATE RATE OF NO MORE THAN 3 TONS PER ACRE.
12) ANY CHANGES IN PLANT LOCATIONS OR TYPES SHALL BE APPROVED BY THE DEVELOPER, LANDOWNER AND CITY PRIOR TO INSTALLATION.
13) CLEAR AND GRUB (TO LIMITS REQUIRED ON GRADING PLAN) TO REMOVE VEGETATION, TREES, ROCKS, DEBRIS, ROOTS, ETC. STUMPS SHALL BE REMOVED AND DISPOSED OF OFF SITE IN ACCORDANCE WITH STATE REGULATIONS. AFTER CLEARING, STRIP AND STOCKPILE ALL ON–SITE TOPSOIL FOR REUSE TO THE MAXIMUM EXTENT POSSIBLE.
14) FOR SEED AREAS USE EXISTING TOPSOIL, IF AVAILABLE, FOR A 4" DEPTH AND TOP DRESS WITH 2" OF SCREENED TOPSOIL, UNLESS OTHERWISE NOTED ON PLAN. ALL LOAM OR TOPSOIL IMPORTED OR RE–UTILIZED FROM ON SITE SHALL BE TESTED AND AMENDED AS DIRECTED BY DEVELOPER TO MEET MINIMUM REQUIREMENTS AND FREE FROM INVASIVE PLANTS.
15) PLANTINGS SHALL BE GUARANTEED BY THE CONTRACTOR FOR ONE YEAR AFTER WRITTEN ACCEPTANCE BY THE DEVELOPER.
16) EXPOSED SOILS SHALL BE SEEDED OR STRAW MULCHED WITHIN 72 HOURS OF FINAL GRADING.
17) ALL WORK SHALL BE COORDINATED WITH APPLICABLE EPA NPDES/SWPPP PERMIT WORK AS REQUIRED.
18) THE CONTRACTOR SHALL INSTALL AN IRRIGATION SYSTEM TO PROVIDE COMPLETE COVERAGE OF ALL SEED AREAS AND SHRUB BEDS SHOWN ON THIS PLAN. THE SYSTEM SHALL INCLUDE A TIMER AND SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODES.

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25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE — CORY N. MASON No.17099 LICENSED PROFESSIONAL ENGINEER — 5/24/22

REVISIONS		
3	REV. PER TAC	5/10/22
2	MISC. REVISIONS	4/19/22
1	REV. PER CITY COMMENTS	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

LANDSCAPE PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

8 OF 15

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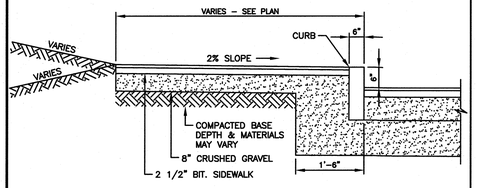
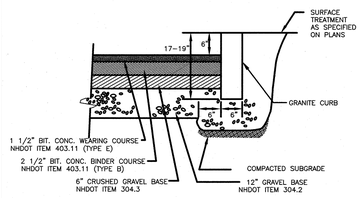
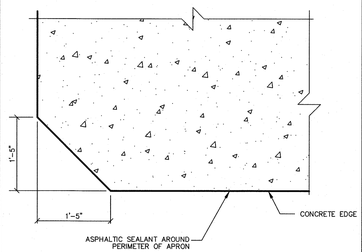


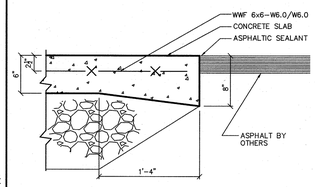
BITUMINOUS CONCRETE SIDEWALK
NOT TO SCALE



PAVEMENT AND VERTICAL GRANITE CURB SECTION ON-SITE
NOT TO SCALE



DISPENSER APRON CHAMFER DETAIL
NOT TO SCALE



DISPENSER APRON EDGE DETAIL
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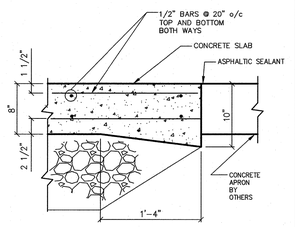
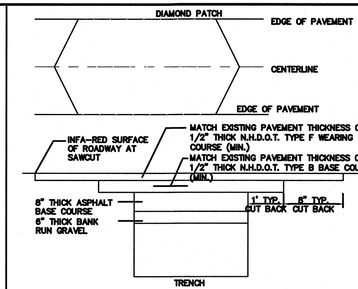


TANK APRON EDGE DETAIL
NOT TO SCALE



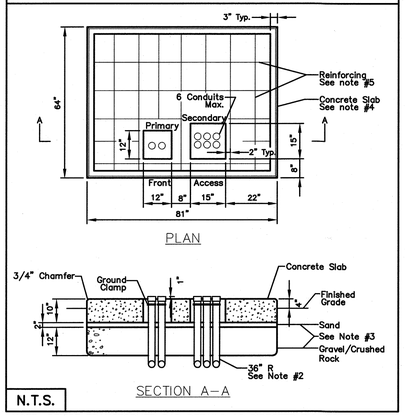
TYPICAL PAVEMENT REPAIR DETAIL
NOT TO SCALE

TRANSFORMER PAD NOTES

NOTES:

1) THIS STANDARD COVERS SPECIFICATIONS FOR THE CONSTRUCTION OF A CONCRETE FOUNDATION FOR PAD-MOUNTED TRANSFORMER.
2) INSTALL CONDUIT AS SHOWN BEFORE SLAB IS POURED. USE 36" RADIUS BENDS, WITH COUPLINGS, NIPPLES AND BUSHINGINGS AS REQUIRED. BENDS FOR PRIMARY CABLES SHALL BE GALVANIZED STEEL. TERMINATIONS OF CONDUITS SHALL BE LOCATED AS SHOWN IN SECTION A–A. THE NIPPLE AND BUSHING SHALL BE INSTALLED AFTER THE TRANSFORMER IS PLACED AND BEFORE THE CABLES ARE PULLED.
3) GRAVEL AND SAND SHALL BE PLACED AS SHOWN IN SECTION A–A; THE GRAVEL BEING COMPACTED AND THE SAND THOROUGHLY WETTED JUST BEFORE PLACING THE CONCRETE.
4) CONCRETE TO CONFORM TO GS 0211 OF LATEST DATE, (MIX M–4) FOR READY MIX CONCRETE. ALL EXPOSED EDGES TO HAVE A 3/4" CHAMFER.
5) REINFORCING TO BE #4 GRADE 60 BARS AND SHALL CONFORM TO ASTM STANDARD A–615 OF LATEST DATE. REINFORCING ROD TO BE LOCATED IN CENTER OF THE SLAB, WITH A MINIMUM OF 2" CLEARANCE FROM FACE OF CONCRETE.
6) GROUND GRID TO BE INSTALLED AS PER GS 2586.

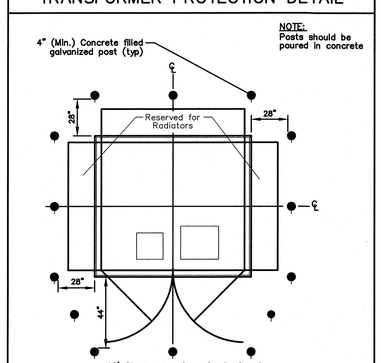
TRANSFORMER PAD DETAIL



N.T.S.

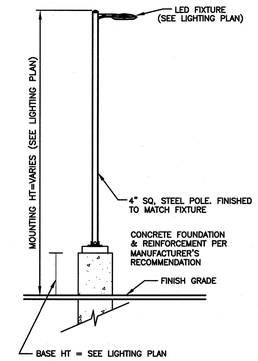
NOTE: REVISE TRANSFORMER PAD DETAILS AS DIRECTED BY LOCAL ELECTRIC COMPANY

TRANSFORMER PROTECTION DETAIL

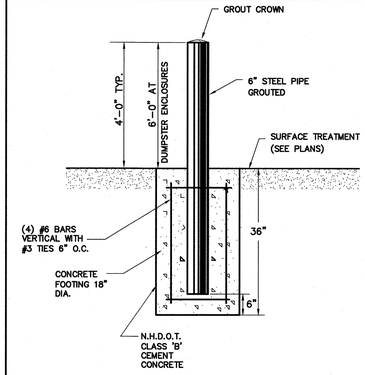


N.T.S.

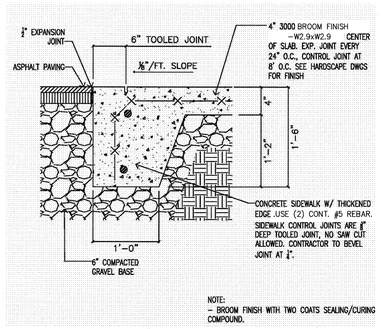
TRANSFORMER PAD DETAILS
NOT TO SCALE



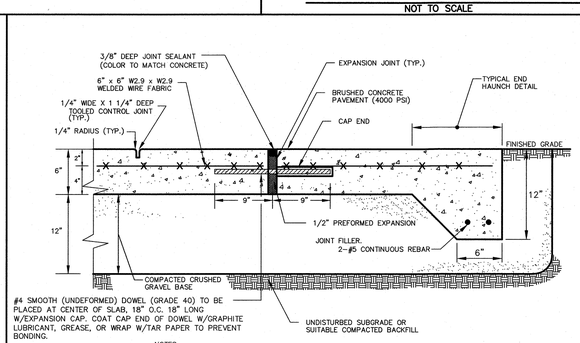
LIGHT FIXTURE DETAIL
NOT TO SCALE



BOLLARD DETAIL
NOT TO SCALE

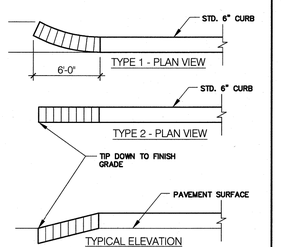


FLUSH CONCRETE SIDEWALK/PARKING DETAIL
NOT TO SCALE

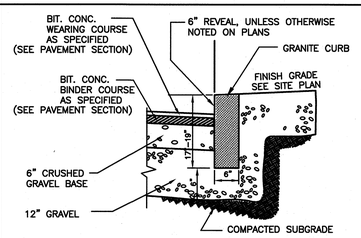


NOTES:
1. MAINTAIN 2" CLEARANCE (TYP) BETWEEN ALL CONCRETE EDGES AND WIRE FABRIC, DOWEL, OR REBAR.
2. CONTROL JOINTS TO BE LOCATED 5 FT. ON CENTER OR AS SHOWN ON ARCHITECTURAL PLANS.
3. EXPANSION JOINTS TO BE LOCATED 25 FT. ON CENTER.
4. WELDED WIRE FABRIC SHALL BE LAPSED A MINIMUM OF 2 WIRE SPACES.

6" HEAVY DUTY CONCRETE PAD DETAILS
NOT TO SCALE

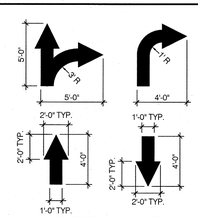


TYPICAL TIP DOWN CURB DETAIL
NOT TO SCALE



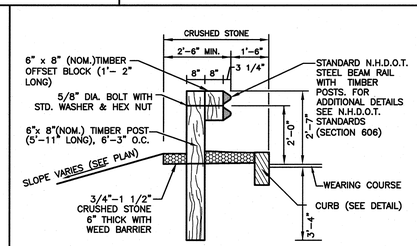
VERTICAL GRANITE CURB
NOT TO SCALE

NOTE: SAWCUT 1' OFF FACE OF CURB WHERE INSTALLED IN EXISTING PAVEMENT. PATCH PAVEMENT TO MATCH EXISTING THICKNESS.

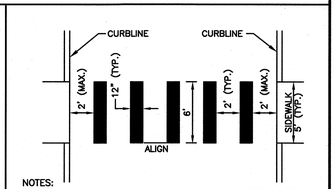


ALL PAVEMENT MARKINGS TO BE WHITE PAVEMENT PAINT, UNLESS STATED OTHERWISE.

ON-SITE PAVEMENT MARKING DETAILS
NOT TO SCALE

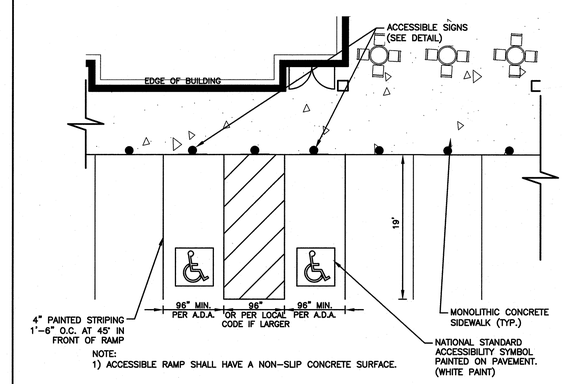


GUARD RAIL DETAIL
NOT TO SCALE



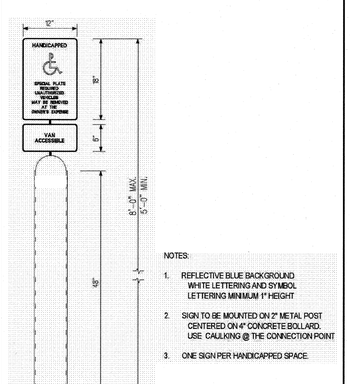
NOTES:
1. TWELVE INCH (12") WHITE THERMOPLASTIC LINES SHALL BE APPLIED IN ONE APPLICATION. NO COMBINATION OF LINES (TWO – 6 INCH LINES) WILL BE ACCEPTED.
2. LONGITUDINAL CROSSWALK LINES TO BE PARALLEL TO CURBLINE.
3. ALL LONGITUDINAL CROSSWALK LINES TO BE THE SAME LENGTH AND PROPERLY ALIGNED.

CROSSWALK
NOT TO SCALE



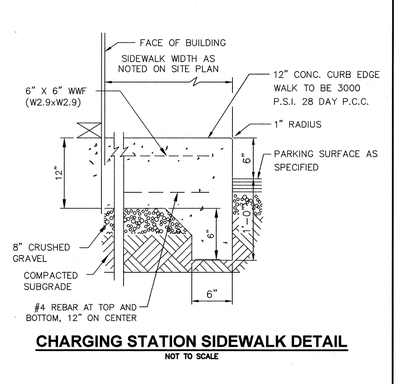
NOTE:
1) ACCESSIBLE RAMP SHALL HAVE A NON–SLIP CONCRETE SURFACE.

ACCESSIBLE PARKING STALLS
NOT TO SCALE

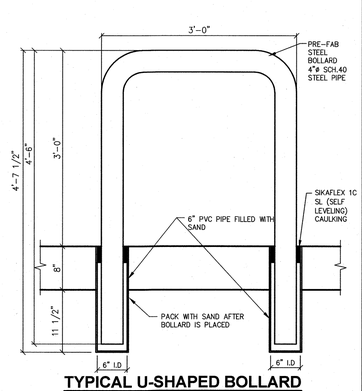


NOTES:
1. REFLECTIVE BLUE BACKGROUND, WHITE LETTERING AND SYMBOL. LETTERING MINIMUM 1" HEIGHT
2. SIGN TO BE MOUNTED ON 2" METAL POST CENTERED ON 4" CONCRETE BOLLARD. USE CAULKING @ THE CONNECTION POINT
3. ONE SIGN PER HANDICAPPED SPACE.

ACCESSIBLE SIGN DETAIL
NOT TO SCALE



CHARGING STATION SIDEWALK DETAIL
NOT TO SCALE



TYPICAL U-SHAPED BOLLARD
NOT TO SCALE

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PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE – CORY N. MASON No.17099 – LICENSED PROFESSIONAL ENGINEER – 4/19/22

REVISIONS		
1	REV. PER CITY COMMENTS	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

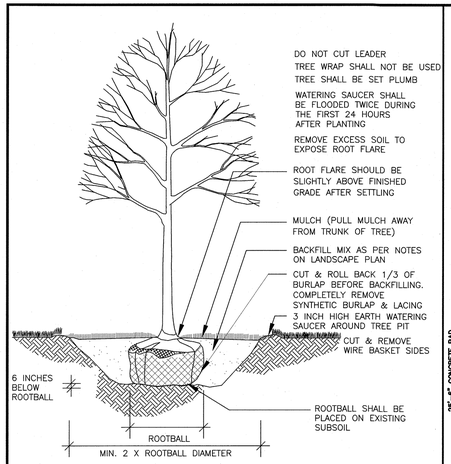
DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

DETAIL SHEET

SCALE: NOT TO SCALE

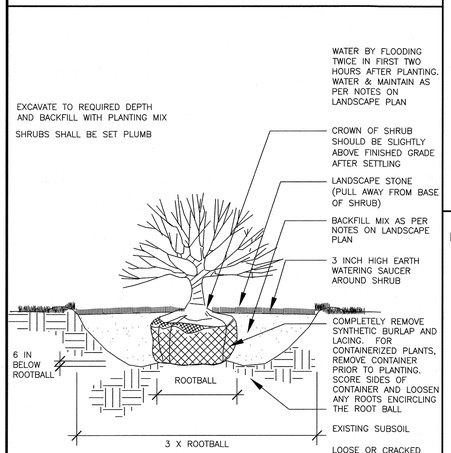
PROJECT NO. NEX-2021163

9 OF 15



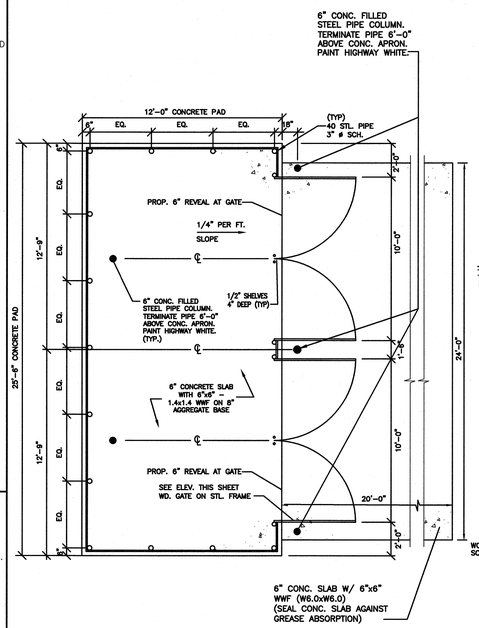
TYPICAL TREE PLANTING

NOT TO SCALE



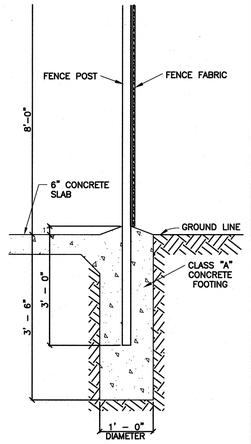
TYPICAL SHRUB PLANTING

NOT TO SCALE



CHAINLINK TRASH ENCLOSURE

NOT TO SCALE



TRASH ENCLOSURE FENCE DETAIL

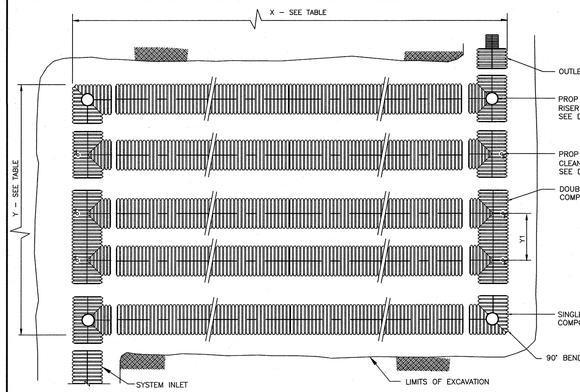
NOT TO SCALE

FENCE NOTES:

1) FENCE FABRIC SHALL BE STANDARD 2" CHAIN LINK GALVANIZED MESH WITH PRIVACY SLATS (FOREST GREEN).
2) ALL POSTS SHALL BE GALVANIZED SCHEDULE 40 STEEL PIPE
3) ALL LINE POSTS TO BE 2.375" O.D. PIPE. MAXIMUM SPACING TO BE 10' ON CENTER.
4) ALL END AND CORNER POSTS TO BE 2.875" O.D. PIPE.
5) ALL TOP AND MIDDLE RAILS TO BE 1.66" O.D. PIPE.
6) ALL FITTINGS AND ACCESSORIES SHALL BE GALVANIZED.

DETENTION SYSTEM NOTES:

1) ALL SITE DRAINAGE PIPE SHALL BE CORRUGATED HIGH-DENSITY POLYETHYLENE PIPE, DUAL WALL, SMOOTH INTERIOR AS MANUFACTURED BY ADS, INC., OR APPROVED EQUAL, UNLESS OTHERWISE NOTED ON PLAN.
2) CONTRACTOR SHOULD CONFIRM SYSTEM PARTS AND OBTAIN SHOP DRAWINGS FROM MANUFACTURER. SUBSTITUTIONS AND SHOP DRAWINGS SHOULD BE APPROVED BY THE ENGINEER.
3) PARTS SPECIFICATIONS SHOWN ARE AS PROVIDED BY ADS, INC., OR APPROVED EQUAL. ANY CHANGES TO THESE SPECIFICATIONS SHOULD BE APPROVED BY DESIGN ENGINEER FOR PERFORMANCE.



NOTE: FOR ADDITIONAL DETAILS, SEE ADS STD-702 & STD-703.

UNDERGROUND STORMWATER DETENTION SYSTEM TABLE

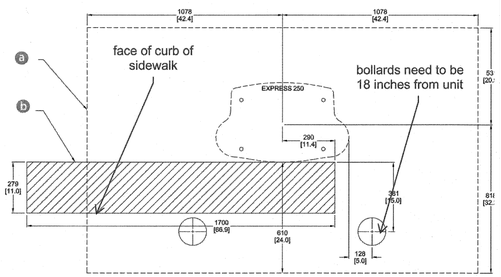
UG DETENTION SYSTEM	LENGTH (X)	WIDTH (Y)	SPACING (Y1) (O.C. TYP.) *	PIPE SIZE (INCHES) SOLID	INV. PIPE ELEV. (A)	# PIPE ROWS
UG-DET	67'	19.25'	63"	36"SOLID(WT)	57.00	4

* SEE TYPICAL CROSS SECTIONS BELOW
WT = WATERTIGHT JOINTS

TYPICAL UNDERGROUND DETENTION SYSTEM LAYOUT

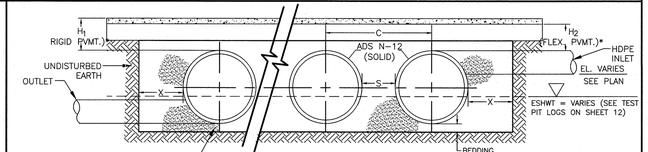
NOT TO SCALE

Head-in or back-in space bollard installation:



EV CHARGING STATION DETAIL

NOT TO SCALE



* H_1, H_2 = 12" FOR UP TO AND INCLUDING 48" N-12
= 24" FOR 60" N-12
* FOR LIVE LOAD INSTALLATIONS PROVIDE 24" COVER FOR 42"-60" N-12

U.G. DET.	NOMINAL DIAMETER	NOMINAL O.D.	TYPICAL SPACING "S"	TYPICAL SPACING "C"	TYPICAL SIDE WALL "X"
	12"	14.5"	11"	25.4"	8"
	15"	18"	12"	28.9"	8"
	18"	21"	13"	33.9"	9"
	24"	28"	13"	40.7"	10"
	30"	36"	17.1"	53.1"	18"
	36"	42"	22"	63"	18"
	42"	48"	24"	71.9"	18"

NOTES
1. ALL DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
3. SEE GRADING & DRAINAGE PLAN FOR INVERT DATA.
4. EXISTING TOPSOIL, BRUSH, TREES, BOULDERS, FILL AND DEBRIS TO BE REMOVED FOR 5' ALL AROUND UNDERGROUND DETENTION SYSTEM DOWN TO NATIVE MATERIAL. BACKFILL WITH STONE BEDDING MATERIAL (CLASS 1A OR 1B).

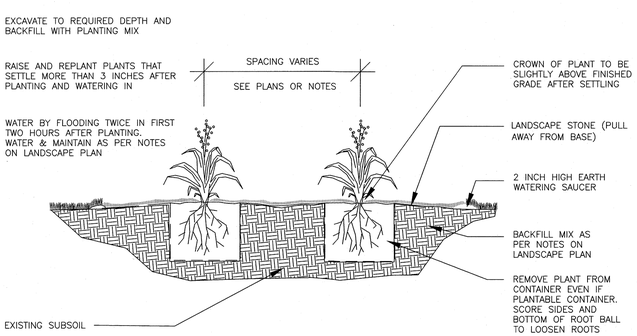
TYPICAL UNDERGROUND DETENTION SYSTEM CROSS SECTION

NOT TO SCALE

Table 5-2
Classes of Embedment and Backfill Materials

Class	ASTM D2321[1] Description	Notation	ASTM D2487 Description	AASHTO M43 Notation	Min. Compaction Required (Std Proctor Dens %)[2]	ASTM D2321[3] Percentage Passing Sieve Sizes 1 ½ in. (40mm)	No. 4 (4.75mm)	No. 200 (0.075mm)	Atterberg Limits LL	PI	Coefficients Uniformity Cu	Curvature Cc
IA[4]	Open-graded, clean manufactured aggregates	N/A	Angular crushed stone or rock, crushed gravel, crushed slag; large voids with little or no fines	6 56	Dumped to Slight	100%	≤10%	<5%	Non Plastic		N/A	
IB	Dense-graded, clean manufactured, processed aggregates	N/A	Angular crushed stone or other Class IA material and stone/sand mixtures with gradations selected to minimize migration of adjacent soils; little or no fines			100%	≤50%	<5%	Non Plastic			
II	Clean, coarse-grained soils	GW	Well-graded gravel, gravel-sand mixtures; little or no fines	57 6 67	Moderate (85%)	100%	<50% of "Coarse Fraction"	<5%	Non Plastic		>4	1 to 3
		GP	Poorly-graded gravels, gravel-sand mixtures; little or no fines								<4	<1 or >3
		SW	Well-graded sands, gravelly sands; little or no fines				>50% of "Coarse Fraction"				>6	1 to 3
		SP	Poorly-graded sands, gravelly sands; little or no fines								<6	<1 or >3
	Coarse-Grained Soils, borderline clean to w/fines	GW-GC, SP-SM	Stands and gravels which are borderline between clean and with fines	N/A		100%	Varies	5% to 12%	Non Plastic		Same as for GW, GP, SW and SP	
III	Coarse-grained soils with fines	GM	Silty gravels, gravel-sand-silt mixtures	Gravel & sand with >10% fines	Moderate to High (90%)	100%	<50% of "Coarse Fraction"	12% to 50%	N/A	<4 or "A" Line	N/A	
		GC	Clayey gravels, gravel-sand-clay mixtures							<7 & "A" Line		
		SM	Silty sands, sand-silt mixtures				>50% of "Coarse Fraction"			<4 or "A" Line		
		SC	Clayey sands, sand-clay mixtures							>7 & "A" Line		
IVA[5]	Inorganic fine-grained soils	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity	N/A	N/R	100%	100%	>50%	<50	<4 or "A" Line	N/A	
		CL	Inorganic clays of low to medium plasticity, gravelly, sandy, or silty clays; lean clays	N/A						>7 & "A" Line		
IVB	Inorganic fine-grained soils	MH	Inorganic silts, enlaceous or diatmaceous fine sandy or silty soils, elastic silts	N/A	N/R	100%	100%	>50%	>50	<4 or "A" Line	N/A	
		CH	Inorganic clays of high plasticity, fat clays	N/A						>7 & "A" Line		
V	Organic soils or Highly organic soils	OL	Organic silts and organic silty clays of low plasticity	N/A	N/R	100%	100%	>50%	<50	<4 or "A" Line	N/A	
		OH	Organic clays of medium to high plasticity, organic silts	N/A					>50	>7 & "A" Line		
		PT	Peat and other high organic soils	N/A								

Notes:
1) Refer to ASTM D2321 for more complete soil descriptions.
2) Class IVA material has limited applications and can be difficult to place and compact; use ONLY with the approval of a soil expert. Contact ADS for additional information regarding suitability of this backfill material.
3) N/R indicates that use of this material and/or compaction level is not recommended by ASTM D2321 for the backfill envelope.
4) When using open-graded material, additional precaution must be taken to reduce or eliminate the risk of migration of fines from adjacent material. Refer to ASTM D2321 for more complete information.

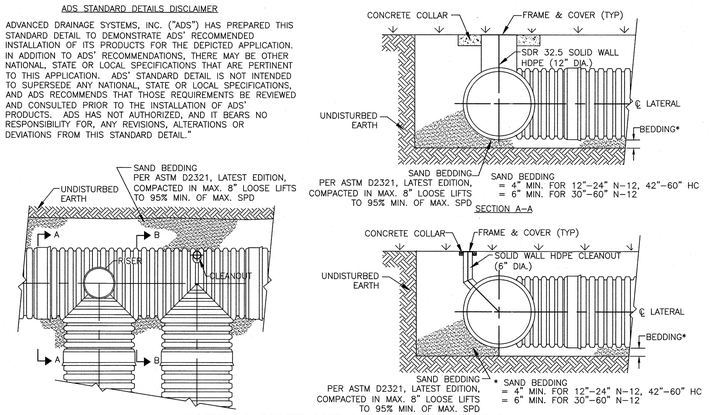


TYPICAL PERENNIAL PLANTING

NOT TO SCALE

ADS STANDARD DETAILS DISCLAIMER

ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS STANDARD DETAIL TO DEMONSTRATE ADS' RECOMMENDED INSTALLATION OF ITS PRODUCTS FOR THE DEPICTED APPLICATION. IN ADDITION TO ADS' RECOMMENDATIONS, THERE MAY BE OTHER NATIONAL, STATE OR LOCAL SPECIFICATIONS THAT ARE PERTINENT TO THIS APPLICATION. ADS' STANDARD DETAIL IS NOT INTENDED TO SUPERSEDE ANY NATIONAL, STATE OR LOCAL SPECIFICATIONS, AND ADS RECOMMENDS THAT THOSE REQUIREMENTS BE REVIEWED AND CONSULTED PRIOR TO THE INSTALLATION OF ADS' PRODUCTS. ADS HAS NOT AUTHORIZED, AND IT BEARS NO RESPONSIBILITY FOR, ANY REVISIONS, ALTERATIONS OR DEVIATIONS FROM THIS STANDARD DETAIL."



TYPICAL RISER AND CLEANOUT DETAILS

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GPI
Engineering
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Planning
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603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
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PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY N. MASON No.17099
LICENSED PROFESSIONAL ENGINEER
4/19/22

REVISIONS		
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

DETAIL SHEET

SCALE: NOT TO SCALE

PROJECT NO. NEX-2021163

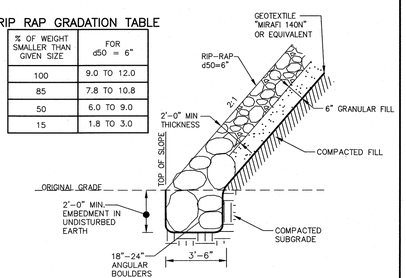
10 OF 15

RIP RAP SLOPE DETAIL

NOT TO SCALE

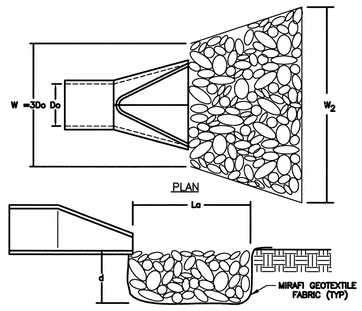
RIP RAP GRADATION TABLE

% OF WEIGHT SMALLER THAN GIVEN SIZE	FOR d50 = 6"
100	9.0 TO 12.0
85	7.8 TO 10.8
50	6.0 TO 9.0
15	1.8 TO 3.0



OUTLET PROTECTION-FLAT DETAIL

NOT TO SCALE



OUTLET	Do	La	W_1	W_2	d_{50}	d
FES-1	18"	26'	4.5'	15'	4"	10"

*PLACE OUTLET APRON STONE ON ENTIRE SEDIMENT FOREBAY BOTTOM. SEE GRADING & DRAINAGE PLAN.

ROCK RIP-RAP GRADATION

% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE IN INCHES
100	4.5 TO 6.0
85	3.9 TO 5.4
50	3.0 TO 4.5
15	0.9 TO 1.5

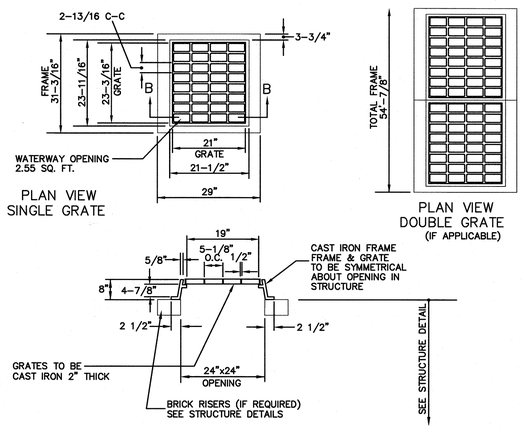
FORMULAS USED (REFERENCE NHDES STORMWATER MANUAL, VOL. 2, PAGE 174)

CONSTRUCTION NOTES:

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIP-RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIP-RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP-RAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP-RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. THE MEDIAN STONE DIAMEMETER FOR THE RIP-RAP APRON IS d50. FIFTY PERCENT BY WEIGHT OF THE RIP-RAP MIXTURE SHALL BE SMALLER THAN THE MEDIAN STONE SIZE. THE LARGEST STONE SIZE IN THE MIXTURE SHALL BE 1.5 d50.

OUTLET PROTECTION-FLAT DETAIL

NOT TO SCALE

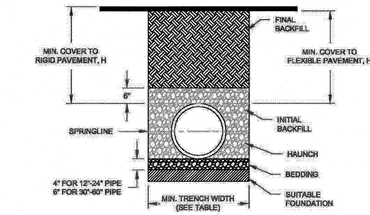


FRAME AND GRATE - TYPE B

NOT TO SCALE

RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
42"	72"
48"	80"
54"	88"
60"	96"



NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION
2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).
5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 18" TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

MINIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

PIPE DIAM.	SURFACE LIVE LOADING CONDITION: H-25	SURFACE LIVE LOADING CONDITION: HEAVY CONSTRUCTION (75T AXLE LOAD)*
12"-48"	12"	48"
54"-60"	24"	60"

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

MINIMUM RECOMMENDED COVER BASED ON RAILWAY LOADING CONDITIONS

PIPE DIAM.	COOPER E-80**
UP TO 24"	24"
30"-36"	36"
42"-60"	48"

** COVER IS MEASURED FROM TOP OF PIPE TO BOTTOM OF RAILWAY TIE.
*** E-80 COVER REQUIREMENTS, ARE ONLY APPLICABLE TO ASTM F 2306 PIPE.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
2	ADDED E-80 INFORMATION	TJR	09/20/07	

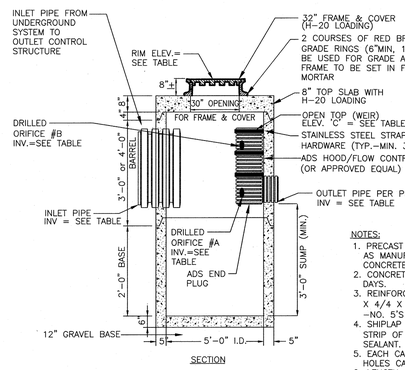
TYPICAL TRENCH DETAIL — DRAWING NUMBER: STD-101

ADS — 4640 TRUEMAN BLVD HILLIARD, OHIO 43026 — ADVANCED DRAINAGE SYSTEMS, INC.

CHK'D 10/18/06 | SCALE NTS | SHT NO 1 OF 1

HDPE PIPE TRENCH

NOT TO SCALE



NOTES:

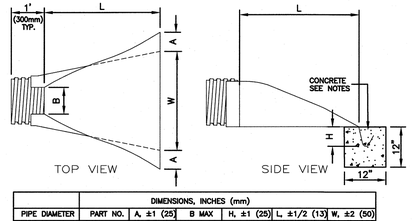
1. PRECAST CONCRETE MAN HOLE AS MANUFACTURED BY SUPERIOR CONCRETE OR APPROVED EQUAL.
2. CONCRETE: 4,000 PSI AFTER 28 DAYS.
3. REINFORCING: H-20 LOADING, 4 X 4/4 X 4 W.W.M. SLAB TOP -NO. 5'S @ 8" O.C.
4. SHIPLAP JOINTS SEALED WITH 1 STRIP OF 1" DIA BUTYL RUBBER SEALANT.
5. EACH CASTING TO HAVE LIFTING HOLES CAST IN.
6. LENGTH AND DIAMETER OF TEE VARIES WITH PIPE.

OUTLET CONTROL STRUCTURE TABLE

OCS	RIM	ORIFICE	SIZE (IN.)	ELEV.	INV.IN (SIZE)	INV.IN (ELEV)	INV.OUT (SIZE)	INV.OUT (ELEV)
#1	63.70	A	5" DIA. x3	57.00	24"	57.00	18"	57.00
		B	5" DIA. x2	57.50				
		C	18" DIA.	59.00				

PRECAST CONCRETE OUTLET CONTROL STRUCTURE (OCS) FOR UNDERGROUND SYSTEMS

NOT TO SCALE



PIPE DIAMETER	PART NO.	DIMENSIONS, INCHES (mm) A, ±1 (25)	B MAX	H, ±1 (25)	L, ±1/2 (13)	W, ±2 (50)
12", 15" (300,375)	1210 NP	6.5 (165)	10 (254)	6.5 (165)	25 (635)	29 (736)
18" (450)	1810 NP	7.5 (190)	15 (380)	6.5 (168)	32 (812)	35 (890)
24" (600)	2410 NP	7.5 (190)	18 (450)	6.5 (165)	36 (900)	45 (1140)
30" (750)	3010 NP	10.5 (266)	NA	7.0 (178)	53 (1346)	68 (1725)
36" (900)	3610 NP	10.5 (266)	NA	7.0 (178)	53 (1346)	68 (1725)

CONSTRUCTION SPECIFICATIONS:

PREPARE BEDDING:
BACKFILL MATERIAL AROUND THE END SECTION MAY BE THE SAME AS THE MATERIAL AROUND THE PIPE. PLACE A FEW INCHES OF BACKFILL MATERIAL IN THE TRENCH OR DITCH WHERE THE END SECTION WILL BE PLACED. COMPACT AND CONTOUR THIS BEDDING MATERIAL TO GENERALLY MATCH THE END SECTION. EXCAVATE AN AREA IN THE BEDDING WHERE TOE TROUGH WILL SEAT SO THAT THE END SECTION WILL BE LEVEL WITH THE BOTTOM OF THE TRENCH OR DITCH IN THE FINISHED INSTALLATION.

PLACE END SECTION OF PIPE:
OPEN THE END SECTION COLLAR AND SEAT IT OVER THE TWO PIPE CONNECTIONS. ONCE THE END SECTION IS POSITIONED, CHECK TO MAKE SURE THAT THE INVERT OF THE END SECTION MATCHES THE INVERT OF THE PIPE AND THAT THE END SECTION IS LEVEL WITH THE TRENCH OR DITCH BOTTOM.

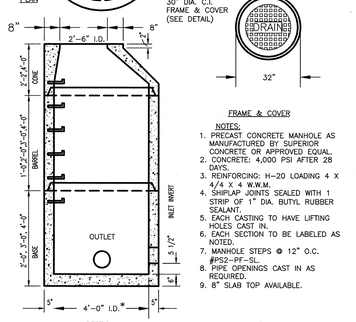
SECURE THE END SECTION:
SLIP THE STAINLESS STEEL ROD THROUGH THE PRE-DRILLED HOLES AT THE TOP OF THE COLLAR. THE ROD SHOULD BE BETWEEN THE CROWNS OF THE TWO PIPE CONNECTIONS. PLACE A WASHER ON EITHER END OF THE ROD. PLACE A NUT ON EITHER END OF THE ROD AND TIGHTEN WITH A WRENCH.

SECURE THE TOE TROUGH:
TO PREVENT WASHOUTS FROM HIGH VELOCITY FLOW, IT IS RECOMMENDED THAT THE TROUGH BE SECURED WITH CONCRETE. POUR CONCRETE IN THE TROUGH UP TO THE LEVEL OF THE TRENCH OR DITCH BOTTOM AND ALONG THE ENTIRE LENGTH OF THE TROUGH.

FINISH BACKFILL:
SHOVEL BACKFILL AROUND THE END SECTION IN 6 TO 9 INCH LAYERS EQUALLY ON BOTH SIDES, KNIFING IT TO ELIMINATE VOIDS. TAMP WITH A SMALL-FACED COMPACTOR OR OTHER EQUIPMENT SUITABLE FOR SMALL AREAS. CONTINUE PLACING, KNIFING, AND COMPACTING BACKFILL LAYERS TO THE TOP OF THE END SECTION TO SEAT IT WELL INTO THE BACKFILL.

FLARED END SECTION HIGH DENSITY POLYETHYLENE (HDPE)

NOT TO SCALE



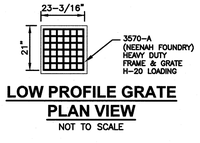
FRAME & COVER

NOTES:

1. PRECAST CONCRETE MANHOLE AS MANUFACTURED BY SUPERIOR CONCRETE OR APPROVED EQUAL.
2. CONCRETE: 4,000 PSI AFTER 28 DAYS.
3. REINFORCING: H-20 LOADING 4 X 4/4 X 4 W.W.M.
4. SHIPLAP JOINTS SEALED WITH 1 STRIP OF 1" DIA. BUTYL RUBBER SEALANT.
5. EACH CASTING TO HAVE LIFTING HOLES CAST IN.
6. EACH SECTION TO BE LABELED AS NOTED.
7. MANHOLE STEPS @ 12" O.C. #PS2-PF-SL.
8. PIPE OPENINGS CAST IN AS REQUIRED.
9. 8" SLAB TOP AVAILABLE.

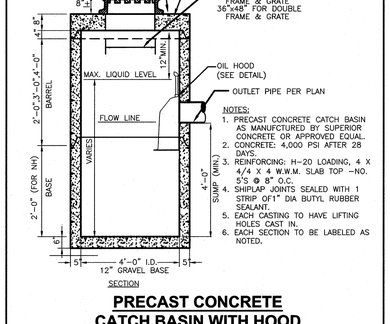
PRECAST CONCRETE DRAIN MANHOLE

MAXIMUM PIPE DIAMETER 30"
NOT TO SCALE



LOW PROFILE GRATE PLAN VIEW

NOT TO SCALE

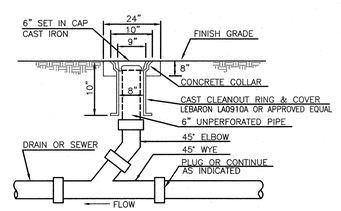


NOTES:

1. PRECAST CONCRETE CATCH BASIN AS MANUFCTURED BY SUPERIOR CONCRETE OR APPROVED EQUAL.
2. CONCRETE: 4,000 PSI AFTER 28 DAYS.
3. REINFORCING: H-20 LOADING, 4 X 4/4 X 4 W.W.M. SLAB TOP -NO. 5'S @ 8" O.C.
4. SHIPLAP JOINTS SEALED WITH 1 STRIP OF1" DIA BUTYL RUBBER SEALANT.
5. EACH CASTING TO HAVE LIFTING HOLES CAST IN.
6. EACH SECTION TO BE LABELED AS NOTED.

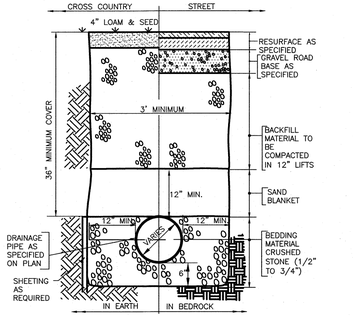
PRECAST CONCRETE CATCH BASIN WITH HOOD

NOT TO SCALE



TYPICAL CLEANOUT

NOT TO SCALE



TYPICAL TRENCH SECTION FOR STORM DRAIN

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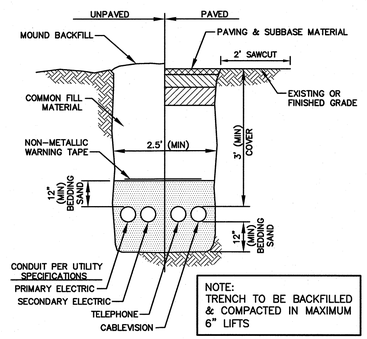

UTILITY TRENCH

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GPI — Engineering, Design, Planning, Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

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25 SPRINGER ROAD
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PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE — CORY N. MASON No.17099 — LICENSED PROFESSIONAL ENGINEER — 4/19/22

REVISIONS		
1	REV. PER CITY COMMENTS	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

DETAIL SHEET

SCALE: NOT TO SCALE

PROJECT NO. NEX-2021163

11 OF 15

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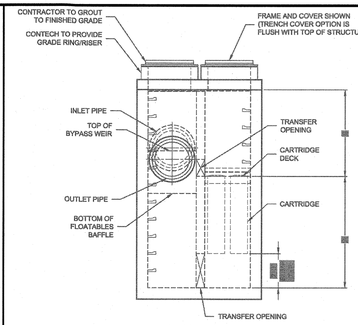
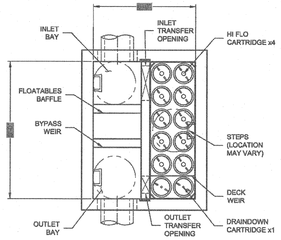


ELEVATION VIEW

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 10', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-978, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.



PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)

FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

JELLYFISH DESIGN NOTES	
JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD	
CARTRIDGE SELECTION	
CARTRIDGE LENGTH	40"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-4"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.133 / 0.067
MAX. TREATMENT (CFS)	1.47
DECK TO INSIDE TOP (MIN) (B)	4.00

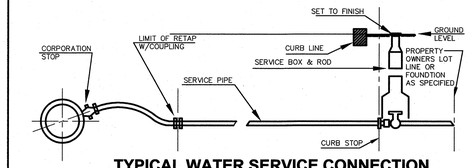
SITE SPECIFIC DATA REQUIREMENTS	
STRUCTURE ID	JF-1
WATER QUALITY FLOW RATE (cfs)	0.80
PEAK FLOW RATE (cfs)	5.20
RETURN PERIOD OF PEAK FLOW (yrs)	50
# OF CARTRIDGES REQUIRED (HF / DD)	4/1
CARTRIDGE LENGTH	54"

JELLYFISH FILTER DETAIL

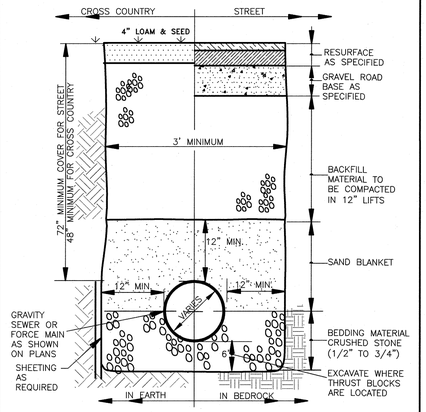
Jellyfish Filter
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING: U.S. PATENT NO. 8,287,720; 8,221,618; U.S. 8,528,695; OTHER INTERNATIONAL PATENTS PENDING

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

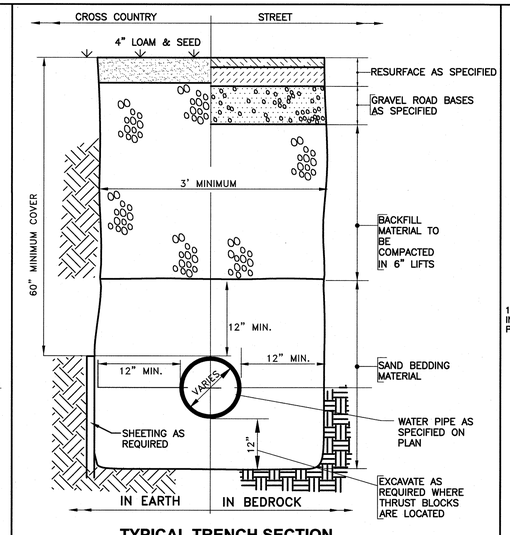
JELLYFISH JFPD0806
STANDARD DETAIL
PEAK DIVERSION CONFIGURATION



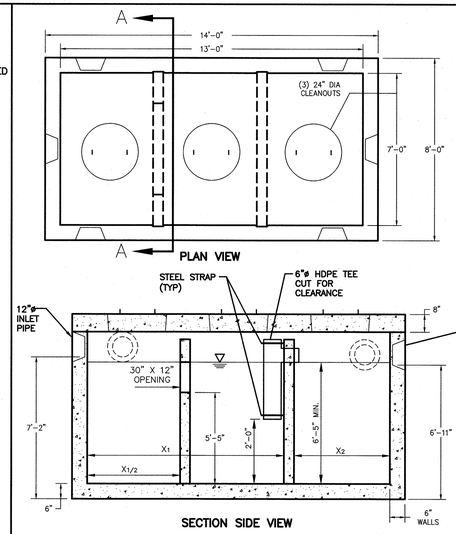
TYPICAL WATER SERVICE CONNECTION
NOT TO SCALE

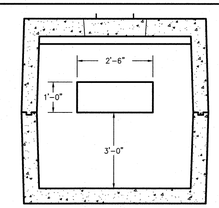


TYPICAL TRENCH SECTION FOR SANITARY SEWER SERVICE
NOT TO SCALE



TYPICAL TRENCH SECTION FOR WATER SERVICE
NOT TO SCALE





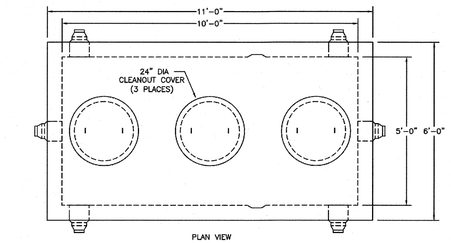
SECTION A–A VIEW

BAFFLE WALL DETAIL

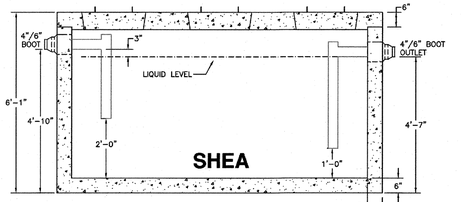
NOTES:
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGNED FOR H–20 LOADING. 1 TO 5 FEET OF COVER.
3. TONGUE & GROOVE JOINT SEALED WITH BUTYL RESIN.
4. FIRST & SECOND CHAMBER SIZING BASED ON NHDES CRITERIA OF 400 CF/ACRE OF IMPERVIOUS AREA:
   O/W SEP #1: IMP. AREA = 1.03 Ac.
   400 CF/Ac. x 1.03 Ac.= 412 CF
   X_1 = 412 CF/(6'–5" x 7') = 9'–2"
   X_2 = 3'–6"
5. CONTRACTOR TO SUBMIT SHOP DRAWING FOR APPROVAL.

ITEM: 8X14–352C

4,000 GAL. OIL/WATER SEPARATOR DETAIL (OWS-1)
NOT TO SCALE



PLAN VIEW

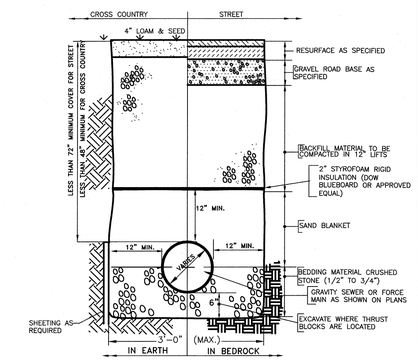


SHEA
SECTION VIEW

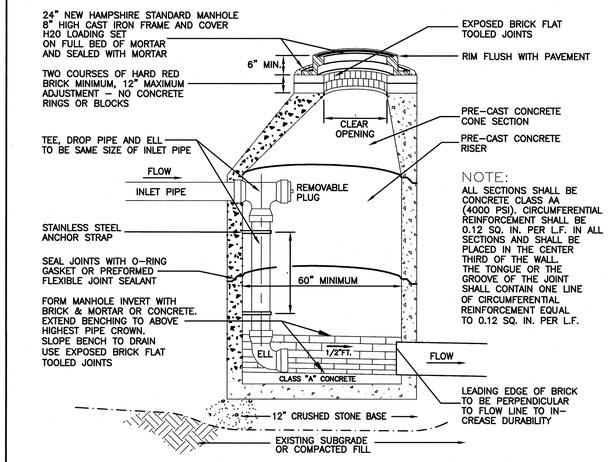
NOTES:
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGN CONFORMS WITH 310 CMR 15.00, DEP TITLE 5 REGS, FOR GREASE TRAPS.
3. ALL REINFORCEMENT PER ASTM C1227.
4. DESIGNED FOR AASHTO HS–20 LOADING, 1 TO 5 FT COVER.
5. TONGUE & GROOVE JOINT SEALED WITH BUTYL RESIN
6. TEES AND BAFFLES SOLD SEPARATELY

	WEIGHT	TOP	BOTTOM
ITEM NO. TK–M1500C	22,600#	5,400#	17,200#
TK–M1500C2C	24,400#	5,400#	19,000#

1,500 GALLON GREASE TRAP DETAIL (H-20 LOADING)
NOT TO SCALE

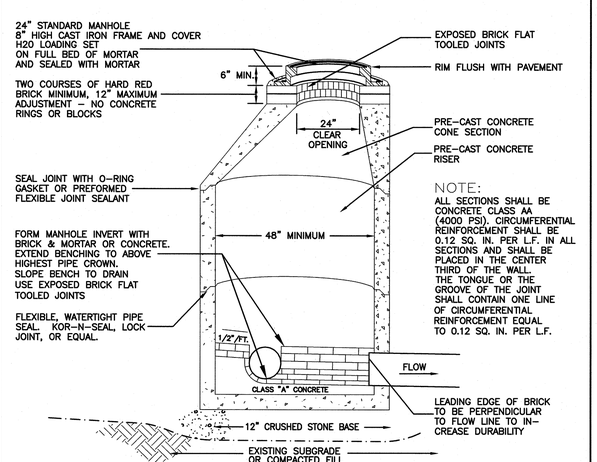


TYPICAL TRENCH SECTION FOR SANITARY SEWER SERVICE WITH LESS THAN 6' OF COVER
NOT TO SCALE



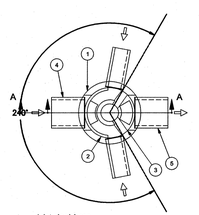
MORTAR SHALL CONSIST OF:
1 PART BY VOLUME PORTLAND CEMENT, 2 PARTS BY VOLUME, DAMP WASHED COARSE SAND AND POTABLE WATER TO PRODUCE A CONSISTENCY OF STIFF PASTE. SEAL ALL PRECAST JOINTS WITH MORTAR.

DROP SEWER MANHOLE
NOT TO SCALE



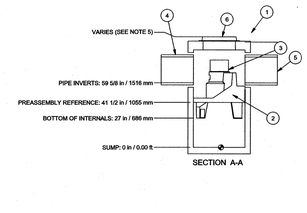
MORTAR SHALL CONSIST OF:
1 PART BY VOLUME PORTLAND CEMENT, 2 PARTS BY VOLUME, DAMP WASHED COARSE SAND AND POTABLE WATER TO PRODUCE A CONSISTENCY OF STIFF PASTE. SEAL ALL PRECAST JOINTS WITH MORTAR.

SEWER MANHOLE
NOT TO SCALE



Inlet pipe(s) can enter anywhere within 240° arc.

Parts List		
ITEM	SIZE (in)	DESCRIPTION
1	48	I.D. PRECAST MANHOLE
2		LEDGER SUPPORT
3		SEPARATION MODULE
4	12	INLET PIPE (BY OTHERS)
5	15	OUTLET PIPE (BY OTHERS)
6	30	FRAME AND COVER (OR GRATE) (ROUND)



GENERAL NOTES:
1. GENERAL ARRANGEMENT DRAWINGS ONLY. CONTACT HYDRO INTERNATIONAL FOR SITE SPECIFIC FABRICATION DRAWINGS.
2. THE DIAMETER OF THE INLET & OUTLET PIPES MAY BE NO MORE THAN 24".
3. MULTIPLE INLET PIPES POSSIBLE (REFER TO PROJECT PLANS).
4. INLET/OUTLET PIPE ANGLE CAN VARY TO ALIGN WITH DRAINAGE NETWORK (REFER TO PROJECT PLANS).
5. PEAK FLOW RATE AND MINIMUM HEIGHT LIMITED BY AVAILABLE COVER AND PIPE DIAMETER.
6. LARGER SEDIMENT STORAGE CAPACITY MAY BE PROVIDED WITH A DEEPER SUMP DEPTH.

PRODUCT SPECIFICATIONS:
A. THE TREATMENT SYSTEM SHALL USE AN INDUCED VORTEX TO SEPARATE POLLUTANTS FROM STORMWATER RUNOFF.
B. THE TREATMENT SYSTEM SHALL FIT WITHIN THE LIMITS OF EXCAVATION (AREA AND DEPTH) AS SHOWN IN THE PROJECT PLANS AND WILL NOT EXCEED THE DIMENSIONS FOR THE DESIGN FLOW RATES SPECIFIED HEREIN.
C. THE TREATMENT SYSTEM SHALL REMOVE GREATER THAN OR EQUAL TO 90% OF TSS BASED ON THE TARGET PARTICLE SIZE (TPS) OF 106 MICRONS AND/OR 85% OF TSS BASED ON THE TPS OF 230 MICRONS AT 0.7 CFS AND 1.2 CFS, RESPECTIVELY.
D. THE TREATMENT SYSTEM SHALL CONVEY THE PEAK ON-LINE FLOW RATES OF UP TO 18 CFS WITHOUT SCOUR OF PREVIOUSLY REMOVED POLLUTANTS UNDER BYPASS CONDITIONS. FULL-SCALE INDEPENDENT LABORATORY SCOUR TESTING SHALL DEMONSTRATE EFFLUENT CONTROL OF LESS THAN OR EQUAL TO 5 MG/L FOR ALL FLOWS UP TO 200% OF MTFR=10S.
E. THE TREATMENT SYSTEM SHALL BE CAPABLE OF CAPTURING AND RETAINING FINE SILT AND SAND SIZE PARTICLES. ANALYSIS OF CAPTURED SEDIMENT FROM FULL-SCALE FIELD INSTALLATIONS SHALL DEMONSTRATE PARTICLE SIZES PREDOMINANTLY IN THE 20–MICRON RANGE

"FIRST DEFENSE" UNIT DETAIL - FD-4HC
(OR APPROVED EQUAL)
NOT TO SCALE

NOTE: CONTRACTOR SHOULD CONFIRM SYSTEM PARTS AND OBTAIN SHOP DRAWINGS FROM MANUFACTURER PRIOR TO CONSTRUCTION.

GPI Engineering Design Planning Construction Management
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PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD
PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY N. MASON
No.17099
LICENSED PROFESSIONAL ENGINEER
4/19/22

REVISIONS		
1	ADD JELLYFISH	4/19/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

DETAIL SHEET

SCALE: NOT TO SCALE

PROJECT NO. NEX-2021163

12 OF 15

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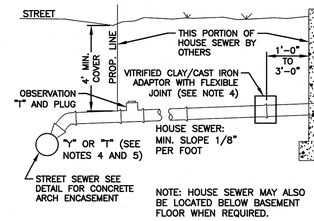
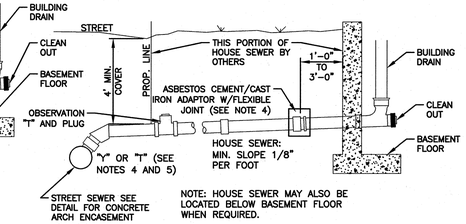
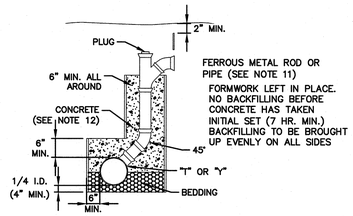


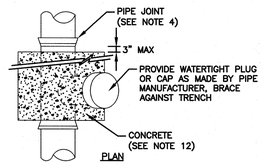
VITRIFIED CLAY SEWER AND HOUSE SEWER



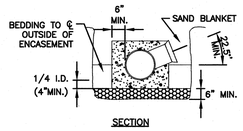
ASBESTOS CEMENT SEWER AND HOUSE SEWER

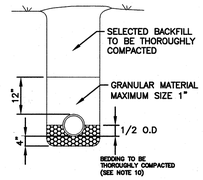


CHIMNEY
(SEE NOTE 13)

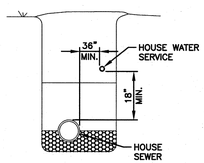


CONCRETE FULL ENCASEMENT





TRENCH CROSS-SECTION



WATER AND SEWER IN SAME TRENCH
(SEE NOTE 9)

HOUSE SEWER DETAILS
NOT TO SCALE

NOTES:
1. MINIMUM SIZE PIPE FOR HOUSE SERVICE SHALL BE 4 INCHES.
2. PIPE AND JOINT MATERIALS
   - A. VITRIFIED CLAY PIPE
     - a. PIPE AND FITTINGS SHALL BE EXTRA STRENGTH CLAY PIPE CONFORMING TO THE REQUIREMENTS OF ASTM C-700.
     - b. JOINTS SHALL BE MADE WITH OIL RESISTANT GASKETS IN ACCORDANCE WITH ASTM C-425 TYPE III MANUFACTURERS INSTRUCTIONS FOR INSTALLATION SHALL BE FOLLOWED.
   - B. ASBESTOS-CEMENT-NON-PRESSURE SEWER PIPE
     - a. PIPE AND FITTINGS SHALL CONFORM TO ASTM TENTATIVE SPECIFICATIONS C644 TYPE II.
     - b. 2. JOINTS SHALL BE OF THE SLEEVE-COUPLING TYPE CONFORMING TO ASTM SPECIFICATIONS C644 TYPE II COMPRESSION RINGS SHALL BE OF OIL RESISTANT RUBBER TYPE OR ELASTOMERIC MATERIAL AND SHALL CONFORM TO ASTM SPECIFICATION D1869. MANUFACTURERS INSTRUCTIONS SHALL BE FOLLOWED FOR INSTALLATIONS.
   - C. CAST IRON PIPE FITTINGS AND JOINTS
     - a. CAST IRON PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE:
       - A21.1 THICKNESS DESIGN OF CAST IRON PIPE
       - A21.4 CEMENT MORTAR LINING FOR CAST IRON PIPE AND FITTINGS
       - A21.6 CAST IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS FOR WATER OR OTHER LIQUIDS.
       - A21.8 CAST IRON PIPE CENTRIFUGALLY CAST IN SAND LINED MOLDS FOR WATER OR OTHER LIQUIDS.
       - A21.10 CAST IRON FITTINGS, 2 INCHES THROUGH 48 INCHES FOR WATER AND OTHER LIQUIDS.
     - b. JOINTS SHALL BE OF THE MECHANICAL OR PUSH ON TYPE JOINTS AND GASKETS SHALL CONFORM TO:
       - A21.11 RUBBER GASKET JOINTS FOR CAST IRON PRESSURE PIPE AND FITTINGS.
   - D. DUCTILE IRON PIPE, FITTINGS AND JOINTS
     - a. DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO THE STANDARDS OF THE UNITED STATES OF AMERICA STANDARDS INSTITUTE:
       - A21.50 THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A536 DUCTILE IRON CASTINGS
       - A21.51 DUCTILES IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND LINED MOLDS FOR WATER OR OTHER LIQUIDS.
     - b. JOINTS SHALL BE SPECIFIED IN Cb ABOVE, CAST IRON PIPE JOINTS
3. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.
4. JOINTS SHALL BE BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATERTIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AS AT THE STREET SEWER "Y" OR AT THE FOUNDATION WALL, APPROPRIATE ADAPTERS SHALL BE USED.
5. "T" AND "Y" WHERE A "T" OR "Y" IS NOT AVAILABLE IN THE EXISTING STREET SEWER, AN APPROPRIATE CONNECTION SHALL BE MADE IN THE SEWER, FOLLOWING MANUFACTURERS INSTRUCTIONS (USING A BOLTED, CLAMPED OR EPOXY CEMENTED SADDLE TAPPED INTO A SMOOTHLY DRILLED OR SAWN OPENING. THE PRACTICE OF BREAKING AN OPENING WITH A SLEDGE HAMMER, STUFFING CLOTH (OR OTHER SUCH MATERIAL) AROUND THE JOINT, OR APPLYING MORTAR TO HOLD THE CONNECTION AND ANY OTHER SIMILAR CRUDE PRACTICES OR INEPT OR HASTY IMPROVISATIONS WILL NOT BE PERMITTED. THE CONNECTION SHALL BE CONCRETE ENCASED, AS SHOWN IN THE DETAIL, UP TO AND INCLUDING * 15" DIAMETER.
6. PIPE INSTALLATION THE PIPE SHALL BE HANDLED, PLACED AND JOINTED IN ACCORDANCE WITH INSTALLATION GUIDES OF THE APPROPRIATE MANUFACTURER. IT SHALL BE CAREFULLY BEDDED ON A 4 INCH LAYER OF CRUSHED STONE AND/OR GRAVEL, AS SPECIFIED IN NOTE 10, BEDDING AND RE-FILL FOR A DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED BY HAND OR WITH APPROPRIATE MECHANICAL DEVICES. THE PIPE SHALL BE LAID AT A CONTINUOUS AND CONSTANT GRADE FROM THE STREET SEWER CONNECTION TO THE HOUSE FOUNDATION AT A GRADE OF NOT LESS THAN 1/8 INCH PER FOOT. PIPE JOINTS MUST BE MADE UNDER DRY CONDITIONS. IF WATER IS PRESENT, ALL NECESSARY STEPS SHALL BE TAKEN TO DEWATER THE TRENCH.
7. TESTING THE COMPLETED HOUSE SEWER SHALL BE SUBJECTED TO A LEAKAGE TEST IN ANY OF THE FOLLOWING MANNERS (PRIOR TO BACKFILLING):
   - A. AN OBSERVATION "T" SHALL BE INSTALLED AS SHOWN. WHEN READY TESTING , AN INFLATABLE BLADDER OR PLUG SHALL BE INSERTED JUST UPSTREAM FROM THE OPENING IN THE "T". AFTER INFLATION, WATER SHALL BE INTRODUCED INTO THE SYSTEM ABOVE THE PLUG TO A HEIGHT OF 5 FEET ABOVE THE LEVEL OF THE PLUG.
   - B. THE PIPE SHALL BE LEFT EXPOSED AND LIBERALLY HOSED WITH WATER TO SIMULATE, AS NEARLY AS POSSIBLE, WET TRENCH CONDITIONS. IF THE TRENCH IS WET, THE GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. INSPECT-IONS FOR LEAKS SHALL BE MADE THROUGH THE CLEANOUT WITH A FLASHLIGHT.

* DOES NOT APPLY TO INSTALLATIONS WHERE "T's" AND "Y's" ARE USED

   - C. FLUORESCENT DYE SHALL BE SPRINKLED INTO THE TRENCH OVER THE PIPE. IF THE TRENCH IS DRY, THE PIPE SHALL BE LIBERALLY HOSED WITH WATER. IF THE TRENCH IS WET, GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. OBSERVATION FOR LEAKS SHALL BE MADE IN THE FIRST MANHOLE DOWNSTREAM. LEAKAGE OBSERVED IN ANY OF THE ABOVE, ALTER-NATE TESTS SHALL BE CAUSE FOR NON-ACCEPTANCE AND THE PIPE SHALL BE DUG UP, IF NECESSARY, AND RELAID SO AS TO ASSURE WATERTIGHTNESS.
8. ILLEGAL CONNECTION NOTHING BUT SANITARY WASTE FLOW FROM THE HOUSE TOILETS, SINKS, LAUNDRY ETC. SHALL BE PERMITTED. ROOF LEADERS, FOOTING DRAINS, SUMP PUMPS OR ANY OTHER SIMILAR CONNECTION CARRYING RAIN WATER, DRAINAGE OR GROUND WATER SHALL NOT BE PERMITTED.
9. HOUSE WATER SERVICE SHOULD NOT BE LAID IN THE SAME TRENCH AS THE SEWER SERVICE, BUT WHEN NECESSARY, SHALL BE PLACED ABOVE AND TO ONE SIDE OF THE HOUSE SEWER AS SHOWN.
10. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATERIAL AND MEETING ASTM C33-67.
    100%-PASSING 1 INCH SCREEN 90-100%-PASSING 3/4 INCH SCREEN
    20-55%-PASSING 3/8 INCH SCREEN 0-10%-PASSING #4 SIEVE
    0-5%-PASSING #8 SIEVE
    WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, SCREENED GRAVEL OR CRUSHED STONE (1-1/2 TO 1/2 INCH) SHALL BE USED.
11. LOCATION THE LOCATION OF THE "T" OR "Y" SHALL BE RECORDED AND FILED IN THE MUNICIPAL RECORDS. IN ADDITION, A FERROUS METAL ROD OR PIPE SHALL BE PLACED OVER THE "T" OR "Y", AS DESCRIBED IN THE TYPICAL "CHIMNEY" DETAIL, TO AID IN LOCATING THE BURIED PIPE WITH A DIP NEEDLE OR PIPE FINDER.
12. CONCRETE SHALL CONFORM TO THE REQUIREMENTS FOR CLASS A (3000 PSI) CONCRETE OF THE N.H. DEPT. OF PUBLIC WORKS AND HIGHWAYS STANDARD SPECIFICATIONS AS FOLLOWS:
    CEMENT: 6.0 BAGS/C.Y. WATER: 5.75 GALS./BAG CEMENT
    AGGREGATE: 1-1/2 INCH MAX.
13. CHIMNEYS IF VERTICAL DROP INTO THE SEWER IS GREATER THAN 4 FEET, A CHIMNEY SHALL BE CONSTRUCTED FOR THE HOUSE CONNECTION.

GPI Engineering Design Planning Construction Management
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PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY N. MASON No.17039
LICENSED PROFESSIONAL ENGINEER
4/19/22

REVISIONS		
NO.	REVISION	DATE

APRIL 19, 2022

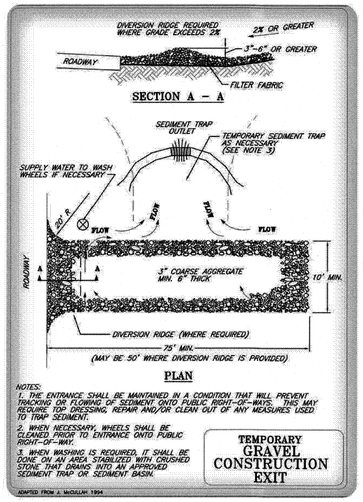
DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

DETAIL SHEET

SCALE: NOT TO SCALE

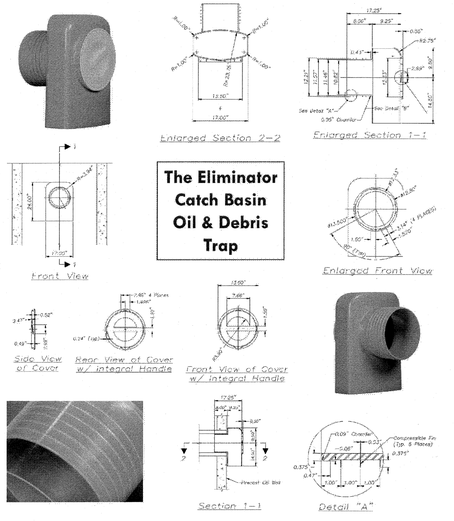
PROJECT NO. NEX-2021163

13 OF 15



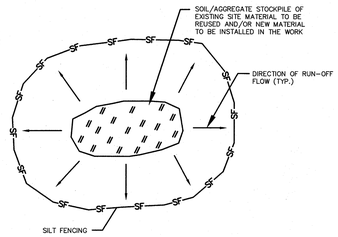
GRAVEL CONSTRUCTION EXIT

NOT TO SCALE



GWR Ground Water Rescue
Ground Water Rescue, Inc.
24 Ryden St., Quincy, MA 02169
Tel: 617-773-1128 Fax: 617-773-0510
www.kleanstream.com

MADE IN USA



NOTES:
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.

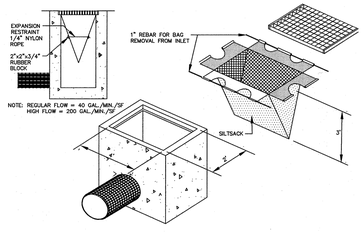
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS.

3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.

4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

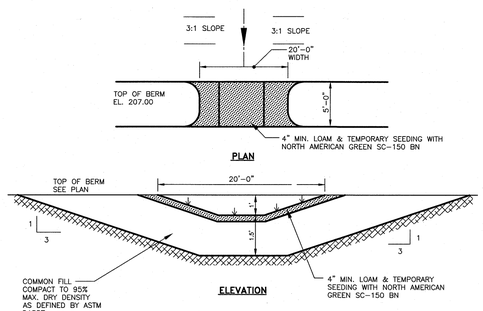
MATERIALS STOCKPILE DETAIL

NOT TO SCALE



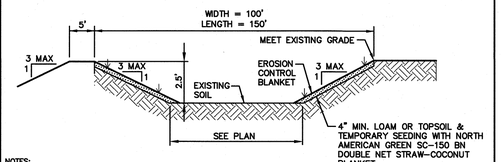
SILTSACK DETAIL-ON OR OFF SITE

NOT TO SCALE



SEDIMENT TRAP SPILLWAY DETAIL

NOT TO SCALE

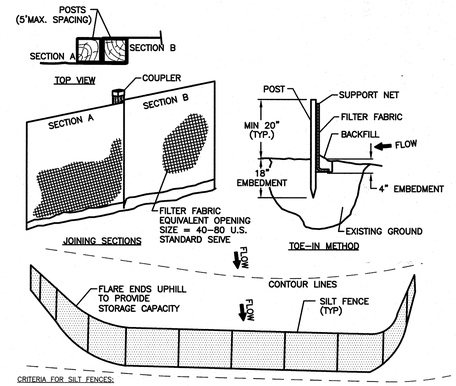


NOTES:

1. SIDE SLOPES OF THE TRAP SHALL BE 3:1 OR FLATTER, AND SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION.
2. THE SPILLWAY ON THE TRAP SHOULD BE A MINIMUM OF 1 FOOT BELOW THE CREST OF THE TRAP AND SHALL DISCHARGE TO A STABILIZED AREA.
3. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

TEMPORARY SEDIMENT TRAP TYPICAL CROSS SECTION

NOT TO SCALE



CRITERIA FOR SILT FENCES:

1) SILT FENCE FILTER CLOTH: THE FABRIC FOR THE SILT FENCE SHALL MEET THE FOLLOWING SPECIFICATIONS:

FABRIC PROPERTIES:	MINIMUM ACCEPTABLE VALUES	TEST METHOD
GRAB TENSILE STRENGTH (lbs)	90	ASTM D1682
ELONGATION AT FAILURE (%)	50	ASTM D1682
MULLEN BURST STRENGTH (PSI)	190	ASTM D3786
PUNCTURE STRENGTH (lbs)	40	ASTM D751
EQUIVELANT OPENING SIZE:	40-80	US STD SIEVE

2) FENCE POSTS (FOR FABRICATED UNITS) – THE POSTS SHALL BE A MINIMUM OF 36 INCHES LONG. WOOD POSTS WILL BE OF SOUND QUALITY HARDWOOD WITH A MINIMUM CROSS SECTIONAL AREA OF 3.0 SQUARE INCHES. STEEL POSTS WILL BE STANDARD T OR U SECTIONS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT. MAXIMUM SPACING SHALL BE 6 LINEAR FEET.

3) WIRE FENCE (FOR FABRICATED UNITS) – WIRE FENCING SHALL BE A MINIMUM 14.5 GUAGE WITH A MAXIMUM 6 INCH MESH OPENING.

4) PREFABRICATED UNITS – PREFABRICATED UNITS MAY BE USED IN LIEU OF THE ABOVE METHOD PROVIDING: (1) THE FILTER CLOTH AND FENCE POSTS MEET THE ABOVE CRITERIA; AND (2) THE UNIT IS INTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

MAINTENANCE:

1) SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY.

2) IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.

3) SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMTELY ONE-HALF THE HEIGHT OF THE BARRIER.

4) SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

CONSTRUCTION SPECIFICATIONS:

1) THE GEOTEXTILE FABRIC SHALL MEET THE DESIGN CRITERIA FOR SILT FENCES.

2) THE FABRIC SHALL BE EMBEDDED A MINIMUM OF 8 INCHES INTO THE GROUND (4" DEEP & 4" WIDE) AND THE SOIL COMPACTED OVER THE EMBEDDED FABRIC.

3) WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES OR STAPLES.

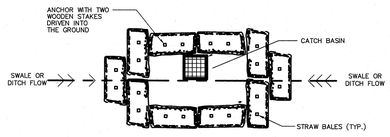
4) FILTER CLOTH SHALL BE FASTENED SECURELY TO THE WOVEN WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP, MID-SECTION AND BOTTOM.

5) WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EAC OTHER, THEY SHALL BE OVERLAPPED BY 6 INCHES (24" IS PREFERRED), FOLDED, AND STAPLED.

6) POSTS TO BE SPACED AT A MAXIMUM OF 6' ON CENTER.

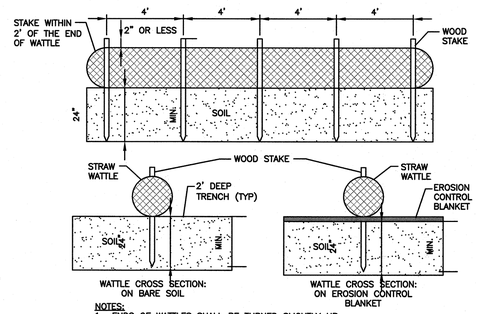
SEDIMENT CONTROL FENCE

NOT TO SCALE



LOW POINT SEDIMENTATION CONTROL BARRIER

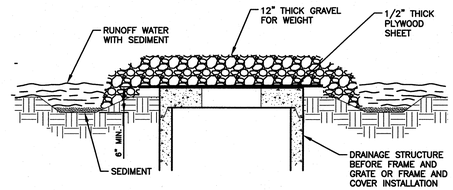
NOT TO SCALE



NOTES:
1. ENDS OF WATTLES SHALL BE TURNED SLIGHTLY UP.
2. RECCOMMENDED STAKES ARE 1 1/8" WIDE x 1 1/8" THICK x 30" LONG. STAKES SHALL NOT EXCEED ABOVE THE STRAW WATTLE MORE THAN 2".

STRAW WATTLE DETAIL

NOT TO SCALE

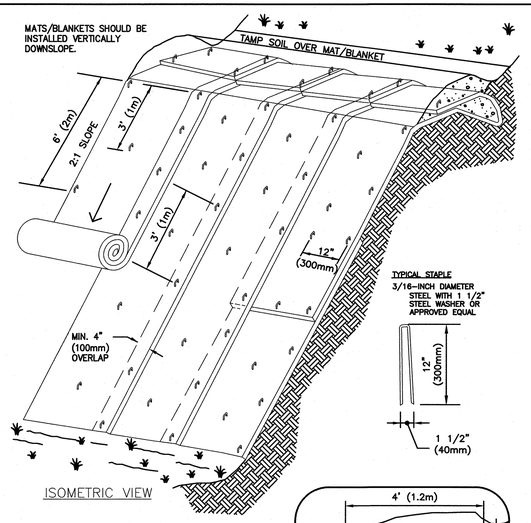


MAINTENANCE

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAIN STORM AND REPAIRS MADE AS NECESSARY.
2. SEDIMENT SHOULD BE REMOVED FROM THE TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF OF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED OF IN A SUITABLE AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURAL OR VEGETATIVE MEANS.
3. THE TEMPOARARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.
4. ALL STRUCTURES WITH INLET PROTECTION MUST BE CLEANED AT THE END OF CONSTRUCTION AND WHEN THE SITE IS FULLY STABILIZED.

INLET PROTECTION DETAIL

NOT TO SCALE



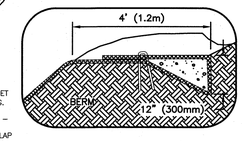
TYPICAL SLOPE SOIL STABILIZATION

NOTES:

1. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH. BACKFILL AND COMPACT TRENCH AFTER STAPLING.
2. ROLL THE BLANKET DOWN THE SWALE IN THE DIRECTION OF THE WATER FLOW. LAY BLANKETS LOOSELY & MAINTAIN DIRECT CONTACT WITH SOIL – DO NOT STRETCH.
3. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
4. WHEN BLANKETS MUST BE SPLICED DOWN THE SWALE, PLACE BLANKET END OVER END WITH 6 INCH (MIN.) OVERLAP AND ANCHOR DOWN SLOPE BLANKET IN A 6 INCH DEEP TRENCH.
5. BLANKETS SHALL BE STAPLED ENOUGH TO ANCHOR BLANKET WHILE MAINTAINING CONTACT WITH SOIL. STAPLES SHALL BE PLACED DOWN THE CENTER & STAGGERED WITH THE STAPLES PLACED ALONG EDGES. PATTERN & AMOUNT OF STAPLES VARIES BY MANUFACTURER, SO FOLLOW MANUFACTURERS RECOMMENDATIONS.
6. BLANKET SHALL BE NORTH AMERICAN GREEN SC-150 OR APPROVED EQUAL.

MAINTENANCE & MATS

1. BLANKETS SHALL BE INSPECTED WEEKLY DURING CONSTRUCTION & AFTER A RAINFALL IN EXCESS OF 1/2" IN A 24-HOUR PERIOD.
2. FAILURES SHALL BE REPAIRED IMMEDIATELY. IF ANY OF THE FOLLOWING OCCUR; SLOPE WASHOUT, MAT DISPLACEMENT, DAMAGE TO MAT, THE AFFECTED AREA SHALL BE REPAIRED & RESEEDED & MAT SHALL BE REPLACED OR RE-INSTALLED.



TYPICAL INSTALLATION OF EROSION CONTROL BLANKETS FOR SLOPES

NOT TO SCALE

NOTE: DO NOT USE PRODUCTS THAT CONTAIN WELDED PLASTIC OR THAT ARE "PHOTODEGRADABLE". USE PRODUCTS WITH BIODEGRADABLE NETTING AND NATURAL FIBER MATERIAL (I.E. STRAW OR COCONUT FIBER).

BLANKET SLOPE PROTECTION FOR EROSION CONTROL

NOT TO SCALE

TEST PIT DATA

Test Pit No. 9-1 — SCS Soil: — Pipestone
ESHWT: >48" — Standing Water: None
Refusal: 48" — Roots: None

Depth	Horizon	Soil Texture	Color	Consistence	Mottles; Quantity/Contrast
0-30"	A	Loamy Sand	10yr 2/2	FR	
30-48"	B	Loamy Sand	10yr 4/4	FR	
48"	R				

Test Pit No. 9-2 — SCS Soil: — Pipestone
ESHWT: 36" — Standing Water: None
Refusal: 38" — Roots: None

Depth	Horizon	Soil Texture	Color	Consistence	Mottles; Quantity/Contrast
0-24"	A	Loamy Sand	10yr 3/2	FR	
24-33"	B	Loamy Sand	10yr 5/8	FR	
33-38"	C	Loamy Sand	2.5y 7/4	FR	@ 36" Distinct
38"	R				

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY J. MASON
No.17099
LICENSED PROFESSIONAL ENGINEER
4/19/22

REVISIONS		
1	ADD ELIMINATOR DTL FROM SHEET 12	4/19/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

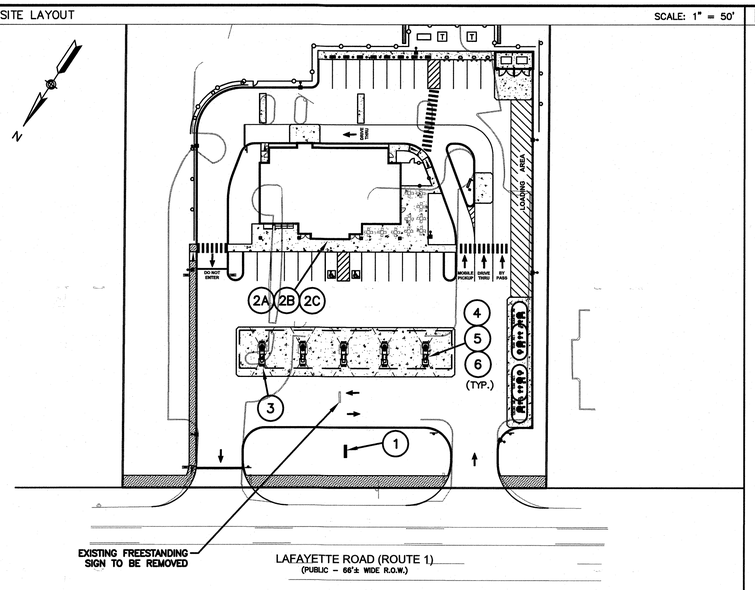
DETAIL SHEET

SCALE: NOT TO SCALE

PROJECT NO. NEX-2021163

01 SITE LAYOUT

SCALE: 1" = 50'

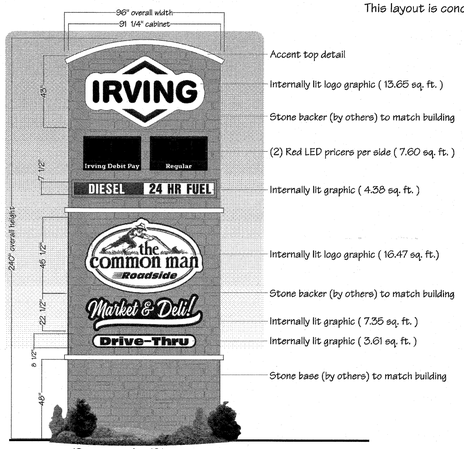


02 PROPOSED FREESTANDING SIGN ELEVATION

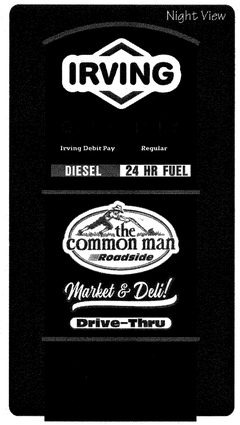
NOT TO SCALE

Common Man Roadside - Irving Epsom, NH Pylon ID Sign CONCEPTUAL — SHEET 01

This layout is conceptual only, all details to be verified and subject to change



Proposed - P1
Option 1.5a



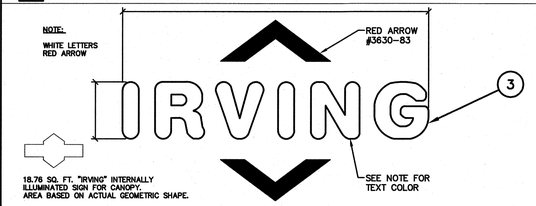
Total area of signage: 53.06 sq. ft.

DATE: 04-26-21	JOB NAME: Common Man Roadside - Irving
REP: J.S.	
CONTACT: Brad Pernaw (617) 821-5604	
AUTHORIZED SIGNATURE REQUIRED TO BEGIN PRODUCTION	

SOUSA Signs
225 East Industrial Park Dr. Manchester, NH 03109
603-622-5067 FAX 603-624-6188

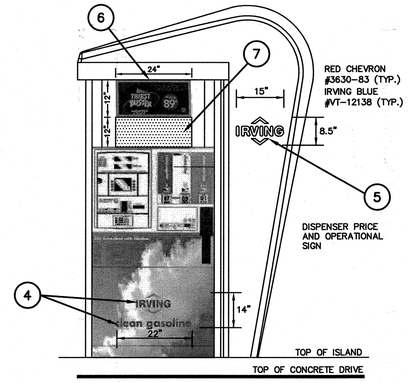
09 PROPOSED "IRVING" CANOPY LOGO

NOT TO SCALE



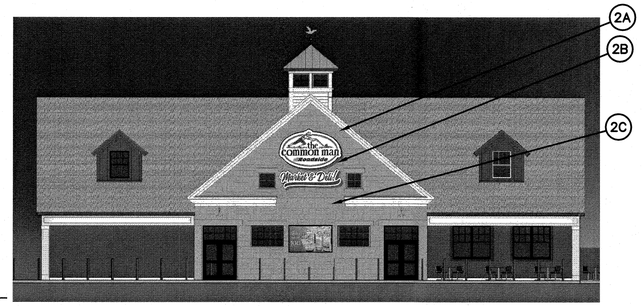
10 PROPOSED MULTI-PRODUCT DISPENSER

NOT TO SCALE



05 PROPOSED STORE ELEVATIONS

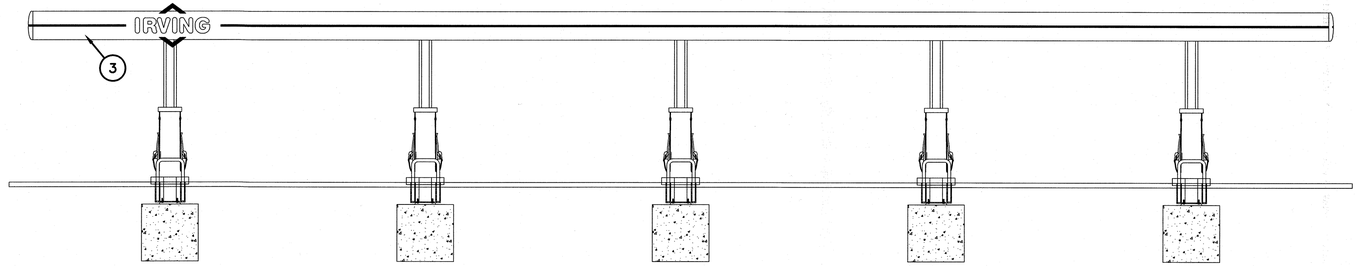
NOT TO SCALE



FRONT ELEVATION
N.T.S.

08 PROPOSED CANOPY ELEVATIONS

SCALE: 1/8"=1'-0"



AUTO FUELING CANOPY- NORTH ELEVATION
1/8" = 1'-0"

06 PROPOSED SIGN SCHEDULE

NOT TO SCALE

PROPOSED SIGN SCHEDULE

MARK	DESCRIPTION	SIZE	AREA	QTY.	TOTAL SF	ILLUM'D.
1	FREESTANDING SIGN	SEE DETAIL 2	100.0*	1	100.0	YES (INTERNAL)
2A	C-STORE WALL SIGN	SEE LOGO DETAIL 4	63.5	3	190.5	YES (INTERNAL)
2B	C-STORE WALL SIGN	SEE LOGO DETAIL 4	28.4	3	85.2	YES (INTERNAL)
2C	C-STORE WALL SIGN	SEE LOGO DETAIL 5	40.0	3	120.0	YES (INTERNAL)
3	"IRVING" CANOPY - LOGO SIGN	SEE LOGO DETAIL 9	18.76	3	56.28	YES (INTERNAL)
4	"IRVING" MPD DOOR GRAPHIC	SEE DISPENSER DETAIL 10	2.14	10	21.4	NO
5	"IRVING" DISPENSER SHROUD LOGO	SEE DISPENSER DETAIL 10	0.89	10	8.9	NO
6	"IRVING" DISPENSER ADVERTISING SIGN	SEE DISPENSER DETAIL 10	2.0	10	20.0	NO
7	DISPENSER PRICE SIGN	SEE DISPENSER DETAIL 10	2.0	10	20.0	NO

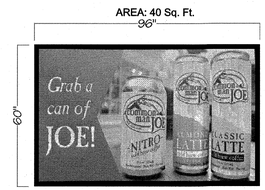
* INCLUDES BASE & STRUCTURE PER PORTSMOUTH REGULATIONS

04 C-STORE BUILDING WALL SIGN

NOT TO SCALE

05 C-STORE BUILDING WALL SIGN

NOT TO SCALE



GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

REVISIONS

NO.	REVISION	DATE

JANUARY 26, 2022

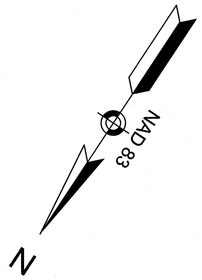
DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

SIGN & GRAPHICS PLAN

SCALE: AS SHOWN

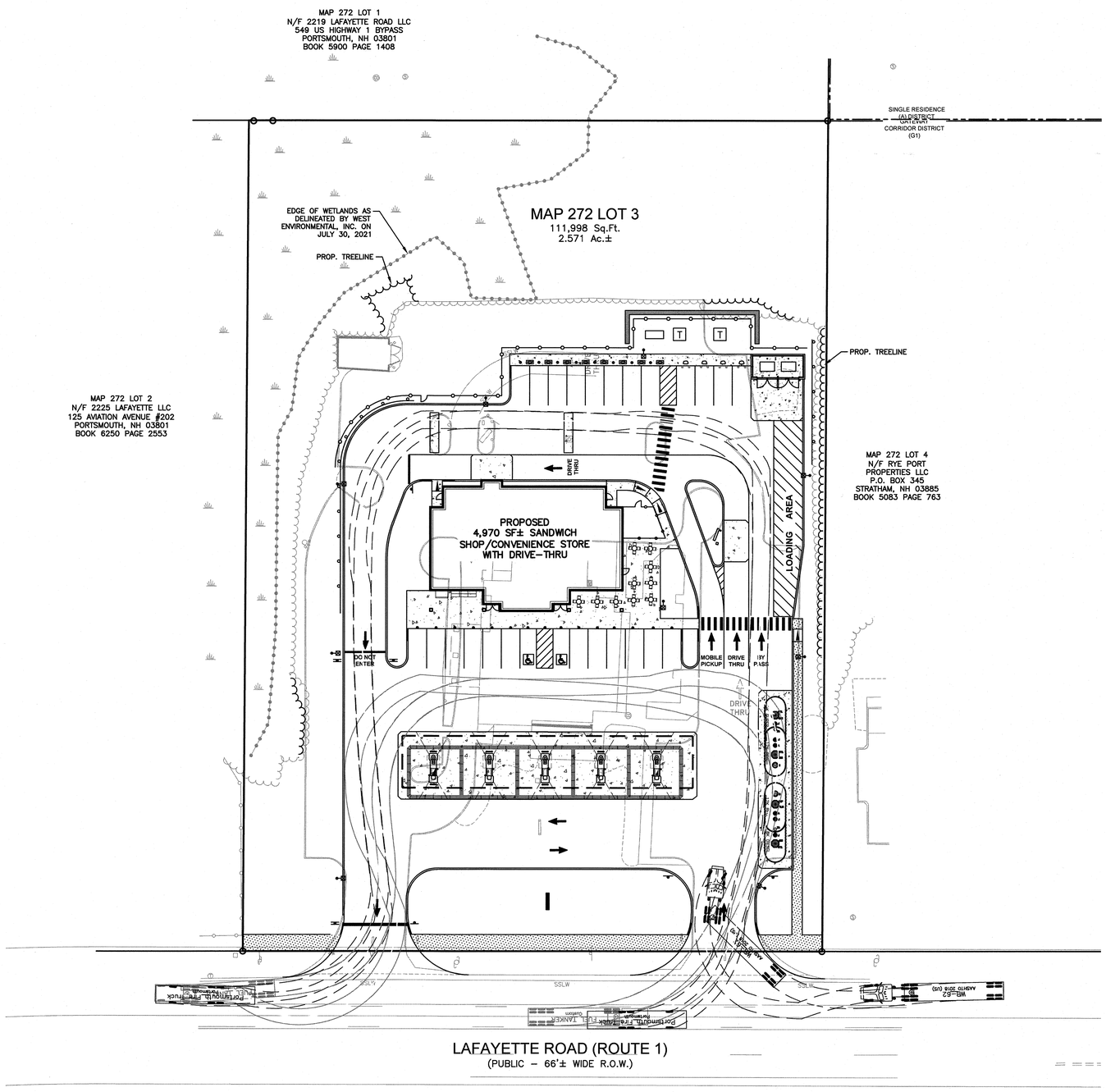
PROJECT NO. NEX-2021163

15 OF 15



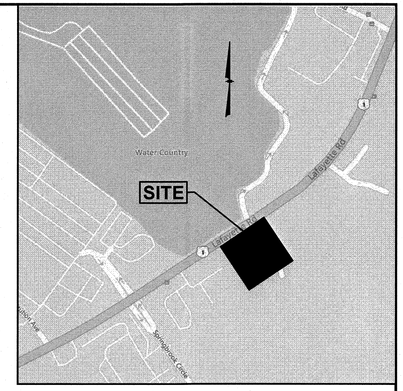
LEGEND

- VGC — VERTICAL GRANITE CURB
- SSLW — SINGLE SOLID LINE WHITE
- G — GAS LINE
- U/GT — UNDERGROUND COMM
- W — WATER LINE
- E — UNDERGROUND ELECTRIC
- CHAIN LINK FENCE
- 90 — CONTOUR ELEVATION
- TREE
- UTILITY POLE
- GUY WIRE
- OVERHEAD WIRE
- TREELINE
- SIGN
- +99.99 — SPOT ELEVATION
- CATCH BASIN
- CLEANOUT
- S — SEWER MANHOLE
- T — TELEPHONE MANHOLE
- WATER SHUT OFF
- BOLLARD
- GM — GAS METER
- LIGHT POLE
- WETLAND LINE
- EASEMENT LINE
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- ZONE LINE



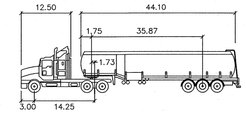
0 30 60 100

SCALE: 1" = 30'



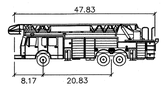
LOCATION MAP

(NOT TO SCALE)



FUEL TANKER — feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 40.0
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		



Portsmouth Fire Truck — feet

Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

GPI
Engineering
Design
Planning
Construction Management
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Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

STATE OF NEW HAMPSHIRE
CORY N. MASON
No.17099
LICENSED PROFESSIONAL ENGINEER
5/24/22

REVISIONS		
3	REV. PER TAC	5/10/22
2	MISC. REVISIONS	4/19/22
1	REV. PER CITY COMMENTS	3/22/22
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

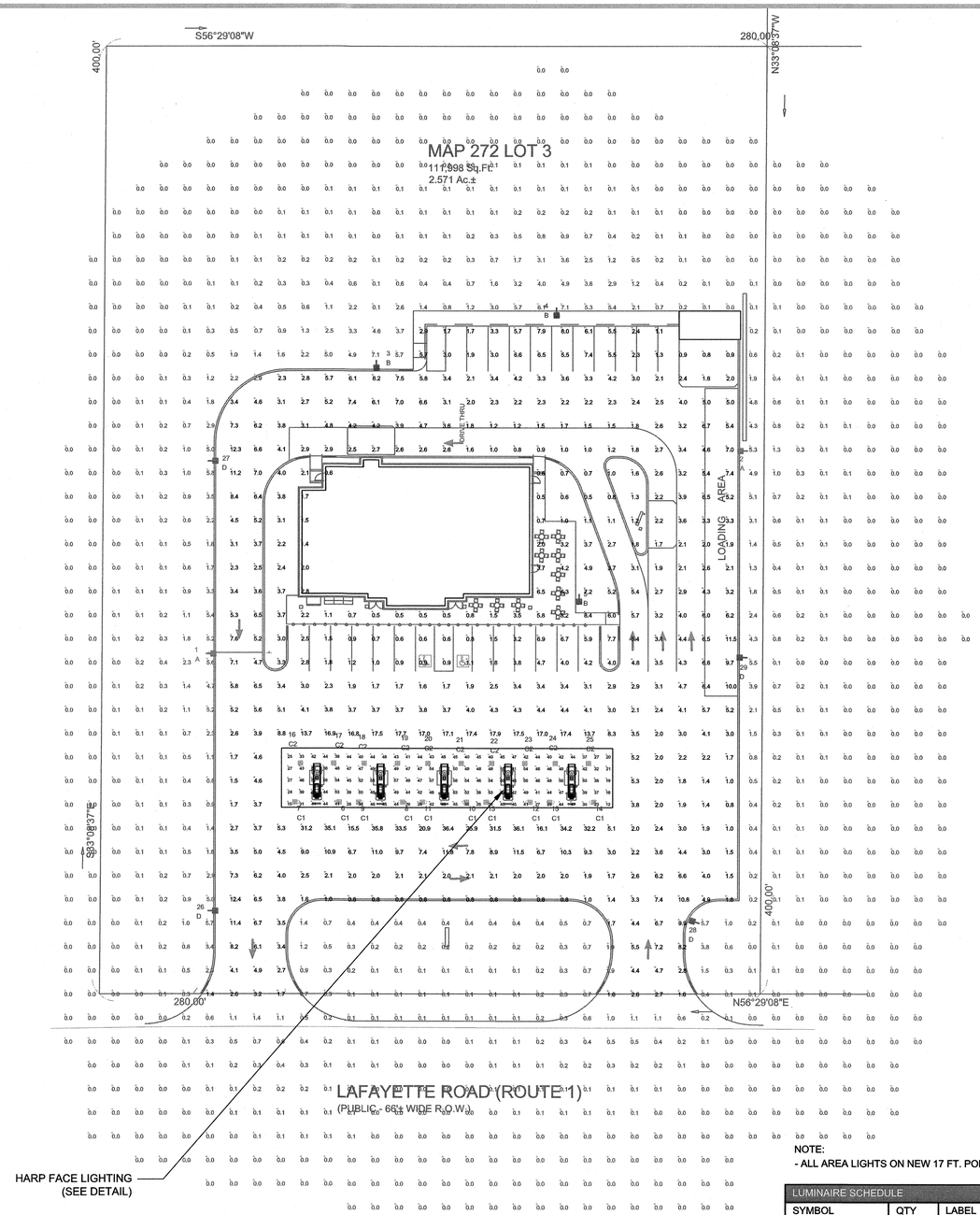
TRUCK TURN PLAN

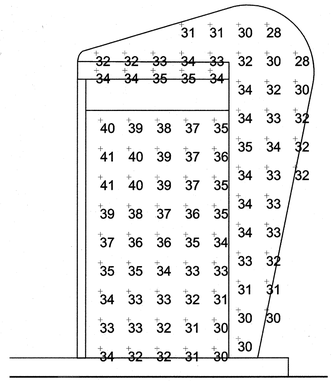
SCALE: 1"=30'

PROJECT NO. NEX-2021163

1 OF 1

811 DigSafe MA.ME.NH.RI.VT





HARP FACE
VERTICAL LIGHTING DETAIL
SCALE: 1/2" = 1 '

THIS SITE IS LOCATED IN A REGION WHERE
LIGHTING IS REGULATED BY LOCAL ORDINANCES

NOTE:
- ALL AREA LIGHTS ON NEW 17 FT. POLE MOUNTED ON 2-1/2 FT. CONCRETE BASE

LUMINAIRE LOCATION SUMMARY		
LUM NO.	LABEL	MTG. HT.
1	A	19.5
2	A	19.5
3	B	19.5
4	B	19.5
5	B	19.5
6	C1	14.5
7	C1	14.5
8	C1	14.5
9	C1	14.5
10	C1	14.5
11	C1	14.5
12	C1	14.5
13	C1	14.5
14	C1	14.5
15	C1	14.5
16	C2	14.5
17	C2	14.5
18	C2	14.5
19	C2	14.5
20	C2	14.5
21	C2	14.5
22	C2	14.5
23	C2	14.5
24	C2	14.5
25	C2	14.5
26	D	19.5
27	D	19.5
28	D	19.5
29	D	19.5

FOOTCANDLE LEVELS CALCULATED AT GRADE USING INITIAL LUMEN VALUES					
LABEL	AVG	MAX	MIN	AVG/MIN	MAX/MIN
IRVING HARP FACE (VERTICAL)	33.88	41	28	1.21	1.46
PAVED AREA	4.78	36.4	0.5	9.56	72.80
UNDEFINED	0.35	7.1	0.0	N.A.	N.A.
UNDER CANOPY	42.73	58	12	3.56	4.83

LUMINAIRE SCHEDULE										
SYMBOL	QTY	LABEL	ARRANGEMENT	LUMENS	LLF	BUG RATING	WATTS/LUMINAIRE	TOTAL WATTS	MANUFACTURER	CATALOG LOGIC
	2	A	SINGLE	16998	1.030	B2-U0-G3	132	264	Cree Inc	OSQ-ML-B-DA-XX + OSQL-B-22L-57K7-4M-UL-NM--XX + OSQ-BLSLF
	3	B	SINGLE	22098	1.030	B3-U0-G3	132	396	Cree Inc	OSQ-ML-B-DA-XX + OSQL-B-22L-57K7-4M-UL-NM-XX
	10	C1	SINGLE	12862	1.030	B2-U1-G1	141	1410	RUUD LIGHTING, INC., A CREE COMPANY	CAN-304-AF-RS-06-E-UL-WH-700-57K
	10	C2	SINGLE	13251	1.030	B3-U0-G1	134	1340	CREE, INC.	CAN-304-SL-RS-06-E-UL-XX-700-57K
	4	D	Single	17499	1.030	B2-U0-G3	132	528	Cree Inc	OSQ-ML-B-DA-XX + OSQL-B-22L-57K7-3M-UL-NM-XX + OSQ-BLSLF

REDLEONARD ASSOCIATES
1340 Kemper Meadow Dr, Forest Park, OH 45240
513-574-9500 | redleonard.com

SCALE: 1" = 30'
LAYOUT BY: JSG
DWG SIZE: D
DATE: 1/10/22

PROJECT NAME:
IRVING OIL
GRANITE STATE C-STORE
DRAWING NUMBER:
RL-7838-S1

IRVING

	QTY	LABEL	DESCRIPTION
AREA	2	A	OSQ-ML-B-DA-XX + OSQL-B-22L-57K7-4M-UL-NM--XX + OSQ-BLSLF
	3	B	OSQ-ML-B-DA-XX + OSQL-B-22L-57K7-4M-UL-NM-XX
	4	D	OSQ-ML-B-DA-XX + OSQL-B-22L-57K7-3M-UL-NM-XX + OSQ-BLSLF

	QTY	LABEL	DESCRIPTION
CANOPY	10	C1	CAN-304-AF-RS-06-E-UL-WH-700-57K
	10	C2	CAN-304-SL-RS-06-E-UL-XX-700-57K

OSQ Series

OSQ™ LED Area/Flood Luminaire featuring Cree TrueWhite® Technology – Medium & Large

Rev. Date: V4 04/14/2021

Product Description

The OSQ™ Area/Flood luminaire blends extreme optical control, advanced thermal management and modern, clean aesthetics. Built to last, the housing is rugged cast aluminum with an integral, weathertight LED driver compartment. Versatile mounting configurations offer simple installation. Its slim, low-profile design minimizes wind load requirements and blends seamlessly into the site providing even, quality illumination. The 6L lumen package is a suitable upgrade for HID applications up to 250 Watt, and the 11L lumen package is a suitable upgrade for HID applications up to 400 Watt. The 22L lumen package is a suitable upgrade for HID applications up to 750 Watts, and the 30L lumen package is a suitable upgrade for HID applications up to 1000 Watts.

Applications: Parking lots, walkways, campuses, car dealerships, office complexes, tunnels, underpasses, and internal roadways

Performance Summary

Utilizes Cree TrueWhite® Technology on 5000K Luminaires

NanoOptic® Precision Delivery Grid™ optic

Assembled in the U.S.A. of U.S. and imported parts

Initial Delivered Lumens: 4,000 – 30,000

Efficacy: Up to 173 LPW

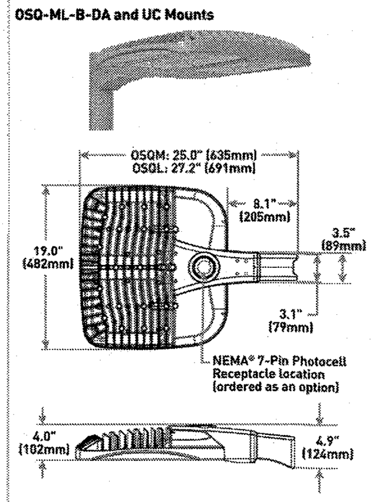
CRI: Minimum 70 CRI (3000K, 4000K & 5700K); 90 CRI (5000K)

CCT: 3000K, 4000K, 5000K, 5700K

Limited Warranty†: 10 years on luminaire; 10 years on Colorfast DeltaGuard® finish; up to 5 years for Synapse® accessories; 1 year on luminaire accessories

† See http://creelighting.com/warranty for warranty terms. For Synapse accessories, consult Synapse spec sheets for details on warranty terms.

OSQ-ML-B-DA and UC Mounts



Luminaire	Weight
OSQM	28.9 lbs. (13.1kg)
OSQL	32.4 lbs. (14.7kg)

Note: Refer to page 11 for fixture mounting drill pattern. For additional mounts, refer to drawings beginning on page 19

Ordering Information

Fully assembled luminaire is composed of two components that must be ordered separately:
Example: **Mount:** OSQ-ML-B-AA-BK + **Luminaire:** OSQM-B-4L-30K7-2M-UL-NM-BK

Mount (Luminaire must be ordered separately)*

OSQ-	
OSQ-ML-B-AA Adjustable Arm **OSQ-ML-B-DA** Direct Arm **OSQ-ML-B-TSP** Transportation Mount (stainless steel; do not specify color) **OSQ-ML-B-TM** Trunnion Mount	**Color Options:** **SV** Silver **BK** Black **BZ** Bronze **WH** White

* Reference EPA and pole configuration suitability data beginning on page 10

Luminaire (Mount must be ordered separately)

Family	Size	Series	Lumen Package	CCT/CRI	Optic	Voltage	Mount	Color Options	Controls**	Options
OSQ	**M** Medium **L** Large	**B**	**Medium** **4L** 4,000 Lumens **6L** 6,000 Lumens **9L** 9,000 Lumens **11L** 11,000 Lumens **16L** 16,000 Lumens **Large** **22L** 22,000 Lumens **30L** 30,000 Lumens	**30K7** 3000K, 70 CRI **40K7** 4000K, 70 CRI **50K9** 5000K, 90 CRI **57K7** 5700K, 70 CRI	**Asymmetric** **2M*** Type II Medium **3M*** Type III Medium **4M*** Type IV Medium **Symmetric** **5N** Type V Narrow **5Q** Type V Square **N3** Narrow Flood **33** NEMA® 3x3 **44** NEMA® 4x4 **55** NEMA® 5x5 **66** NEMA® 6x6 **75** NEMA® 7x5	**UL** Universal 120-277V **UH** Universal 347-480V - Not available with 4L or 6L lumen packages	**NM** No Mount - Must specify mount from table above - Mount ships separately **Utility Mounts** **UA** 45° Utility Arm w/8' 14/3 AWG Cord Side Exit - Includes N option **UB** 45° Utility Arm w/8' 14/3 AWG Cord End Exit - Includes N option **UC** Direct Arm Mount - Standard 2" (51mm) bolt spacing - Shipped separately - Field-installed - Includes N option **UD** Trunnion Mount - Adjustable from 0-45° in 15° increments - Includes N option	**BK** Black **BZ** Bronze **SV** Silver **WH** White	**PML** Programmable Multi-Level, up to 40' Mounting Height - Refer to PML spec sheet for details - Intended for downlight applications at 0° tilt **PML2** Programmable Multi-Level, 10-30' Mounting Height - Refer to PML spec sheet for details - Intended for downlight applications at 0° tilt **Q9/Q8/Q7/Q6/Q5/Q4/Q3/Q2/Q1** Field Adjustable Output - Must select Q9, Q8, Q7, Q6, Q5, Q4, Q3, Q2, or Q1 - Offers full range adjustability - Refer to pages 12-18 for power and lumen values - Not available with PML or PML2 options **X8/X7/X6/X5/X4/X3/X2/X1** Locked Lumen Output - Must select add X8, X7, X6, X5, X4, X3, X2, or X1 - Not available with 22L or 30L lumen packages - Not available with PML or PML2 options - Lumen output is permanently locked to the setting selected - Refer to pages 12-18 for power and lumen values	**F** Fuse - Compatible with 120V, 277V or 347V (phase to neutral) - Consult factory if fusing is required for 208V, 240V or 480V (phase to phase) - Refer to PML spec sheet for availability with PML options - When code dictates fusing, use time delay fuse **N** Utility Label and NEMA® 7-Pin Photocell Receptacle - Included with UA, UB, UC and UD mounts - External wattage label per ANSI C136.15 - 7-pin receptacle per ANSI C136.41 - Intended for downlight applications with maximum 45° tilt - Factory connected 0-10V dim leads - 7-conductor (NM mount), 3-conductor (UA/UB mounts), or 5-conductor (UC/UD mounts) cord exits luminaire - Requires photocell or shorting cap by others **R** NEMA® 7-Pin Photocell Receptacle - 7-pin receptacle per ANSI C136.41 - Intended for downlight applications with maximum 45° tilt - Factory connected 0-10V dim leads - 18" (457mm) seven-conductor cord exits luminaire - Requires photocell or shorting cap by others **RL** Rotate Left - LED and optic are rotated to the left - Refer to RR/RL configuration diagram on page 19 for optic directionality - Not for use with symmetric optics **RR** Rotate Right - LED and optic are rotated to the right - Refer to RR/RL configuration diagram on page 19 for optic directionality - Not for use with symmetric optics

* Available with Backlight Shield when ordered with field-installed accessory (see table above)
** Luminaire comes standard with 0-10V dimming

CREE ≑ TRUEWHITE TECHNOLOGY

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US: creelighting.com (800) 236-6800
Canada: creelighting-canada.com (800) 473-1234

304 Series™

LED Recessed Canopy Luminaire

Rev. Date: V7 04/05/2021

Product Description

Luminaire housing is constructed from rugged die cast aluminum components (RS Mount) or die cast and extruded aluminum components (RD Mount). LED driver is mounted in a sealed weathertight center chamber that allows for access from below the fixture. Luminaire mounts directly to the canopy deck and is secured in place with die cast aluminum trim frame. Luminaire housing is provided with factory applied foam gasket that provides a watertight seal between luminaire housing and canopy deck. Suitable for use in single or double skin canopies with 16" (406 mm) wide panels. Designed for canopies of 19-22 gauge (maximum 0.040" [1 mm] thickness).

Applications: Petroleum stations, convenience stores, drive-thru banks and restaurants, retail and grocery

Performance Summary

Patented NanoOptic® Product Technology

Assembled in the U.S.A. of U.S. and imported parts

CRI: Minimum 70 CRI

CCT: 4000K (+/- 300K), 5700K (+/- 500K) standard

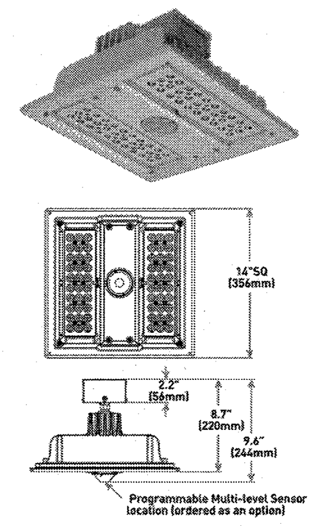
Limited Warranty†: 10 years on luminaire/10 years on Colorfast DeltaGuard® finish

† See http://creelighting.com/warranty for warranty terms

Accessories

Field-Installed
Hand-Held Remote XA-SENSREM - For successful implementation of the programmable multi-level option, a minimum of one hand-held remote is required

RS Mount



Weight
22.0 lbs. (9.9kg)

Ordering Information

Example: CAN-304-5M-RS-04-E-UL-SV-350

Product	Optic	Mounting	LED Count (x10)	Series	Voltage	Color Options	Drive Current	Options
CAN-304				E				
CAN-304	**5M** Type V Medium **5S** Type V Short **PS** Petroleum Symmetric **SL** Sparkle Petroleum	**RS** Recessed Single Skin **RD** Recessed Double Skin	**04** **06**	**E**	**UL** Universal 120-277V **UH** Universal 347-480V	**BK** Black **BZ** Bronze **SV** Silver **WH** White	**350** 350mA **525** 525mA **700*** 700mA	**DIM** 0-10V Dimming - Control by others - Refer to Dimming spec sheet for details - Can't exceed specified drive current **F** Fuse - Compatible only with 120V, 277V or 347V (phase to neutral) - Consult factory if fusing is required for 208V, 240V or 480V (phase to phase) - Refer to PML spec sheet for availability with PML options - When code dictates fusing, use time delay fuse **PML** Programmable Multi-Level - Refer to PML spec sheet for details **40K** 4000K Color Temperature - Minimum 70 CRI - Color temperature per luminaire **TRL** Amber Turtle Friendly LEDs - Available only with 350mA - Lumen multiplier from 5700K: 0.32 (350mA) - Power multiplier: 0.76 - 600nm dominant wavelength - Additional shielding (by others) may be required for Florida Fish and Wildlife Conservation Commission compliance

* 60 LED luminaire requires marked spacing: 48" x 24" x 6" (1,219mm x 610mm x 152mm); 48" (1,219mm) center-to-center of adjacent luminaires, 24" (610mm) luminaire center to side building member, 6" (152mm) top of luminaire to overhead building member

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Canada: creelighting-canada.com (800) 473-1234

Product Specifications

CREE TRUEWHITE® TECHNOLOGY

A revolutionary way to generate high-quality white light, Cree TrueWhite® Technology is a patented approach that delivers an exclusive combination of 90+ CRI, beautiful light characteristics and lifelong color consistency, all while maintaining high luminous efficacy – a true no compromise solution.

CONSTRUCTION & MATERIALS

- Slim, low profile design minimizes wind load requirements
- Luminaire housing is rugged die cast aluminum with an integral, weathertight LED driver compartment and high performance heat sink
- Convenient interlocking mounting method on direct arm and UC mounts. Mounting adaptor is rugged die cast aluminum and mounts to 3" (76mm) or larger square or round pole, secured by two 5/16-18 UNC bolts spaced on 2" (51mm) centers. Refer to page 11 for fixture mounting drill pattern.
- Mounting for the adjustable arm mount adaptor is rugged die cast aluminum and mounts to 2" (51mm) IP, 2.375" (60mm) O.D. tenon. UA and UB mounts are preset to 45°
- Adjustable arm mount can be adjusted 180° in 2.5° increments. UA and UB mounts be field adjusted in 2.5° increments to a maximum tilt of 45°
- Transportation mount is constructed of 316 stainless steel and mounts to surface with (4) 3/8" fasteners by others
- Trunnion mount is constructed of A500 and A1011 steel and is adjustable from 0-180° in 15° degree increments. UD mount is adjustable from 0-45° in 15° degree increments, and is factory preset to 45°. Trunnion mount secures to surface with (1) 3/4" bolt or (2) 1/2" or 3/8" bolts
- Luminaires ordered with NM mount include 18" (340mm) 18/5 or 16/5 cord exiting the luminaire; when combined with N or R option, 18" (340mm) 18/7 or 16/7 cord is provided. UA and UB mounts include 8' (2.4m) 14/3 AWG SEOW black cord exiting the side of the mounting arm through watertight fitting (UA) or the end of the mounting arm (UB). UC mount includes 12" (305mm) 18/5 or 16/5 leads exiting the luminaire. UD mount includes 8' (2.4m) 14/3 cord exiting the luminaire
- Utility mounts (UA, UB, UC, UD) include Utility Label per ANSI C136.15 and 7-pin NEMA® Photocell Receptacle per ANSI C136.41
- Designed for uplight and downlight applications
- Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Silver, bronze, black, and white are available

Weight		
Mount	Housing Medium	Large
OSQ-ML-B-AA	28.4 lbs. (12.9kg)	32.0 lbs. (14.5kg)
OSQ-ML-B-DA	28.9 lbs. (13.1kg)	32.4 lbs. (14.7kg)
OSQ-ML-B-TSP	42.0 lbs. (19.1kg)	44.0 lbs. (20.0kg)
OSQ-ML-B-TM	32.6 lbs. (14.8kg)	36.1 lbs. (16.4kg)
UA	29.5 lbs. (13.4kg)	33.1 lbs. (15.0kg)
UB	29.5 lbs. (13.4kg)	33.1 lbs. (15.0kg)
UC	28.9 lbs. (13.1kg)	32.4 lbs. (14.7kg)
UD	32.6 lbs. (14.8kg)	36.1 lbs. (16.4kg)

ELECTRICAL SYSTEM

- **Input Voltage:** 120-277V or 347-480V, 50/60Hz, Class 1 drivers
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Integral 10kV surge suppression protection standard
- When code dictates fusing, a slow blow fuse or type C/D breaker should be used to address inrush current
- Designed with 0-10V dimming capabilities. Controls by others
- Refer to Dimming spec sheet for details
- **Maximum 10V Source Current:** 1.0mA
- **Operating Temperature Range:** -40°C - +40°C (-40°F - +104°F)

REGULATORY & VOLUNTARY QUALIFICATIONS

- cULus Listed (UL1598)
- Suitable for wet locations
- Meets NEMA C82.77 standards
- Drivers and LEDs are UL Recognized in accordance with UL8750
- Enclosure rated IP66 per IEC 60529 when ordered without N or R options
- Consult factory for CE Certified products
- Certified to ANSI C136.31-2018, 3G bridge and overpass vibration standards
- ANSI C136.2 10kV surge protection, tested in accordance with IEEE/ANSI C62.41.2
- Meets FCC Part 15, Subpart B, Class A limits for conducted and radiated emissions
- Luminaire and finish endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117
- Meets Buy American requirements within ARRA
- RoHS compliant. Consult factory for additional details
- Dark Sky Friendly, IDA Approved when ordered with 30K CCT and direct or transportation mounts only. Please refer to https://www.darksky.org/our-work/lighting/lighting-for-industry/fsa/fsa-products/ for most current information
- CA RESIDENTS WARNING: Cancer and Reproductive Harm – www.p65warnings.ca.gov

Product Specifications

SYNAPSE® SIMPLYSNAP INTELLIGENT CONTROL

The Synapse SimplySNAP platform is a highly intuitive connected lighting solution featuring zone dimming, motion sensing, and daylight harvesting with utility-grade power monitoring and support of up to 1000 nodes per gateway. The system features a reliable and robust self-healing mesh network with a browser-based interface that runs on smartphones, tablets, and PCs. The Twist-Lock Lighting Controller (TL7-B2) and Site Controller (SS450-002) take the OSQ Series to a new performance plateau, providing extreme energy productivity, code compliance and a better light experience.

Electrical Data*

Input Power Designator	Optic	System Watts 120-480V	Utility Label Wattage	120V	208V	240V	277V	347V	480V
				Total Current (A)					
4L**	All	29	30	0.25	0.14	0.12	0.11	N/A	N/A
6L**	Asymmetric	48	50	0.41	0.23	0.20	0.17	N/A	N/A
	Symmetric	39	40	0.33	0.19	0.17	0.14	N/A	N/A
9L	All	60	60	0.51	0.29	0.25	0.22	0.18	0.13
11L	All	72	70	0.62	0.36	0.31	0.27	0.21	0.16
16L	All	104	100	0.89	0.51	0.43	0.39	0.31	0.22
22L	All	132	130	1.12	0.63	0.55	0.47	0.39	0.28
30L	All	202	200	1.72	0.96	0.84	0.72	0.60	0.43

* Electrical data at 25°C (77°F). Actual wattage may differ by +/- 10% when operating between 120-277V or 347-480V+/-10%
** Available with UL voltage only

OSQ Series Ambient Adjusted Lumen Maintenance[1]

Ambient	Optic	Initial LMF	25K hr Reported[2] LMF	50K hr Reported[2] LMF	75K hr Reported[2]/ Estimated[3] LMF	100K hr Reported[2]/ Estimated[3] LMF
5°C (41°F)	Asymmetric	1.04	1.03	1.01	0.99[2]	0.97[3]
	Symmetric	1.05	1.05	1.05	1.05[2]	1.05[3]
10°C (50°F)	Asymmetric	1.03	1.02	1.00	0.98[2]	0.96[3]
	Symmetric	1.04	1.03	1.03	1.03[2]	1.03[3]
15°C (59°F)	Asymmetric	1.02	1.01	0.99	0.97[2]	0.95[3]
	Symmetric	1.02	1.02	1.02	1.02[2]	1.02[3]
20°C (68°F)	Asymmetric	1.01	1.00	0.98	0.96[2]	0.94[3]
	Symmetric	1.01	1.01	1.01	1.01[2]	1.01[3]
25°C (77°F)	Asymmetric	1.00	0.99	0.97	0.95[2]	0.93[3]
	Symmetric	1.00	1.00	1.00	1.00[2]	1.00[3]

[1] Lumen maintenance values at 25°C (77°F) are calculated per IES TM-21 based on IES LM-80 report data for the LED package and in-situ luminaire testing. Luminaire ambient temperature factors (LATF) have been applied to all lumen maintenance factors. Please refer to the Temperature Zone Reference Document for outdoor average nighttime ambient conditions.
[2] In accordance with IES TM-21, Reported values represent interpolated values based on time durations that are up to 6x the tested duration in the IES LM-80 report for the LED.
[3] Estimated values are calculated and represent time durations that exceed the 6x test duration of the LED.

Accessories

Field-Installed

Backlight Shield (Front Facing Optics)
OSQ-BLSMF (Medium)
OSQ-BLSLF (Large)
Backlight Shield (Rotated Optics)
OSQ-BLSMR (Medium)
OSQ-BLSLR (Large)
Bird Spikes
OSQ-MED-BRDSPK
OSQ-LG-BRDSPK

Hand-Held Remote
XA-SENSREM
- For successful implementation of the programmable multi-level option, a minimum of one hand-held remote is required

Shorting Cap
XA-XSLSHRT

Synapse Wireless Control Accessories

Twist-Lock Lighting Controller
TL7-B2
- Suitable for 120-277V (UL) voltage only
- Requires NEMA/ANSI C136.41 7-Pin Dimming Receptacle
- Not for use with PML or PML2 options
- Provides On/Off switching, dimming, power metering, digital sensor input, and status monitoring of luminaire
- Refer to TL7-B2 spec sheet for details

Twist-Lock Lighting Controller
TL7-HVG
- Suitable for 120-480V (UL and UH) voltage
- Requires NEMA/ANSI C136.41 7-Pin Dimming Receptacle
- Not for use with PML or PML2 options
- Provides On/Off switching, dimming, power metering, digital sensor input, and status monitoring of luminaire
- Refer to TL7-HVG spec sheet for details

SimplySNAP Central Base Station
CBSSW-450-002
- Includes On-Site Controller (SS450-002) and 5-button switch
- Indoor and Outdoor rated
- Refer to CBSSW-450-002 spec sheet for details

Synapse Wireless Sensor
WSN-DPM
- Motion and light sensor
- Control multiple zones
- Refer to WSN-DPM spec sheet for details

SimplySNAP On-Site Controller
SS450-002
- Verizon® LTE-enabled
- Designed for indoor applications
- Refer to SS450-002 spec sheet for details

Building Management System (BMS) Gateway
BMS-GW-002
- Required for BACnet integration
- Refer to BMS-GW-002 spec sheet for details

Outdoor Antennas
(Optional, for increased range, 8dB gain)
KIT-ANT420SM
- Kit includes antenna, 20' cable and bracket
KIT-ANT360
- Kit includes antenna, 30' cable and bracket
KIT-ANT600
- Kit includes antenna, 50' cable and bracket
- Refer to Outdoor antenna spec sheet for details

US: creelighting.com (800) 236-6800
Canada: creelighting-canada.com (800) 473-1234

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Product Specifications

CONSTRUCTION & MATERIALS

- RS Mount luminaire housing is constructed from rugged die cast aluminum and incorporates integral, high performance heatsink fins specifically designed for LED canopy applications
- RD Mount luminaire housing is constructed from rugged die cast aluminum and features high performance extruded aluminum heatsinks specifically designed for LED canopy applications
- LED driver is mounted in a sealed weathertight center chamber that allows for access from below the luminaire
- Field adjustable drive current between 350mA, 525mA and 700mA on Non-IC rated luminaires
- Luminaire housing provided with factory applied foam gasket and provides for a watertight seal between luminaire housing and canopy deck
- Mounts directly to the canopy deck and is secured in place with a die cast aluminum trim frame
- RS mount includes integral junction box which allows ease of installation without need to open luminaire
- Suitable for use in single (RS Mount) or double (RD Mount) skin canopies with 16" (406mm) wide panels
- Designed for canopies of 19-22 gauge (maximum 0.040" [1mm] thickness)
- See 228 Series™ canopy luminaires for canopies using 12" (305mm) deck sections
- Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Black, bronze, silver, and white are available

ELECTRICAL SYSTEM

- **Input Voltage:** 120-277V or 347-480V, 50/60Hz, Class 1 drivers
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Integral weathertight electrical box with terminal strips (12Ga-20Ga) for easy power hookup
- Integral 10kV surge suppression protection standard
- When code dictates fusing, a slow blow fuse or type C/D breaker should be used to address inrush current
- **10V Source Current:** 0.15mA

REGULATORY & VOLUNTARY QUALIFICATIONS

- cULus Listed
- Suitable for wet locations
- Meets FCC Part 15, Subpart B, Class A limits for conducted and radiated emissions
- Enclosure meets IP66 requirements per IEC 60529
- ANSI C136.2 10kV surge protection, tested in accordance with IEEE/ANSI C62.41.2
- Luminaire and finish endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117
- DLC qualified with select SKUs. Please refer to www.designlights.org for most current information
- RoHS Compliant. Consult factory for additional details
- Meets Buy American requirements within ARRA
- CA RESIDENTS WARNING: Cancer and Reproductive Harm – www.p65warnings.ca.gov

Electrical Data*

LED Count (x10)	System Watts 120-480V	120V	208V	240V	277V	347V	480V
		Total Current (A)					
350mA							
04	46	0.39	0.24	0.22	0.21	0.15	0.12
06	69	0.57	0.34	0.30	0.27	0.21	0.16
525mA							
04	71	0.59	0.35	0.31	0.28	0.21	0.16
06	101	0.84	0.49	0.43	0.38	0.30	0.22
700mA							
04	94	0.79	0.46	0.40	0.36	0.28	0.21
06	135	1.14	0.65	0.57	0.50	0.40	0.29

* Electrical data at 25°C (77°F). Actual wattage may differ by +/- 10% when operating between 120-277V or 347-480V

304 Series™ Ambient Adjusted Lumen Maintenance[1]

Ambient	CCT	Initial LMF	25K hr Reported[2] LMF	50K hr Reported[2] LMF	75K hr Estimated[3] LMF	100K hr Estimated[3] LMF
5°C (41°F)	30K/40K/50K/57K	1.04	1.01	0.99	0.98	0.96
	TRL	1.06	1.06	1.06	1.06	1.06
10°C (50°F)	30K/40K/50K/57K	1.03	1.00	0.98	0.97	0.95
	TRL	1.04	1.04	1.04	1.04	1.04
15°C (59°F)	30K/40K/50K/57K	1.02	0.99	0.97	0.96	0.94
	TRL	1.03	1.03	1.03	1.03	1.03
20°C (68°F)	30K/40K/50K/57K	1.01	0.98	0.96	0.95	0.93
	TRL	1.01	1.01	1.01	1.01	1.01
25°C (77°F)	30K/40K/50K/57K	1.00	0.97	0.95	0.94	0.92
	TRL	1.00	1.00	1.00	1.00	1.00

[1] Lumen maintenance values at 25°C (77°F) are calculated per IES TM-21 based on IES LM-80 report data for the LED package and in-situ luminaire testing. Luminaire ambient temperature factors (LATF) have been applied to all lumen maintenance factors. Please refer to the Temperature Zone Reference Document for outdoor average nighttime ambient conditions.
[2] In accordance with IES TM-21, Reported values represent interpolated values based on time durations that are up to 6x the tested duration in the IES LM-80 report for the LED.
[3] Estimated values are calculated and represent time durations that exceed the 6x test duration of the LED.

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Canada: creelighting-canada.com (800) 473-1234

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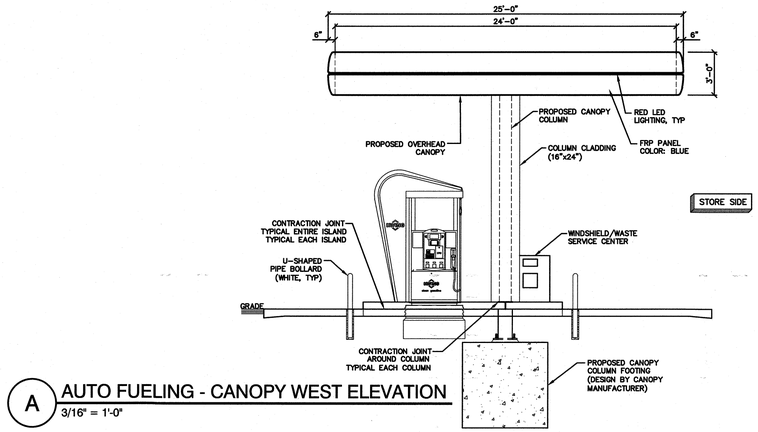
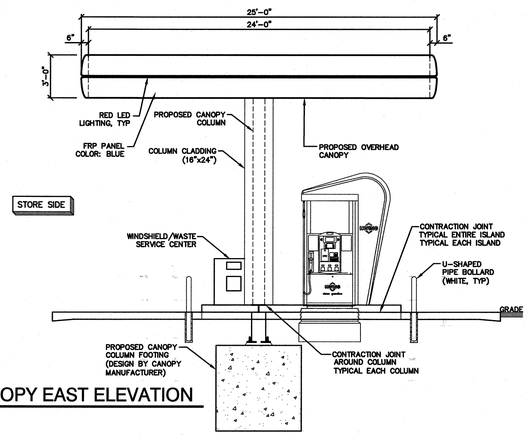
REDLEONARD ASSOCIATES
1340 Kemper Meadow Dr, Forest Park, OH 45240
513-574-9500 | redleonard.com

PROJECT NAME:
IRVING OIL
GRANITE STATE C-STORE
DRAWING NUMBER:
RL-7838-S1

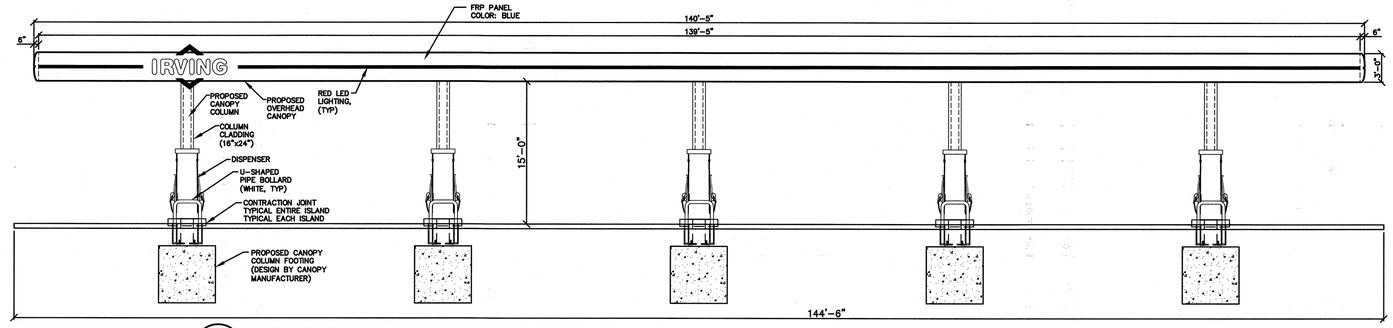
IRVING



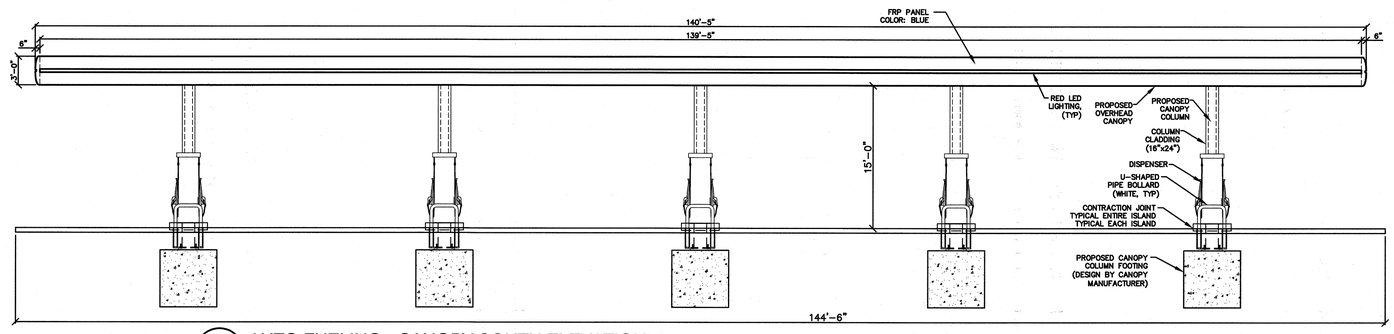
A AUTO FUELING - CANOPY WEST ELEVATION
3/16" = 1'-0"



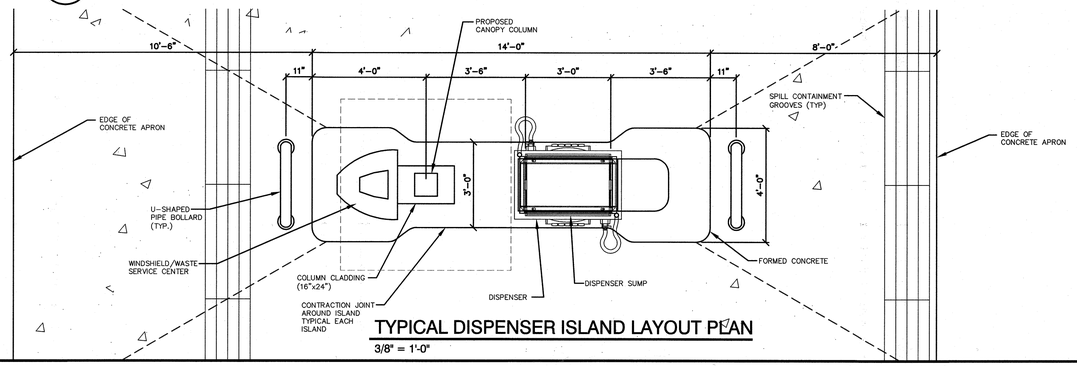
B AUTO FUELING - CANOPY EAST ELEVATION
3/16" = 1'-0"



1 AUTO FUELING CANOPY - NORTH ELEVATION
1/8" = 1'-0"



2 AUTO FUELING - CANOPY SOUTH ELEVATION
1/8" = 1'-0"



TYPICAL DISPENSER ISLAND LAYOUT PLAN
3/8" = 1'-0"

GPI
Engineering
Design
Planning
Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

REVISIONS		
NO.	REVISION	DATE

JANUARY 26, 2022

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

PROPOSED CANOPY ELEVATIONS

SCALE: AS SHOWN

PROJECT NO. NEX-2021163

1 OF 1

STORMWATER MANAGEMENT REPORT

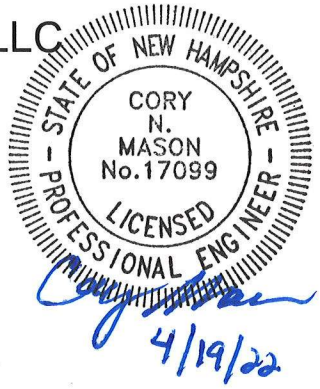
PROPOSED RETAIL MOTOR FUEL OUTLET
TAX MAP 272 LOT 3
2255 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

GPI

44 Stiles Road, Suite One
Salem, NH 03079
(603) 893-0720

Prepared For:

Granite State Convenience, LLC
25 Springer Road
Hooksett, NH 03106



Revised: April 19, 2022
February 3, 2022

(GPI Project No.: NEX-2021163)

Granite State Convenience, LLC
Proposed Retail Motor Fuel Outlet
Stormwater Management Report

TABLE OF CONTENTS

SECTION 1 EXECUTIVE SUMMARY

This report contains a stormwater management analysis for the proposed retail fuel development located at 2255 Lafayette Road (Route 1) in Portsmouth, New Hampshire. The analysis includes both pre- and post-development calculations of stormwater runoff rates at specific locations on the project site.

This analysis has been prepared in accordance with both City of Portsmouth requirements and the guidelines contained in the New Hampshire Department of Environmental Services (NHDES) New Hampshire Stormwater Manual.

The project site consists of one parcel identified as Map 272 Lot 3 which totals approximately 2.571 acres. The site is bordered by Lafayette Road (Route 1) to the northwest, commercial properties to the northeast and southwest and wooded areas containing wetlands to the south and southeast.

The applicant is proposing to construct a 4,970 square foot convenience store with food service and drive-thru, a fueling canopy with 5 retail fuel islands and 10 fueling locations, and associated paved driveways and parking. Access to the proposed developed site will be provided by two separate one-way ingress and one-way egress from Lafayette Road. Two underground storage tanks (USTs) will be located along the western site driveway to Lafayette Road. Water and sewer for the proposed building will be provided by municipal services. Electric service will be provided via an existing utility pole on Lafayette Road and a new on-site transformer.

In order to mitigate increases in peak discharge rates of stormwater runoff as a result of the new impervious surfaces, a comprehensive stormwater management system has been designed that includes deep-sump, hooded catch basins, First Defense Hydrodynamic Separators, an oil/water separator, a Jellyfish Filter treatment unit, and an underground detention system with outlet control structure.

Based on site topography and discharge points, one analysis point is identified for the purposes of this analysis. Design Point #1 represents overland flow which flows southeast eventually to an on-site wetland which is part of a larger off-site wetland system.

The table below summarizes the comparative pre- and post-development peak rates of stormwater runoff at the design point.

TABLE 1: PEAK RATE ANALYSIS SUMMARY

Design Storm	Pre-Development (cfs)	Post-Development (cfs)	Change (cfs)
DESIGN POINT #1 – Wetland			
2-year	3.5	3.4	-0.1
10-year	8.1	6.8	-1.3
25-year	12.0	9.7	-2.3
50-year	15.8	12.1	-3.7

(All values shown are peak rates in CFS)

In conclusion, by incorporating a new on-site drainage system that includes provisions for stormwater treatment and detention, there will be a decrease in the peak rates of stormwater runoff leaving the property at the design point as a result of this project.

Implementing the maintenance procedures outlined in the Inspection and Maintenance Manual (I&M) will ensure the long-term performance of the system.

SECTION 2 EXISTING CONDITIONS

The project site consists of one parcel identified as Map 272 Lot 3 which totals approximately 2.571 acres. The site is bordered by Lafayette Road (Route 1) to the northwest, commercial properties to the northeast and southwest and wooded areas containing wetlands to the south and southeast.

The site is previously developed and contains a Burger King restaurant with drive-thru, which is currently vacant, and associated paved parking lot and driveways to Lafayette Road. The majority of the lot is paved and on-site drainage structures are limited to a single catch basin in the landscaped area northwest of the existing building which had no visible pipe outlet at the time of survey. The majority of stormwater runoff currently sheet flows uncontrolled and untreated over the pavement to the southeast eventually off the edge of pavement to the wetland.

Site topography is variable, with slopes ranging from mild (2% on the maintained front lawn) to severe (25% or greater) near the wetland areas. Elevations range from 53 at the southern edge of the property to 67 at the northwest property corner along Lafayette Road.

The NRCS Web Soil Survey identifies on-site soils as Urban Land with no Hydrologic Soil Group (HSG) classification. Areas directly south of the site are identified as Pipestone sand with an HSG-A classification which is used in the analysis.

Test pits were performed by Greenman-Pedersen, Inc. (GPI) on September 30, 2021. Test Pits encountered Loamy Sand with estimated seasonal high groundwater table (ESHWT) encountered at 36 inches below ground in Test Pit 9-1 and not encountered in Test Pit 9-2. Refusal was encountered at 38 inches and 48 inches below ground respectively. Test pit logs are included in Appendix C.

On-site wetlands were delineated by West Environmental, Inc. on July 30, 2021 along the northeast and southeast property lines and are shown on the Existing Conditions Plan with the associated 100-foot wetland buffer.

The site is not located in a special flood hazard area (100-year flood) per Flood Insurance Rate Map Number 33015C0270F, with an effective date of January 29, 2021.

SECTION 3 PROPOSED CONDITIONS

The applicant is proposing to construct a 4,970 square foot convenience store with food service and drive-thru, a fueling canopy with 5 retail fuel islands and 10 fueling locations, and associated paved driveways and parking. Access to the proposed developed site will be provided by two separate one-way ingress and one-way egress from Lafayette Road. Two underground storage tanks (USTs) will be located along the western site driveway to Lafayette Road. Water and sewer for the proposed building will be provided by municipal services. Electric service will be provided via an existing utility pole on Lafayette Road and a new on-site transformer.

In order to mitigate increases in peak discharge rates of stormwater runoff as a result of the new impervious surfaces, a comprehensive stormwater management system has been designed that includes deep-sump, hooded catch basins, First Defense Hydrodynamic Separators, an oil/water separator, a Jellyfish Filter treatment unit, and an underground detention system with outlet control structure.

To safeguard against oil or gas introduction into the drainage system, stormwater runoff from areas in which fuel is dispensed will be collected in hooded catch basins with deep sumps and routed through an oil/water separator unit. Such pretreatment of stormwater reduces both suspended solids and oils in the drainage system and is recommended by NHDES. Runoff will then enter an underground detention system consisting of four (4) rows of 36-inch HDPE pipe with watertight joints. This system, together with the outlet control structure, will attenuate peak rates of runoff discharging to the design point during all design storms. Finally, runoff discharging from the detention system will flow through a Jellyfish Filter which uses membrane filters to remove fine particles and particulate-bound pollutants such as nitrogen, phosphorous, metals, and hydrocarbons.

The Jellyfish Filter is performance tested to achieve 89% TSS and 51% total Nitrogen (TN) removal efficiencies, which satisfy the Enhanced Stormwater Treatment Standards described in Section 7.6.2 of the *Site Plan Review Regulations*.

Recharge of runoff from non-high load areas (where petroleum products are not dispensed) was explored but was not possible due to the presence of high groundwater and the nature of the existing topography.

The total area of disturbance related to the proposed redevelopment and stormwater management system construction is approximately 75,000 square feet therefore the project will require an EPA Construction General Permit under the NPDES program. The area of disturbance is less than 100,000 square feet, therefore, the project is not subject to an NHDES Alteration of Terrain (AoT) permit.

SECTION 4 STORMWATER MODELING METHODOLOGY

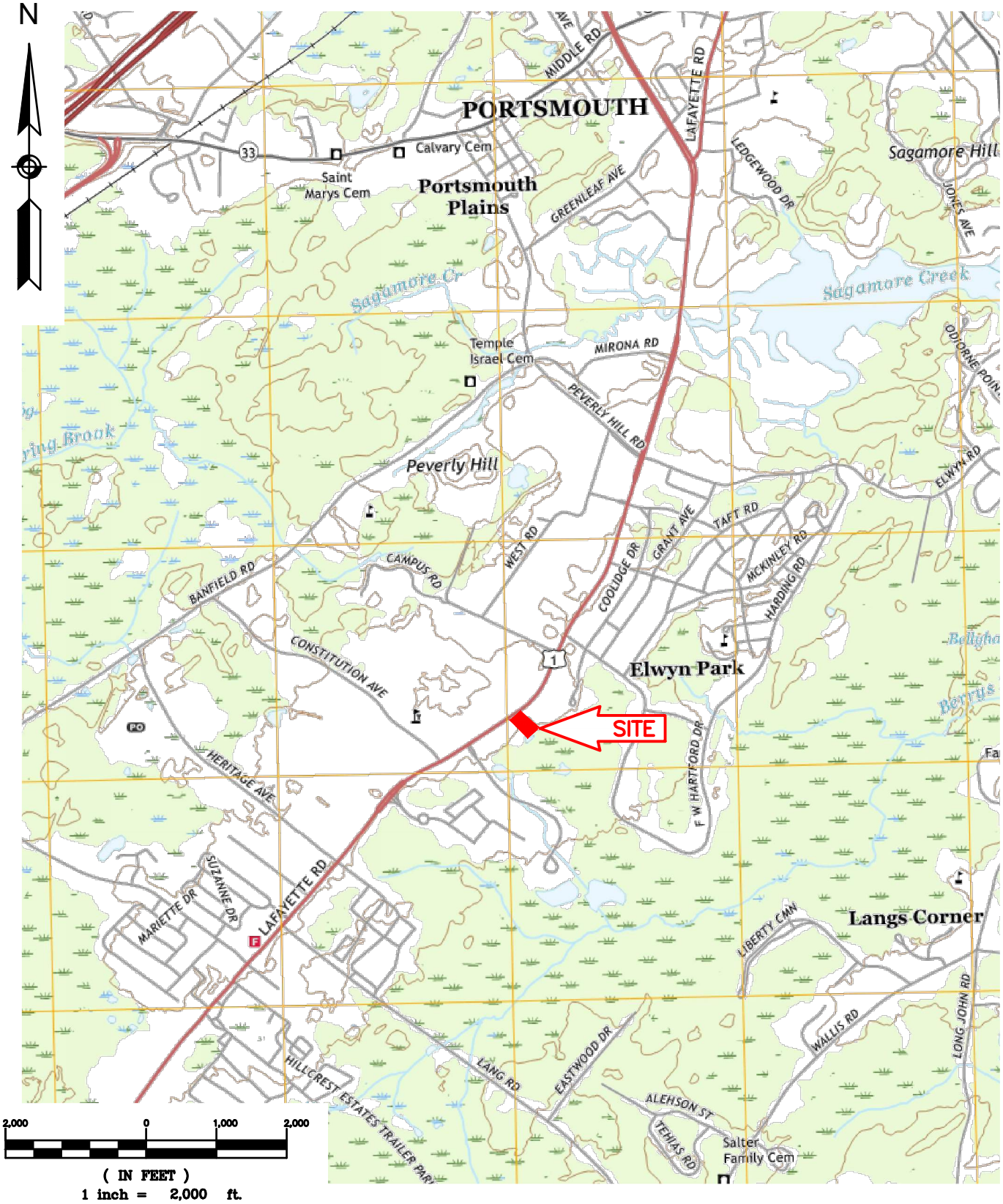
The drainage system for this project was modeled using HydroCAD, a stormwater modeling computer program that analyzes the hydrology, and hydraulics of stormwater runoff. HydroCAD is based largely on the hydrology techniques developed by the Soil Conservation Service (SCS/NRCS), combined with other hydrology and hydraulics calculations. For a given rainfall event, these techniques are used to generate hydrographs throughout a watershed. This provides verification that a given drainage system is adequate for the area under consideration, or to predict where flooding or erosion is likely to occur.

In HydroCAD, each watershed is modeled as a subcatchment, streams and culverts as a Reach (or Pond, depending on available storage capacity), and large wetlands and other natural or artificial storage areas as a Pond. SCS hydrograph generation and routing procedures were used to model both Pre-development and Post-development runoff conditions.

The Pre-development and Post-development watershed limits and the subcatchment characteristics were determined using both USGS and on-the-ground topographic survey information and through visual, on-site inspection. Conservative estimates were used at all times in estimating the hydrologic characteristics of each watershed or subcatchment.

APPENDIX A

Figures



USGS MAP

ASSESSORS MAP 272 LOT 3
2255 LAFAYETTE ROAD
PORTSMOUTH, NH

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

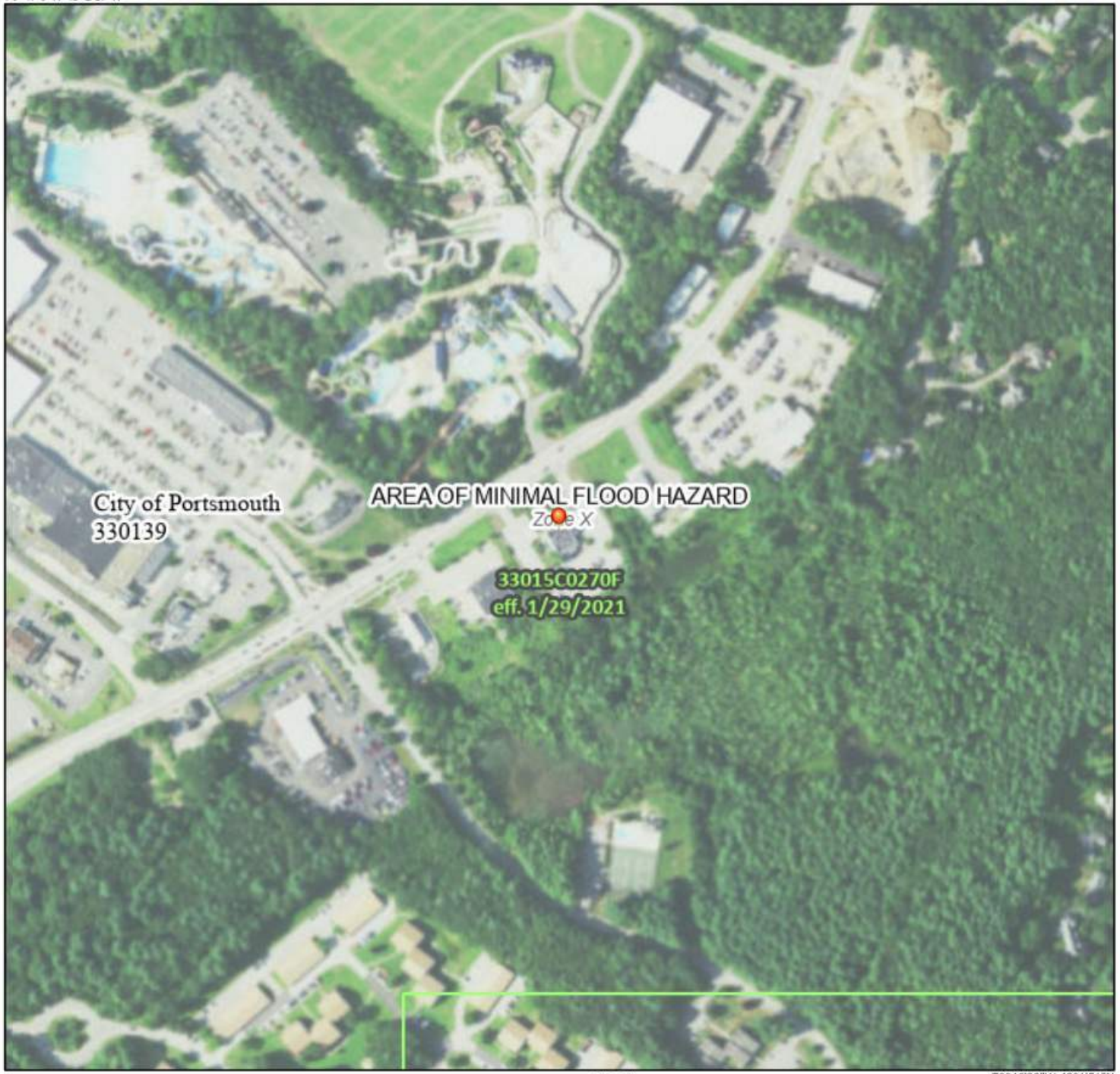
DRAWN BY: SMS
PROJECT #: NEX-2021163
DATE: 1/7/2022
FIGURE 1

F:\Projects\NEX-2021163 - Portsmouth, NH - GSC\Drainage\Stormwater Report\Appendix A - Figures\21163 - USGS Map.dwg USGS 1/10/22 8:58am ssimon

National Flood Hazard Layer FIRMette

FEMA

70°47'6"W 43°2'17"N



70°46'29"W 43°1'51"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/3/2021 at 3:56 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX B

Soils Information

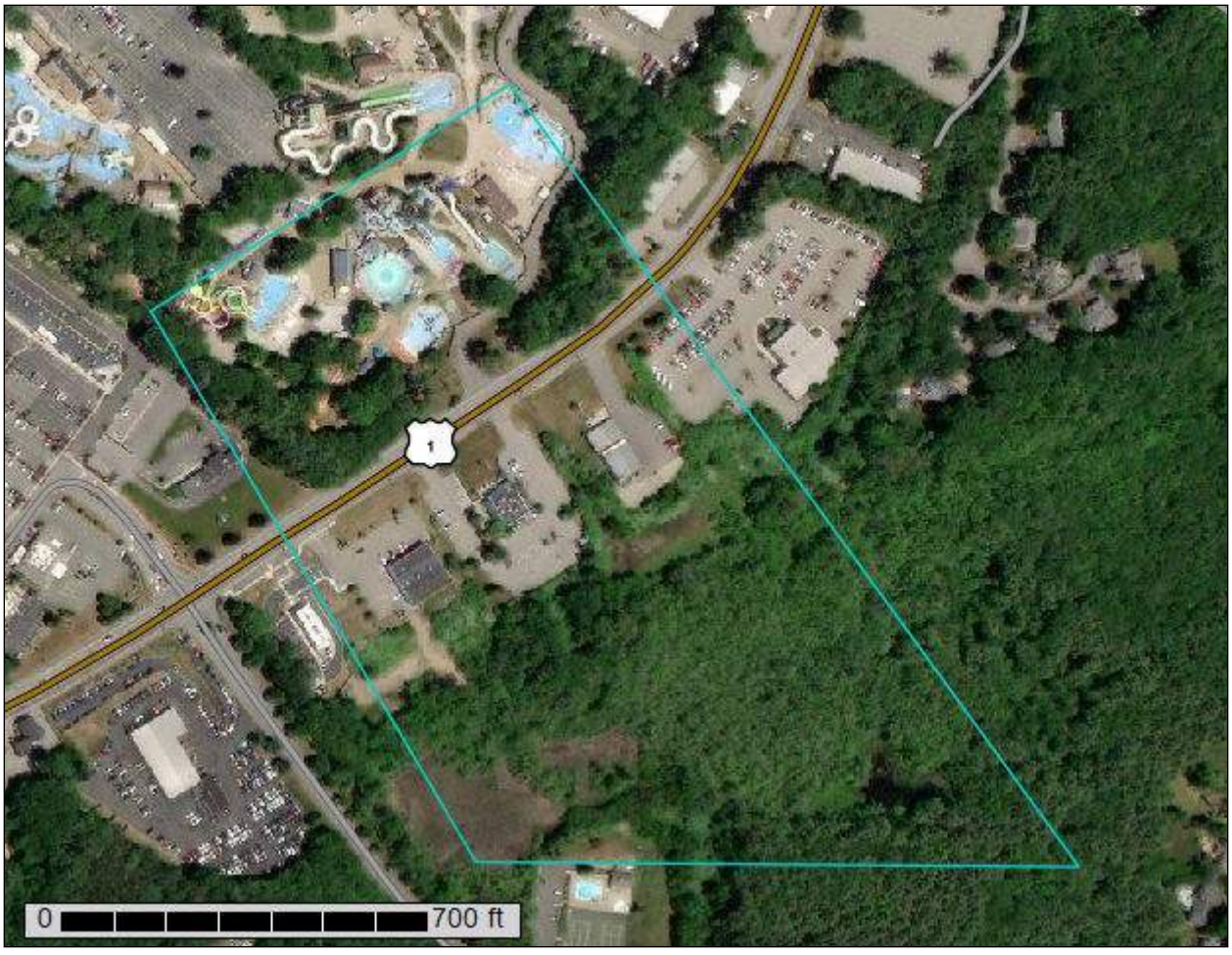
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Rockingham County, New Hampshire



September 20, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,850 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 22, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Jun 14, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	5.4	17.5%
299	Udorthents, smoothed	4.6	14.8%
314A	Pipestone sand, 0 to 5 percent slopes	13.9	44.6%
699	Urban land	7.2	23.1%
Totals for Area of Interest		**31.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rockingham County, New Hampshire

140B—Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky

Map Unit Setting

National map unit symbol: 2w82m
Elevation: 380 to 1,070 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield, very stony, and similar soils: 35 percent
Hollis, very stony, and similar soils: 25 percent
Canton, very stony, and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Canton, Very Stony

Setting

Landform: Ridges, hills, moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam

2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Freetown

Percent of map unit: 5 percent
Landform: Bogs, marshes, depressions, kettles, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Newfields, very stony

Percent of map unit: 5 percent
Landform: Hills, ground moraines, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Walpole, very stony

Percent of map unit: 3 percent
Landform: Outwash plains, depressions, depressions, deltas, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Rock outcrop

Percent of map unit: 2 percent
Landform: Ridges, hills
Hydric soil rating: Unranked

299—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9cmt
Elevation: 0 to 840 feet
Mean annual precipitation: 44 to 49 inches
Mean annual air temperature: 48 degrees F
Frost-free period: 155 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Properties and qualities

Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

314A—Pipestone sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 9cn2
Elevation: 0 to 2,100 feet
Mean annual precipitation: 28 to 55 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Pipestone and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pipestone

Setting

Landform: Outwash terraces

Typical profile

H1 - 0 to 6 inches: sand
H2 - 6 to 33 inches: sand
H3 - 33 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: Yes

Minor Components

Not named wet

Percent of map unit: 5 percent
Landform: Outwash terraces
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Chocorua

Percent of map unit: 5 percent
Landform: Bogs
Hydric soil rating: Yes

Deerfield

Percent of map unit: 5 percent
Hydric soil rating: No

Squamscott

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

699—Urban land

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Not named

Percent of map unit: 15 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

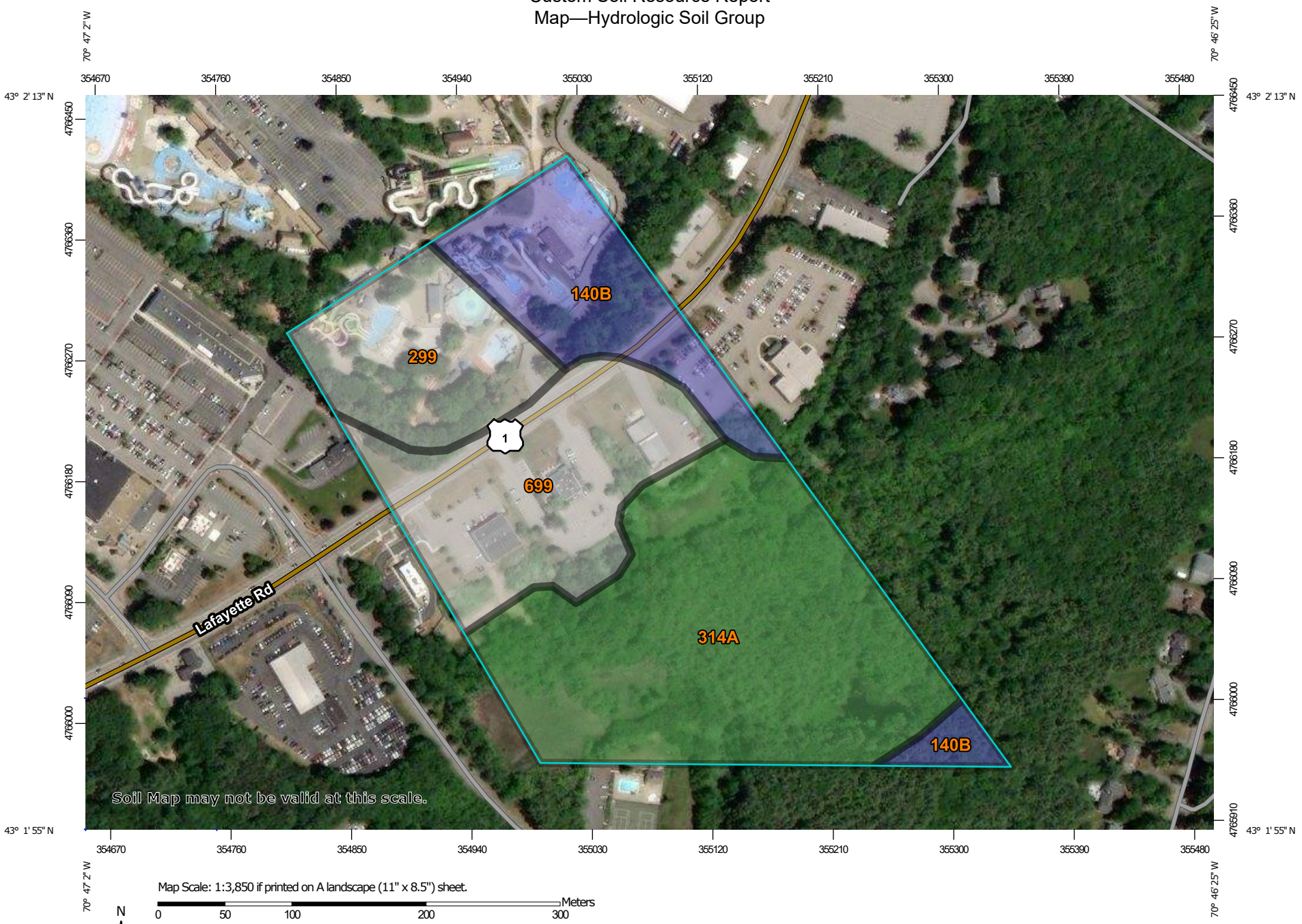
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:3,850 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 22, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Jun 14, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	B	5.4	17.5%
299	Udorthents, smoothed		4.6	14.8%
314A	Pipestone sand, 0 to 5 percent slopes	A/D	13.9	44.6%
699	Urban land		7.2	23.1%
Totals for Area of Interest			**31.1**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX C

Test Pit Logs

TEST PIT DATA

Client: Granite State Convenience
Project Address: 2255 Lafayette Road
Town, State: Portsmouth, NH
Job Number: NEX-2021163
Date: September 30, 2021
Performed by: Diane Pantermoller

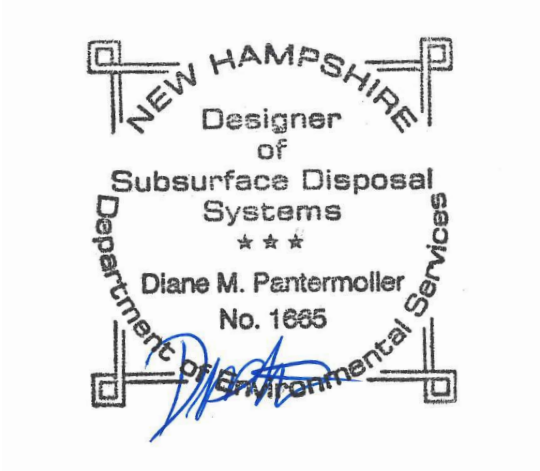
Test Pit No.	**9-1**	SCS Soil:	Pipestone
ESHWT:	>48”	Standing Water:	None
Refusal:	48”	Roots:	None

Depth	Horizon	Soil Texture	Color	Consistence	Mottles; Quantity/Contrast
0-30”	A	Loamy Sand	10yr 2/2	FR	
30-48”	B	Loamy Sand	10yr 4/4	FR	
48”	R				

Test Pit No.	**9-2**	SCS Soil:	Pipestone
ESHWT:	36”	Standing Water:	None
Refusal:	38”	Roots:	None

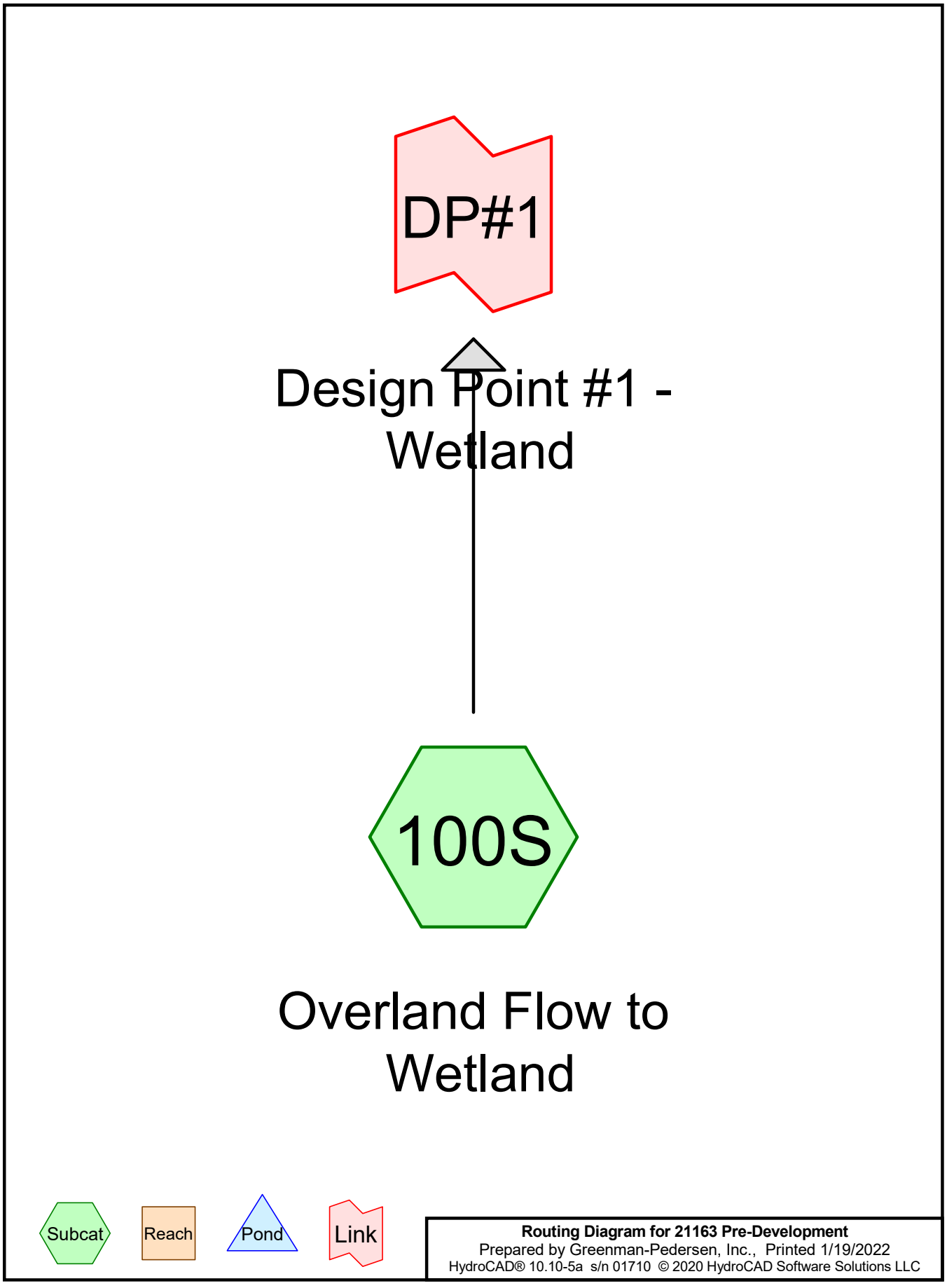
Depth	Horizon	Soil Texture	Color	Consistence	Mottles; Quantity/Contrast
0-24”	A	Loamy Sand	10yr 3/2	FR	
24-33”	B	Loamy Sand	10yr 5/8	FR	
33-38”	C	Loamy Sand	2.5y 7/4	FR	@ 36” Distinct
38”	R				

NOTES



APPENDIX D

Pre-Development HydroCAD Computations



Routing Diagram for 21163 Pre-Development
Prepared by Greenman-Pedersen, Inc., Printed 1/19/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.683	39	>75% Grass cover, Good, HSG A (100S)
1.376	98	Paved parking, HSG A (100S)
0.123	98	Roofs, HSG A (100S)
0.461	30	Woods, Good, HSG A (100S)
2.643	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.643	HSG A	100S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.643		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.683	0.000	0.000	0.000	0.000	0.683	>75% Grass cover, Good	100S
1.376	0.000	0.000	0.000	0.000	1.376	Paved parking	100S
0.123	0.000	0.000	0.000	0.000	0.123	Roofs	100S
0.461	0.000	0.000	0.000	0.000	0.461	Woods, Good	100S
2.643	**0.000**	**0.000**	**0.000**	**0.000**	**2.643**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100S: Overland Flow to Runoff Area=2.643 ac 56.72% Impervious Runoff Depth=1.20"
Flow Length=179' Tc=6.0 min CN=71 Runoff=3.52 cfs 0.264 af

Link DP#1: Design Point #1 - Wetland Inflow=3.52 cfs 0.264 af
Primary=3.52 cfs 0.264 af

Total Runoff Area = 2.643 ac Runoff Volume = 0.264 af Average Runoff Depth = 1.20"
43.28% Pervious = 1.144 ac 56.72% Impervious = 1.499 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100S: Overland Flow to Runoff Area=2.643 ac 56.72% Impervious Runoff Depth=2.62"
Flow Length=179' Tc=6.0 min CN=71 Runoff=8.07 cfs 0.577 af

Link DP#1: Design Point #1 - Wetland Inflow=8.07 cfs 0.577 af
Primary=8.07 cfs 0.577 af

Total Runoff Area = 2.643 ac Runoff Volume = 0.577 af Average Runoff Depth = 2.62"
43.28% Pervious = 1.144 ac 56.72% Impervious = 1.499 ac

Summary for Subcatchment 100S: Overland Flow to Wetland

Runoff = 8.07 cfs @ 12.09 hrs, Volume= 0.577 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.683	39	>75% Grass cover, Good, HSG A
1.376	98	Paved parking, HSG A
0.123	98	Roofs, HSG A
0.461	30	Woods, Good, HSG A
2.643	71	Weighted Average
1.144		43.28% Pervious Area
1.499		56.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	12	0.0900	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.71"
1.2	13	0.0540	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.71"
0.5	51	0.0590	1.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	103	0.0510	1.13		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	179	Total, Increased to minimum Tc = 6.0 min			

Summary for Link DP#1: Design Point #1 - Wetland

Inflow Area = 2.643 ac, 56.72% Impervious, Inflow Depth = 2.62" for 10-Year event
Inflow = 8.07 cfs @ 12.09 hrs, Volume= 0.577 af
Primary = 8.07 cfs @ 12.09 hrs, Volume= 0.577 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100S: Overland Flow to Runoff Area=2.643 ac 56.72% Impervious Runoff Depth=3.86"
Flow Length=179' Tc=6.0 min CN=71 Runoff=11.96 cfs 0.850 af

Link DP#1: Design Point #1 - Wetland Inflow=11.96 cfs 0.850 af
Primary=11.96 cfs 0.850 af

Total Runoff Area = 2.643 ac Runoff Volume = 0.850 af Average Runoff Depth = 3.86"
43.28% Pervious = 1.144 ac 56.72% Impervious = 1.499 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

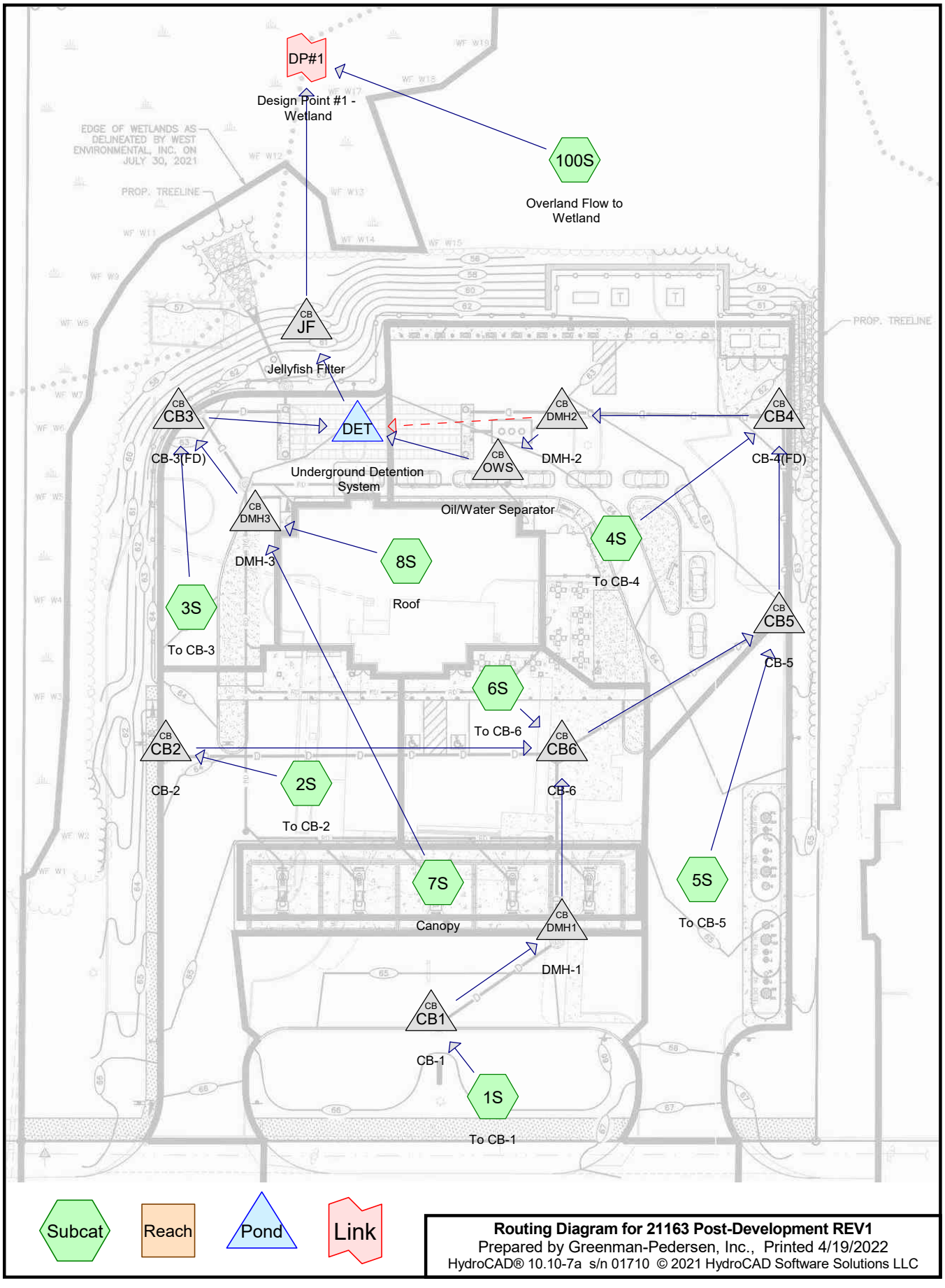
Subcatchment 100S: Overland Flow to Runoff Area=2.643 ac 56.72% Impervious Runoff Depth=5.09"
Flow Length=179' Tc=6.0 min CN=71 Runoff=15.75 cfs 1.120 af

Link DP#1: Design Point #1 - Wetland Inflow=15.75 cfs 1.120 af
Primary=15.75 cfs 1.120 af

Total Runoff Area = 2.643 ac Runoff Volume = 1.120 af Average Runoff Depth = 5.09"
43.28% Pervious = 1.144 ac 56.72% Impervious = 1.499 ac

APPENDIX E

Post-Development HydroCAD Computations



Routing Diagram for 21163 Post-Development REV1
Prepared by Greenman-Pedersen, Inc., Printed 4/19/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.731	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 6S, 100S)
1.349	98	Paved parking, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 100S)
0.114	98	Roofs, HSG A (8S)
0.449	30	Woods, Good, HSG A (100S)
2.643	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.643	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 100S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.643		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.731	0.000	0.000	0.000	0.000	0.731	>75% Grass cover, Good	1S, 2S, 3S, 4S, 6S, 100S
1.349	0.000	0.000	0.000	0.000	1.349	Paved parking	1S, 2S, 3S, 4S, 5S, 6S, 7S, 100S
0.114	0.000	0.000	0.000	0.000	0.114	Roofs	8S
0.449	0.000	0.000	0.000	0.000	0.449	Woods, Good	100S
2.643	**0.000**	**0.000**	**0.000**	**0.000**	**2.643**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	CB1	61.05	60.50	50.9	0.0108	0.012	0.0	12.0	0.0
2	CB2	60.20	59.50	138.6	0.0051	0.012	0.0	12.0	0.0
3	CB3	58.80	57.00	28.8	0.0625	0.012	0.0	12.0	0.0
4	CB4	57.95	57.55	80.7	0.0050	0.012	0.0	18.0	0.0
5	CB5	58.40	58.05	70.4	0.0050	0.012	0.0	18.0	0.0
6	CB6	59.25	58.65	93.9	0.0064	0.012	0.0	15.0	0.0
7	DET	57.00	56.90	3.0	0.0333	0.012	0.0	18.0	0.0
8	DMH1	60.40	59.50	65.9	0.0137	0.012	0.0	12.0	0.0
9	DMH2	57.45	57.35	10.4	0.0096	0.012	0.0	6.0	0.0
10	DMH2	57.95	57.00	29.4	0.0323	0.012	0.0	18.0	0.0
11	DMH3	59.20	58.90	30.5	0.0098	0.012	0.0	12.0	0.0
12	JF	56.40	56.25	12.4	0.0121	0.012	0.0	18.0	0.0
13	OWS	57.10	57.00	7.5	0.0133	0.012	0.0	6.0	0.0

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: To CB-1 Runoff Area=0.390 ac 61.82% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=75 Runoff=0.65 cfs 0.047 af

Subcatchment 2S: To CB-2 Runoff Area=0.206 ac 97.16% Impervious Runoff Depth=3.25"
Tc=6.0 min CN=96 Runoff=0.73 cfs 0.056 af

Subcatchment 3S: To CB-3 Runoff Area=0.123 ac 79.43% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=86 Runoff=0.33 cfs 0.023 af

Subcatchment 4S: To CB-4 Runoff Area=0.331 ac 90.25% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=92 Runoff=1.07 cfs 0.078 af

Subcatchment 5S: To CB-5 Runoff Area=0.172 ac 100.00% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=98 Runoff=0.62 cfs 0.050 af

Subcatchment 6S: To CB-6 Runoff Area=0.135 ac 97.82% Impervious Runoff Depth=3.36"
Tc=6.0 min CN=97 Runoff=0.48 cfs 0.038 af

Subcatchment 7S: Canopy Runoff Area=0.081 ac 100.00% Impervious Runoff Depth=3.48"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

Subcatchment 8S: Roof Runoff Area=0.114 ac 100.00% Impervious Runoff Depth=3.48"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.033 af

Subcatchment 100S: Overland Flow to Runoff Area=1.091 ac 11.63% Impervious Runoff Depth=0.06"
Flow Length=416' Tc=8.1 min CN=42 Runoff=0.01 cfs 0.006 af

Pond CB1: CB-1 Peak Elev=61.46' Inflow=0.65 cfs 0.047 af
12.0" Round Culvert n=0.012 L=50.9' S=0.0108 '/' Outflow=0.65 cfs 0.047 af

Pond CB2: CB-2 Peak Elev=60.71' Inflow=0.73 cfs 0.056 af
12.0" Round Culvert n=0.012 L=138.6' S=0.0051 '/' Outflow=0.73 cfs 0.056 af

Pond CB3: CB-3(FD) Peak Elev=59.33' Inflow=1.05 cfs 0.080 af
12.0" Round Culvert n=0.012 L=28.8' S=0.0625 '/' Outflow=1.05 cfs 0.080 af

Pond CB4: CB-4(FD) Peak Elev=59.21' Inflow=3.54 cfs 0.269 af
18.0" Round Culvert n=0.012 L=80.7' S=0.0050 '/' Outflow=3.54 cfs 0.269 af

Pond CB5: CB-5 Peak Elev=59.46' Inflow=2.48 cfs 0.191 af
18.0" Round Culvert n=0.012 L=70.4' S=0.0050 '/' Outflow=2.48 cfs 0.191 af

Pond CB6: CB-6 Peak Elev=60.03' Inflow=1.86 cfs 0.141 af
15.0" Round Culvert n=0.012 L=93.9' S=0.0064 '/' Outflow=1.86 cfs 0.141 af

Pond DET: Underground Detention System Peak Elev=58.57' Storage=837 cf Inflow=4.31 cfs 0.349 af
Outflow=3.36 cfs 0.349 af

Pond DMH1: DMH-1 Peak Elev=60.81' Inflow=0.65 cfs 0.047 af
12.0" Round Culvert n=0.012 L=65.9' S=0.0137 '/' Outflow=0.65 cfs 0.047 af

Pond DMH2: DMH-2 Peak Elev=58.88' Inflow=3.54 cfs 0.269 af
Primary=0.56 cfs 0.189 af Secondary=3.05 cfs 0.080 af Outflow=3.54 cfs 0.269 af

Pond DMH3: DMH-3 Peak Elev=59.71' Inflow=0.86 cfs 0.056 af
12.0" Round Culvert n=0.012 L=30.5' S=0.0098 '/' Outflow=0.86 cfs 0.056 af

Pond JF: Jellyfish Filter Peak Elev=57.38' Inflow=3.36 cfs 0.349 af
18.0" Round Culvert n=0.012 L=12.4' S=0.0121 '/' Outflow=3.36 cfs 0.349 af

Pond OWS: Oil/Water Separator Peak Elev=58.71' Inflow=0.56 cfs 0.189 af
6.0" Round Culvert n=0.012 L=7.5' S=0.0133 '/' Outflow=0.56 cfs 0.189 af

Link DP#1: Design Point #1 - Wetland Inflow=3.36 cfs 0.354 af
Primary=3.36 cfs 0.354 af

Total Runoff Area = 2.643 ac Runoff Volume = 0.354 af Average Runoff Depth = 1.61"
44.63% Pervious = 1.179 ac 55.37% Impervious = 1.463 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: To CB-1 Runoff Area=0.390 ac 61.82% Impervious Runoff Depth=2.99"
Tc=6.0 min CN=75 Runoff=1.37 cfs 0.097 af

Subcatchment 2S: To CB-2 Runoff Area=0.206 ac 97.16% Impervious Runoff Depth=5.18"
Tc=6.0 min CN=96 Runoff=1.13 cfs 0.089 af

Subcatchment 3S: To CB-3 Runoff Area=0.123 ac 79.43% Impervious Runoff Depth=4.08"
Tc=6.0 min CN=86 Runoff=0.57 cfs 0.042 af

Subcatchment 4S: To CB-4 Runoff Area=0.331 ac 90.25% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=92 Runoff=1.73 cfs 0.130 af

Subcatchment 5S: To CB-5 Runoff Area=0.172 ac 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.95 cfs 0.077 af

Subcatchment 6S: To CB-6 Runoff Area=0.135 ac 97.82% Impervious Runoff Depth=5.30"
Tc=6.0 min CN=97 Runoff=0.74 cfs 0.060 af

Subcatchment 7S: Canopy Runoff Area=0.081 ac 100.00% Impervious Runoff Depth=5.41"
Tc=0.0 min CN=98 Runoff=0.54 cfs 0.036 af

Subcatchment 8S: Roof Runoff Area=0.114 ac 100.00% Impervious Runoff Depth=5.41"
Tc=0.0 min CN=98 Runoff=0.77 cfs 0.051 af

Subcatchment 100S: Overland Flow to Runoff Area=1.091 ac 11.63% Impervious Runoff Depth=0.50"
Flow Length=416' Tc=8.1 min CN=42 Runoff=0.24 cfs 0.045 af

Pond CB1: CB-1 Peak Elev=61.69' Inflow=1.37 cfs 0.097 af
12.0" Round Culvert n=0.012 L=50.9' S=0.0108 '/' Outflow=1.37 cfs 0.097 af

Pond CB2: CB-2 Peak Elev=61.00' Inflow=1.13 cfs 0.089 af
12.0" Round Culvert n=0.012 L=138.6' S=0.0051 '/' Outflow=1.13 cfs 0.089 af

Pond CB3: CB-3(FD) Peak Elev=59.53' Inflow=1.67 cfs 0.129 af
12.0" Round Culvert n=0.012 L=28.8' S=0.0625 '/' Outflow=1.67 cfs 0.129 af

Pond CB4: CB-4(FD) Peak Elev=60.15' Inflow=5.91 cfs 0.454 af
18.0" Round Culvert n=0.012 L=80.7' S=0.0050 '/' Outflow=5.91 cfs 0.454 af

Pond CB5: CB-5 Peak Elev=60.37' Inflow=4.19 cfs 0.323 af
18.0" Round Culvert n=0.012 L=70.4' S=0.0050 '/' Outflow=4.19 cfs 0.323 af

Pond CB6: CB-6 Peak Elev=60.69' Inflow=3.24 cfs 0.246 af
15.0" Round Culvert n=0.012 L=93.9' S=0.0064 '/' Outflow=3.24 cfs 0.246 af

Pond DET: Underground Detention System Peak Elev=59.33' Storage=1,459 cf Inflow=7.16 cfs 0.583 af
Outflow=6.74 cfs 0.583 af

Pond DMH1: DMH-1 Peak Elev=61.12' Inflow=1.37 cfs 0.097 af
12.0" Round Culvert n=0.012 L=65.9' S=0.0137 '/' Outflow=1.37 cfs 0.097 af

Pond DMH2: DMH-2 Peak Elev=59.71' Inflow=5.91 cfs 0.454 af
Primary=0.57 cfs 0.282 af Secondary=5.46 cfs 0.172 af Outflow=5.91 cfs 0.454 af

Pond DMH3: DMH-3 Peak Elev=59.87' Inflow=1.31 cfs 0.088 af
12.0" Round Culvert n=0.012 L=30.5' S=0.0098 '/' Outflow=1.31 cfs 0.088 af

Pond JF: Jellyfish Filter Peak Elev=57.95' Inflow=6.74 cfs 0.583 af
18.0" Round Culvert n=0.012 L=12.4' S=0.0121 '/' Outflow=6.74 cfs 0.583 af

Pond OWS: Oil/Water Separator Peak Elev=59.52' Inflow=0.57 cfs 0.282 af
6.0" Round Culvert n=0.012 L=7.5' S=0.0133 '/' Outflow=0.57 cfs 0.282 af

Link DP#1: Design Point #1 - Wetland Inflow=6.83 cfs 0.628 af
Primary=6.83 cfs 0.628 af

Total Runoff Area = 2.643 ac Runoff Volume = 0.628 af Average Runoff Depth = 2.85"
44.63% Pervious = 1.179 ac 55.37% Impervious = 1.463 ac

Summary for Subcatchment 1S: To CB-1

Runoff = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af, Depth= 2.99"
Routed to Pond CB1 : CB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.149	39	>75% Grass cover, Good, HSG A
0.241	98	Paved parking, HSG A
0.390	75	Weighted Average
0.149		38.18% Pervious Area
0.241		61.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 2S: To CB-2

Runoff = 1.13 cfs @ 12.08 hrs, Volume= 0.089 af, Depth= 5.18"
Routed to Pond CB2 : CB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.006	39	>75% Grass cover, Good, HSG A
0.200	98	Paved parking, HSG A
0.206	96	Weighted Average
0.006		2.84% Pervious Area
0.200		97.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 3S: To CB-3

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 4.08"
Routed to Pond CB3 : CB-3(FD)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.025	39	>75% Grass cover, Good, HSG A
0.097	98	Paved parking, HSG A
0.123	86	Weighted Average
0.025		20.57% Pervious Area
0.097		79.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 4S: To CB-4

Runoff = 1.73 cfs @ 12.08 hrs, Volume= 0.130 af, Depth= 4.73"
Routed to Pond CB4 : CB-4(FD)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.032	39	>75% Grass cover, Good, HSG A
0.299	98	Paved parking, HSG A
0.331	92	Weighted Average
0.032		9.75% Pervious Area
0.299		90.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 5S: To CB-5

Runoff = 0.95 cfs @ 12.08 hrs, Volume= 0.077 af, Depth= 5.41"
Routed to Pond CB5 : CB-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.172	98	Paved parking, HSG A
0.172		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 6S: To CB-6

Runoff = 0.74 cfs @ 12.08 hrs, Volume= 0.060 af, Depth= 5.30"
Routed to Pond CB6 : CB-6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.003	39	>75% Grass cover, Good, HSG A
0.132	98	Paved parking, HSG A
0.135	97	Weighted Average
0.003		2.18% Pervious Area
0.132		97.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 7S: Canopy

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.54 cfs @ 12.00 hrs, Volume= 0.036 af, Depth= 5.41"
Routed to Pond DMH3 : DMH-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.081	98	Paved parking, HSG A
0.081		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry,**

Summary for Subcatchment 8S: Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.77 cfs @ 12.00 hrs, Volume= 0.051 af, Depth= 5.41"
Routed to Pond DMH3 : DMH-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.114	98	Roofs, HSG A
0.114		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry,**

Summary for Subcatchment 100S: Overland Flow to Wetland

Runoff = 0.24 cfs @ 12.34 hrs, Volume= 0.045 af, Depth= 0.50"
Routed to Link DP#1 : Design Point #1 - Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.65"

Area (ac)	CN	Description
0.516	39	>75% Grass cover, Good, HSG A
0.127	98	Paved parking, HSG A
0.449	30	Woods, Good, HSG A
1.091	42	Weighted Average
0.964		88.37% Pervious Area
0.127		11.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	25	0.0320	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.71"
4.1	286	0.0280	1.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	105	0.0510	1.13		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.1	416	Total			

Summary for Pond CB1: CB-1

Inflow Area = 0.390 ac, 61.82% Impervious, Inflow Depth = 2.99" for 10-Year event
Inflow = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af
Outflow = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af
Routed to Pond DMH1 : DMH-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 61.69' @ 12.10 hrs
Flood Elev= 64.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	61.05'	**12.0" Round Culvert** L= 50.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 61.05' / 60.50' S= 0.0108 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.35 cfs @ 12.09 hrs HW=61.68' TW=61.08' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.35 cfs @ 3.65 fps)

Summary for Pond CB2: CB-2

Inflow Area = 0.206 ac, 97.16% Impervious, Inflow Depth = 5.18" for 10-Year event
Inflow = 1.13 cfs @ 12.08 hrs, Volume= 0.089 af
Outflow = 1.13 cfs @ 12.08 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.08 hrs, Volume= 0.089 af
Routed to Pond CB6 : CB-6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 61.00' @ 12.12 hrs
Flood Elev= 63.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.20'	**12.0" Round Culvert** L= 138.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.20' / 59.50' S= 0.0051 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 12.08 hrs HW=60.94' TW=60.53' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.05 cfs @ 2.34 fps)

Summary for Pond CB3: CB-3(FD)

Inflow Area = 0.317 ac, 92.05% Impervious, Inflow Depth = 4.90" for 10-Year event
Inflow = 1.67 cfs @ 12.00 hrs, Volume= 0.129 af
Outflow = 1.67 cfs @ 12.00 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.67 cfs @ 12.00 hrs, Volume= 0.129 af
Routed to Pond DET : Underground Detention System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 59.53' @ 12.11 hrs
Flood Elev= 62.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	58.80'	**12.0" Round Culvert** L= 28.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.80' / 57.00' S= 0.0625 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.65 cfs @ 12.00 hrs HW=59.50' TW=58.52' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.65 cfs @ 2.84 fps)

Summary for Pond CB4: CB-4(FD)

Inflow Area = 1.234 ac, 84.61% Impervious, Inflow Depth = 4.41" for 10-Year event
Inflow = 5.91 cfs @ 12.09 hrs, Volume= 0.454 af
Outflow = 5.91 cfs @ 12.09 hrs, Volume= 0.454 af, Atten= 0%, Lag= 0.0 min
Primary = 5.91 cfs @ 12.09 hrs, Volume= 0.454 af
Routed to Pond DMH2 : DMH-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 60.15' @ 12.10 hrs
Flood Elev= 61.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.95'	**18.0" Round Culvert** L= 80.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.95' / 57.55' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.41 cfs @ 12.09 hrs HW=60.06' TW=59.65' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.41 cfs @ 3.06 fps)

Summary for Pond CB5: CB-5

Inflow Area = 0.903 ac, 82.54% Impervious, Inflow Depth = 4.29" for 10-Year event
Inflow = 4.19 cfs @ 12.09 hrs, Volume= 0.323 af
Outflow = 4.19 cfs @ 12.09 hrs, Volume= 0.323 af, Atten= 0%, Lag= 0.0 min
Primary = 4.19 cfs @ 12.09 hrs, Volume= 0.323 af
Routed to Pond CB4 : CB-4(FD)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 60.37' @ 12.11 hrs
Flood Elev= 63.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	58.40'	**18.0" Round Culvert** L= 70.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.40' / 58.05' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.10 cfs @ 12.09 hrs HW=60.19' TW=60.06' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.10 cfs @ 1.76 fps)

Summary for Pond CB6: CB-6

Inflow Area = 0.732 ac, 78.44% Impervious, Inflow Depth = 4.03" for 10-Year event
Inflow = 3.24 cfs @ 12.09 hrs, Volume= 0.246 af
Outflow = 3.24 cfs @ 12.09 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Primary = 3.24 cfs @ 12.09 hrs, Volume= 0.246 af
Routed to Pond CB5 : CB-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 60.69' @ 12.12 hrs
Flood Elev= 63.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.25'	**15.0" Round Culvert** L= 93.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 59.25' / 58.65' S= 0.0064 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.79 cfs @ 12.09 hrs HW=60.54' TW=60.20' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.79 cfs @ 2.73 fps)

Summary for Pond DET: Underground Detention System

Inflow Area = 1.552 ac, 86.13% Impervious, Inflow Depth = 4.51" for 10-Year event
Inflow = 7.16 cfs @ 12.08 hrs, Volume= 0.583 af
Outflow = 6.74 cfs @ 12.11 hrs, Volume= 0.583 af, Atten= 6%, Lag= 1.8 min
Primary = 6.74 cfs @ 12.11 hrs, Volume= 0.583 af
Routed to Pond JF : Jellyfish Filter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 59.33' @ 12.11 hrs Surf.Area= 1,290 sf Storage= 1,459 cf
Flood Elev= 60.50' Surf.Area= 1,290 sf Storage= 1,977 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.7 min (774.8 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	57.00'	0 cf	**19.25'W x 67.00'L x 3.50'H Field A** 4,514 cf Overall - 2,468 cf Embedded = 2,046 cf x 0.0% Voids
#2A	57.00'	1,977 cf	**ADS N-12 36"** x 4 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= +40.00' x 7.10 sf x 4 rows 19.25' Header x 7.10 sf x 2 = 273.3 cf Inside
		1,977 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	57.00'	**18.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.00' / 56.90' S= 0.0333 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	57.00'	**5.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	57.50'	**5.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	59.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.71 cfs @ 12.11 hrs HW=59.33' TW=57.95' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.71 cfs of 9.98 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.31 cfs @ 5.65 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.54 cfs @ 5.65 fps)
  └─**4=Orifice/Grate** (Weir Controls 2.86 cfs @ 1.87 fps)

Pond DET: Underground Detention System - Chamber Wizard Field A

Chamber Model = ADS N-12 36" (ADS N-12® Pipe)
Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf
Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf
Row Length Adjustment= +40.00' x 7.10 sf x 4 rows

42.0" Wide + 21.0" Spacing = 63.0" C-C Row Spacing

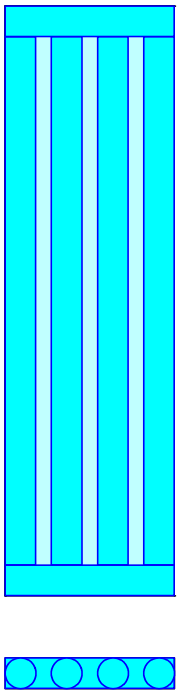
1 Chambers/Row x 20.00' Long +40.00' Row Adjustment +3.50' Header x 2 = 67.00' Row Length
4 Rows x 42.0" Wide + 21.0" Spacing x 3 = 19.25' Base Width
42.0" Chamber Height = 3.50' Field Height

4 Chambers x 142.0 cf +40.00' Row Adjustment x 7.10 sf x 4 Rows + 19.25' Header x 7.10 sf x 2 = 1,977.3 cf Chamber Storage
4 Chambers x 177.1 cf +40.00' Row Adjustment x 8.86 sf x 4 Rows + 19.25' Header x 8.86 sf x 2 = 2,466.7 cf Displacement

4,514.1 cf Field - 2,466.7 cf Chambers = 2,047.4 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 1,977.3 cf = 0.045 af
Overall Storage Efficiency = 43.8%
Overall System Size = 67.00' x 19.25' x 3.50'

4 Chambers
167.2 cy Field
75.8 cy Stone



Summary for Pond DMH1: DMH-1

Inflow Area = 0.390 ac, 61.82% Impervious, Inflow Depth = 2.99" for 10-Year event
Inflow = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af
Outflow = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.09 hrs, Volume= 0.097 af
Routed to Pond CB6 : CB-6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 61.12' @ 12.12 hrs
Flood Elev= 65.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.40'	**12.0" Round Culvert** L= 65.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.40' / 59.50' S= 0.0137 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.29 cfs @ 12.09 hrs HW=61.08' TW=60.56' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.29 cfs @ 3.20 fps)

Summary for Pond DMH2: DMH-2

Inflow Area = 1.234 ac, 84.61% Impervious, Inflow Depth = 4.41" for 10-Year event
Inflow = 5.91 cfs @ 12.09 hrs, Volume= 0.454 af
Outflow = 5.91 cfs @ 12.09 hrs, Volume= 0.454 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 11.67 hrs, Volume= 0.282 af
Routed to Pond OWS : Oil/Water Separator
Secondary = 5.46 cfs @ 12.09 hrs, Volume= 0.172 af
Routed to Pond DET : Underground Detention System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 59.71' @ 12.10 hrs
Flood Elev= 63.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.45'	**6.0" Round Culvert** L= 10.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.45' / 57.35' S= 0.0096 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	57.95'	**18.0" Round Culvert** L= 29.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.95' / 57.00' S= 0.0323 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.56 cfs @ 11.67 hrs HW=58.25' TW=57.90' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.56 cfs @ 2.83 fps)

Secondary OutFlow Max=5.17 cfs @ 12.09 hrs HW=59.66' TW=59.30' (Dynamic Tailwater)
2=Culvert (Inlet Controls 5.17 cfs @ 2.93 fps)

Summary for Pond DMH3: DMH-3

Inflow Area = 0.195 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year event
Inflow = 1.31 cfs @ 12.00 hrs, Volume= 0.088 af
Outflow = 1.31 cfs @ 12.00 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.31 cfs @ 12.00 hrs, Volume= 0.088 af
Routed to Pond CB3 : CB-3(FD)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 59.87' @ 12.00 hrs
Flood Elev= 64.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.20'	**12.0" Round Culvert** L= 30.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 59.20' / 58.90' S= 0.0098 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.27 cfs @ 12.00 hrs HW=59.87' TW=59.50' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.27 cfs @ 3.22 fps)

Summary for Pond JF: Jellyfish Filter

Inflow Area = 1.552 ac, 86.13% Impervious, Inflow Depth = 4.51" for 10-Year event
Inflow = 6.74 cfs @ 12.11 hrs, Volume= 0.583 af
Outflow = 6.74 cfs @ 12.11 hrs, Volume= 0.583 af, Atten= 0%, Lag= 0.0 min
Primary = 6.74 cfs @ 12.11 hrs, Volume= 0.583 af
Routed to Link DP#1 : Design Point #1 - Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 57.95' @ 12.11 hrs
Flood Elev= 62.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	56.40'	**18.0" Round Culvert** L= 12.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 56.40' / 56.25' S= 0.0121 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.73 cfs @ 12.11 hrs HW=57.95' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 6.73 cfs @ 4.58 fps)

Summary for Pond OWS: Oil/Water Separator

Inflow Area = 1.234 ac, 84.61% Impervious, Inflow Depth = 2.74" for 10-Year event
Inflow = 0.57 cfs @ 11.67 hrs, Volume= 0.282 af
Outflow = 0.57 cfs @ 11.67 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 11.67 hrs, Volume= 0.282 af
Routed to Pond DET : Underground Detention System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 59.52' @ 12.10 hrs
Flood Elev= 63.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.10'	**6.0" Round Culvert** L= 7.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.10' / 57.00' S= 0.0133 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.56 cfs @ 11.67 hrs HW=57.90' TW=57.56' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.56 cfs @ 2.83 fps)

Summary for Link DP#1: Design Point #1 - Wetland

Inflow Area = 2.643 ac, 55.37% Impervious, Inflow Depth = 2.85" for 10-Year event
Inflow = 6.83 cfs @ 12.11 hrs, Volume= 0.628 af
Primary = 6.83 cfs @ 12.11 hrs, Volume= 0.628 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: To CB-1 Runoff Area=0.390 ac 61.82% Impervious Runoff Depth=4.29"
Tc=6.0 min CN=75 Runoff=1.96 cfs 0.139 af

Subcatchment 2S: To CB-2 Runoff Area=0.206 ac 97.16% Impervious Runoff Depth=6.68"
Tc=6.0 min CN=96 Runoff=1.44 cfs 0.115 af

Subcatchment 3S: To CB-3 Runoff Area=0.123 ac 79.43% Impervious Runoff Depth=5.52"
Tc=6.0 min CN=86 Runoff=0.77 cfs 0.056 af

Subcatchment 4S: To CB-4 Runoff Area=0.331 ac 90.25% Impervious Runoff Depth=6.21"
Tc=6.0 min CN=92 Runoff=2.23 cfs 0.171 af

Subcatchment 5S: To CB-5 Runoff Area=0.172 ac 100.00% Impervious Runoff Depth=6.92"
Tc=6.0 min CN=98 Runoff=1.21 cfs 0.099 af

Subcatchment 6S: To CB-6 Runoff Area=0.135 ac 97.82% Impervious Runoff Depth=6.80"
Tc=6.0 min CN=97 Runoff=0.95 cfs 0.077 af

Subcatchment 7S: Canopy Runoff Area=0.081 ac 100.00% Impervious Runoff Depth=6.92"
Tc=0.0 min CN=98 Runoff=0.69 cfs 0.046 af

Subcatchment 8S: Roof Runoff Area=0.114 ac 100.00% Impervious Runoff Depth=6.92"
Tc=0.0 min CN=98 Runoff=0.98 cfs 0.066 af

Subcatchment 100S: Overland Flow to Runoff Area=1.091 ac 11.63% Impervious Runoff Depth=1.06"
Flow Length=416' Tc=8.1 min CN=42 Runoff=0.83 cfs 0.097 af

Pond CB1: CB-1 Peak Elev=62.58' Inflow=1.96 cfs 0.139 af
12.0" Round Culvert n=0.012 L=50.9' S=0.0108 '/' Outflow=1.96 cfs 0.139 af

Pond CB2: CB-2 Peak Elev=62.29' Inflow=1.44 cfs 0.115 af
12.0" Round Culvert n=0.012 L=138.6' S=0.0051 '/' Outflow=1.44 cfs 0.115 af

Pond CB3: CB-3(FD) Peak Elev=59.74' Inflow=2.14 cfs 0.169 af
12.0" Round Culvert n=0.012 L=28.8' S=0.0625 '/' Outflow=2.14 cfs 0.169 af

Pond CB4: CB-4(FD) Peak Elev=61.05' Inflow=7.78 cfs 0.601 af
18.0" Round Culvert n=0.012 L=80.7' S=0.0050 '/' Outflow=7.78 cfs 0.601 af

Pond CB5: CB-5 Peak Elev=61.45' Inflow=5.55 cfs 0.430 af
18.0" Round Culvert n=0.012 L=70.4' S=0.0050 '/' Outflow=5.55 cfs 0.430 af

Pond CB6: CB-6 Peak Elev=62.06' Inflow=4.34 cfs 0.331 af
15.0" Round Culvert n=0.012 L=93.9' S=0.0064 '/' Outflow=4.34 cfs 0.331 af

Pond DET: Underground Detention System Peak Elev=59.55' Storage=1,623 cf Inflow=9.41 cfs 0.770 af
Outflow=8.99 cfs 0.770 af

Pond DMH1: DMH-1 Peak Elev=62.34' Inflow=1.96 cfs 0.139 af
12.0" Round Culvert n=0.012 L=65.9' S=0.0137 '/' Outflow=1.96 cfs 0.139 af

Pond DMH2: DMH-2 Peak Elev=60.23' Inflow=7.78 cfs 0.601 af
Primary=0.58 cfs 0.351 af Secondary=7.21 cfs 0.251 af Outflow=7.78 cfs 0.601 af

Pond DMH3: DMH-3 Peak Elev=60.00' Inflow=1.67 cfs 0.112 af
12.0" Round Culvert n=0.012 L=30.5' S=0.0098 '/' Outflow=1.67 cfs 0.112 af

Pond JF: Jellyfish Filter Peak Elev=58.43' Inflow=8.99 cfs 0.770 af
18.0" Round Culvert n=0.012 L=12.4' S=0.0121 '/' Outflow=8.99 cfs 0.770 af

Pond OWS: Oil/Water Separator Peak Elev=59.89' Inflow=0.58 cfs 0.351 af
6.0" Round Culvert n=0.012 L=7.5' S=0.0133 '/' Outflow=0.58 cfs 0.351 af

Link DP#1: Design Point #1 - Wetland Inflow=9.72 cfs 0.867 af
Primary=9.72 cfs 0.867 af

Total Runoff Area = 2.643 ac Runoff Volume = 0.867 af Average Runoff Depth = 3.94"
44.63% Pervious = 1.179 ac 55.37% Impervious = 1.463 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: To CB-1 Runoff Area=0.390 ac 61.82% Impervious Runoff Depth=5.57"
Tc=6.0 min CN=75 Runoff=2.53 cfs 0.181 af

Subcatchment 2S: To CB-2 Runoff Area=0.206 ac 97.16% Impervious Runoff Depth=8.10"
Tc=6.0 min CN=96 Runoff=1.73 cfs 0.139 af

Subcatchment 3S: To CB-3 Runoff Area=0.123 ac 79.43% Impervious Runoff Depth=6.89"
Tc=6.0 min CN=86 Runoff=0.95 cfs 0.070 af

Subcatchment 4S: To CB-4 Runoff Area=0.331 ac 90.25% Impervious Runoff Depth=7.62"
Tc=6.0 min CN=92 Runoff=2.71 cfs 0.210 af

Subcatchment 5S: To CB-5 Runoff Area=0.172 ac 100.00% Impervious Runoff Depth=8.34"
Tc=6.0 min CN=98 Runoff=1.45 cfs 0.119 af

Subcatchment 6S: To CB-6 Runoff Area=0.135 ac 97.82% Impervious Runoff Depth=8.22"
Tc=6.0 min CN=97 Runoff=1.14 cfs 0.093 af

Subcatchment 7S: Canopy Runoff Area=0.081 ac 100.00% Impervious Runoff Depth=8.34"
Tc=0.0 min CN=98 Runoff=0.83 cfs 0.056 af

Subcatchment 8S: Roof Runoff Area=0.114 ac 100.00% Impervious Runoff Depth=8.34"
Tc=0.0 min CN=98 Runoff=1.17 cfs 0.079 af

Subcatchment 100S: Overland Flow to Runoff Area=1.091 ac 11.63% Impervious Runoff Depth=1.72"
Flow Length=416' Tc=8.1 min CN=42 Runoff=1.65 cfs 0.157 af

Pond CB1: CB-1 Peak Elev=64.55' Inflow=2.53 cfs 0.181 af
12.0" Round Culvert n=0.012 L=50.9' S=0.0108 '/' Outflow=2.53 cfs 0.181 af

Pond CB2: CB-2 Peak Elev=64.04' Inflow=1.73 cfs 0.139 af
12.0" Round Culvert n=0.012 L=138.6' S=0.0051 '/' Outflow=1.73 cfs 0.139 af

Pond CB3: CB-3(FD) Peak Elev=60.39' Inflow=2.59 cfs 0.206 af
12.0" Round Culvert n=0.012 L=28.8' S=0.0625 '/' Outflow=2.59 cfs 0.206 af

Pond CB4: CB-4(FD) Peak Elev=62.24' Inflow=9.55 cfs 0.742 af
18.0" Round Culvert n=0.012 L=80.7' S=0.0050 '/' Outflow=9.55 cfs 0.742 af

Pond CB5: CB-5 Peak Elev=62.82' Inflow=6.84 cfs 0.532 af
18.0" Round Culvert n=0.012 L=70.4' S=0.0050 '/' Outflow=6.84 cfs 0.532 af

Pond CB6: CB-6 Peak Elev=63.72' Inflow=5.39 cfs 0.413 af
15.0" Round Culvert n=0.012 L=93.9' S=0.0064 '/' Outflow=5.39 cfs 0.413 af

Pond DET: Underground Detention System Peak Elev=60.21' Storage=1,972 cf Inflow=11.53 cfs 0.948 af
Outflow=10.55 cfs 0.948 af

Pond DMH1: DMH-1 Peak Elev=64.17' Inflow=2.53 cfs 0.181 af
12.0" Round Culvert n=0.012 L=65.9' S=0.0137 '/' Outflow=2.53 cfs 0.181 af

Pond DMH2: DMH-2 Peak Elev=61.12' Inflow=9.55 cfs 0.742 af
Primary=0.73 cfs 0.409 af Secondary=8.82 cfs 0.333 af Outflow=9.55 cfs 0.742 af

Pond DMH3: DMH-3 Peak Elev=60.43' Inflow=2.00 cfs 0.135 af
12.0" Round Culvert n=0.012 L=30.5' S=0.0098 '/' Outflow=2.00 cfs 0.135 af

Pond JF: Jellyfish Filter Peak Elev=58.69' Inflow=10.55 cfs 0.948 af
18.0" Round Culvert n=0.012 L=12.4' S=0.0121 '/' Outflow=10.55 cfs 0.948 af

Pond OWS: Oil/Water Separator Peak Elev=60.66' Inflow=0.73 cfs 0.409 af
6.0" Round Culvert n=0.012 L=7.5' S=0.0133 '/' Outflow=0.73 cfs 0.409 af

Link DP#1: Design Point #1 - Wetland Inflow=12.14 cfs 1.105 af
Primary=12.14 cfs 1.105 af

Total Runoff Area = 2.643 ac Runoff Volume = 1.105 af Average Runoff Depth = 5.02"
44.63% Pervious = 1.179 ac 55.37% Impervious = 1.463 ac

APPENDIX F

Supplemental Calculations and Backup Data

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.780 degrees West
Latitude	43.034 degrees North
Elevation	0 feet
Date/Time	Wed, 22 Sep 2021 13:51:31 -0400

Per Env-Wq 1503.08(l) these values are increased by 15% for the analysis

2yr 3.71
10yr 5.65
25yr 7.16
50yr 8.58

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.71	0.98	1.22	1.57	2.04	2.68	2.93	**1yr**	2.37	2.83	3.25	3.97	4.59	**1yr**
2yr	0.32	0.50	0.62	0.82	1.03	1.30	**2yr**	0.89	1.18	1.52	1.95	2.50	3.23	3.60	**2yr**	2.86	3.46	3.97	4.72	5.37	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.16	4.10	4.62	**5yr**	3.63	4.44	5.09	5.99	6.76	**5yr**
10yr	0.41	0.65	0.82	1.12	1.46	1.90	**10yr**	1.26	1.73	2.24	2.91	3.78	4.91	5.58	**10yr**	4.34	5.37	6.15	7.17	8.05	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.35	**25yr**	1.54	2.15	2.79	3.65	4.78	6.23	7.16	**25yr**	5.51	6.89	7.89	9.12	10.14	**25yr**
50yr	0.54	0.86	1.11	1.55	2.08	2.77	**50yr**	1.80	2.54	3.31	4.36	5.71	7.46	8.66	**50yr**	6.60	8.33	9.54	10.93	12.09	**50yr**
100yr	0.60	0.97	1.25	1.78	2.43	3.28	**100yr**	2.10	2.99	3.93	5.20	6.83	8.94	10.48	**100yr**	7.91	10.08	11.53	13.11	14.41	**100yr**
200yr	0.68	1.11	1.44	2.06	2.85	3.86	**200yr**	2.46	3.54	4.65	6.18	8.16	10.71	12.67	**200yr**	9.48	12.19	13.95	15.74	17.19	**200yr**
500yr	0.81	1.33	1.73	2.51	3.51	4.81	**500yr**	3.03	4.41	5.82	7.78	10.32	13.62	16.31	**500yr**	12.06	15.68	17.95	20.04	21.72	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	**1yr**	0.62	0.87	0.92	1.33	1.68	2.26	2.56	**1yr**	2.00	2.46	2.89	3.18	3.94	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.87	1.16	1.37	1.82	2.33	3.08	3.49	**2yr**	2.73	3.36	3.86	4.59	5.12	**2yr**
5yr	0.35	0.54	0.67	0.92	1.18	1.41	**5yr**	1.01	1.38	1.61	2.12	2.73	3.83	4.25	**5yr**	3.39	4.09	4.77	5.60	6.32	**5yr**
10yr	0.39	0.60	0.74	1.03	1.33	1.61	**10yr**	1.15	1.57	1.81	2.38	3.05	4.42	4.94	**10yr**	3.91	4.75	5.54	6.51	7.29	**10yr**
25yr	0.44	0.67	0.84	1.20	1.58	1.91	**25yr**	1.36	1.87	2.10	2.75	3.53	4.78	6.01	**25yr**	4.23	5.78	6.80	7.95	8.82	**25yr**
50yr	0.49	0.74	0.92	1.33	1.78	2.18	**50yr**	1.54	2.13	2.35	3.06	3.93	5.41	6.96	**50yr**	4.79	6.69	7.94	9.25	10.20	**50yr**
100yr	0.54	0.82	1.03	1.48	2.04	2.48	**100yr**	1.76	2.43	2.63	3.40	4.34	6.09	8.06	**100yr**	5.39	7.75	9.28	10.78	11.79	**100yr**
200yr	0.60	0.90	1.15	1.66	2.31	2.83	**200yr**	2.00	2.77	2.94	3.77	4.79	6.84	9.33	**200yr**	6.06	8.97	10.84	12.57	13.65	**200yr**
500yr	0.70	1.04	1.34	1.94	2.76	3.39	**500yr**	2.39	3.31	3.42	4.29	5.45	7.99	11.32	**500yr**	7.07	10.89	13.33	15.44	16.55	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.72	0.89	1.09	**1yr**	0.77	1.06	1.26	1.74	2.20	3.01	3.17	**1yr**	2.66	3.05	3.61	4.40	5.09	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.51	3.45	3.72	**2yr**	3.05	3.58	4.11	4.87	5.67	**2yr**
5yr	0.40	0.62	0.77	1.05	1.34	1.63	**5yr**	1.16	1.59	1.88	2.53	3.25	4.37	4.98	**5yr**	3.87	4.79	5.42	6.40	7.18	**5yr**
10yr	0.47	0.72	0.89	1.25	1.61	1.98	**10yr**	1.39	1.94	2.28	3.10	3.95	5.38	6.21	**10yr**	4.76	5.97	6.82	7.87	8.78	**10yr**
25yr	0.58	0.88	1.09	1.56	2.06	2.58	**25yr**	1.77	2.52	2.96	4.07	5.14	7.82	8.33	**25yr**	6.92	8.01	9.12	10.36	11.43	**25yr**
50yr	0.67	1.03	1.28	1.84	2.47	3.14	**50yr**	2.13	3.07	3.60	5.00	6.31	9.79	10.42	**50yr**	8.66	10.02	11.38	12.74	13.98	**50yr**
100yr	0.79	1.20	1.50	2.17	2.98	3.83	**100yr**	2.57	3.74	4.37	6.15	7.74	12.24	13.04	**100yr**	10.83	12.53	14.18	15.70	17.09	**100yr**
200yr	0.93	1.40	1.77	2.56	3.57	4.67	**200yr**	3.08	4.57	5.34	7.58	9.51	15.35	16.32	**200yr**	13.58	15.70	17.71	19.33	20.91	**200yr**
500yr	1.15	1.71	2.21	3.20	4.56	6.07	**500yr**	3.93	5.94	6.93	10.02	12.51	20.72	21.97	**500yr**	18.34	21.13	23.74	25.46	27.30	**500yr**

Powered by ACIS Northeast Regional Climate Center

OUTLET APRON DESIGN

Project: Lafayette Rd, Portsmouth, NH Job # 2021163
Date: 26-Jan-22

GPI Engineering Design Planning Construction Management
603.893.0720 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road
Suite One
Salem, NH 03079

FES-1 (from HydroCAD POND DET)
Q25 = 9 cfs
D_o = 18 inches
Tw = 0.8 feet

Design Criteria

Apron Dimensions

The dimensions of the apron at the outlet of the pipe shall be determined as follows:

1.) The width of the apron at the outlet of the pipe or channel shall be 3 times the diameter of the pipe, or the width of the channel.

USE THIS W= **4.5** feet

2.) The length of the apron shall be determined from the following formula when the tailwater depth at the outlet of the pipe or channel is less than one-half the diameter of the pipe or one-half the width of the channel:

La=1.8*Q/ Do^3/2+ 7Do
La= **19.32** feet

Where:

La is the length of the apron
Q is the discharge from the pipe or channel
D_o is the diameter of pipe of width of channel

3.) When the depth of the tailwater at the outlet of the pipe or channel is equal to or greater than one-half the diameter of the pipe or the width of the channel. Then the following formula applies:

La=3.0*Qo/ Do^1.5 +7D_o
USE THIS La= **25.197** feet

4.) Where there is no well defined channel downstream of the outlet, the width of the downstream end of the apron shall be determined as follows:

a. For minimum tailwater conditions where the tailwater depth is less than the elevation of the center of the pipe:

W=3*Do+La
W= **23.82** feet

b. For maximum tailwater conditions where the tailwater depth is greater than the elevation of the center of the pipe:

W=3*Do+0.4*La
USE THIS W= **14.58** feet

5.) Where there is a stable well-defined channel downstream of the apron, the bottom of the apron shall be equal to the width of the channel.

6.) The side of the apron in a well-defined channel shall be 2:1 (horizontal to vertical) or flatter. The height of the structural lining along the channel sides shall begin at the elevation equal to the top of conduit and taper down to the channel bottom through the length of the apron.

7.) The bottom grade of the apron shall be level (0% grade). No overfall is allowable at the end of the apron.

8.) The apron shall be located so that there are no bends in the horizontal alignment of the apron.

Rock Riprap

The following criteria shall be used to determine the dimensions of the rock riprap used for the apron:

1.) The median stone diameter shall be determined using the formula:

d_{50}=0.02*Q^4/3/(Tw*D_o)

d_{50}= **3.72** inches **USE** **4** inches

d_{50} minimum 3 inches

Where:
d_{50} is the median stone diameter in feet
Tw is the tailwater depth above the invert of the pipe channel in feet
Q is the discharge from the pipe or channel in cubic feet per second
D_o is the diameter of the pipe or width of the channel in feet

2.) Fifty percent by weight of the riprap mixture shall be smaller the than median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size.

3.) The quality and gradation of the rock, the thickness of the riprap lining, filter material and the quality of the stone shall meet the requirements in the Rock Riprap BMP. The minimum depth shall be 6 inches or 1.5 times the largest stone size in the mixture whichever is larger (d).

Thickness of the riprap
d = 1.5*(d100 avg.(largest stone size))
d= **10** inches*

* must use a minimum of 6"

Rock Rip Rap Gradation

% of weight smaller than the given size	size of stone in inches		
100	**5.6**	to	**7.4**
85	**4.8**	to	**6.7**
50	**3.7**	to	**5.6**
15	**1.1**	to	**1.9**

Hydro International

First Defense® High Capacity

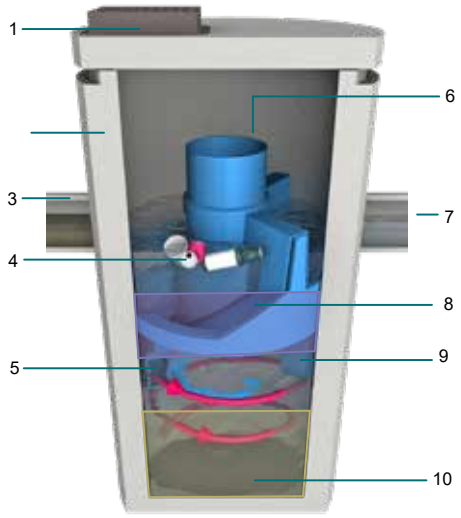
Advanced Hydrodynamic Separator

Product Summary

A Simple Solution for your Trickiest Sites

First Defense® High Capacity is a versatile stormwater separator with some of the highest approved flow rates in the United States, enabling engineers and contractors to save site space and projects costs by using the smallest possible footprint. It also works with single and multiple inlet pipes and inlet grates has an internal bypass to convey infrequent peak flows directly to the outlet.

Fig.1 The First Defense® High Capacity has internal components designed to efficiently capture pollutants and prevent washout at



Product Profile

1. Inlet Grate (optional)
2. Precast chamber
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Inlet Chute
6. Internal Bypass
7. Outlet pipe
8. Oil and Floatables Storage
9. Outlet chute
10. Sediment Storage Sump

Applications

- Areas requiring a minimum of 50% TSS removal
- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Highways, car parks, industrial areas and urban developments
- Pre-treatment to ponds, storage systems, green infrastructure

How it Works

Highest Flow through the Smallest Footprint

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

Benefits

Small & Simple

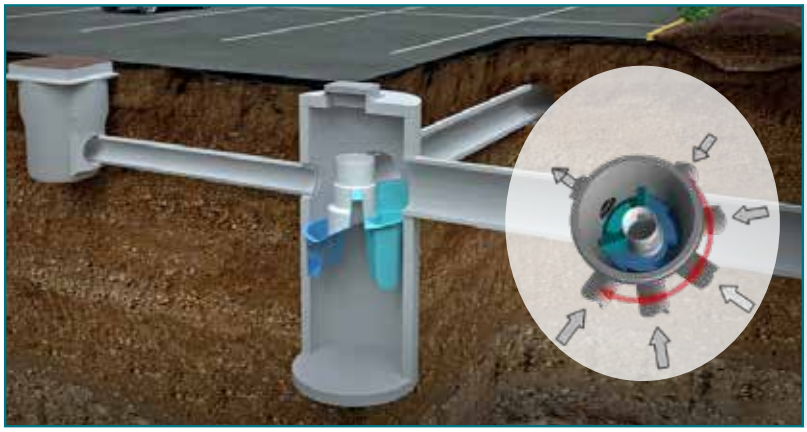
- Cut footprint size, cut costs: First Defense® provides space-saving, easy-to-install surface water treatment in standard sized chambers/ manholes.
- Adapt to site limitations: Variable configuratoins will help you effectively slip First Defense® into a tight spot. It also works well with large pipes, multiple inlet pipes and inlet grates.
- Save installation time: Every First Defense® unit is delivered to site pre-assembled and ready for installation – so installation is as easy as fitting any chamber/manhole.

Stormwater Solutions

→ hydro-int.com/firstdefense

Sizing & Design

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows. Designed with site flexibility in mind, the First Defense® High Capacity allows engineers to maximize available site space without compromising treatment level.



Free Sizing Tool

This simple online tool will recommend the best separator, model size and online/offline arrangement based on site-specific data entered by the user.

Go to hydro-int.com/sizing to access the tool.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Standard Distance from Outlet Invert to Sump Floor
		NJDEP Certified	110µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	1.06 / 30.0	15 / 424	18 / 450	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	1.88 / 53.2	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC	5 / 1.5	2.35 / 66.2	2.94 / 83.2	20 / 566	24 / 600	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	4.23 / 119.8	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	7.52 / 212.9	50 / 1415	48 / 1200	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2
FD-10HC	10 / 3.0	9.38 / 265.6	11.75 / 332.7	50 / 1415	48 / 1200	1742 / 6594	4.4 / 3.3	6.5 -8.0 / 2.0 - 2.4	10.25 / 3.12

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

Maintenance

Easy vactor hose access through the center shaft of the system makes for quick, simple sump cleanout while trash and floatables can be fished out from the surface with a net.

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients.

Hydro International

Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200
Email: stormwaterinquiry@hydro-int.com
Web: www.hydro-int.com/firstdefense

FD_SS_B_2105

Download Drawings!

→ hydro-int.com/fddrawings

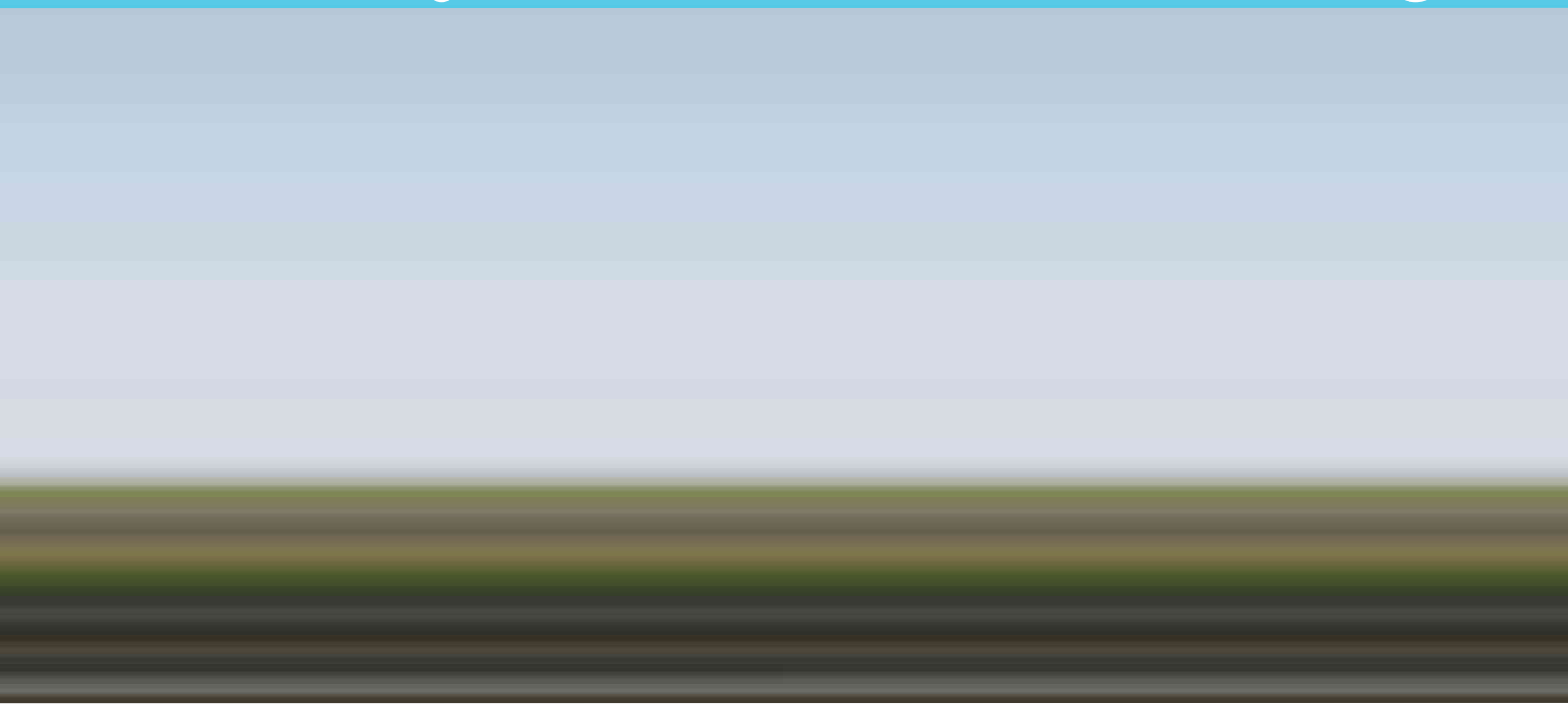
Access the Operation & Maintenance Manual

→ hydro-int.com/fd-om

CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter
Stormwater Treatment

The experts you need to solve your stormwater challenges



Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Setting new standards in Stormwater Treatment – Jellyfish® Filter

The Jellyfish Filter has been tested in the field and laboratory, and has received approval from numerous stormwater regulatory agencies.

The Jellyfish Filter is a stormwater quality treatment technology featuring high flow pretreatment and membrane filtration in a compact stand-alone system. Jellyfish removes floatables, trash, oil, debris, TSS, fine silt-sized particles, and a high percentage of particulate-bound pollutants; including phosphorus, nitrogen, metals and hydrocarbons. The high surface area membrane cartridges, combined with up-flow hydraulics, frequent, passive backwashing, and rinseable/ reusable cartridges ensure long-lasting performance.

Jellyfish® Filter

How the Jellyfish® Filter Treats Stormwater

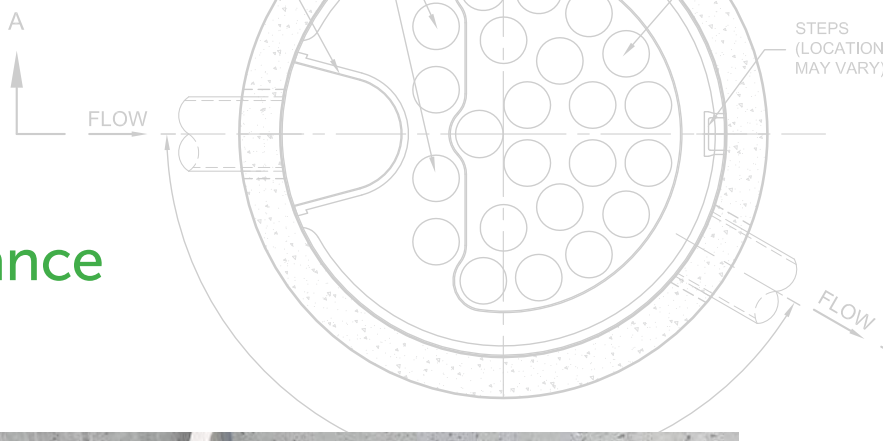
Tested in the field and laboratory ...

- Stormwater enters the Jellyfish through the inlet pipe and traps floating pollutants behind the maintenance access wall and below the cartridge deck.
- Water is conveyed below the cartridge deck where a separation skirt around the cartridges isolates oil, trash and debris outside the filtration zone.
- Water is directed to the filtration zone and up through the top of the cartridge where it exits via the outlet pipe.
- The membrane filters provide a very large surface area to effectively remove fine sand and silt-sized particles, and a high percentage of particulate-bound pollutants such as nitrogen, phosphorus, metals, and hydrocarbons while ensuring long-lasting treatment.
- As influent flow subsides, the water in the backwash pool flows back into the lower chamber. This passive backwash extends cartridge life.
- The draindown cartridge(s) located outside the backwash pool enables water levels to balance.

Jellyfish® Filter Standard Configuration

Learn More:
www.ContechES.com/jellyfish

Pretreat bioretention or infiltration with Jellyfish to extend service life.



Jellyfish® Filter Performance Testing Results

APPLICATION TIPS

- The Peak Diversion Jellyfish provides treatment and high-flow bypass in one structure, eliminating the need for a separate bypass structure.
- LID and GI are complemented by filtration solutions, as they help keep sites free from fine sediments that can impede performance, remove unsightly trash, and provide a single point of maintenance.
- Selecting a filter with a long maintenance cycle and low maintenance cost will result in healthy waterways and happy property owners.

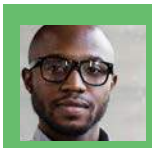
The pleated tentacles of the Jellyfish® Filter provide a large surface area for pollutant removal.

POLLUTANT OF CONCERN	% REMOVAL
Total Trash	99%
Total Suspended Solids (TSS)	89%
Total Phosphorus (TP)	59%
Total Nitrogen (TN)	51%
Total Copper (TCu)	> 50%
Total Zinc (TZn)	> 50%

Sources:
TARP II Field Study – 2012 JF 4-2-1 Configuration
MRDC Floatables Testing – 2008 JF6-6-1 Configuration

Jellyfish® Filter Features and Benefits

FEATURE	BENEFITS
High surface area membrane filtration	Low flux rate promotes cake filtration and slows membrane occlusion
High design treatment flow rate per cartridge (up to 80 gpm (5 L/s))	Compact system with a small footprint, lower construction cost
Low driving head (typically 18 inches or less (457 mm))	Design flexibility, lower construction cost
Lightweight cartridges with passive backwash	Easy maintenance and low life-cycle cost



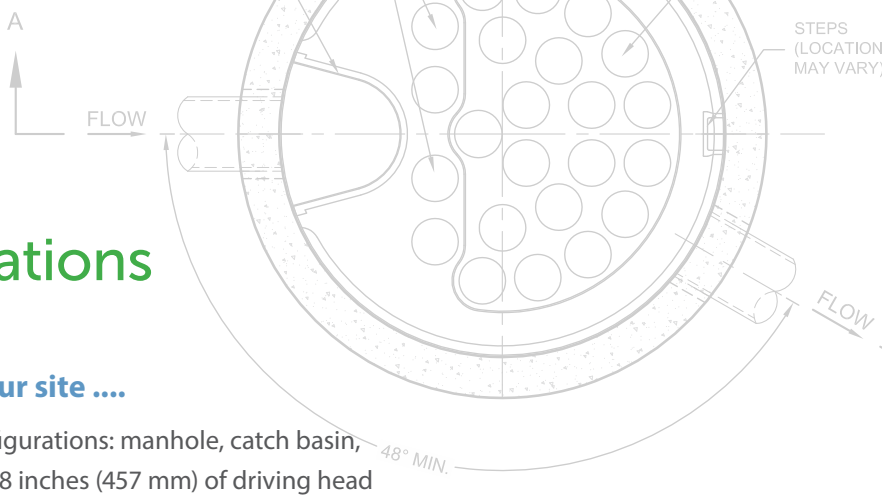
The Jellyfish Filter can be configured in a manhole, catch basin, or vault.

Select Jellyfish® Filter Certifications and Verifications

The Jellyfish Filter has been reviewed by numerous state and federal programs, including:

- Washington State Department of Ecology (TAPE) GULD – BASIC, Phosphorus
- Virginia Department of Environmental Quality (VA DEQ)
- Texas Commission of Environmental Quality (TCEQ)
- Canada ISO 14034 Environmental Management – Environmental Technology Verification (ETV)
- Philadelphia Water District (PWD)
- Maryland Department of the Environment (MD DOE)

Field tested and performance verified

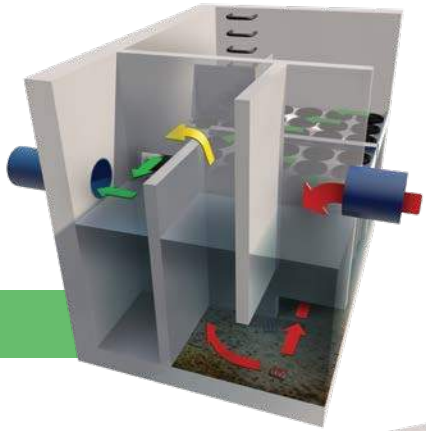


Jellyfish® Filter Configurations

Multiple system configurations to optimize your site ....

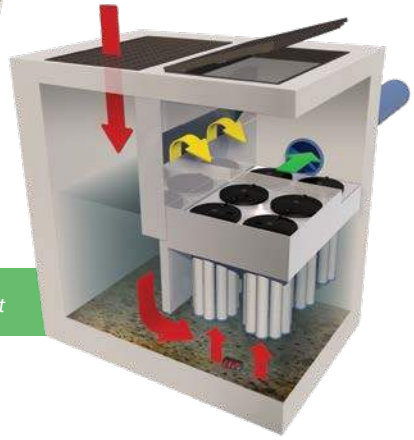
The Jellyfish Filter can be manufactured in a variety of configurations: manhole, catch basin, vault, fiberglass tank, or custom configurations. Typically, 18 inches (457 mm) of driving head is designed into the system. For low drop sites, the designed driving head can be less.

Manhole



Vault

Curb Inlet



Grated Inlet

Jellyfish® Filter Maintenance

- Jellyfish Filter cartridges are light weight and reusable
- Maintenance of the filter cartridges is performed by removing, rinsing and reusing the cartridge tentacles.
- Vacuum extraction of captured pollutants in the sump is recommended at the same time.
- Full cartridge replacement intervals differ by site due to varying pollutant loading and type, and maintenance frequency. Replacement is anticipated every 2-5 years.
- Contech® has created a network of Certified Maintenance Providers to provide maintenance on stormwater BMP's.

The Jellyfish® Filter tentacle is light and easy to clean.

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

CONTECH® ENGINEERED SOLUTIONS

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800-338-1122 | www.ContechES.com

11. Data Quality Assessment

Data was analyzed using statistical methods in accordance with guidelines in the **TARP Protocol for Stormwater Best Management Practice Demonstrations**, and the **VTAP Guidance for Evaluating Stormwater Manufactured Treatment Devices**. Data was examined by statistical and regression analysis, ANOVA statistics, non-parametric analysis, correlations, probability distributions of data, normality testing, standards, and physical data replication.

Data integrity in the laboratory was addressed in a multi-level review process for all analyses conducted. The initial step in this review process was conducted by each lab analyst as tests were conducted. Calibration values and procedures were checked against previous tests to alert the analyst to in case of malfunction in equipment or test errors.

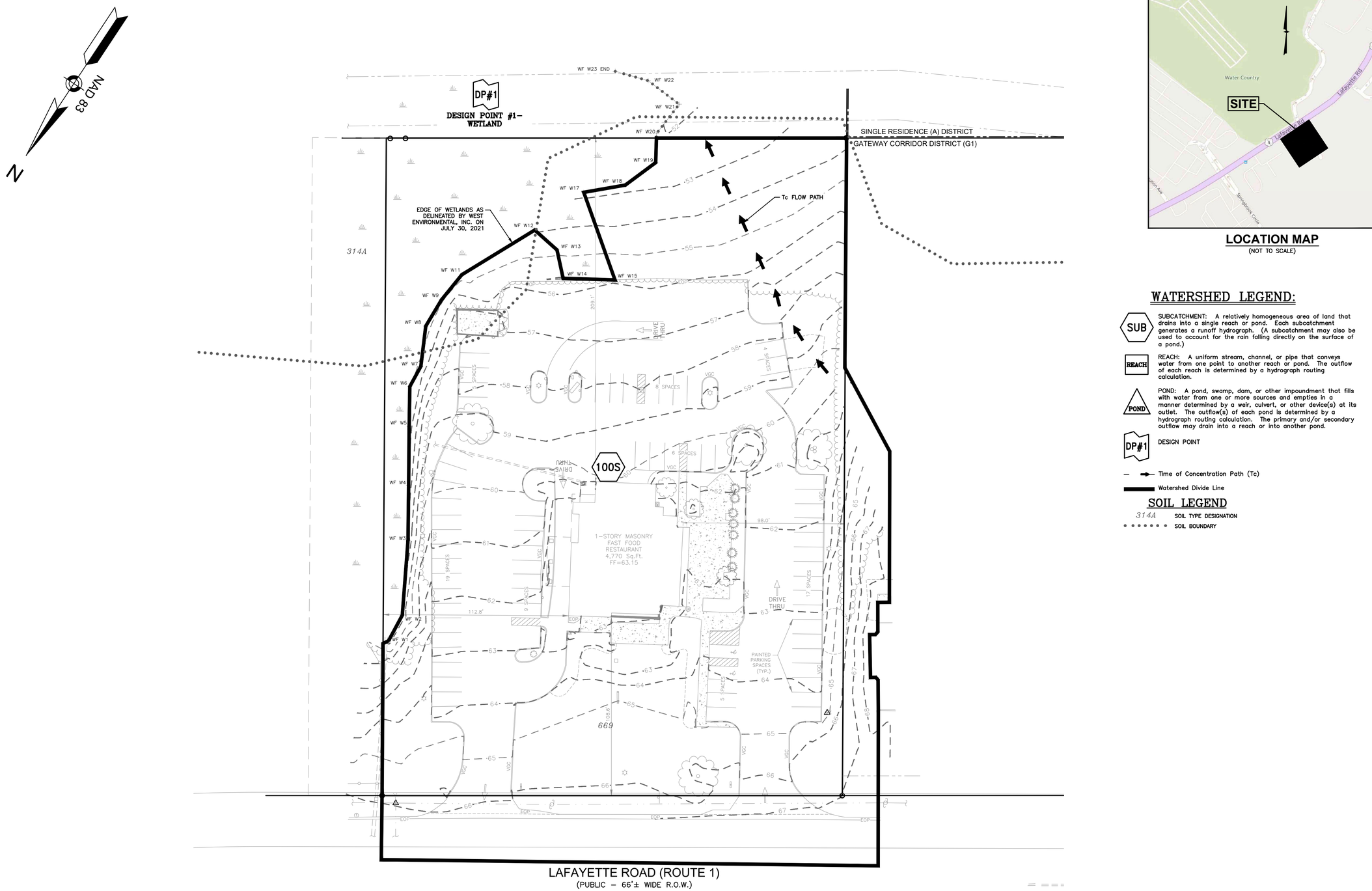
The second level of review was conducted by the lab director who collected results and entered these values into the tabular spreadsheets for each test. Each of the results was checked for accuracy of input as well as to appropriateness for the samples which were analyzed. All results were overseen or conducted personally by the lab manager. All preliminary calculations were reviewed.

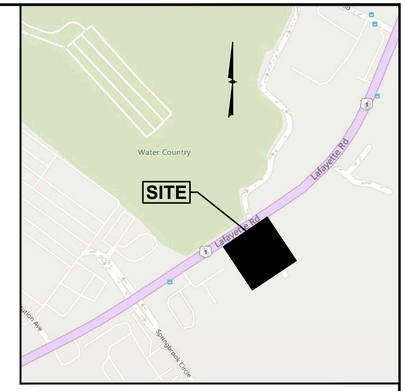
The final level of review was conducted by the project manager who reviewed all results generated within the laboratory.

12. Conclusions

Field testing of an Imbrium Systems' Jellyfish® Filter model JF4-2-1 with second-generation filtration cartridges was conducted in accordance with the TARP and VTAP field test protocols. The physical modeling campaign was carried out on the University of Florida campus with the full-scale unit loaded by rainfall-runoff from a surface parking watershed. A total of 25 monitored storm events, with 15 inches of cumulative rainfall depth, were treated by the JF4 during this study. Of the 25 storms treated, two storms generated flows exceeding the maximum design flow of 200 gpm. No maintenance was required or conducted during the 13-month monitoring period from May 28, 2010 to June 27, 2011.

Treatment results generated median SSC and TSS removal efficiency results of 99% and 89%, respectively. Median removal efficiency was 59% for Total Phosphorus and 51% for Total Nitrogen. For Total Copper, Zinc, Lead and Chromium median removal efficiencies were 90, 70, 81, and 36%, respectively. The d_{50} for influent and effluent particle sizes were 82 and 3 μm, respectively. Median head loss never exceeded 8.4 inches (21.4 cm) for any event and across the entire monitoring campaign the median head loss was 3.3 inches (8.3 cm). Dry basis particulate matter (PM) recovered from the treatment unit totaled 166 pounds, and the JF4-2-1 had a volumetric capacity to retain a significantly larger mass of PM. Median and peak head losses were driven predominately by flow rate and to a much lesser degree by filter cartridge ripening which was muted. At the completion of the monitoring campaign, a 95% mass balance was obtained on particulate matter (PM) which validates the testing methods used throughout this study. This mass balance on PM is an independent requirement to validate the influent and effluent monitoring and validates the most rigorous unit operation and process physical modeling available. The results obtained in this field study demonstrate that the Jellyfish Filter's particulate removal performance is reasonably insensitive to incoming particle size distribution (PSD) and runoff event duration.





LOCATION MAP
(NOT TO SCALE)

WATERSHED LEGEND:

SUB — SUBCATCHMENT: A relatively homogeneous area of land that drains into a single reach or pond. Each subcatchment generates a runoff hydrograph. (A subcatchment may also be used to account for the rain falling directly on the surface of a pond.)

REACH — REACH: A uniform stream, channel, or pipe that conveys water from one point to another reach or pond. The outflow of each reach is determined by a hydrograph routing calculation.

POND — POND: A pond, swamp, dam, or other impoundment that fills with water from one or more sources and empties in a manner determined by a weir, culvert, or other device(s) at its outlet. The outflow(s) of each pond is determined by a hydrograph routing calculation. The primary and/or secondary outflow may drain into a reach or into another pond.

DP#1 — DESIGN POINT

— → Time of Concentration Path (Tc)

Watershed Divide Line

SOIL LEGEND

314A — SOIL TYPE DESIGNATION

• • • • • • SOIL BOUNDARY

0 30 60 100

SCALE: 1" = 30'

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Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE, LLC
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL MOTOR FUEL OUTLET
2255 LAFAYETTE ROAD PORTSMOUTH, NH 03801

REVISIONS		
NO.	REVISION	DATE

FEBRUARY 3, 2022

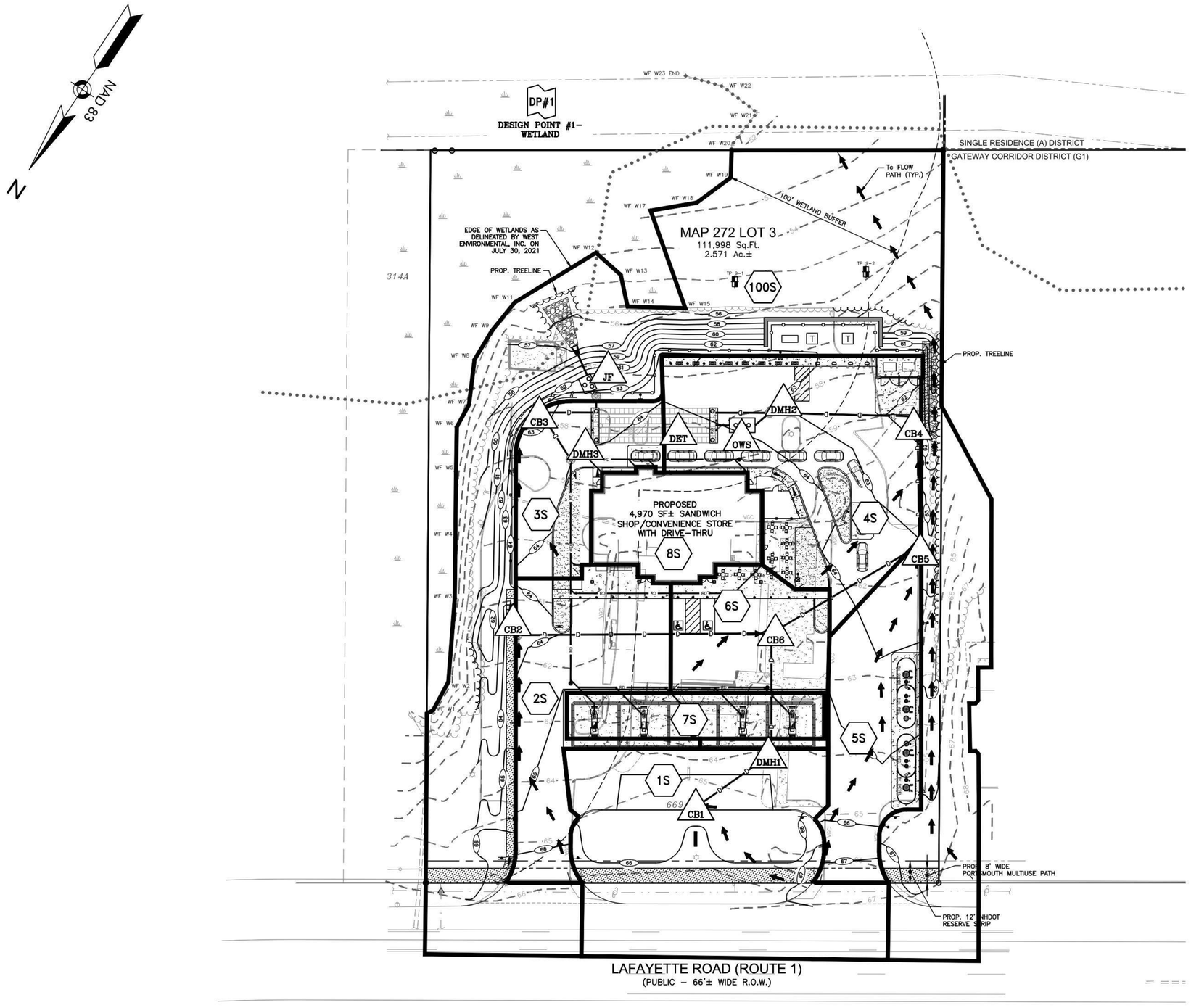
DRAWN/DESIGN BY	CHECKED BY
CCC/NID	DRJ

PRE-DEVELOPMENT DRAINAGE AREA PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

1 OF 2



LOCATION MAP
(NOT TO SCALE)

WATERSHED LEGEND:

- SUB — SUBCATCHMENT: A relatively homogeneous area of land that drains into a single reach or pond. Each subcatchment generates a runoff hydrograph. (A subcatchment may also be used to account for the rain falling directly on the surface of a pond.)
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- DP#1 — DESIGN POINT
- Time of Concentration Path (Tc)
- Watershed Divide Line

SOIL LEGEND

- 314A — SOIL TYPE DESIGNATION
- SOIL BOUNDARY

0 30 60 100
SCALE: 1" = 30'

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REVISIONS		
1	MISC. REVISIONS	4/19/22
NO.	REVISION	DATE

FEBRUARY 3, 2022

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CCC/NID	DRJ

POST-DEVELOPMENT DRAINAGE AREA PLAN

SCALE: 1"=30'

PROJECT NO. NEX-2021163

INSPECTION & MAINTENANCE MANUAL FOR STORMWATER MANAGEMENT SYSTEMS

PROPOSED RETAIL MOTOR FUEL OUTLET
TAX MAP 272 LOT 3
2255 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

GPI

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Prepared For:

Granite State Convenience, LLC
25 Springer Road
Hooksett, NH 03106

Revised: April 19, 2022
February 3, 2022

(GPI Project No.: NEX-2021163)

Granite State Convenience, LLC
Proposed Retail Motor Fuel Outlet
Inspection & Maintenance Manual

TABLE OF CONTENTS

SECTION 1 I & M DOCUMENTATION REQUIREMENTS

The Owner of Record shall be responsible for the continued operation, and maintenance of all stormwater management systems in accordance with this manual and Section 7.6.5 of the City of Portsmouth Site Plan Review Regulations. Logs of inspections and maintenance shall be maintained and filed with the City of Portsmouth as needed. Copies will need to be kept for the most recent three years and made available to the Planning Board and City Engineer upon request.

Logs shall include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the cleanout of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations.

All stormwater facilities associated with this development are identified on Figure 1 contained within Section 3 of this manual and listed individually on the log form included herein, and shall be inspected and maintained in accordance with the procedures outlined in Section 4.

SECTION 2 BMP SPECIFIC I & M PROCEDURES

Driveway/Parking Lot Sweeping

Sweeping shall be done once in the early fall and then immediately following spring snowmelt to remove sand and other debris and when visual buildup of debris is apparent. Pavement surfaces shall be swept at other times such as in the fall after leaves have dropped to remove accumulated debris. Since contaminants typically accumulate within 12 inches of the curbline, street cleaning operations should concentrate in cleaning curb and gutter lines for maximum pollutant removal efficiency. Other areas shall also be swept periodically when visual buildup of debris is apparent. Once removed from paved surfaces, the sweeping must be handled and disposed of properly. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations.

Deep Sump Hooded Catch Basins

Inspect and clean as required all catch basins at least two times per year including at the end of the foliage and snow removal seasons. Sediment must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of sump to the invert of the lowest pipe in the basin. If the basin outlet is designed with a hood to trap floatable materials check to ensure watertight seal is working. Damaged hoods should be replaced when noted by inspection. At a minimum, remove floating debris and hydrocarbons at the time of the inspection. Sediment and debris can be removed by a clamshell bucket; however, a vacuum truck is preferred. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations.

Outlet Aprons/Weirs

Inspect at least once annually for damage and deterioration. Repair damages immediately.

Oil/Water Separator

The system should initially be inspected within the first three months after completion of the site's construction and after any rainfall greater than 1-inch. The units should be inspected after every major storm but at least on a monthly basis. Cleaning of the units should be done at least twice a year and should include the following:

1. Removal of accumulated oil and grease and sediment by using a vacuum truck or similar catch basin cleaning device.
2. Visually inspect, and clean as needed, inlet and outlets including tees during each inspection.
3. At a minimum, remove any floating debris at the time of the inspection.

Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations.

Hydrodynamic Separators (First Defense Units)

Initial maintenance to be performed twice a year for the first year after the unit is online and operational. A vacuum truck must be used at a minimum of once per year for sediment removal. Refer to the attached First Defense Owner's manual for operation and maintenance procedures and schedules thereafter.

Jellyfish Filter Treatment Unit
See attached product maintenance materials by Contech ES.

Underground Detention System
All subsurface systems should initially be inspected within the first three months after completion of the site's construction.

Preventive maintenance should be performed at least every six months and sediment shall be removed from pretreatment BMP's after every major storm event. The Detention System shall be inspected on regular bi-annual scheduled dates. Sediment and debris removal should be through the use of truck mounted vacuum equipment. Outlet pipes should be flushed to point of discharge on the same frequency as mentioned above. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations.

The following is the recommended procedure to inspect the underground system in service:

1. Locate the riser or cleanout section of the system. The riser/cleanout will typically be 6 or 12" in diameter or larger.
2. Remove the lid from the riser/cleanout.
3. Measure the sediment buildup at each riser and cleanout location. Only certified confined space entry personnel having appropriate equipment should be permitted to enter the system.
4. Inspect each manifold, all laterals, and outlet pipes for sediment build up, obstructions, or other problems. Obstructions should be removed at this time.
5. If measured sediment build up is between 2" to 8", cleaning should be considered; if sediment build up exceeds 8", cleaning should be performed at the earliest opportunity. A thorough cleaning of the system (manifolds and laterals) shall be performed by water jets and/or truck mounted vacuum equipment.

Pretreatment BMP's shall be inspected and cleaned during the regular bi-annual inspections.

The inlet and outlet of the subsurface systems should be checked periodically to ensure that flow structures are not blocked by debris. All pipes connecting the structures to the system should be checked for debris that may obstruct flow. Inspections should be conducted monthly during wet weather conditions from March to November.

Vegetated Areas
Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. During the summer months, all landscape features are to be maintained with the minimum possible amount of fertilizers, pesticides or herbicides.

Winter Maintenance
Proposed snow storage is located along the edge of the roadways. Any excess snow is to be trucked offsite. During the winter months all snow is to be stored such that snowmelt is

controlled. Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. The minimum amount of deicing chemicals needed is to be used. It is recommended that winter maintenance contractors be current UNHT2 Green SnowPro Certified applicators or equivalent. In addition, a NHDES Salt Applicator Certification is recommended, but not required. Information on these certifications can be found in the links provided below:

- http://t2.unh.edu/green-snopro-training-and-nhdes-certification
- http://des.nh.gov/organization/divisions/water/wmb/was/salt-reduction-initiative/salt-applicator-certification.htm

Control of Invasive Species

During maintenance activities, check for the presence of invasive species. Invasive species must be managed/removed in accordance with RSA 430:530 and AGR 3800. See Section 4 of this manual for information from the University of New Hampshire Cooperative Extension and the New Hampshire Guide to Upland Invasive Species from the New Hampshire Department of Agriculture Markets and Food, Plant Industry Division or the information provided on their website (http://www.agriculture.nh.gov/divisions/plant-industry/invasive-plants.htm).

SECTION 3 LONG TERM MAINTENANCE PLAN EXHIBIT

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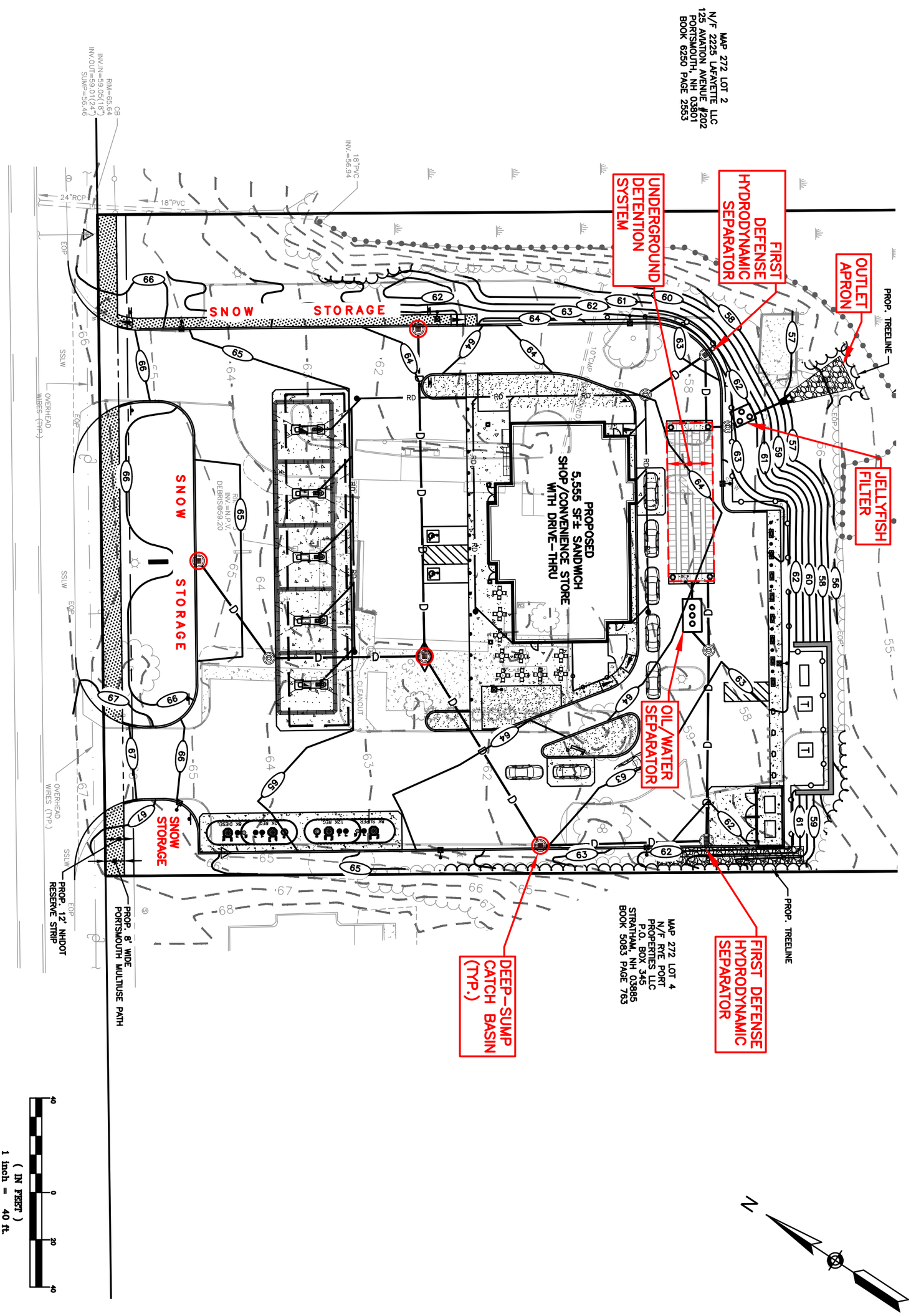

LONG TERM MAINTENANCE EXHIBIT

2255 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

GPI Engineering Design Planning Construction Management
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44 Stiles Road, Suite One
Salem, NH 03079

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PROJECT #:	2021163
DATE:	2/3/22
REV.:	4/19/22 –
FIGURE	1

SECTION 4 CONTROL OF INVASIVE SPECIES

CONTACT INFORMATION

TERRESTRIAL PLANTS

Douglas Cygan, Invasive Species Coordinator, NH Department of Agriculture, Markets & Food, Division of Plant Industry, 29 Hazen Drive, Concord, NH 03301
(603) 271-3488, douglas.cygan@agr.nh.gov
Website: www.agriculture.nh.gov

AQUATIC PLANTS

Amy Smagula, Clean Lakes and Exotic Species Coordinator, NH Department of Environmental Services, 29 Hazen Drive, PO Box 95, Concord, NH 03302
(603) 271-2248, asmagula@des.state.nh.us.

RESOURCES

NH Coastal Watershed Invasive Plant Partnership (CWIPP)
www.des.nh.gov/organization/divisions/water/wmb/coastal/cwipp/index.htm
Invasive Plant Atlas of New England (IPANE)
http://invasives.eeb.uconn.edu/ipane
Natural Resource Conservation Service (NRCS)
http://plants.usda.gov
New England Wildflower Society (NEWS)
www.newfs.org
New Hampshire Department of Agriculture, Markets & Food (DAMF)
www.agriculture.nh.gov
New Hampshire Department of Resources & Economic Development, Natural Heritage Bureau (DRED)
http://www.naturalheritage.org
New Hampshire Department of Resources & Economic Development, Division of Forests and Lands (DRED)
http://www.nhdfl.org/organization/div_nhnhi.htm
New Hampshire Department of Environmental Services (DES)
www.des.state.nh.us/wmb/exoticspecies
New Hampshire Fish & Game Department
www.wildlife.state.nh.us
The Nature Conservancy (TNC)
www.nature.org
U.S. Department of Agriculture's Animal Plant Health Inspection Service (USDA APHIS)
www.aphis.usda.gov
University of New Hampshire Cooperative Extension (UNHCE)
www.ceinfo.unh.edu

Funding for the printing of this booklet provided by:
U.S. Department of Agriculture's Animal Plant Health Inspection Service

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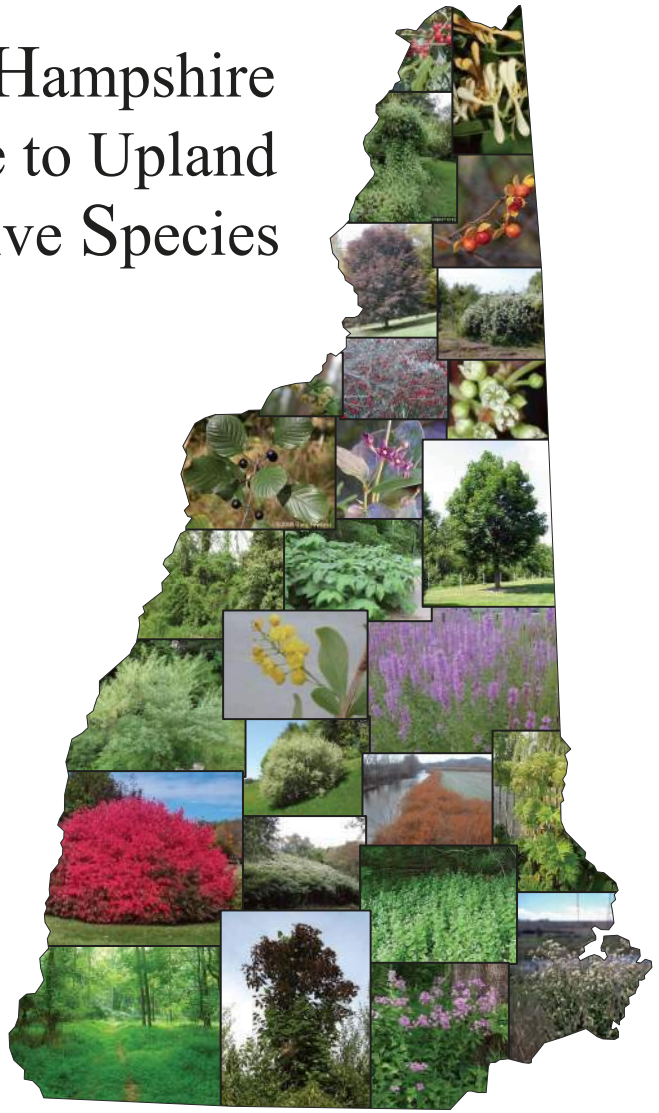
New Hampshire Guide to Upland Invasive Species



New Hampshire
Department of Agriculture
Markets and Food, Plant Industry Division

5th Edition
2018

Douglas Cygan

Introduction

Throughout the world, non-native invasive species have become an overwhelming problem resulting in impacts to the natural environment and managed landscapes. Invasive species typically possess certain traits that give them an advantage over most native species. The most common traits include the production of many offspring, early and rapid development, and adaptability and high tolerance to many environmental conditions. These traits allow invasive species to be highly competitive and, in many cases, suppress native species. Studies show that invasives can reduce natural diversity, impact endangered or threatened species, reduce wildlife habitat, create water quality impacts, stress and reduce forest and agricultural crop production, damage personal property, and cause health problems.

Invasive species began arriving in North America in the mid-to-late 1700s by various means. Many were brought here for ornamental uses, erosion control, or to provide for wildlife habitat. Others arrived inadvertently through international travel and commerce.

Impacts and Actions

Biologists have found that invasive species cover more than 100 million acres of land in the U.S. and their population numbers continue to spread. The repeated process of spread has become so extreme that invasive species cost the United States billions of dollars per year. This is a result of lost agricultural and forest crops, impacts to natural resources and the environment, and the control efforts required to eradicate them.

On February 3, 1999, President Clinton signed Executive Order 13112, which established the National Invasive Species Council. The Council is responsible for assessing the impacts of invasive species, providing the nation with guidance and leadership on invasive species issues, and seeing that federal programs are coordinated and compatible with state and local initiatives.

Each state is also required to participate by evaluating and responding to their invasive species concerns. In the summer of 2000, the State of New Hampshire passed House Bill 1258-FN, which created the Invasive Species Act (ISA) and the New Hampshire Invasive Species Committee.

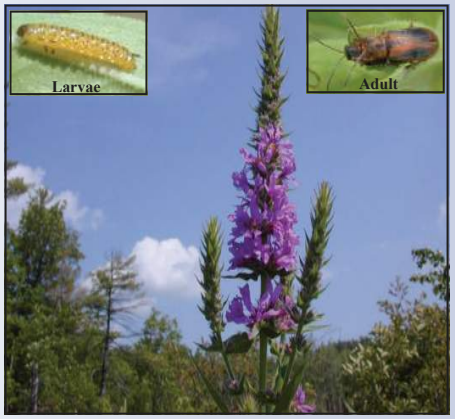
GLOSSARY OF PLANT TERMS

Alternate: Arranged singly at each node, as leaves or buds on different sides of a stem.
Annual: Living or growing for only one year or season.
Aril: A fleshy, usually brightly colored cover of a seed that develops from the ovule stalk and partially or entirely envelops the seed.
Axis: The point at which the leaf is attached to the main stem or branch.
Berry: A small, juicy, fleshy fruit.
Biennial: Having a life cycle that normally takes two growing seasons to complete.
Capsule: A dry dehiscent fruit that develops from two or more united capsules.
Compound: Composed of more than one part.
Deciduous: Shedding or losing foliage at the end of the growing season.
Dehiscent: The spontaneous opening of a fruit at maturity.
Drupe: A fleshy fruit usually having a single hard stone enclosing a seed.
Entire: Referring to a leaf not having an indented margin.
Filiform: Having the form resembling a thread or filament.
Furrowed: A rut groove or narrow depression.
Glabrous: Having no hairs or projections; smooth.
Imbricate: To be arranged with regular overlapping edges.
Inflorescence: A cluster of small flowers arranged on a flower stalk.
Lanceolate: A leaf tapering from a rounded base toward an apex, lance-shaped
Lenticels: The small, corky pores or narrow lines on the surface of the stems of woody plants that allow the interchange of gases between the interior tissue and the surrounding air.
Lustrous: Having a sheen or glow.
Native: A species that originated in a certain place or region; indigenous.
Naturalized: Adapted or acclimated to a new environment without cultivation.
Opposite: Growing in pairs on either side of a stem.
Ovate: Broad or rounded at the base and tapering toward the end.
Panicle: A branched cluster of flowers in which the branches are racemes
Peduncle: The stalk of a solitary flower of an inflorescence.
Peltate: Leaf being round with the stem attached near its center.
Perennial: Living three or more years.
Perfect: Having both stamens and pistals in the same flower.
Pod: A dry, several-sealed, dehiscent fruit.
Pubescent: Covered in fine short hairs.
Raceme: Elongated cluster of flowers along the main stem in which the flowers at the base open first.
Rhizome: A horizontal, usually underground stem that often sends out roots and shoots from its nodes.
Samara: A winged, often one-seed indehiscent fruit as of the ash, elm or maple.
Simple: Having no divisions or branches; not compound.
Umbel: A flat-topped or rounded inflorescence.

Lythrum salicaria - Purple Loosestrife

Family: Lythraceae
Native to: Eurasia

Description: Perennial growing 30-80" tall by $^{2}/_{3}$'s as wide. **Stems:** 4-6 sided, turning woody in summer. **Leaves:** Opposite to whorled, lanceolate, 2-4" long. **Flowers:** Spiked raceme, purple to magenta, June to October. **Fruit:** Capsule. **Habitat:** Mostly found in wetlands and aquatic systems, full to partial sun. **Spread:** Each plant can produce approximately 2.5-4.5 million seeds. Seeds dispersed by water, wildlife and humans. **Comments:**Invades wetlands suppressing native species and destroying wildlife habitat. **Controls:** Hand pull, use a spade to dig larger plants or use biocontrols (*Galerucella Spp*., top left is a larvae & top right is an adult).



Photos by Douglas Cygan

Phragmites australis - Common Reed

Family: Poaceae
Native to: Eurasia

Description: Perennial rhizomatous grass growing 14' tall. **Stems:** Called 'culms' are large, hollow and grow up to 1" dia. **Leaves:** Lanceolate, up to 24" long, bluish-green in color. **Flowers:** Panicles with many spikelets having seven small reddish flowers. **Habitat:** Mostly found in marshlands, but also grows in freshwater wetlands and aquatic systems, full to partial sun. **Spread:** Spreads primarily by rhizomes. **Comments:** Forms dense colonies that suppress native species and alter wildlife habitat. **Controls:** Hand pull small plants. Use a spade to dig larger plants or apply herbicides.

Photos by Douglas Cygan

New Hampshire Invasive Species Committee

The New Hampshire Invasive Species Committee (ISC) is an advisory group for the Commissioner of the NH Department of Agriculture, Markets & Food (DAMF) on matters concerning invasive species in the state. The ISC consists of 11 appointed members representing the following: the NH Department of Agriculture, the NH Department of Environmental Services, the NH Department of Resources & Economic Development, the NH Department of Transportation, the NH Department of Fish & Game, The College of Life Science & Agriculture of the University of NH, the UNH Cooperative Extension, environmental interests, horticultural interests, general public interests, and livestock owners & feed growers interests. The ISC meets regularly to conduct the following efforts:

- Review information;
- Evaluate and discuss potentially invasive plant, insect and fungi species of concern;
- Host guest presentations on related topics;
- Develop outreach and educational materials;
- Formulate management practices as guidance for the control of invasive species; and
- Prepare lists of proposed prohibited and restricted species.

(*Note: This committee is not charged with the evaluation or listing of aquatic plant species, which is conducted by the Department of Environmental Services under RSA-487:16-a. However, a brief description of the program and four of the aquatic species are described on pages 29 & 30 of this book*).

New Hampshire Rules

In accordance with the Invasive Species Act (ISA), HB 1258-FN, the DAMF is the lead state agency for terrestrial invasive plants, insects and fungi species. The DAMF has the responsibility for the evaluation, publication and development of rules on invasive plant species. This is for the purpose of protecting the health of native species, the environment, commercial agriculture, forest crop production, and human health. Therefore, the rule, Agr 3800, states "**No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living or viable portion of any listed prohibited invasive plant species, which includes all of their cultivars and varieties, listed"** (see the New Hampshire Department of Agriculture's website at www.agriculture.nh.gov to review the complete set of rules).

Invasive Upland Plant Species (Agr 3800)

Invasive Insect Species

(To see the complete list of all 16 invasive insects refer to rules Agr 3800)

Invasive Aquatic Plant Species

To see the complete list of invasive aquatic plants refer to DES's Env-Wq 1300 rules

New Hampshire Department of Environmental Services Aquatic Invasive Plant Species

"Exotic aquatic species" are plants or animals that are not part of New Hampshire's native aquatic flora and fauna. Since the first exotic aquatic plant infestation in New Hampshire was discovered in 1965 in Lake Winnipesaukee, exotic aquatic plant infestations have increased to a total of 83 infestations in 72 waterbodies in 2008. Species present include variable milfoil (63 waterbodies), Eurasian milfoil (3 waterbodies), fanwort (9 waterbodies), water chestnut (1 waterbody) and Brazilian elodea (1 waterbody), Curly Leaf Pondweed (3 waterbodies), and European Naiad (3 waterbodies), and Didymo (1 waterbody). Most of these exotic plants can propagate by fragmentation as well as by seed.

Exotic aquatic plant fragments can easily become attached to aquatic recreational equipment, such as boats, motors, and trailers, and can spread from waterbody to waterbody through transient boating activities. Infestations can have detrimental effects on the ecological, recreational, aesthetic, and economic values of the state's precious surface waters, limiting use of the waterbodies and decreasing shorefront property values by as much as 1020 percent according to a UNH study (Halstead, et al., 2001).

Myriophyllum heterophyllum - Variable Milfoil

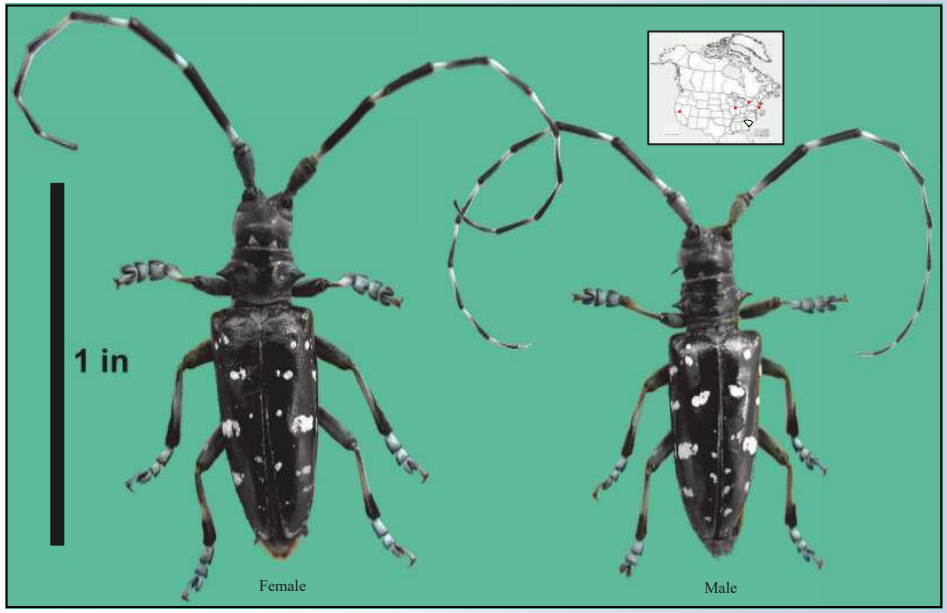
Family: Haloragaceae
Native to: Eurasia

Description: Submerged aquatic perennial growing 20' tall. **Stems:** Round, thick and reddish. **Leaves:** Feathery leaflets surrounding the stem. **Flowers:** Stalks that emerge above the water with green leaves, June to August. **Habitat:** Lakes, ponds, calm streams, and other similar aquatic systems with full to partial sun. **Spread:** It reproduces primarily by vegetative propagules when individual plant segments break off, and dispersed by water movement, humans, and boats. **Comments:**Invades water bodies, suppresses native species and destroys fish habitat. **Controls:** Prevention, hand pulling, bottom screening, and aquatic herbicide use.

Photos by Amy Smagula

Anoplophora glabripennis - Asian Longhorned Beetle

Family: Cerambycidae
Native to: Europe



Asian Longhorned Beetle—*Anoplophora glabripennis* (Photo by Chris Rallis)

The Asian longhorned beetle (ALB) is a serious threat to a large variety of deciduous hardwoods in North America. ALB is a large glossy black insect with white spots dotting its elytra. Adults grow to 1-1.5" long and have whitish bandings on their antennae. Females are typically bigger than males. Tree injury occurs when larvae tunnel through the xylem (heartwood) of the host, thus weakening the tree. Hosts trees include, but aren't limited to: Maple, Chestnut, Poplar, Willow, Birch, Elm, and Mountain ash. Adult females chew a crater in the bark and lay 1-egg per site. Upon hatching the larvae feed on the wood and emerge as adults in 1-2 years through perfect $^{3}/_{8}$" diameter exit holes. Other signs include coarse wood shavings called frass, oozing sap, oviposition sites, leaf-feeding damage, and mature beetles. **If found, please call the NH Dept. of Agriculture at (603) 271-2561**.


Oviposition Site


Egg (Rutgers University)


Sap flow from injury


Larval damage (Rutgers Univ.)


Adult feeding damage on leaf


3/8" diameter exit hole

Photos by Douglas Cygan, Chris Rallis & Rutgers University

DO NOT MOVE FIREWOOD

WHAT YOU CAN DO

There are many things that you, as an individual, can do to help control the spread of invasive species and preserve native flora and fauna:

- Minimize impacts to natural vegetation, soils, and drainage.
- Learn how to identify invasive plants and know how to tell them apart from native species.
- Control invasives on your property by following recommended practices.
- When landscaping, ask your local garden center or contact your County Extension Service about alternative plantings.
- Become active in local or regional initiatives to control invasives.
- After working in an area with invasive species remove any soil, or propagules that may have adhered to clothing, shoes, vehicle tires, etc.

CONTROL METHODS

Mechanical: Mechanical control involves hand pulling, digging, cultivation, mowing, cutting or utilizing some type of physical barrier such as a tarpaulin, mulch, wood chips, etc. This method is most effective when populations of unwanted species are low.

Cultural: Cultural control is the manipulation of a plant community to prevent the introduction or spread of an unwanted species. This can be accomplished by modifying the growing environment such as the soil, available light or moisture, or planting trees or shrubs that can outcompete the invasive species.

Chemical: Chemical control involves the use of an approved herbicide to manage a targeted species. The application method must be chosen to avoid damage to beneficial or native species. The applicator must adhere to all State and Federal pesticide regulations and in many cases be licensed by the state. For more information, contact the NH Department of Agriculture's Pesticide Control Division at 603-271-3550 or www.agriculture.nh.gov.

Biological: Biological control is the use of native or introduced beneficial organisms to naturally reduce populations of unwanted species. Most biological controls are found to be self-sustaining and host specific.

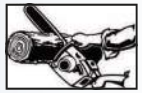

Pulling


Digging


Cutting-Hand tools


Herbiciding


Mowing

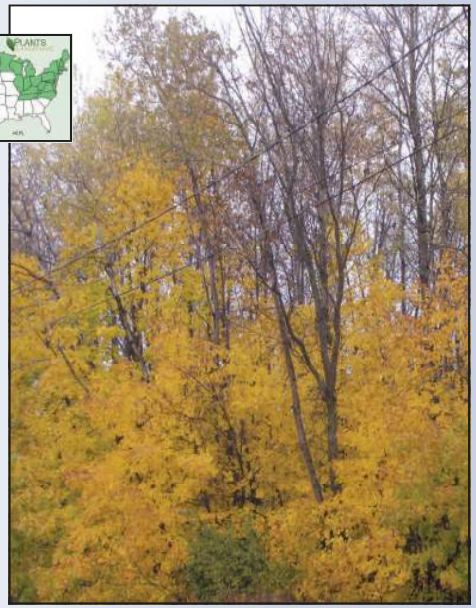

Cutting-Saws


Biocontrols

Acer platanoides - Norway Maple

Family: Aceraceae
Native to: Europe

Norway Maple—*Acer platanoides*



Norway Maple (in yellow) Invasion in Franklin, NH

Description: Large deciduous tree 60' high by 40' wide. **Bark:** Grayish and somewhat furrowed. **Twigs:** Smooth, olive-brown. **Buds:** Terminal, imbricate, rounded, smooth, greenish-red. **Leaves:** Opposite, 4-7" wide, 5-lobed, dark green to dark red above, lustrous below. **Flowers:** Greenish-yellow, April. **Fruit:** Horizontal samara. **Zone:** 3-7. **Habitat:** Moist, well drained soils, full sun to partial shade. **Spread:** Seeds spread by wind and water. **Comments:** Leaf stalks exude milky white sap. Fast growing, buds break earlier than most native species. Naturalizes in woodlands where it can outcompete native species. **Controls:** Pull or dig seedlings/saplings. Cut large trees and prune suckers when they sprout. Herbicide: foliar spray, cut-stem, bark banding, or slash bark with ax and apply to wounds.

Milky white sap-leaf petiole

Leaf with winged seed

Terminal buds rounded

Flowers greenish-yellow

Bark is grayish & furrowed

Leaves turn yellow in Fall

Photos by Douglas Cygan

Agrilus planipennis - Emerald Ash Borer

Family: Buprestidae
Native to: Asia

Emerald Ash Borer—*Agrilus planipennis*

Dead standing Ash trees (Canadian Forest Service)

Emerald Ash Borers (EAB) are small invasive wood boring beetles that attack all species of ash trees (*Fraxinus spp.*). Native to East Asia, it is suspected that they were accidentally introduced to North America in infested wood packing material. The adults are 3/8" to ½" in length by 1/16" in width. Their bodies have a dark metallic green appearance. Adults emerge from a D-shaped exit hole from late May to mid-July and live for 3-6 weeks, during which time they feed on ash foliage, and fly 1-mile or so in search of a mate and to lay eggs. Females will lay 60-90 eggs in the crevices of ash tree bark. Larvae emerging from the eggs create distinctive S -shaped feeding galleries within the cambium which is directly beneath the bark. These feeding galleries can girdle the tree and result in tree death. Movement of EAB into new uninfested areas is principally through transportation of firewood. **If found, please contact the NH Dept. of Agriculture at (603) 271-2561.**

Egg

Larvae in feeding galleries

Adult with wings spread

Feeding galleries in cambium

D-shaped exit hole

EAB Purple prism trap

Photos by Douglas Cygan & Chris Rallis

DO NOT MOVE FIREWOOD

Adelges tsugae - Hemlock Wooly Adelgid

Family: Adelgidae
Native to: Asia

Hemlock Wooly Adelgid—*Adelges tsugae* Nests

Hemlock trees dead from Adelgid (www.earthportal.org)

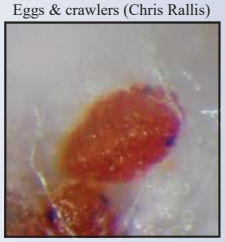
Hemlock Wooly Adelgid (*Adelges tsugae*) (HWA) is a serious pest to all North American hemlock trees (*Tsuga spp.*). It is native to Japan & China and was first found in the Pacific Northwest in the 1920's. By the 1950's it had reached the east coast and now infects hemlock trees from Georgia to Maine. It spreads by movement of nursery stock, wind and animals. These insects are extremely small averaging about $^{1}/_{8}$" in length with piercing-sucking mouth parts similar in appearance to aphids. All adults are females with each producing 50-300 eggs. To protect themselves & their eggs they produce a white-waxy covering. Adults insert their piercing mouth parts into the stem at the base of the needles. Trees die from needle loss & lack of nutrition. **If found, please call the NH Dept. of Agriculture at (603) 271-2561**.

Adult female laying eggs

Egg mass in protective nest

Eggs & crawlers (Chris Rallis)

Heavily infested branch



Crawlers (Chris Rallis)

Crawler leaving nest (Chris Rallis)

Photos by Douglas Cygan & Chris Rallis

DO NOT MOVE FIREWOOD

Ailanthus altissima - Tree of Heaven

Family: Simaroubaceae
Native to: China

Tree of Heaven—*Ailanthus altissima*

Tree of Heaven invasion

Description: Deciduous tree up to 60' tall by 40' wide. **Bark:** Grayish, slightly furrowed. **Twigs:**Reddish-brown. **Leaves:** Compound, 18-24" long with 13 -25 leaflets arranged alternately on stem, lanceolate, 3-5" long with 2-4 teeth near base. **Flowers:** Panicles, 8-16" long, yellowish-green, mid-June. **Fruit:** Samara. **Zone:** 4-8. **Habitat:** Highly adaptable and pollution tolerant, full sun to partial shade. **Spread:** Seeds are wind dispersed. **Comments:** Very fast growing, dense canopy shades out native species. **Controls:** Remove seedlings and saplings by hand. Larger trees can be mechanically removed or cut. To prevent suckering, if trees are cut, apply herbicide to cut portion of stump.

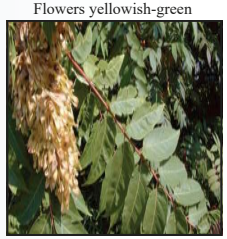
Leaf scar on stem

Compound leaves & leaf

Leaf bud

Flowers yellowish-green

Bark grayish & furrowed



Winged seed cluster

Photos by Douglas Cygan

Alliaria petiolata - Garlic Mustard

Family: Cruciferae
Native to: Europe

Garlic Mustard—*Alliaria petiolata*

Woodland invasion (photo by Cornell University)

Description: Cool season biennial, 2nd year plants flower and reach 2-3$^1/_2$' tall. **Leaves:** Triangular, coarsely toothed, heart-shaped. **Flowers:** Umbel, small, 4-petals, white, April-May. **Fruit:** Pods, seeds turn black when mature. **Zone:** 4-8. **Habitat:** Prefers moist shaded flood-plains, forests and roadsides, adaptable to most soil and light conditions. **Spread:** Seeds spread by water and wildlife. **Comments:** Plants spread quickly into natural areas leading to competition and displacement of native species. **Controls:** Small populations can be hand pulled while large populations can be continuously cut back to prevent flowering and seed production. Herbicide treatments are also effective.

Basal rosette

Leaf

Flower buds

Flowers 4-petaled, white

Stems

Seed pods

Photos by Douglas Cygan

Rosa multiflora - Multiflora Rose

Family: Rosaceae
Native to: Japan & Korea

Multiflora Rose-*Rosa multiflora*

Multiflora Rose invasion, Canterbury, NH

Description: Hardy shrub / climber reaching up to 15' or more in height and 10' in width. **Stems:** Long and arching, forming dense clumps, thorns may or may not be present. **Leaves:** Alternately arranged, compound with 7-9 leaflets and having feather margins at base. **Flowers:** Clusters of white or pink, June to July. **Fruit:** Rose hips turn red in fall. **Zone:** 3-8. **Habitat:** Prefers moist, well drained soils, full sun. **Spread**: Fruits with seeds are dispersed by birds. **Comments:** Very aggressive, leading to competition and displacement of native species. **Controls:** Hand or mechanical removal, cutting, or herbicide application.

Twig/stem bark

Leaves

Feathery margin at base of leaf

Flowers white

Fall color

Fruit is called a hip

Photos by Douglas Cygan

Rhamnus cathartica - Common Buckthorn

Family: Rhamnaceae
Native to: Eurasia

Description: Deciduous shrub or small tree measuring 20' by 15'. **Bark:** Grayish to brown with raised lenticels. **Stems:** Cinnamon colored with terminal spine. **Leaves:** Alternate, simple and broadly ovate with toothed margins. **Flowers:** Inconspicuous, 4-petaled, greenish-yellow, mid-June. **Fruit:** Fleshy, 1/4" diameter turning black in the fall. **Zone:** 3-7. **Habitat:** Adapts to most conditions including pH, heavy shade to full sun. **Spread:** Seeds are bird dispersed. **Comments: Highly:** Aggressive, fast growing, outcompetes native species. **Controls:** Remove seedlings and saplings by hand. Larger trees can be cut or plants can be treated with an herbicide.

Photos courtesy of John M. Randall/The Nature Conservancy

Rhamnus frangula - Glossy Buckthorn

Family: Rhamnaceae
Native to: Japan

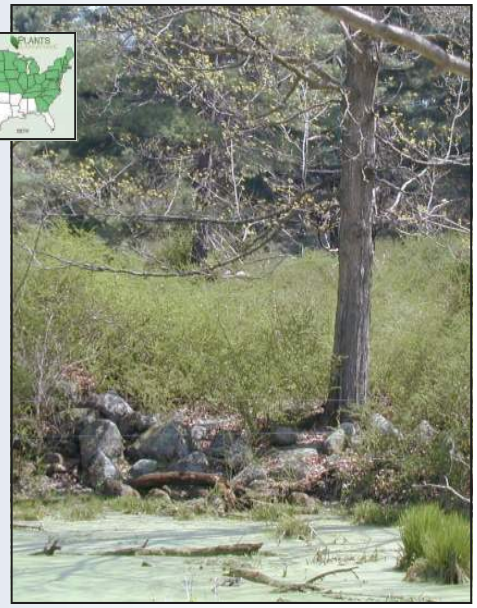
Description: Tall deciduous shrub up to 20' in height by 15' wide, **Bark:** Grayish with whitish lenticels. **Twigs:** Reddish-brown. **Leaves:** Ovate, 4-5" long by 3-4" wide, arranged alternate or whorled on stem. **Flowers:** Small, greenish-white, mid-June. **Fruit:** Fleshy, turning black in the fall. **Zone:** 2-7. **Habitat:** Highly adaptable and pollution tolerant, full sun to partial shade. **Spread:** Seeds are bird dispersed. **Comments:** Very fast growing, dense canopy shades out native species. **Controls:** Remove seedlings and saplings by hand. Larger trees can be cut or herbicide may be used.

Photos by Douglas Cygan

Berberis thunbergii - Japanese Barberry

Family: Berberidaceae
Native to: Japan

Japanese Barberry-*Berberis thunbergii*



Japanese Barberry invasion, Antrim, NH

Description: Deciduous shrub, 2-4$^{1}/_{2}$' tall. **Leaves:** Ovate, simple, entire. Color varies depending on variety. **Flowers:** Small yellowish, bloom in May in clusters of 2-4. **Fruit:** Drupe, turning red in summer. **Zone:** 4-8. **Habitat:** Prefers well drained soils in semi shade and often occurring in forests, roadsides, and open fields. **Spread:** Seeds are dispersed by wildlife. **Comments:** Forms dense thickets in natural environments where it becomes established, resulting in impacts to native flora and fauna. **Controls:** Remove small immature plants by hand. Dig larger plants with a garden spade or remove mechanically. Cut stems at base or control with herbicide treatment.

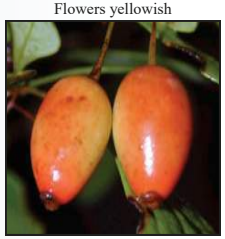
'Crimson Pygmy' variety

Leaves

Thorn

Flowers yellowish

Frost covered Barberry



Fruit is a fleshy drupe

Photos by Douglas Cygan

Berberis vulgaris - European Barberry

Family: Berberidaceae
Native to: China

European Barberry-*Berberis vulgaris*

Woodland invasion, Claremont, NH

Description: Shrub 3-8' in height by 3-6' in width. **Stems:** Tan bark with 3 long spines at each leaf axis. **Leaves:** Alternate, simple, $^{1}/_{2}$"-1$^{1}/_{2}$" long, bright green above, dull below. **Flowers:** Perfect, yellow, $^{1}/_{2}$" long, mid-April to May. **Fruit:** Oblong drupe turning pale red in fall. **Zone:** 4-8. **Habitat:** Prefers full sun to partial shade and open spaces to wooded areas. **Spread:** Seeds are dispersed by birds and wildlife. **Comments:** Highly adaptable to most environments and is pollution tolerant. **Controls:** Hand pull young plants. Cut or mechanically remove older larger plants or apply approved herbicides for large populations.

Thorns

Leaves

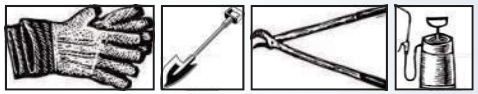
Flowers

Flowers whitish-yellow

Stems

Seed pods

Photos by Douglas Cygan



Polygonum cuspidatum - Japanese Knotweed

Family: Polygonaceae
Native to: Japan

Description: Perennial reaching 10' in height and width. Bohemian Knotweed (*Reynoutria x bohemica*) is similar. **Stems:** Greenish, hollow and jointed, similar to bamboo. **Leaves:** Alternate, broadly ovate, 3-7" long. **Flowers:** Small, whitish, forming panicles, August-September. **Seeds:** Calyx, brown, triangular. **Habitat:** Found in woodland sites, open spaces, ditches, roadsides, riverbanks. Prefers moist, well-drained soils. **Spread:** Stem & root fragments, and by seed. **Comments:** Aggressive, spreads quickly along surface waters and in right-of-ways. **Controls: Do <u>not</u> mow**, cut stems at base then smother by covering area with heavy-duty fabric/plastic, herbicides also recommended.

Photos by Douglas Cygan

Polygonum perfoliatum - Mile-a-Minute Vine

Family: Polygonaceae
Native to: Asia

Description: Very fast growing herbaceous perennial vine growing to 25' in height. **Stems:** Greenish with stiff barbs used for support. **Leaves:** Alternate, triangular in shape with clasping bract at the base, 1-3" long. **Flowers:** Racemes, inconspicuous and white forming at the bract, August - October. **Seeds:** An achene within a greenish, berry-like fruit. **Habitat:** Grows in partial shade to full sun, fields, roadsides & forests. Prefers moist, well-drained soils. **Spread:** Seed spread by birds & wildlife. **Comments:** Fast growing, aggressive. **Controls:** Mowing, hand cutting or herbicide use is recommended.

Photos by Leslie J. Mehrhoff

Microstegium vimineum - Japanese Stilt Grass

Family: Poaceae
Native to: Asia

Japanese Stilt Grass—*Microstegium vimineum*

Japanese Stilt Grass woodland invasion

Description: Weak-stemmed annual grass, reaching 2-4' tall. **Leaves:** Lanceolate, tapered at both ends, 2-3" long with silvery stripe of reflective hairs down the midrib. **Flowers:** Racemes occur at the ends of the stalk itself, late August. **Fruit:** Achenes develop in late fall. **Zone:** 5-11. **Habitat:** Occurs along riverbanks, floodplains, forests and roadsides, adaptable to most soil and light conditions. **Spread:** Seeds spread by water, wildlife & humans. **Comments:** Plants spread quickly into natural areas leading to competition and displacement of native species. **Controls:** Small populations can be hand pulled while large populations can be continuously cut back to prevent flowering and seed production. Herbicide treatments are also effective.

Early development

Root (UMASS Extension)

Leaf with silvery reflective hairs along midrib

Fall-leaves turn purplish

Seed-Achene

Photos courtesy of Leslie J. Mehrhoff/UCONN-IPANE and UMASS Extension

Celastrus orbiculatus - Oriental Bittersweet

Family: Celastraceae
Native to: Japan, China

Oriental Bittersweet-*Celastrus orbiculatus*

Oriental Bittersweet invasion, Concord, NH

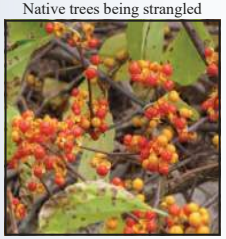
Description: Deciduous vine reaching heights of 40-60'. **Bark:** Tannish, furrowed. **Leaves:** Alternate, ovate, bluntly toothed, 3-4" long by 2/3's as wide, tapered at the base. **Flowers:** Small, greenish, blooming in spring. **Fruit:** Yellow dehiscent capsule surrounding an orange-red aril. *Fruits occur in the axils of the stems whereas native bittersweet (Celastrus scandens) fruits at the ends.* **Zone:** 4-8. **Habitat:** Disturbed edges, roadsides, fields, forests and along rivers and streams. **Spread:** Birds and humans. **Comments:** Very aggressive, climbs up and over trees and smothers them. Do not buy wreaths made of these vines. **Controls:** Difficult to manage. Cutting, pulling, or recommended herbicide use applied to foliage, bark, or cut-stump.

Looking up into canopy

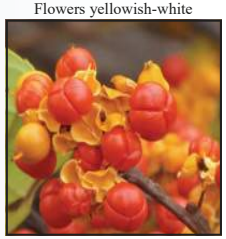
Leaves

Native trees being strangled

Flowers yellowish-white

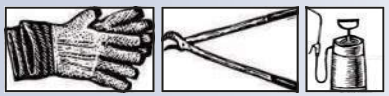


Mature Orange-yellow fruit



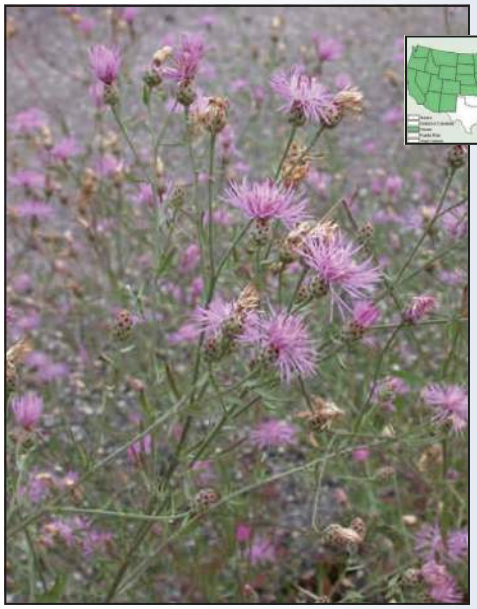
Fruit is a fleshy capsule

Photos by Douglas Cygan

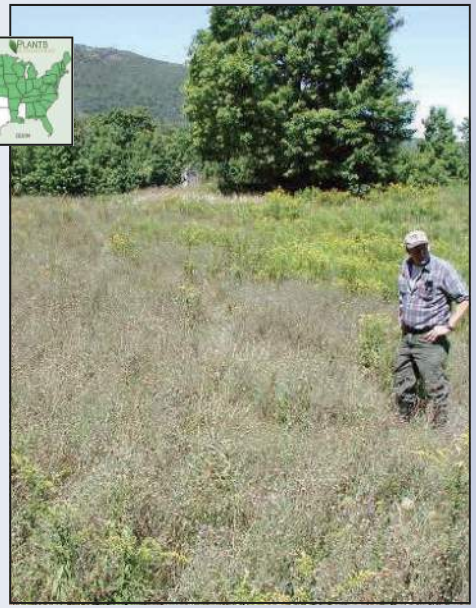


Centaurea maculosa - Spotted Knapweed

Family: Compositae
Native to: Eurasia



Spotted Knapweed—*Centaurea maculosa*



Invasion (photo by Leslie Mehrhoff)

Description: Tall erect herbaceous perennial living 3-5 years. **Leaves:** Alternate, divided, Pale green, 1-3" long. **Flowers:** Aster-like, terminal, purple, July-August. **Fruit:** Each plant produces thousands of brownish seeds per year. **Zone:** 3-10. **Habitat:** Invades dry sunny roadsides, fields and waste places. Its large taproot allows it to survive harsh winters and draught **Spread:** Seeds spread by wind and wildlife. **Comments:** Plants spread quickly into natural meadows and fields leading to competition and displacement of native species. Roots excrete a toxin killing off other plants. **Controls:** Small populations can be hand pulled while large populations can be continuously cut back to prevent flowering and seed production. Herbicide treatments are also effective.

Basal rosette

Leaf

Seed head

Flowers—Aster like

Stems

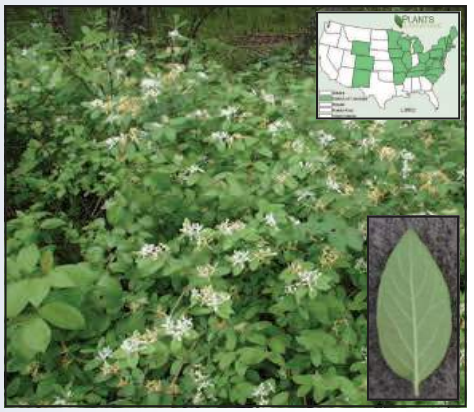
Seeds

Photos by Leslie Mehrhoff & Douglas Cygan

Lonicera morrowii - Morrow's Honeysuckle

Family: Caprifoliaceae
Native to: Japan

Description: Shrub reaching 6-8' tall. **Stems:** Smooth, glabrous, Tannish, hollow. **Leaves:** Ovate, simple, entire, opposite, pubescent beneath, 1-2 1/2" long. **Flowers:** Tubular, white, turning yellow with age, May to June. **Fruits:** Berry turning red. **Zone:** 3 . **Habitat:** Moist to wet shaded floodplains, forests, roadsides, fields, waste places. **Spread:** Seeds are dispersed by wildlife and humans. **Comments:** Rapidly invades sites, forming a dense vegetative layer that outcompetes native flora and fauna species. **Controls:** Hand control is effective for small plants, while mechanical removal and repetitive cutting also work well. Herbicide treatment is better for areas with greater infestations.



Photos by Douglas Cygan & Leaf Photo by Leslie J. Mehrhoff

Lonicera tatarica - Tatarian Honeysuckle

Family: Caprifoliaceae
Native to: Eurasia

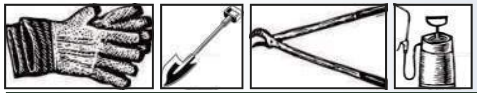
Description: Upright deciduous shrub reaching 6-15' tall. **Stems:** Smooth, glabrous, tan, hollow. **Leaves:** Ovate, smooth, bluish-green, opposite, 1-2 1/2" long. **Flowers:** Tubular, pink or white, April to May. **Fruit:** Berry with two seeds, turning red in fall. **Zone:** 3. **Habitat:** Under story species in woodland sites, also invades open spaces. Thrives in moist soils. **Spread:** Seeds dispersed by wildlife and humans. **Comments:** Rapidly invades forests, fields, roadsides and floodplains. Outcompetes native species. **Controls:** Hand control is effective for small plants while mechanical removal, cutting and chemical applications are better for larger stands.

Photos by Leslie J. Mehrhoff & Berry Photo by Douglas Cygan

Lonicera x bella - Showy Bush Honeysuckle

Family: Caprifoliaceae
Native to: Eurasia

Description: Shrub reaching 20' in height and width. **Stems:** Greenish to tan with corky wings. **Leaves:** Oppositely arranged, simple and elliptic, 1-3" long by half as wide, light green. **Flowers:** Yellow, white or pink, May to early June. **Fruit:** Fleshy red, forming in pairs in leaf axis. **Zone:** 4. **Habitat:** Prefers dry upland soils, full sun to heavy shade, pH adaptable. **Spread:** Seeds are dispersed by birds. **Comments:** *L. x bella* is a cross between *L. tatarica* & *L. morrowii*. Spreads into natural areas forming dense stands, which displace native species. **Controls**: Hand or mechanical removal, continuous cutting, girdling, and herbicide treatment.

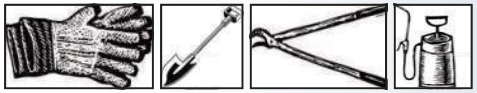


Photos courtesy of Leslie J. Mehrhoff/UCONN-IPANE

Lonicera japonica - Japanese Honeysuckle

Family: Caprifoliaceae
Native to: Eurasia

Description: Climbing vine. **Stems:** Reddish-brown, pubescent. **Leaves:** Opposite and not clasping the stem as opposed to the three native honeysuckle vines that do clasp the stem, oblong, $1^1/_2$ -2" long, rounded at base. **Flowers:** Tubular, white or yellow, fragrant, May to mid-July. **Fruit:** Berry, smooth, blackish to slightly purplish. **Zone:** 4-8. **Habitat:** Prefers moist soils and full sun to partial shade. **Spread:** Seeds spread by wildlife. **Comments:** Vines grow quickly, covering native vegetation, resulting in loss of habitat. **Controls:** hand or mechanical removal, cutting, girdling, chemical.



Photos courtesy of John M. Randall/The Nature Conservancy
& Leaf Photo by Leslie J. Mehrhoff

Cynanchum nigrum - Black Swallow-Wort

Family: Asclepiadaceae
Native to: Eurasia

Description: Perennial herbaceous vine that grows to 6'. **Leaves:** Opposite, lanceolate, dark glossy green, simple with a smooth edge, 2-4" long. **Flowers:** Small $^1/_4$", 5-petaled, purplish, from June to September. **Seed:** Seeds are similar to those of milkweed. **Zone:** 4 to 8. **Habitat:** It prefers full to partial sun. **Spread:** Seeds dispersed by wind. **Comments:** Invades roadsides, fields, disturbed sites, meadows, and woodlands, outcompeting native species. **Controls:** Hand pull young plants. Remove and destroy seed pods before they open. Apply herbicides as a foliar spray during the growing season. If plants are to be dug, use a spade and make sure that all root fragments are removed.

Photos by Douglas Cygan

Cynanchum rossicum - Pale Swallow-Wort

Family: Asclepiadaceae
Native to: China

Description: Perennial vine growing to 3-6'. Very similar to black swallow-wort with the exception of the flowers. **Leaves:** Opposite, lanceolate, 2-4" long. **Flowers:** Magenta, $^3/_8$", flowering from June to September. **Seed:** Seeds are similar to milkweed. **Zone:** 4 to 8. **Habitat:** It prefers full to partial sun. **Spread:** Seeds dispersed by wind. **Comments:** Invades roadsides, fields, disturbed sites, meadows and woodlands. **Controls:** Hand pull young plants. Remove and destroy seed pods before they open. Apply herbicides as a foliar spray. Dig using a spade to ensure all root fragments are removed.

Photos courtesy of John M. Randall/The Nature Conservancy

Elaeagnus umbellata - Autumn Olive

Family: Elaeagnaceae
Native to: Asia

Autumn Olive—Elaeagnus umbellata

Autumn Olive invasion in Concord, NH

Description: Weedy deciduous shrub measuring 20' by 20'. **Bark:** Silvery-gray and smooth with whitish lenticels. **Stems:** Cinnamon-brown. **Leaves:** Elliptical, 2-3" long, glossy, green above and silverish below. **Flowers:** Solitary, whitish, 4-petaled, mid-June. **Fruit:** Drupe. **Zone:** 3-8. **Habitat:** Naturalizes in open spaces exposed to full sun. **Spread:** Seeds dispersed by birds and wildlife. **Comments:** Very aggressive. Outcompetes and displaces native species. **Controls:** Remove seedlings and saplings by hand. Larger shrubs can be mechanically removed, or cut and apply herbicide to stump.

Silvery-gray Bark

Leaves

Terminal bud

Flowers whitish

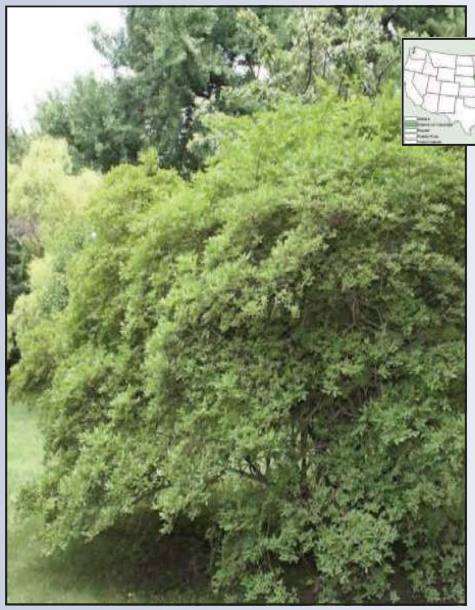
Fall Color

Fruit is a fleshy drupe

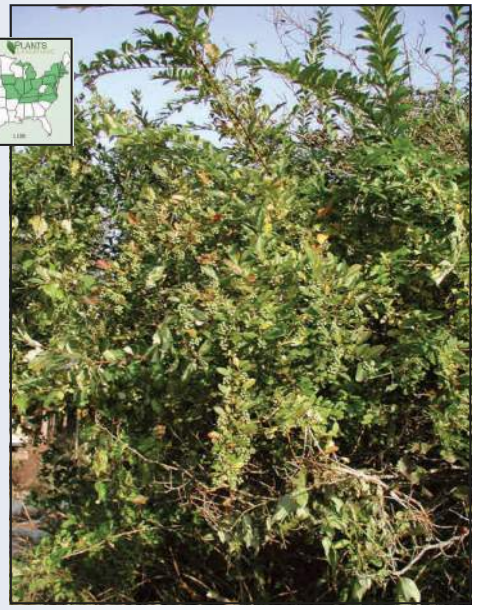
Photos by Douglas Cygan

Ligustrum obtusifolium - Blunt-leaved Privet

Family: Oleaceae
Native to: Europe



Blunt-leaved Privet-*Ligustrum obtusifolium*



Blunt-leaved Privet (Photo: Leslie J. Mehrhoff)

Description: Shrub reaching 12' tall by 10-12' wide. **Stems:** Greenish, smooth. **Leaves:** Opposite, simple and elliptic, 1-3" long by half as wide, blunt tipped, light green. **Flowers:** Small white panicles, May to early June. **Fruit:** Small blackish drupe. **Zone:** 4-7. **Habitat:** Prefers dry upland soils, full sun to heavy shade, pH adaptable. **Spread:** Seeds dispersed by birds. **Comments**: Becomes established in natural areas leading to competition and displacement of native species. **Controls:** Hand or mechanical removal, cutting, herbicide applications such as foliar or cut-stem.

Twig/stem bark

Leaves

Terminal bud

Flowers white

Fall color

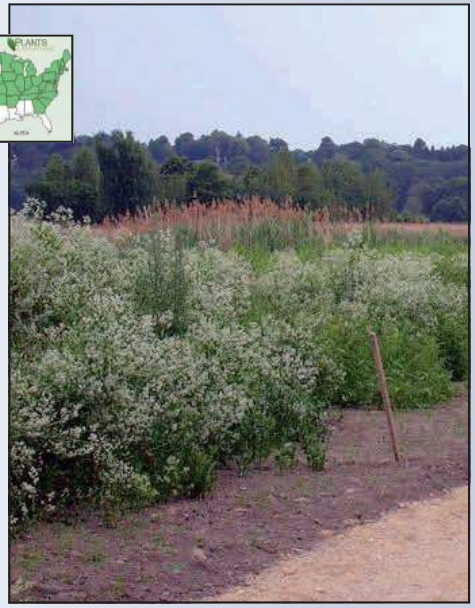
Fruit is a dark drupe

Photos by Douglas Cygan & Leslie Mehrhoff

Lepidium latifolium - Perennial Pepperweed

Family: Cruciferae
Native to: Eurasia

Perennial Pepperweed—*Lepidium latifolium*

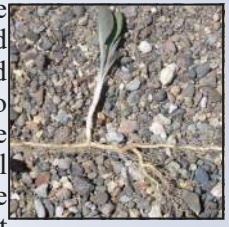


Perennial Pepperweed invasion Seacoast area, NH

Description: Long lived perennial growing 2-4' tall. **Leaves:** Alternate, lanceolate with serrated edge. **Flowers:** Terminal, tightly clustered, white, July. **Fruit:** Silicle, rounded, flattish, hairy $^{1}/_{16}$" long. **Zone:** 4-8. **Habitat:** Prefers wet, brackish soils such as coastal tidal marshes and ditches, wetlands, and floodplains. **Spread:** Seeds and creeping rhizome fragments spread by water, wildlife and humans. **Comments:** Plants spread quickly into natural areas leading to competition and displacement of native coastal wetland species. **Controls:** Small populations can be hand pulled while large populations can be continuously cut back to prevent flowering and seed production. Herbicide treatments are also effective.

Basal rosette

Leaf



Rhizome root with shoot

Flower head

Persistent stems

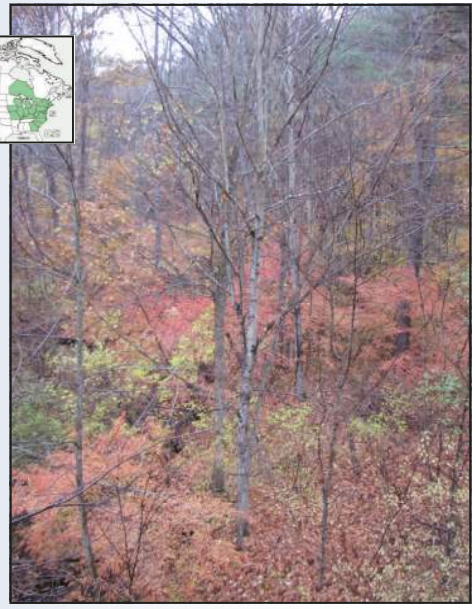
Seeds (photo—USDA)

Photos by Kevin Lucey & Jennifer Forman

Euonymus alatus - Burning Bush

Family: Celastraceae
Native to: Asia

Burning Bush-*Euonymus alatus*



Burning Bush invasion, Boscawen, NH

Description: Deciduous shrub reaching 20' in height and width. **Stems:** Greenish with corky wings. **Leaves:** Oppositely arranged, simple and elliptic, 1-3" long by half as wide, light green. **Flowers:** Inconspicuous greenish-yellow, May to June. **Fruit:** Fleshy green capsule turning red in fall. **Zone:** 3 to 8. **Habitat:** Prefers dry upland soils, full sun to heavy shade, pH adaptable. **Spread**: Seeds are dispersed by birds and wildlife. **Comments:** Outcompetes and displaces native species. **Controls:** Hand remove seedlings and saplings. Use a spade or shovel to dig out larger plants. Large populations may be controlled with herbicide use.

Corky-winged bark

Leaves

Terminal buds

Flowers yellowish-white

Fall color

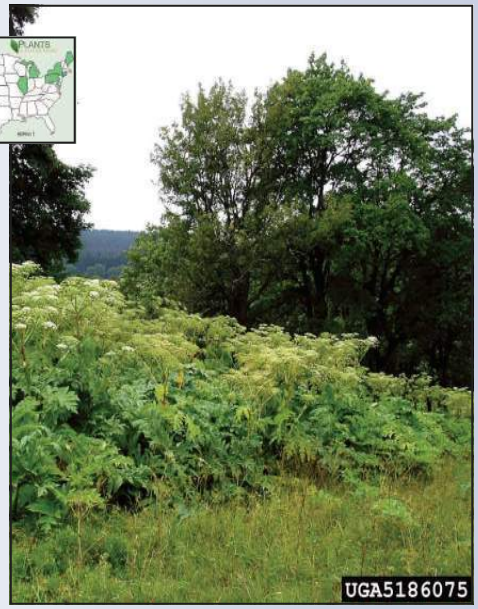
Fruit is a fleshy capsule

Photos by Douglas Cygan

Heracleum mantegazzianum - Giant Hogweed

Family: Apiaceae
Native to: China

Giant Hogweed-*Heracleum mantegazzianum*



Open field invasion (Photo-Bugwood.org)

Description: Biennial growing to 15' tall. **Stems:** Greenish with purple splotches, 2-4" diameter with coarse hairs, hollow. **Leaves:** Large, compound, deeply incised, 3-5' wide, hairy on underside. **Flowers:** White inflorescence, 1-2' in diameter, May-June. **Seeds:** Flattened, $^{3}/_{8}$" long, ovate with 4 brown resin canals. **Zone:** 3-8. **Habitat:** Found in wet areas, roadsides, gardens, open spaces, full sun to partial shade. **Spread:** Seeds dispersed by water, wildlife and humans. **Comments:** The clear, watery sap is phototoxic to human skin, causing severe blistering and burns. Spreads readily and displaces native species. **Controls:** Remove plants by digging up tap root. Herbicide can also be used as a foliar treatment.

Purple spotted, hairy stem

Leaf

130-150 Floral rays

Flowers whitish umbel

Persistent dead stalks

Seeds with resinous veins

Photos by Douglas Cygan

Hesperis matronalis - Dame's Rocket

Family: Brassicaceae
Native to: Eurasia

Dame's Rocket—*Hesperis matronalis*

Dame's Rocket invasion

Description: Cool season biennial, 2nd year plants flower and reach 30" tall. **Leaves:** Alternately arranged and lanceolate in shape with toothed margins. **Flowers:** Terminal racemes, 4-petals, purplish, early to mid spring. **Fruit:** Pods, seeds turn brown when mature. **Zone:** 4-8. **Habitat:** Prefers partial sun, moist to mesic conditions such as floodplains, forests and roadsides, adaptable to full sun with adequate moisture. **Spread:** Seeds spread by water and wildlife. **Comments:** Plants spread quickly into natural areas leading to competition and displacement of native species. **Controls:** Small populations can be hand pulled while large populations can be continuously cut back to prevent flowering and seed production. Herbicide treatments are also effective.

Basal rosette

Leaf

Flower buds

Flowers 4-petaled, white

Stems

Seed pods

Photos by Leslie Mehroff

SECTION 5 STORMWATER INSPECTION & MAINTENANCE LOG

STORMWATER INSPECTION MAINTENANCE LOG

2255 Lafayette Road- Portsmouth, NH

General Information			
Project Name	Retail Motor Fuel Outlet	**Location**	Portsmouth, NH
Date of Inspection		**Start/ End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			

	Site Specific BMP's	Maintenance Interval
1	Street Sweeping	1 year
2	Deep Sump Catch Basins	6 months
3	Outlet Apron/Weirs	1 Year
4	Oil/Water Separator	6 months
5	Hydrodynamic Separators (First Defense Unit)	1 Year (See separate maintenance log for First Defense Unit)
6	Jellyfish Filter	1 Year (See separate maintenance log for Jellyfish Filter)
7	Underground Detention System	6 months

STORMWATER INSPECTION MAINTENANCE LOG

2255 Lafayette Road - Portsmouth, NH

BMP Description	Corrective Action Required?	Notes
Street Sweeping		
Evidence of debris accumulation	☐ Yes ☐ No	
Evidence of oil grease	☐ Yes ☐ No	
Other (specify)	☐ Yes ☐ No	
Deep Sump Catch Basins		
Grates clear of debris	☐ Yes ☐ No	
Inlet and outlet clear of debris	☐ Yes ☐ No	
Evidence of oil grease	☐ Yes ☐ No	
Observance of accumulated sediment	☐ Yes ☐ No	Sediment Depth =
Evidence of structural deterioration	☐ Yes ☐ No	
Evidence of flow bypassing facility	☐ Yes ☐ No	
Other (specify)	☐ Yes ☐ No	
Outlet Aprons/Weirs		
Inlet/ inflow pipe clear of debris	☐ Yes ☐ No	
Overflow spillway clear of debris	☐ Yes ☐ No	
Evidence of rilling or gullying	☐ Yes ☐ No	
Tree growth	☐ Yes ☐ No	
Other (specify)	☐ Yes ☐ No	
Oil / Water Seperator		
Grates clear of debris	☐ Yes ☐ No	
Inlet and outlet clear of debris	☐ Yes ☐ No	
Observance of accumulated sediment	☐ Yes ☐ No	Sediment Depth =
Evidense of oil grease	☐ Yes ☐ No	
Evidence of flow bypassing facility	☐ Yes ☐ No	
Hydrodynamic Separator (First Defense Unit)		
See separate maintenance log for First Defense Unit		
Jellyfish Filter		
See separate maintenance log for Jellyfish Filter		
Underground Detention System		
Inlet and outlet clear of debris	☐ Yes ☐ No	
Pipe bottom clear of debris	☐ Yes ☐ No	
Observance of accumulated sediment	☐ Yes ☐ No	Sediment Depth =
Bottom dewaters within 72 hrs. of a storm event	☐ Yes ☐ No	
Outlet control structure clear of debris	☐ Yes ☐ No	
Other (specify)		

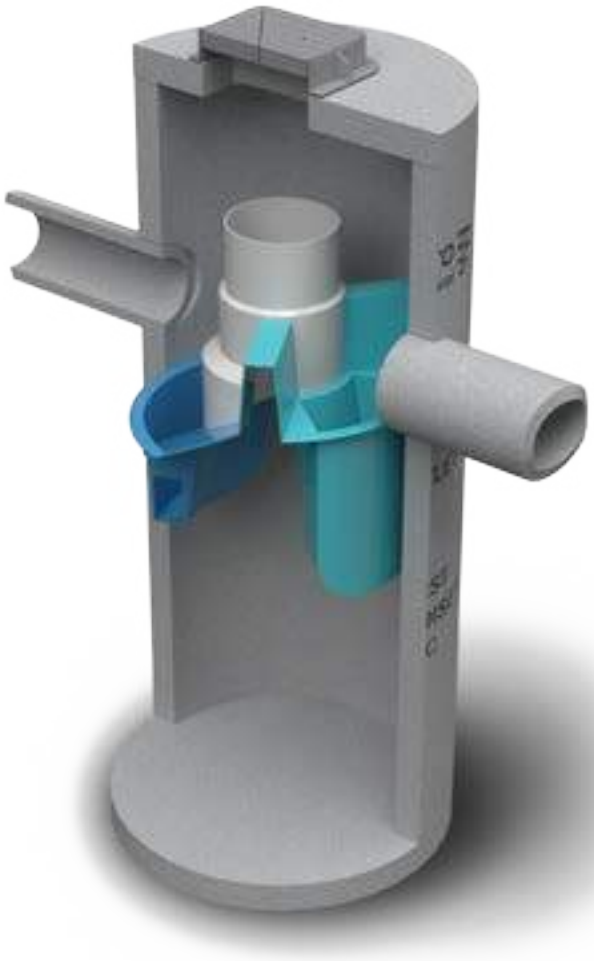
NOTE: Photos shall be provided with each inspection log and shall be sufficiently labeled to identify photo location.

SECTION 6 DE-ICING LOG

Deicing Log

Date Applied	Type of Deicing Material	Amount Applied

Hydro International



Operation and Maintenance Manual

First Defense® and First Defense® High Capacity

Vortex Separator for Stormwater Treatment

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Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

Hydro Maintenance Services

Hydro International has been engineering stormwater treatment systems for over 30 years. We understand the mechanics of removing pollutants from stormwater and how to keep systems running at an optimal level.

Nobody Knows our Systems Better than we do

Avoid Service Negligence

Sanitation services providers not intimately familiar with stormwater treatment systems are at risk of the following:

- Inadvertently breaking parts or failing to clean/replace system components appropriately.
- Charging you for more frequent maintenance because they lacked the tools to service your system properly in the first place.
- Billing you for replacement parts that might have been covered under your Hydro warranty plan
- Charging for maintenance that may not yet have been required.

Leave the Dirty Work to us

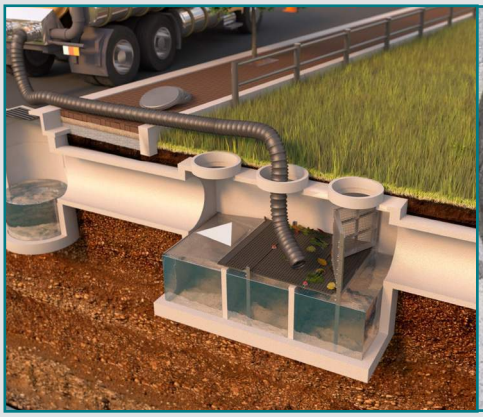
Trash, sediment and polluted water is stored inside treatment systems until they are removed by our team with a vactor truck. Sometimes teams must physically enter the system chambers in order to prepare the system for maintenance and install any replacement parts. Services include but are not limited to:

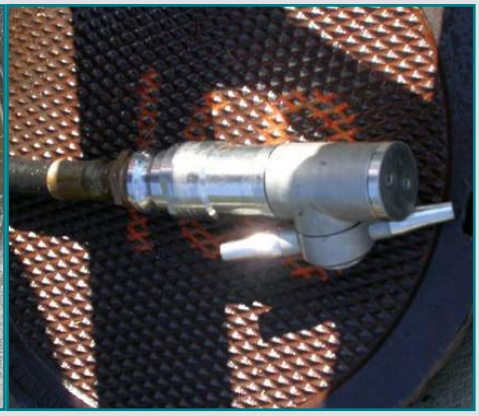
- Solids removal
- Removal of liquid pollutants
- Replacement media installation (when applicable)

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

Better Tools, Better Results

Not all vactor trucks are created equal. Appropriate tools and suction power are needed to service stormwater systems appropriately. Companies who don't specialize in stormwater treatment won't have the tools to properly clean systems or install new parts.





Service Warranty

Make sure you're not paying for service that is covered under your warranty plan. Only Hydro International's service teams can identify tune-ups that should be on us, not you.

Treatment Systems Serviced by Hydro:

- Stormwwater filters
- Stormwater separators
- Baffle boxes
- Biofilters/biorention systems
- Storage structures
- Catch basins
- Stormwater ponds
- Permeable pavement

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I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations (refer to *Section II. Model Sizes & Configurations*, page 4) to accommodate a wide range of pipe sizes, peak flows and depth constraints.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 500% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

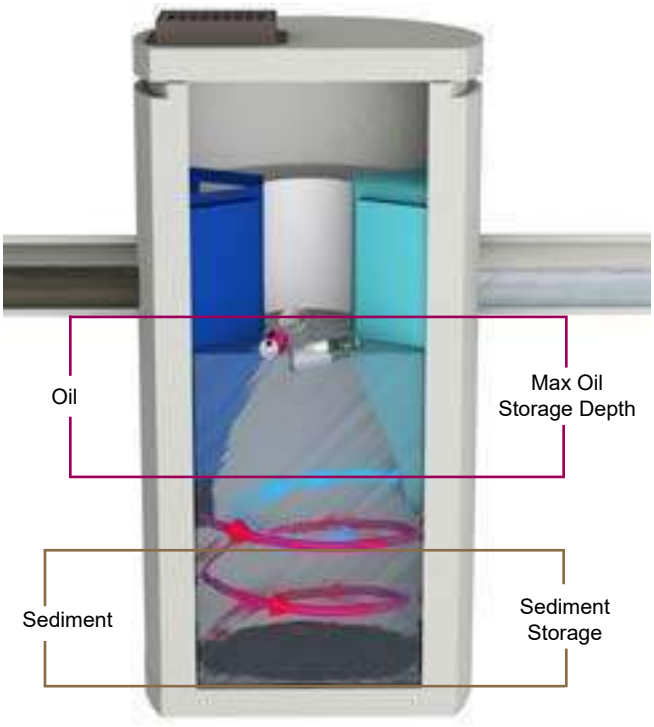

Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components of the First Defense®-4HC and First Defense®-6HC have modified geometries as to allow greater design flexibility needed to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2a - 2b). First Defense® model parameters and design criteria are shown in Table 1.

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

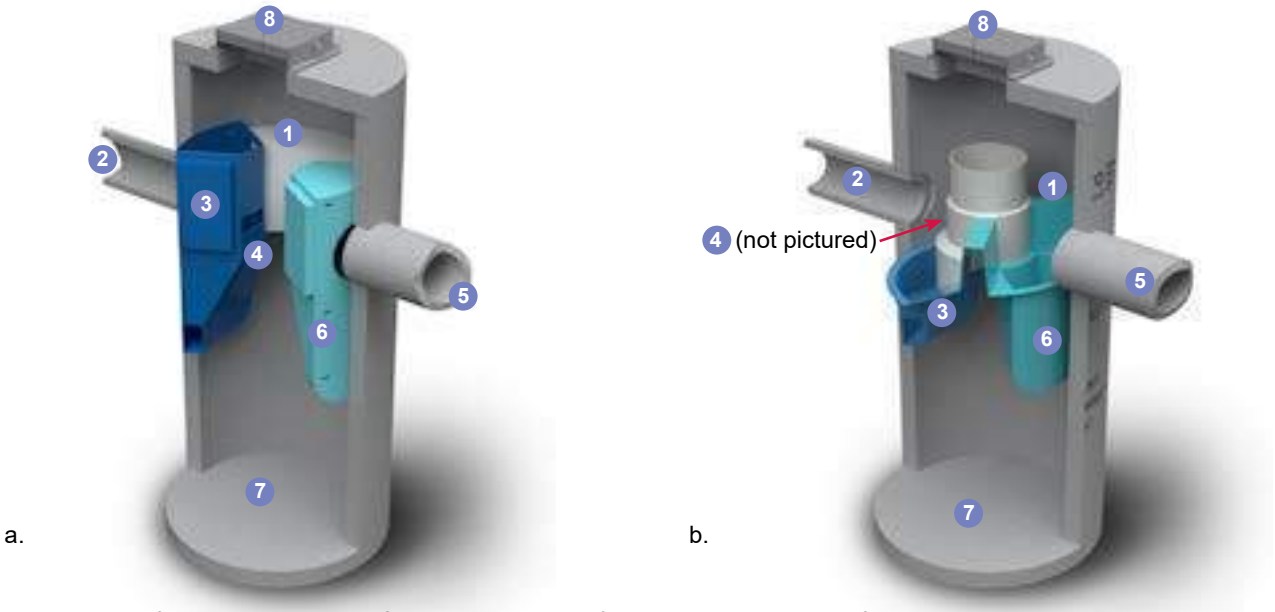

Fig.2a) First Defense®-4 and First Defense®-6; b) First Defense®-4HC and First Defense®-6HC, with higher capacity dual internal bypass and larger maximum pipe diameter.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Standard Distance from Outlet Invert to Sump Floor
		NJDEP Certified	106µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	1.60 / 45.3	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	1.88 / 50.9	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC	5 / 1.5	2.34 / 66.2	2.94 / 82.1	20 / 566	24 / 609	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	4.73 / 133.9	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	7.52 / 212.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

III. Maintenance

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in Table 1.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense®-HC have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

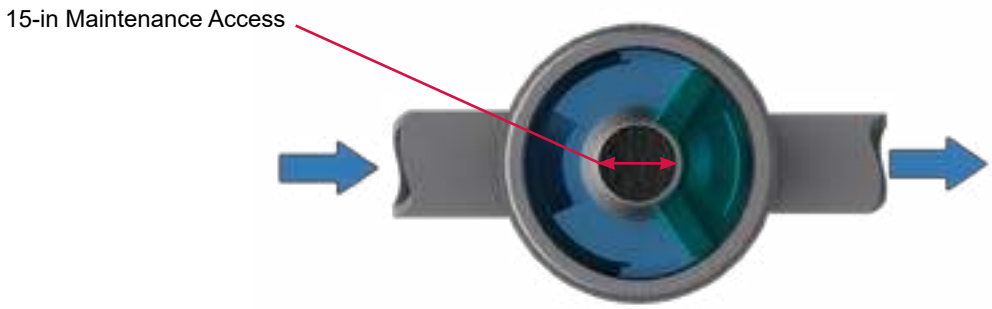

Fig.3 The central opening to the sump of the First Defense®-HC is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for a 6-ft First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.5).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose and skimmer pole to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Fig.4 Floatables are removed with a vactor hose (First Defense model FD-4, shown).

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose (Fig.5) or with the skimmer or net (not pictured).

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor (Fig.5).

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Fig.5 Sediment is removed with a vactor hose (First Defense model FD-4, shown).

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

First Defense® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE): **FD-4** **FD-4HC** **FD-6** **FD-6HC**

INLET (CIRCLE ALL THAT APPLY): **GRATED INLET (CATCH BASIN)** **INLET PIPE (FLOW THROUGH)**

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

First Defense® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

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Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

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stormwaterinquiry@hydro-int.com

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Turning Water Around...®

CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter
Owner's Manual

Jellyfish® Filter

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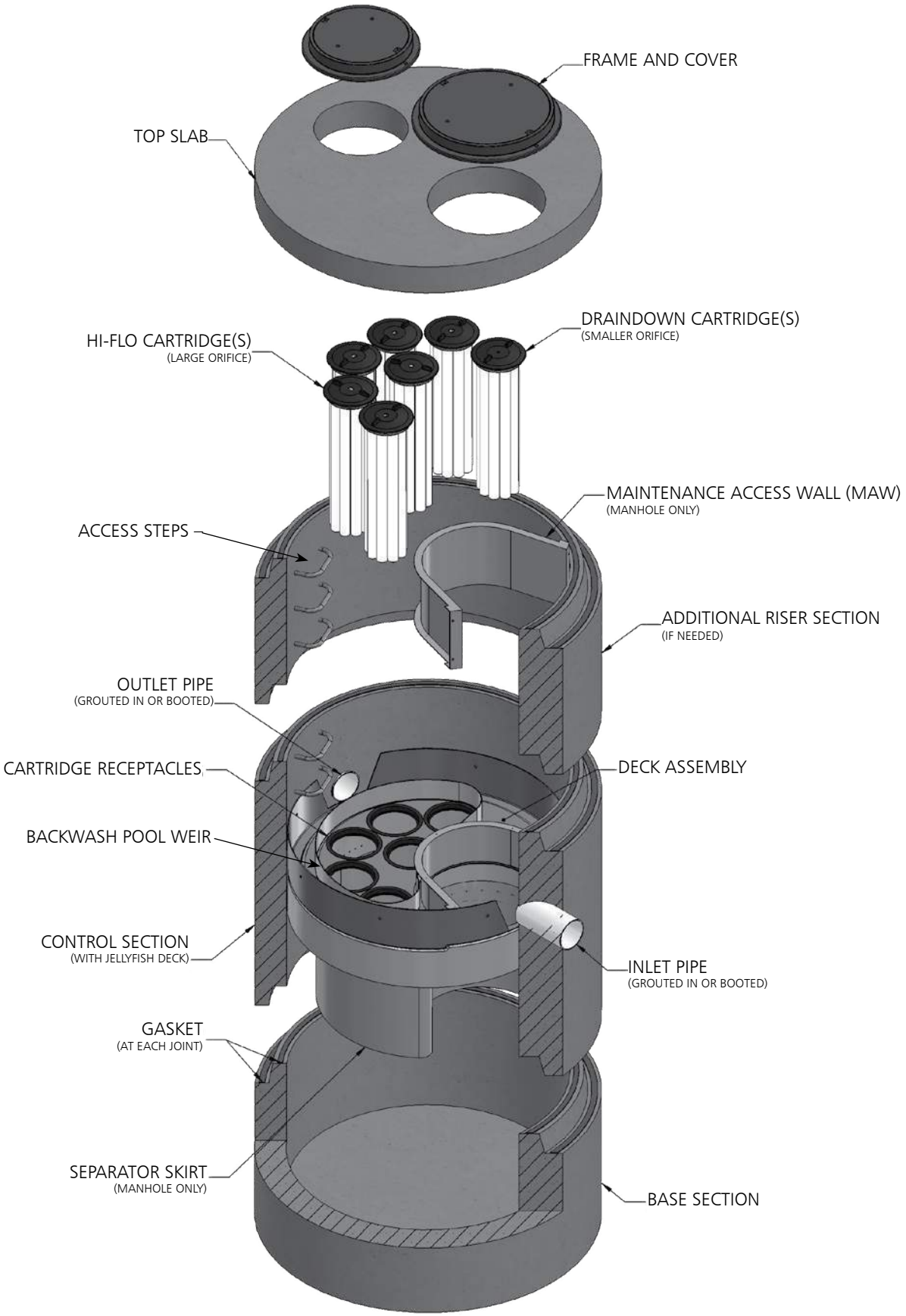
THANK YOU FOR PURCHASING THE JELLYFISH® FILTER!

Contech Engineered Solutions would like to thank you for selecting the Jellyfish Filter to meet your project's stormwater treatment needs. With proper inspection and maintenance, the Jellyfish Filter is designed to deliver ongoing, high levels of stormwater pollutant removal.

If you have any questions, please feel free to call us or e-mail us:

Contech Engineered Solutions
9025 Centre Pointe Drive, Suite 400 | West Chester, OH 45069
513-645-7000 | 800-338-1122
www.ContechES.com
info@conteches.com


FRAME AND COVER
TOP SLAB
DRAINDOWN CARTRIDGE(S)
(SMALLER ORIFICE)
HI-FLO CARTRIDGE(S)
(LARGE ORIFICE)
MAINTENANCE ACCESS WALL (MAW)
(MANHOLE ONLY)
ACCESS STEPS
ADDITIONAL RISER SECTION
(IF NEEDED)
OUTLET PIPE
(GROUTED IN OR BOOTED)
CARTRIDGE RECEPTACLES
DECK ASSEMBLY
BACKWASH POOL WEIR
CONTROL SECTION
(WITH JELLYFISH DECK)
INLET PIPE
(GROUTED IN OR BOOTED)
GASKET
(AT EACH JOINT)
SEPARATOR SKIRT
(MANHOLE ONLY)
BASE SECTION

WARNINGS / CAUTION

1. FALL PROTECTION may be required.
2. WATCH YOUR STEP if standing on the Jellyfish Filter Deck at any time; Great care and safety must be taken while walking or maneuvering on the Jellyfish Filter Deck. Attentive care must be taken while standing on the Jellyfish Filter Deck at all times to prevent stepping onto a lid, into or through a cartridge hole or slipping on the deck.
3. The Jellyfish Filter Deck can be SLIPPERY WHEN WET.
4. If the Top Slab, Covers or Hatches have not yet been installed, or are removed for any reason, great care must be taken to NOT DROP ANYTHING ONTO THE JELLYFISH FILTER DECK. The Jellyfish Filter Deck and Cartridge Receptacle Rings can be damaged under high impact loads. This type of activity voids all warranties. All damaged items to be replaced at owner's expense.
5. Maximum deck load 2 persons, total weight 450 lbs.

Safety Notice

Jobsite safety is a topic and practice addressed comprehensively by others. The inclusions here are intended to be reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s) and Contractor(s). OSHA and Canadian OSH, and Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.

Confined Space Entry

Secure all equipment and perform all training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to proceed safely at all times.

Personal Safety Equipment

Contractor is responsible to provide and wear appropriate personal protection equipment as needed including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment as necessary. Make sure all equipment is staffed with trained and/or certified personnel, and all equipment is checked for proper operation and safety features prior to use.

- Fall protection equipment
- Eye protection
- Safety boots
- Ear protection
- Gloves
- Ventilation and respiratory protection
- Hard hat
- Maintenance and protection of traffic plan

Chapter 1

1.0 – Owner Specific Jellyfish Filter Product Information

Below you will find a reference page that can be filled out according to your Jellyfish Filter specification to help you easily inspect, maintain and order parts for your system.

Owner Name:	
Phone Number:	
Site Address:	
Site GPS Coordinates/unit location:	
Unit Location Description:	
Jellyfish Filter Model No.:	
Contech Project & Sequence Number	
No. of Hi-Flo Cartridges	
No. of Cartridges:	
Length of Draindown Cartridges:	
No. of Blank Cartridge Lids:	
Bypass Configuration (Online/Offline):	

Notes:

_____

_____

_____

_____

Chapter 2

2.0 – Jellyfish Filter System Operations and Functions

The Jellyfish Filter is an engineered stormwater quality treatment technology that removes a high level and wide variety of stormwater pollutants. Each Jellyfish Filter cartridge consists of eleven membrane - encased filter elements ("filtration tentacles") attached to a cartridge head plate. The filtration tentacles provide a large filtration surface area, resulting in high flow and high pollutant removal capacity.

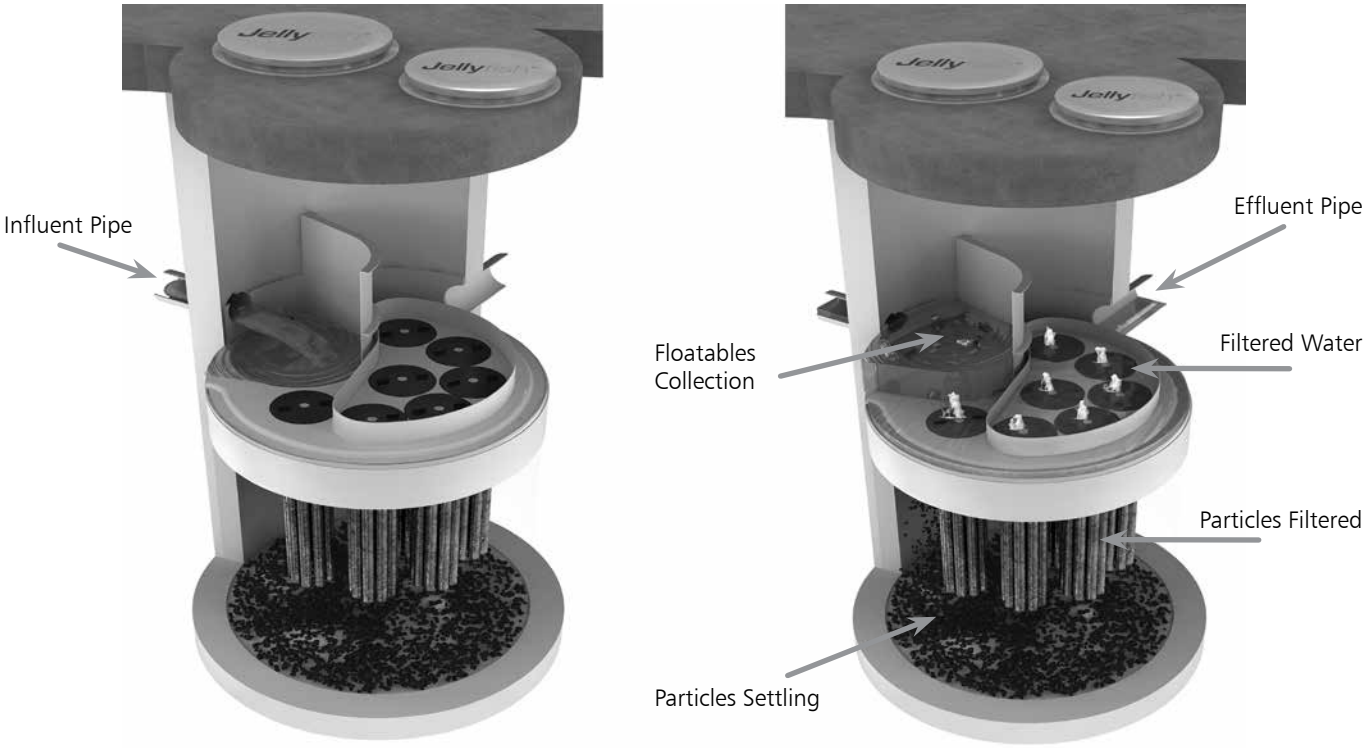
The Jellyfish Filter functions are depicted in Figure 1 below.

FIGURE 1

Jellyfish Filter Treatment Functions

Membrane Filtration

Section View with Maintenance Access Wall (MAW) Cutaway



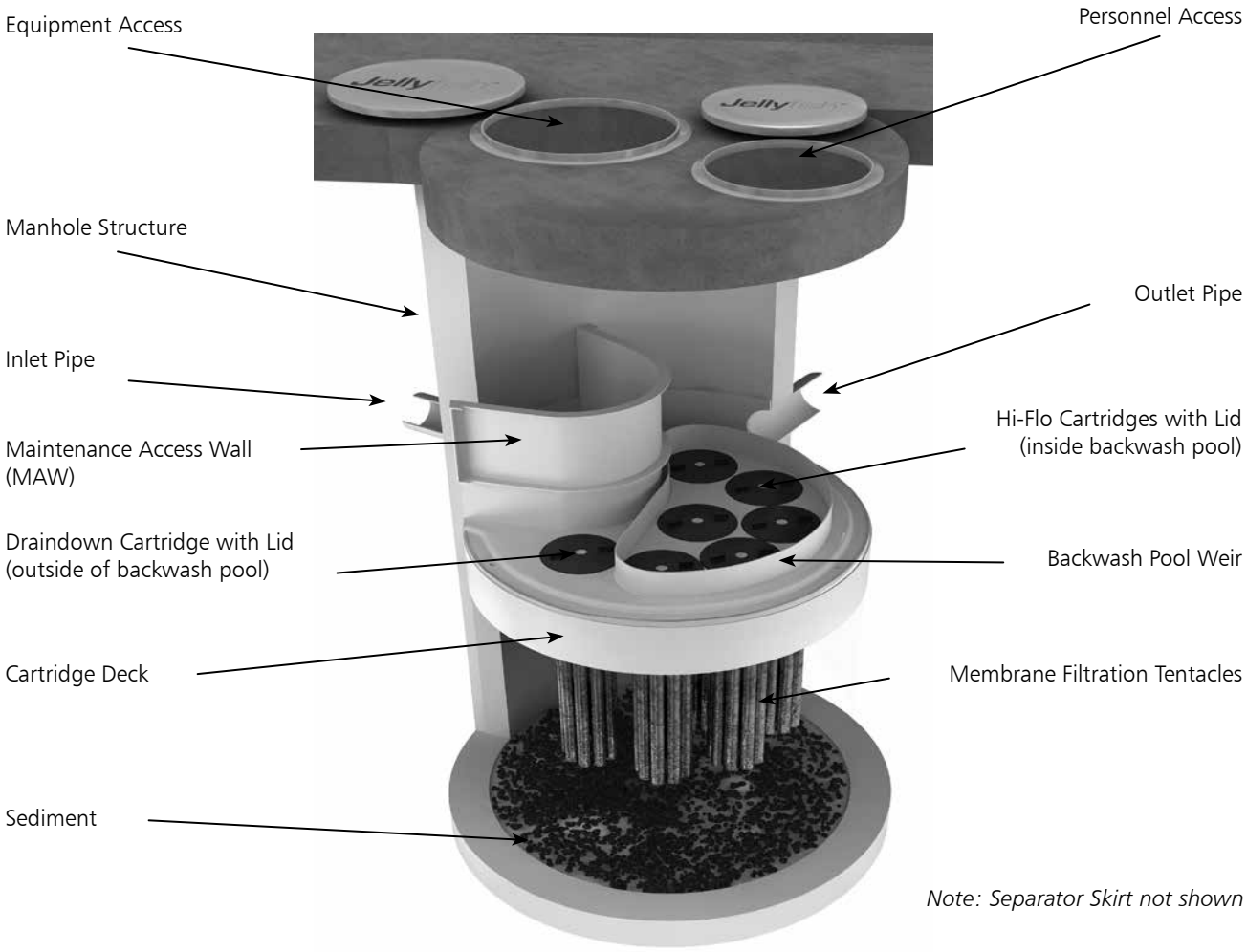
Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

For additional details on the operation and pollutant capabilities of the Jellyfish Filter please refer to additional details on our website at www.ContechES.com.

2.1 – Components and Cartridges

The Jellyfish Filter and components are depicted in Figure 2 below.

FIGURE 2 **Jellyfish Filter Components**



Tentacles are available in various lengths as depicted in Table 1 below.

Table 1 – Cartridge Lengths / Weights and Cartridge Lid Orifice Diameters

Cartridge Lengths	Dry Weight	Hi-Flo Orifice Diameter	Draindown Orifice Diameter
15 inches (381 mm)	10 lbs (4.5 kg)	35 mm	20 mm
27 inches (686 mm)	14.5 lbs (6.6 kg)	45 mm	25 mm
40 inches (1,016 mm)	19.5 lbs (8.9 kg)	55 mm	30 mm
54 inches (1,372 mm)	25 lbs (11.4 kg)	70 mm	35 mm

2.2 – Jellyfish Membrane Filtration Cartridge Assembly

The Jellyfish Filter utilizes multiple membrane filtration cartridges. Each cartridge consists of removable cylindrical filtration "tentacles" attached to a cartridge head plate. Each filtration tentacle has a threaded pipe nipple and o-ring. To attach, insert the top pipe nipples with the o-ring through the head plate holes and secure with locking nuts. Hex nuts to be hand tightened and checked with a wrench as shown below.

2.3 – Jellyfish Membrane Filtration Cartridge Installation

- Cartridge installation will be performed by trained individuals and coordinated with the installing site Contractor. Flow diversion devices are required to be in place until the site is stabilized (final paving and landscaping in place). Failure to address this step completely will reduce the time between required maintenance.
- Descend to the cartridge deck (see Safety Notice and page 3).
- Refer to Contech's submittal drawings to determine proper quantity and placement of Hi-Flo, Draindown and Blank cartridges with appropriate lids. Lower the Jellyfish membrane filtration cartridges into the cartridge receptacles within the cartridge deck. It is possible that not all cartridge receptacles will be filled with a filter cartridge. In that case, a blank headplate and blank cartridge lid (no orifice) would be installed.

Cartridge Assembly

Do not force the tentacles down into the cartridge receptacle, as this may damage the membranes. Apply downward pressure on the cartridge head plate to seat the lubricated rim gasket (thick circular gasket surrounding the circumference of the head plate) into the cartridge receptacle. (See Figure 3 for details on approved lubricants for use with rim gasket.)

- Examine the cartridge lids to differentiate lids with a small orifice, a large orifice, and no orifice.
  - Lids with a small orifice are to be inserted into the Draindown cartridge receptacles, outside of the backwash pool weir.
  - Lids with a large orifice are to be inserted into the Hi-Flo cartridge receptacles within the backwash pool weir.
  - Lids with no orifice (blank cartridge lids) and a blank headplate are to be inserted into unoccupied cartridge receptacles.
- To install a cartridge lid, align both cartridge lid male threads with the cartridge receptacle female threads before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation.

3.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.
Inspection activities are typically conducted from surface observations and include:

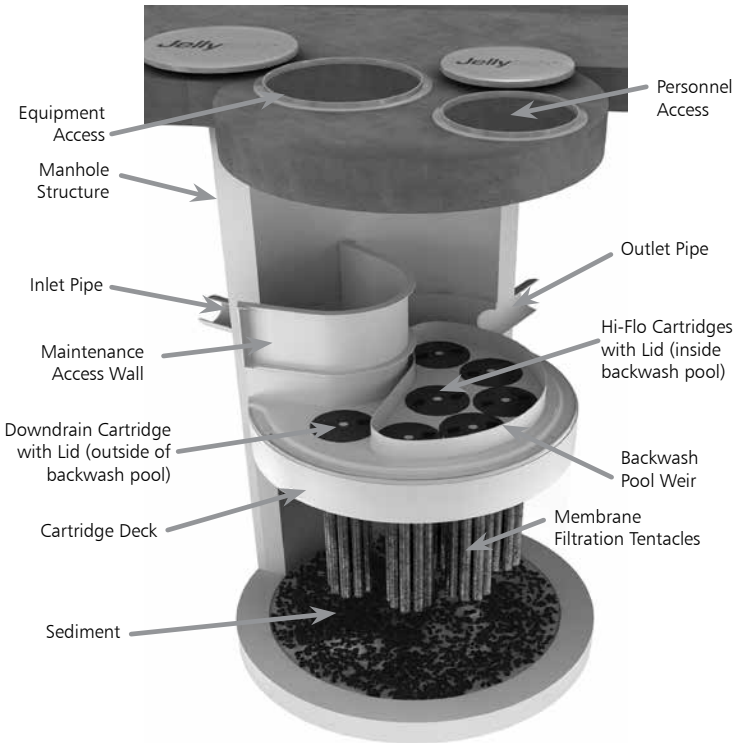
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed

4.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.



Note: Separator Skirt not shown

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

5.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

5.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥1/16") accumulated on the deck surface should be removed.

5.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

6.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

7.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

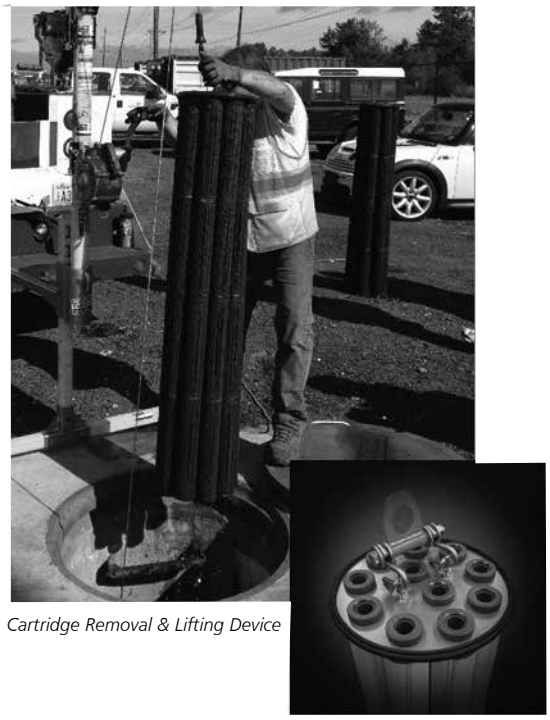
1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

7.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs*.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

7.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.
2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.



Cartridge Removal & Lifting Device

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane*.
4. Collected rinse water is typically removed by vacuum hose.

5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

7.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.
3. Pressure wash cartridge deck and receptacles to remove all

Rinsing Cartridge with Contech Rinse Tool

sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.

4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.
6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some

Vacuuming Sump Through MAW

vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. *Caution: Do not force the cartridge downward; damage may occur.*
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

7.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

7.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

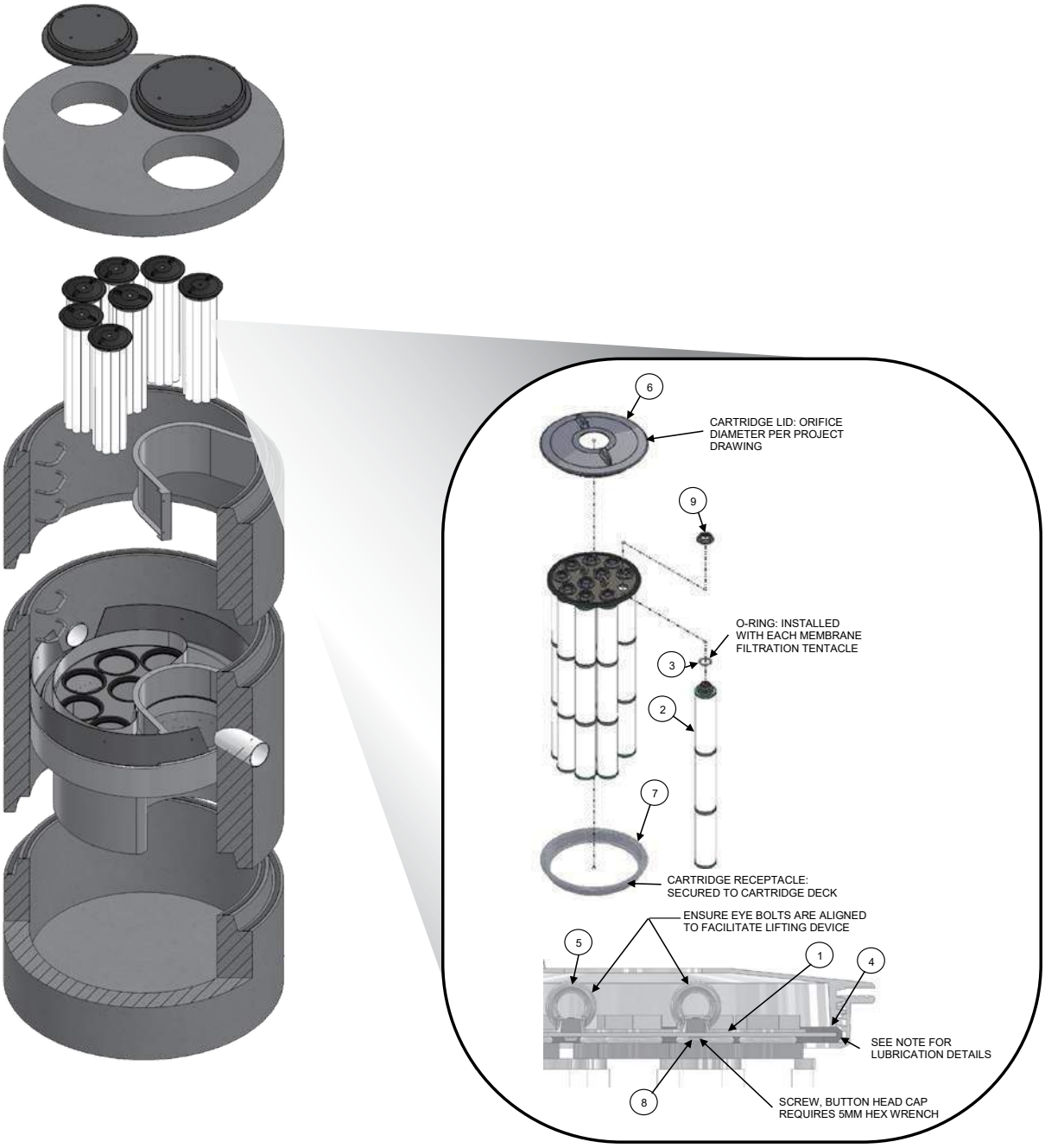


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:
Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:
Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner: _____ Jellyfish Model No.:_____

Location: _____ GPS Coordinates: _____

Land Use: Commercial:_____ Industrial: _____ Service Station:_____

Road/Highway:____ Airport: _____ Residential: _____ Parking Lot:_____

Date/Time:					
Inspector:					
Maintenance Contractor:					
Visible Oil Present: (Y/N)					
Oil Quantity Removed					
Floatable Debris Present: (Y/N)					
Floatable Debris removed: (Y/N)					
Water Depth in Backwash Pool					
Cartridges externally rinsed/re-commissioned: (Y/N)					
New tentacles put on Cartridges: (Y/N)					
Sediment Depth Measured: (Y/N)					
Sediment Depth (inches or mm):					
Sediment Removed: (Y/N)					
Cartridge Lids intact: (Y/N)					
Observed Damage:					
Comments:					

TRAFFIC IMPACT AND SITE ACCESS STUDY

PROPOSED RETAIL FUEL OUTLET

Portsmouth, New Hampshire

February 2022

Prepared for

Granite State Convenience, LLC

Stephen G. Pernaw
& Company, Inc.

Stephen G. Pernaw & Company, Inc.
P.O. Box 1721 • Concord, NH 03302
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Transportation: Engineering • Planning • Design

TRAFFIC IMPACT & SITE ACCESS STUDY
PROPOSED RETAIL FUEL OUTLET
PORTSMOUTH, NEW HAMPSHIRE
FEBRUARY 24, 2022

INTRODUCTION

This study has been prepared for Granite State Convenience, LLC to assess the traffic impacts associated with the proposed gasoline station/convenience store (with drive-through window) that will replace the existing Burger King fast-food restaurant located at 2255 Lafayette Road in Portsmouth, New Hampshire. A traffic study scope meeting was conducted with the NHDOT and city officials on July 28, 2021. At that meeting the study area was identified as including the US1 / South Site Driveway and the US1 / North Site Driveway / Water Country Driveway on Lafayette Road. The analysis periods included the weekday morning (AM) and evening (PM) peak hour periods. Subsequent to the scope meeting, Pernaw & Company, Inc. elected to add the Saturday midday (SAT) peak hour case given the heavy use of the Water Country driveway on weekends. Both Opening Year (2023) and Horizon Year (2033) analyses are included herein.

This report is intended to summarize the traffic count data collected, the future traffic projections, the technical analyses, and our findings relative to traffic operations, capacity, and safety.

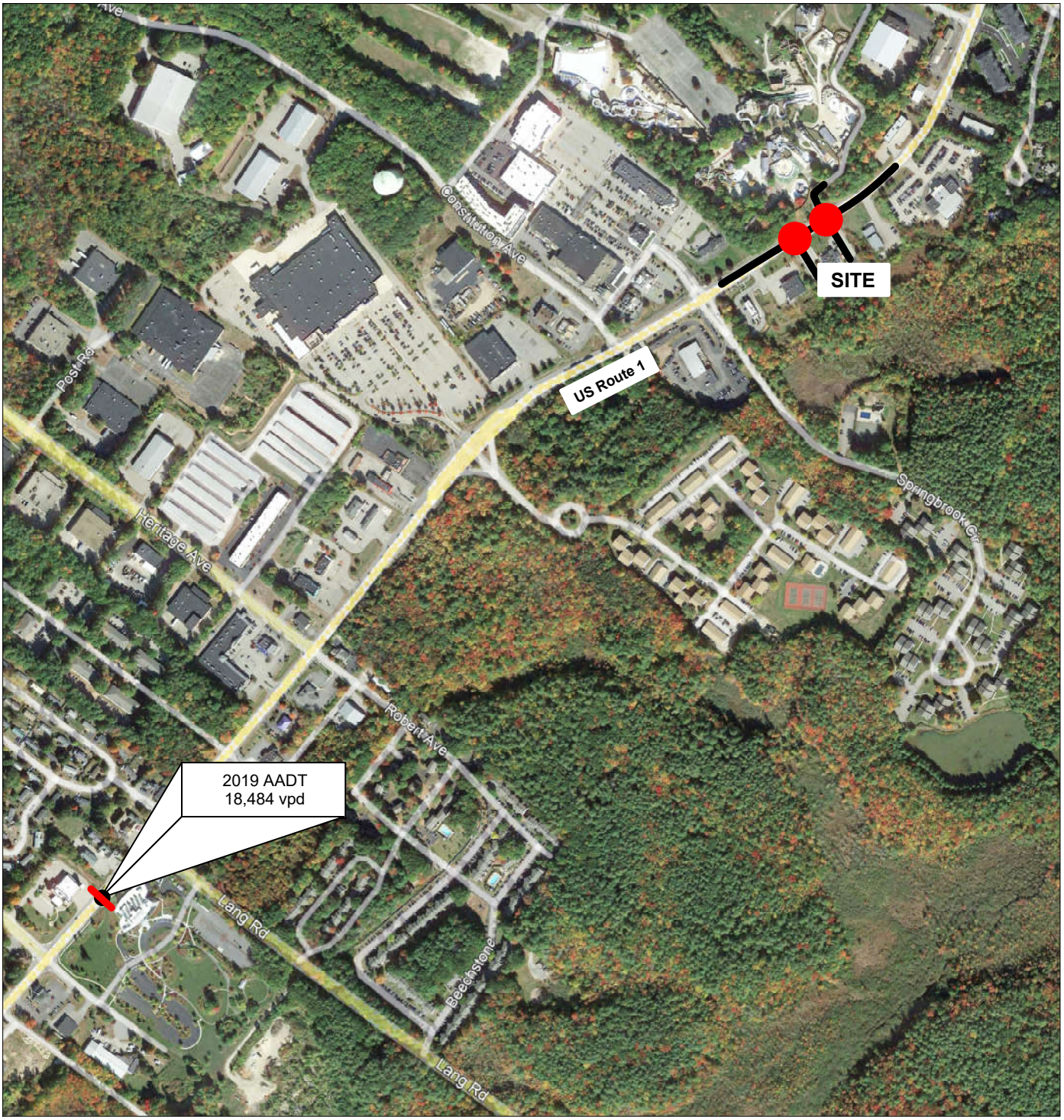
PROPOSAL

Granite State Convenience, LLC proposes to raze the existing fast-food restaurant building and replace it with a new 5,555 sf convenience store (with drive-through window) and 10 vehicle fueling positions. Access to the site will continue to be provided via the South Site Driveway (entrance only) and egress from the site will continue to be provided via the North Site Driveway (exit only) that is located across from the Water Country driveway. Figure 1 shows the location of the subject site with respect to the area highway system. Appendix A contains a preliminary site plan prepared by Greenman-Pedersen, Inc. (GPI) and the Scope Meeting notes.

EXISTING CONDITIONS

ROADWAYS

Lafayette Road (US1) functions as a multi-lane principal arterial highway that carries through traffic in a general north-south direction between points south in Hampton and beyond, through Portsmouth, to points north in Maine. The roadway segment north of the site provides one travel lane in each direction and a continuous two-way left-turn lane. The roadway segment south of the site provides an additional southbound travel lane. There are paved shoulders of variable width on both sides of the roadway. The horizontal alignment of the highway follows a straight tangent section south of the site, and it transitions to a large-radius northbound curve to the left to the north of the subject site. The vertical alignment of the roadway is generally flat in this area. The speed limit is posted at 35 mph in both directions.



= AUTOMATIC TRAFFIC RECORDER LOCATION (NHDOT)

= INTERSECTION TURNING MOVEMENT COUNT LOCATION

NORTH

2122A

Figure 1

Site Location

Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire

TRAFFIC VOLUMES

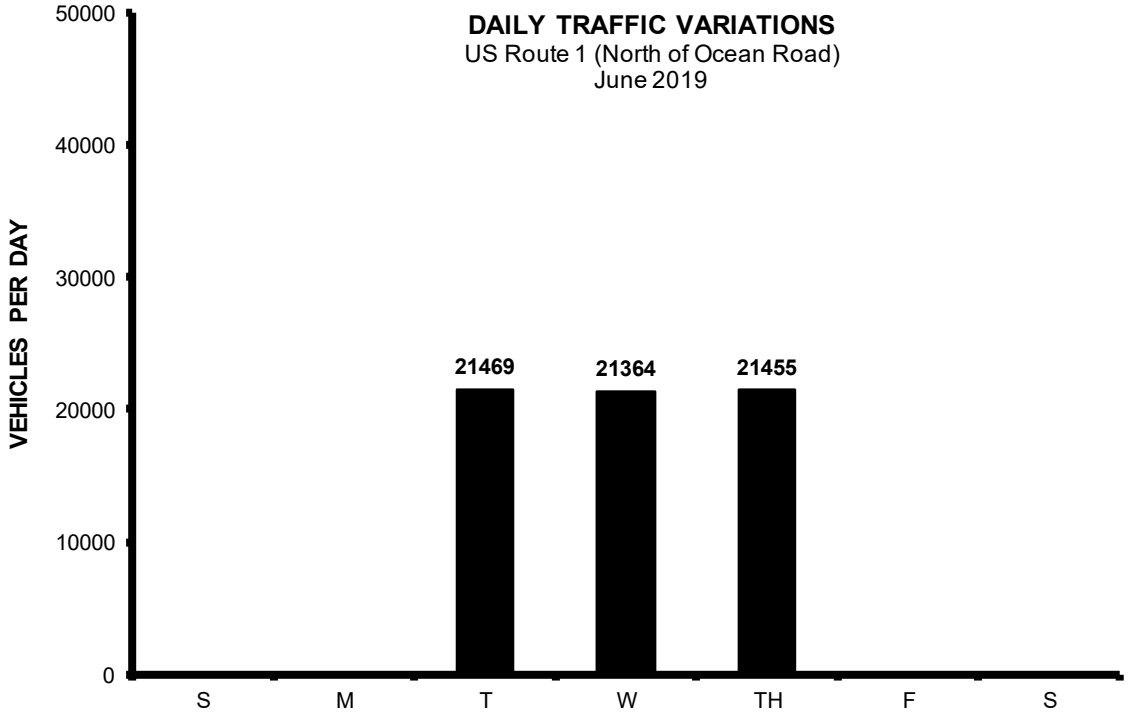
The New Hampshire Department of Transportation conducted a short-term automatic traffic recorder count on US1 (north of Ocean Road) approximately one mile south of the subject site in June 2019. Based on this count data, the NHDOT estimates that this section of US1 carried an Annual Average Daily Traffic (AADT) volume of 18,484 vehicles per day (vpd) in 2019. The 2020 AADT estimate is lower at 15,600 vpd due to the ongoing pandemic.

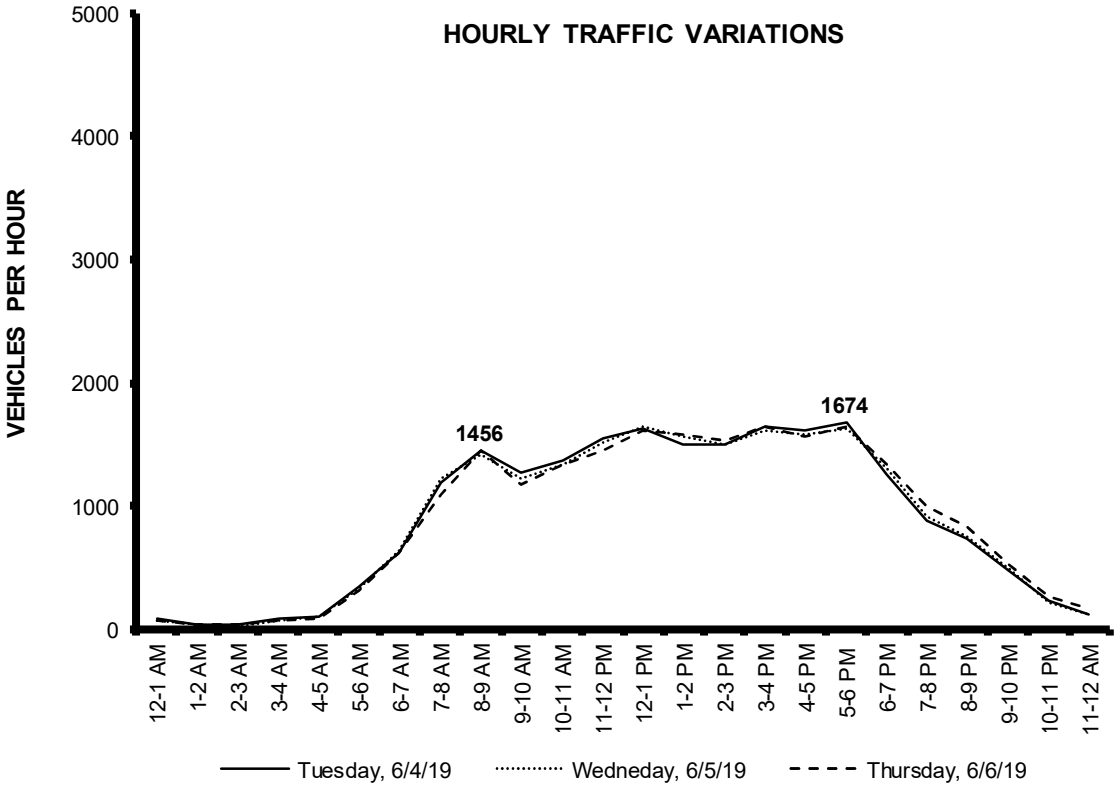
The raw traffic count data collected at this count station is summarized graphically on Page 4 in terms of daily and hourly variations. This data demonstrates that weekday traffic demand in the study area generally reaches peak levels during the typical AM and PM commuter periods. Appendix B contains the detail sheets pertaining to this count.

To establish the current traffic demand at the subject site, Pernaw & Company, Inc. conducted turning movement and vehicle classification counts at the two existing site driveways on US1 on Thursday, July 29, 2021 from 7:00 to 9:00 AM and from 3:00 to 6:00 PM, and on Saturday, July 31, 2021 from 9:00 AM to 2:00 PM. Several facts and conclusions are evident from this count data:

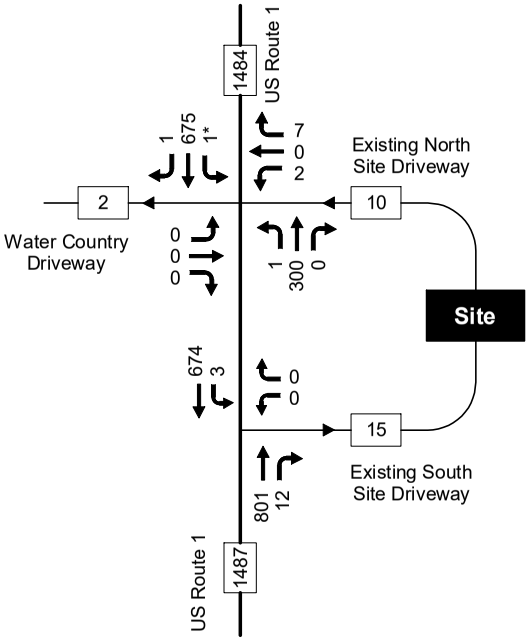
- Peak traffic periods were found to occur from 7:45 to 8:45 AM in the morning, from 3:30 to 4:30 PM in the evening, and from 11:15 AM to 12:15 PM on Saturday.
- During the morning peak hour, the two-way traffic flow on US1 (south of the site) totaled 1,487 vehicles and the predominant travel direction was northbound (55%). The existing Burger King business generated 25 vehicle-trips during the AM peak hour period, with one errant vehicle entering the site via the exit-only driveway.
- During the evening peak hour, the two-way traffic flow on US1 (south of the site) totaled 2,045 vehicles and the predominant travel direction was southbound (51%). The existing Burger King business generated 64 vehicle-trips during the PM peak hour period, and four errant vehicles were observed entering the site via the exit-only driveway.
- During the Saturday midday peak hour, the two-way traffic flow on US1 (south of the site) totaled 2,065 vehicles and the predominant travel direction was northbound (56%). The existing Burger King business generated 82 vehicle-trips during the SAT peak hour period, and six vehicles were observed entering the site via the exit-only driveway.
- The Water Country driveway was essentially inactive during the weekday peak hour periods, and quite busy during the Saturday midday peak hour. During the Saturday midday peak hour, the Water Country driveway accommodated 239 arrivals; with equal percentages from the north and south.
- Truck traffic in the study area ranged from 4-5% (AM), 2-4% (PM) and 1% (SAT) during the peak hour periods.

The peak hour traffic count data for the study area intersections are summarized on Figure 2. Appendix C contains the detail sheets from the manual turning movement counts.

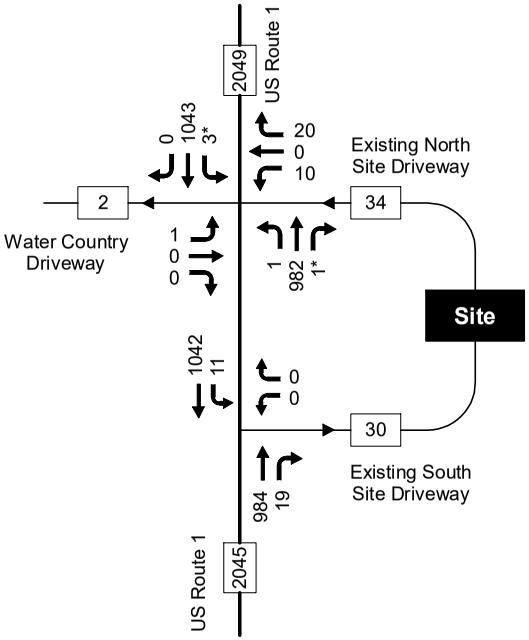

DAILY TRAFFIC VARIATIONS
US Route 1 (North of Ocean Road)
June 2019
VEHICLES PER DAY
50000
40000
30000
20000
10000
0
21469
21364
21455
S
M
T
W
TH
F
S


HOURLY TRAFFIC VARIATIONS
VEHICLES PER HOUR
5000
4000
3000
2000
1000
0
1456
1674
12-1 AM
1-2 AM
2-3 AM
3-4 AM
4-5 AM
5-6 AM
6-7 AM
7-8 AM
8-9 AM
9-10 AM
10-11 AM
11-12 PM
12-1 PM
1-2 PM
2-3 PM
3-4 PM
4-5 PM
5-6 PM
6-7 PM
7-8 PM
8-9 PM
9-10 PM
10-11 PM
11-12 AM
Tuesday, 6/4/19
Wedneday, 6/5/19
Thursday, 6/6/19

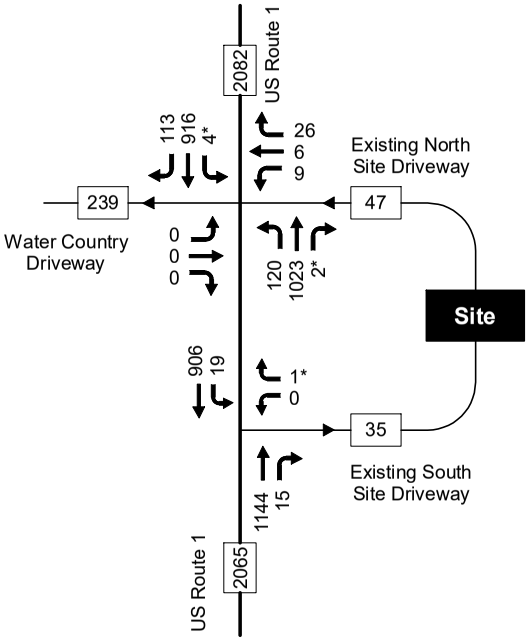
Pernaw & Company, Inc.



AM Peak Hour
Thursday, July 29,2021
7:45 to 8:45 AM



PM Peak Hour
Thursday, July 29,2021
3:30 to 4:30 PM



Saturday Peak Hour
Saturday, July 31,2021
11:15 AM to 12:15 PM

2122A

* = Prohibited Movement

Figure 2

2021 Existing Traffic Volumes

Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire

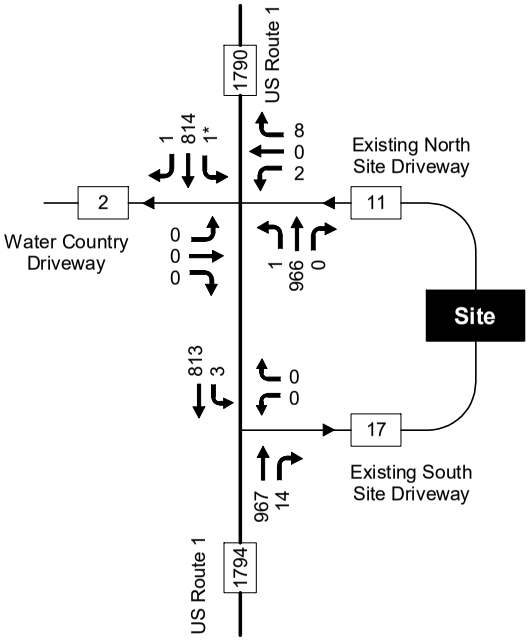
NO-BUILD TRAFFIC VOLUMES

In order to identify the net impact that site traffic will have in the study area, future traffic projections with and without the proposed redevelopment project are necessary. The future traffic projections without the proposed development are referred to as the "No-Build" traffic projections and these are summarized on Figure 3 (2023) and Figure 4 (2033).

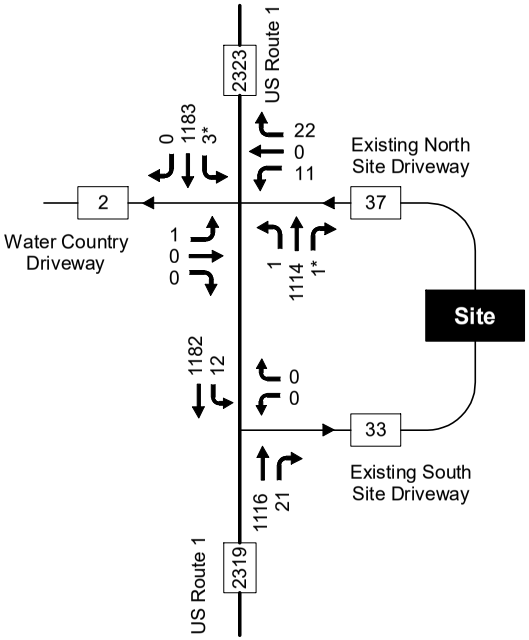
These projections are based on the existing traffic volumes (July 2021 data), a 1.0 percent annual background traffic growth rate (compounded annually) to account for normal growth in the area, a peak-month seasonal adjustment factor of 1.02, and Covid-19 adjustment factors of 1.16 (AM), 1.09 (PM), and 1.04 (Saturday) to reflect non-pandemic conditions. At the scope meeting no other recently approved development projects that could affect traffic volumes in the study area were identified.

The No-Build traffic projections therefore reflect worst-case, peak-month, peak-hour conditions without a pandemic. Calculations pertaining to the derivation of the background traffic growth rate, seasonal adjustment factor, and Covid-19 factors are contained in Appendix D.

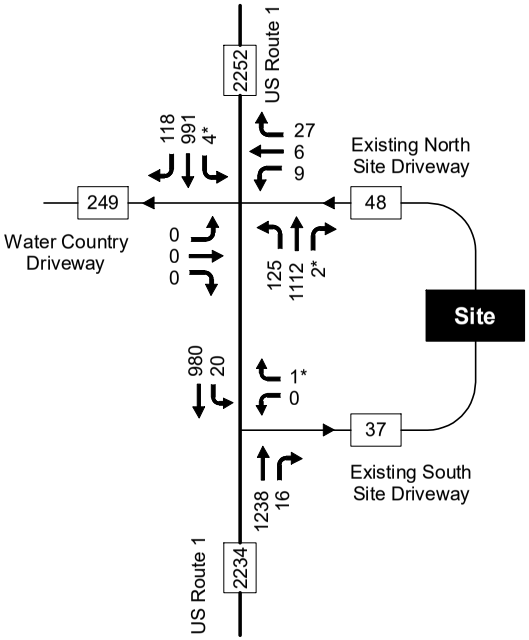
Pernaw & Company, Inc.



AM Peak Hour



PM Peak Hour



Saturday Peak Hour

2122A

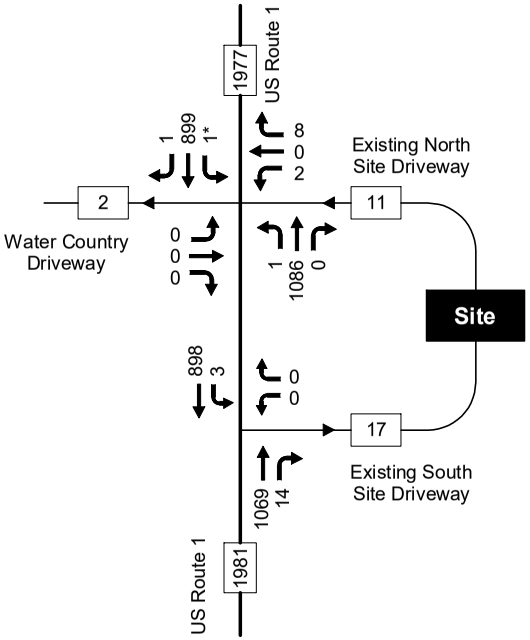
* = Prohibited Movement

Figure 3

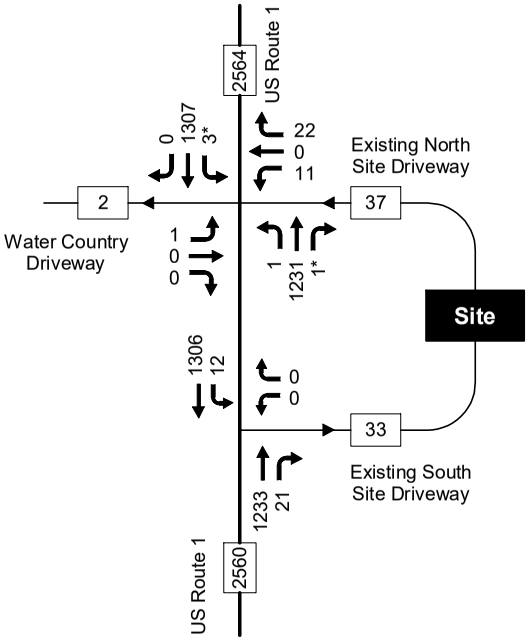
2023 No-Build Traffic Volumes

Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire

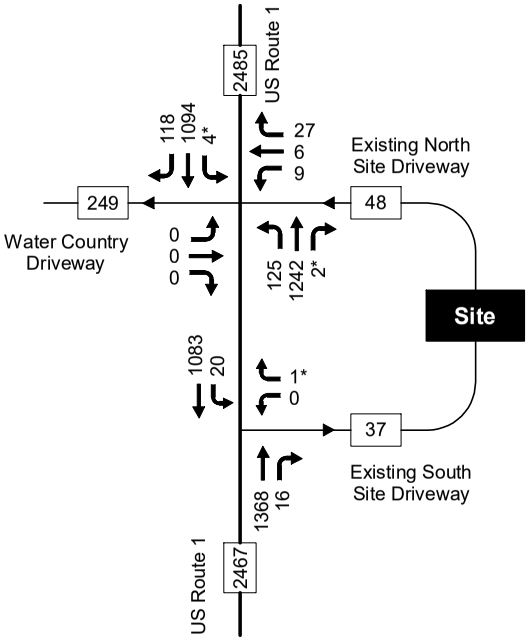
Pernaw & Company, Inc.



AM Peak Hour



PM Peak Hour



Saturday Peak Hour

2122A

* = Prohibited Movement

Figure 4

2033 No-Build Traffic Volumes

Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire

SITE GENERATED TRAFFIC

To estimate the quantity of vehicle-trips that will be produced by the replacement gasoline station/convenience store Pernaw & Company, Inc. considered both the standardized trip-generation rates published by the Institute of Transportation Engineers (ITE)[1], and similar site data. More specifically, ITE Land Use Code (LUC) 945 - Convenience Store/Gas Station, was selected and the gross floor area of the store was utilized as the independent variable. As requested at the scope meeting, supplemental driveway counts were conducted at the Common Man Roadside site on South Willow Street in Manchester, New Hampshire. Table 1A summarizes the results of the trip generation analyses and compares this with the former use of the site.

Table 1A — Trip Generation Summary / Comparison

		Existing Burger King Site [1]	Proposed Retail Fuel Outlet: ITE Trip Generation Estimate [2]	Proposed Retail Fuel Outlet: Similar Site Trip Generation [3]
Weekday Total				
	Entering		1,729 veh	
	Exiting	NA	1,729 veh	NA
	Total		3,458 trips	
Weekday AM Peak Hour				
	Entering	16 veh	**158 veh**	72 veh
	Exiting	9 veh	**158 veh**	66 veh
	Total	25 trips	**316 trips**	138 trips
Weekday PM Peak Hour				
	Entering	34 veh	**134 veh**	79 veh
	Exiting	30 veh	**135 veh**	74 veh
	Total	64 trips	**269 trips**	153 trips
Saturday Total				
	Entering		1,459 veh	
	Exiting	NA	1,459 veh	NA
	Total		2,918 trips	
Saturday Peak Hour				
	Entering	40 veh	**146 veh**	73 veh
	Exiting	42 veh	**152 veh**	70 veh
	Total	82 trips	**298 trips**	143 trips

[1] Driveway counts conducted at 2255 Lafayette Road in Portsmouth, NH on July 7/29/21& 7/31/21

[2] ITE Land Use Code 945 - Convenience Store / Gas Station (5,555 sf / trip rate method)

[3] Driveway counts conducted at 1805 South Willow Street in Manchester, NH on July 7/29/21& 7/31/21at the Common Man Roadside site.

[1] Institute of Transportation Engineers, *Trip Generation*, eleventh edition (Washington, D.C., 2021)

This table shows that the proposed gasoline station/convenience store will generate approximately 316 (AM), 269 (PM), and 298 (SAT) vehicle-trips during the peak hour periods. This type of development generates a combination of "primary" type trips (new trips to the area) and "pass-by" trips (drawn from existing traffic stream) as shown in Table 1B.

Table 1B — Trip Generation Composition

	Primary Trips	Pass-By Trips [1]	Total Trips
Weekday AM Peak Hour			
Entering	38 veh	120 veh	158 veh
Exiting	38 veh	120 veh	158 veh
Total	76 trips	240 trips	316 trips
Weekday PM Peak Hour			
Entering	33 veh	101 veh	134 veh
Exiting	34 veh	101 veh	135 veh
Total	67 trips	202 trips	269 trips
Saturday Peak Hour			
Entering	34 veh	112 veh	146 veh
Exiting	40 veh	112 veh	152 veh
Total	74 trips	224 trips	298 trips

[1] *ITE Trip Manual,* 11th Edition, 3rd Edition, LUC 945, AM = 76%, PM = 75% and assume Saturday = 75%

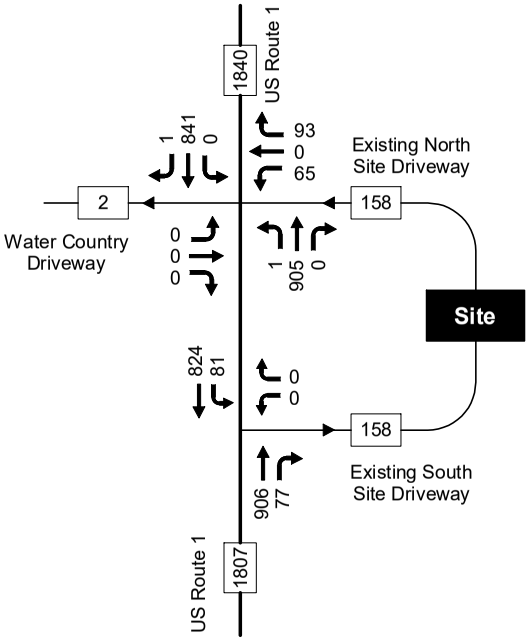
This table shows that the clear majority of trips will be drawn from the existing traffic stream on US1; whereas the minority represents new trips to the area. Appendix E contains the trip generation computations for this project, as well as diagrams summarizing the travel patterns associated with the primary and pass-by trips.

BUILD TRAFFIC VOLUMES

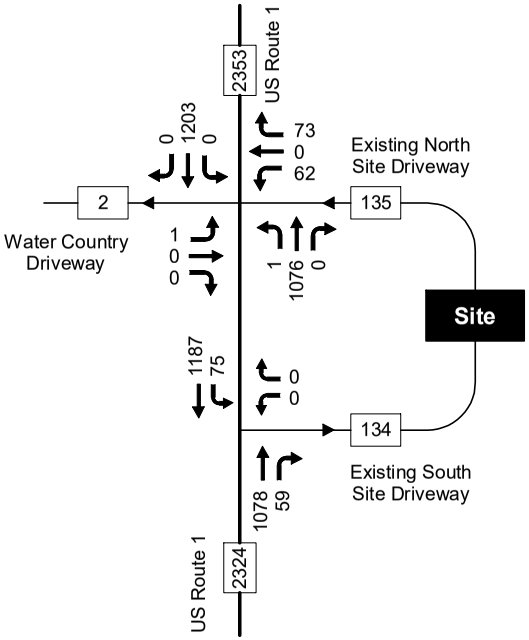
The future traffic projections with the proposed redevelopment project in full operation are referred to as the "Build" traffic projections and these are summarized schematically on Figure 5 (2023) and Figure 6 (2033). These projections are based on the No-Build projections (Figures 3 & 4), the site generated traffic levels depicted in Table 1A, and the expectation that the majority of the primary vehicle-trips (70%) will travel to/from points north on US1, and the remaining 30% to/from points south.

These travel patterns were based on analysis of the "journey to work" data from the latest census and our familiarity with the study area. The distribution of the pass-by trips was based on the proportion of northbound versus southbound vehicles on US1. Consequently, these trip distribution patterns varied depending upon the peak hour period.

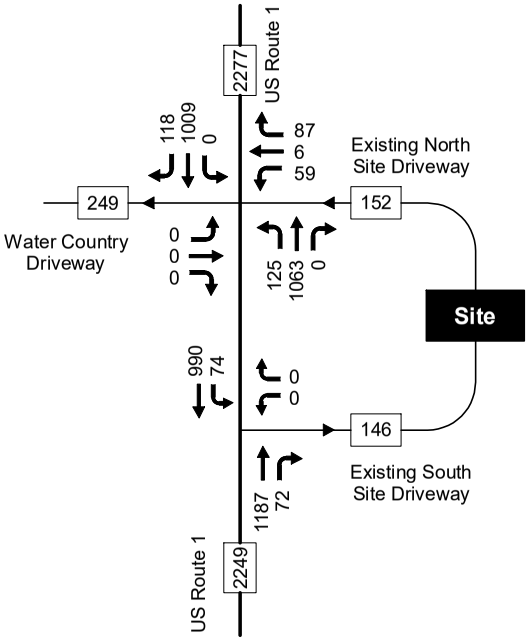
Pernaw & Company, Inc.



AM Peak Hour



PM Peak Hour



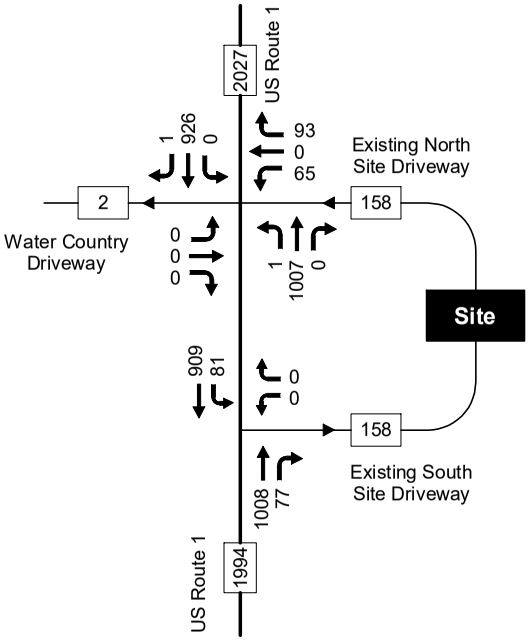
Saturday Peak Hour

2122A

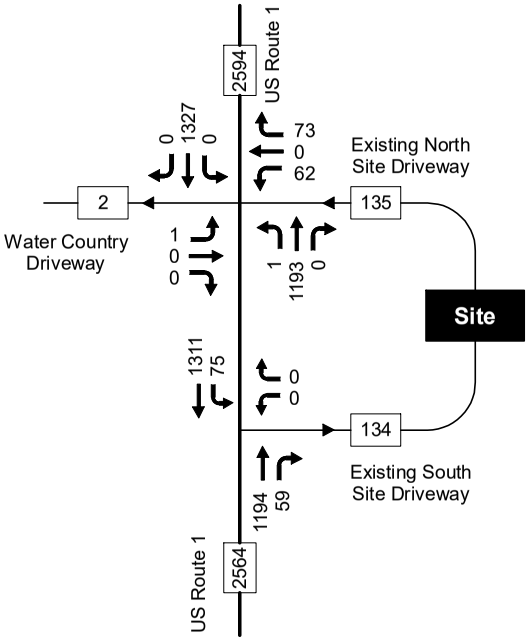
Figure 5

2023 Build Traffic Volumes

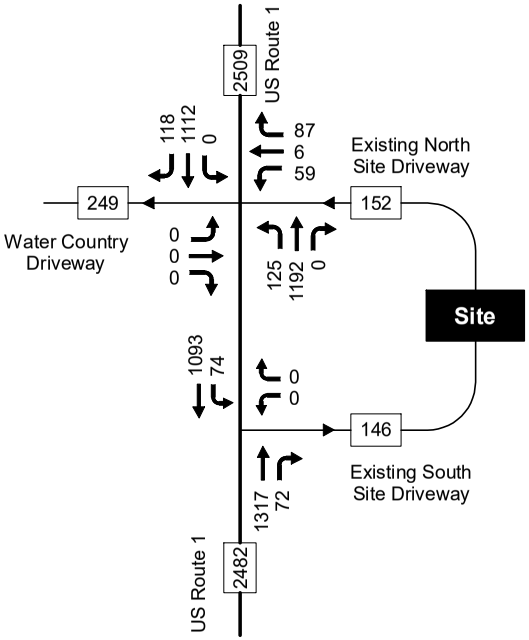
Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire



AM Peak Hour



PM Peak Hour



Saturday Peak Hour

2122A

Figure 6

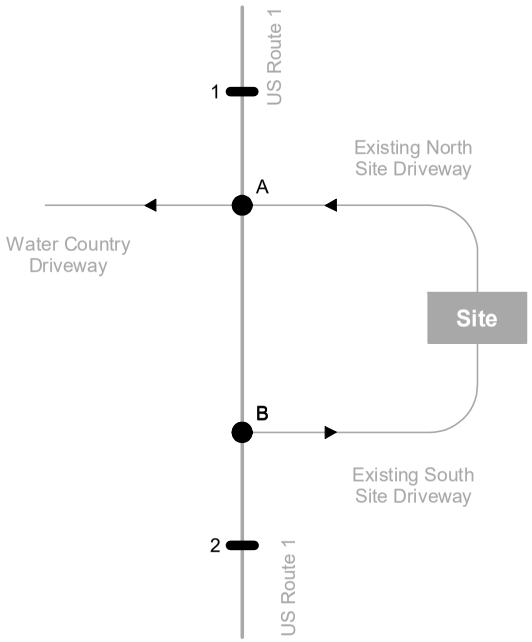
2033 Build Traffic Volumes

Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire

IMPACT SUMMARY

The net impact that the proposed redevelopment project will have on traffic levels on US1 can be estimated by comparing the No-Build traffic projections with the Build traffic projections. This comparison is summarized on Figure 7 and it demonstrates that the greatest impact to roadway volumes will occur north of the subject site. The greatest hourly increase is expected to occur during the weekday AM peak hour with +50 additional vehicles (total both directions) or by +3%. The net impact south of the site is estimated at 1% or less during the peak hour periods.

To put these percentages into perspective, the NHDOT count data in Appendix B shows that random traffic flow from one day to the next accounts for peak hour changes of 2-3 percent.



AM Peak Hour

Location	2023 No-Build	2023 Build	Change	% Change
Intersection A	1793	1906	+113 veh	6%
Intersection B	1797	1889	+92 veh	5%
Checkpoint 1	1790	1840	+50 veh	3%
Checkpoint 2	1794	1807	+13 veh	1%

PM Peak Hour

Location	2023 No-Build	2023 Build	Change	% Change
Intersection A	2336	2416	+80 veh	3%
Intersection B	2331	2402	+71 veh	3%
Checkpoint 1	2323	2353	+30 veh	1%
Checkpoint 2	2319	2324	+5 veh	neg

Saturday Peak Hour

Location	2023 No-Build	2023 Build	Change	% Change
Intersection A	2394	2466	+72 veh	3%
Intersection B	2255	2329	+74 veh	3%
Checkpoint 1	2252	2277	+25 veh	1%
Checkpoint 2	2234	2251	+17 veh	1%

2122A

Figure 7

2023 Impact Summary

Traffic Impact and Site Access Study, Proposed Retail Fuel Outlet, Portsmouth, New Hampshire

TRAFFIC OPERATIONS AND SAFETY

INTERSECTION CAPACITY - UNSIGNALIZED INTERSECTIONS

The short-range (2023) and long-range (2033) traffic projections form the basis for assessing traffic operations at the site driveway intersections on US1. These intersections were analyzed according to the methodologies of the *Highway Capacity Manual* as replicated by the latest edition of the *Synchro Traffic Signal Coordination Software (Version 10)*, which also performs unsignalized intersection capacity analyses.

Capacity and Level of Service (LOS) calculations pertaining to unsignalized intersections address the quality of service for those vehicles turning into and out of intersecting side streets or driveways. The availability of adequate gaps in the traffic stream on the major street (US1) actually controls the potential capacity for vehicle movements from the driveway approaches. Levels of Service are simply letter grades (A-F) that categorize the vehicle delays associated with specific turning maneuvers. Table 2 describes the criteria used in this analysis.

Table 2 — Level-of-Service Criteria for Unsignalized Intersections

Control Delay (seconds/vehicle)	Level of Service by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	v/c > 1.0
0 - 10	A	F
> 10 - 15	B	F
> 15 - 25	C	F
> 25 - 35	D	F
> 35 - 50	E	F
> 50	F	F

Source: Transportation Research Board, Highway Capacity Manual 2010.

The results of this analysis for the **US1 / North Site Driveway / Water Country Driveway** intersection are summarized on Table 3. The analysis confirms that left-turn departures from the northerly site driveway will encounter long delays (LOS F) during all three peak hour periods, similar to all other streets and driveways that intersect this corridor. As a result, on-site vehicle queues of up to ten vehicles could occur during the Saturday midday peak hour during the summer months. Analysis of the right-turn departure movement revealed that this movement will operate at LOS C (AM & PM) and LOS D (SAT) in the opening year, and at LOS D in 2033 (summer months). Vehicle queues are expected to remain short in the right-turn departure lane. These results demonstrate the importance of providing two departure lanes on the north site driveway approach to US1.

The results of this analysis for the **US1 / South Site Driveway** intersection are summarized on Table 4, and applies to the southbound left-turn arrival movement only. Left-turn arrivals will operate well below capacity and at LOS B or higher during all hours of the day through 2033 and beyond. The 95th percentile queue in the center turn lane on US1 will remain short (1 vehicle) during all three peak hour periods.

Appendix F contains the calculations pertaining to these analyses.

Table 3

STOP-Controlled Intersection Capacity Analysis
US Route 1 / Water Country Driveway / North Site Driveway

		Weekday AM Peak Hour				Weekday PM Peak Hour				Saturday Peak Hour			
		Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]
US Route 1 - NB LT													
	2021 Existing	9.0	0.00	A	<1	10.7	0.00	B	<1	11.8	0.19	B	1
	2023 No Build	9.5	0.00	A	<1	11.5	0.00	B	<1	12.5	0.21	B	1
	2023 Build	9.6	0.00	A	<1	11.7	0.00	B	<1	12.6	0.22	B	1
	2033 No Build	9.8	0.00	A	<1	12.3	0.00	B	<1	13.4	0.23	B	1
	2033 Build	10.0	0.00	A	<1	12.5	0.00	B	<1	13.6	0.24	B	1
North Site Driveway - WB LT & TH													
	2021 Existing	35.6	0.02	E	<1	86.3	0.20	F	1	195.6	0.51	F	2
	2023 No Build	54.5	0.03	F	<1	149.7	0.34	F	1	>300	0.69	F	2
	2023 Build	165.1	0.90	F	5	>300*	1.81	F	7	>300*	2.78	F	9
	2033 No Build	73.2	0.04	F	<1	245.9	0.49	F	2	>300	0.98	F	3
	2033 Build	296.8	1.20	F	6	>300*	2.65	F	8	>300*	4.01	F	10
North Site Driveway - WB RT													
	2021 Existing	15.7	0.02	C	<1	18.1	0.08	C	<1	19.8	0.11	C	<1
	2023 No Build	18.8	0.03	C	<1	21.1	0.10	C	<1	22.1	0.12	C	<1
	2023 Build	23.6	0.35	C	2	24.9	0.31	C	1	27.1	0.38	D	2
	2033 No Build	21.6	0.04	C	<1	24.3	0.12	C	<1	26.2	0.15	D	1
	2033 Build	28.6	0.41	D	2	30.1	0.36	D	2	34.7	0.45	D	2
US Route 1 - SB LT													
	2021 Existing	9.7	0.00	A	<1	10.2	0.01	B	<1	10.5	0.01	B	<1
	2023 No Build	10.5	0.00	B	<1	10.8	0.01	B	<1	10.9	0.01	B	<1
	2023 Build (prohibited)	-	-	-	-	-	-	-	-	-	-	-	-
	2033 No Build	11.2	0.00	B	<1	11.5	0.01	B	<1	11.7	0.01	B	<1
	2033 Build (prohibited)	-	-	-	-	-	-	-	-	-	-	-	-

[1] HCM Control Delay (seconds per vehicle), [2] HCM Volume to Capacity Ratio, [3] HCM Level of Service, [4] HCM 95th Percentile Queue (vehicles)

*HCM 2010 Pg 19-28: "If demand exceeds capacity during a 15-minute period, the delay results computed by the procedures may not be accurate"

Table 4

STOP-Controlled Intersection Capacity Analysis
US Route 1 / South Site Driveway

		Weekday AM Peak Hour				Weekday PM Peak Hour				Saturday Peak Hour			
		Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]
US Route 1 - SB LT													
	2021 Existing	9.8	0.00	A	<1	10.3	0.02	B	<1	11.4	0.03	B	<1
	2023 No Build	10.6	0.01	B	<1	11.0	0.02	B	<1	12.0	0.04	B	<1
	2023 Build	11.4	0.13	B	<1	11.8	0.13	B	1	12.9	0.14	B	1
	2033 No Build	11.2	0.01	B	<1	11.1	0.02	B	<1	12.9	0.04	B	<1
	2033 Build	12.2	0.14	B	1	12.7	0.15	B	1	14.1	0.16	B	1

[1] HCM Control Delay (seconds per vehicle), [2] HCM Volume to Capacity Ratio, [3] HCM Level of Service, [4] HCM 95th Percentile Queue (vehicles)

AUXILIARY TURN LANE ANALYSES

Left-Turn Treatment - The type of treatment needed to accommodate left-turning vehicles from any street or highway to an intersecting side street (or driveway) can range from no treatment, where turning volumes are low; to the provision of a bypass lane for through traffic to travel around left-turning vehicles; to the addition of a formal center turn lane used exclusively by left-turning vehicles for deceleration and storage while waiting to complete their maneuvers. Favorably, this section of US1 currently provides a center turn lane that will be used by vehicles entering the subject site at the southerly site driveway.

Right-Turn Treatment - The type of treatment needed to accommodate right-turning vehicles from any street or highway to any intersecting side street (or driveway) can range from a radius only, where turning volumes are low; to the provision of a short 10:1 right-turn taper; to the addition of an exclusive right-turn lane, where turning volumes and through traffic volumes are significant.

Analysis of the 2023 Build traffic volume projections using NCHRP 457 guidelines confirmed that right-turn treatment is desirable at the southerly site driveway on US1. Although this could be accomplished by widening the existing shoulder to 10-feet (minimum), it would involve work along the southerly abutter's frontage and the relocation of at least one significant utility pole. Recognizing that this type of treatment is not provided at other commercial driveways on the corridor, it may be more appropriate for corridor-wide shoulder widening to be considered as part of NHDOT Project 29640. In the interim, the northbound travel lane on US1 will continue to function as a shared through-right lane.

The results of these analyses are summarized on Table 5.

Minor-Road Approach Analysis – The type of treatment needed to accommodate exiting vehicles from the minor-road approach at a stop-controlled intersection can range from a single lane (shared left-right lane) in low-volume conditions, to two exit lanes (exclusive left-turn lane and exclusive right-turn lane) where turning volumes and through traffic volumes are significant, to multiple exit lanes in extreme cases.

Analysis of the 2023 Build traffic volumes using NCHRP 457 guidelines is also summarized on Table 5 and it indicates that providing two exit lanes on the northerly site driveway approach to US1 is advisable given the anticipated traffic volumes, and the capacity analysis results. Consequently, it is recommended that the northerly site driveway should be delineated with a shared left-through lane and an exclusive right-turn lane.

The auxiliary turn lane warrants analyses are included in Appendix G.

DRIVE-THROUGH QUEUING

The extent of vehicle queuing at the drive-through window was analyzed to ensure that spillback onto US1 will not occur. The 95th percentile vehicle queue is expected to range from 4 to 6 vehicles depending upon the arrival rate and service times (see Appendix H). Spillback is not expected to occur as there is sufficient storage space for up to 14 vehicles without impacting the flow of through traffic on the US1 corridor.

Table 5

Auxiliary Turn Lane Warrants Analysis
US Route 1 / Existing Site Driveways

	2023 AM Build Volumes	2023 PM Build Volumes	2023 Saturday Build Volumes
I. RIGHT-TURN LANE WARRANTS ANALYSIS			
South Site Driveway			
Peak Hour Inputs:			
Right-Turn Volume (NB)	77	59	72
Approach Volume (NB)	983	1137	1259
Speed (mph)	35	35	35
Limiting Right-Turn Volume (veh/h)	18	10	7
Add Right-Turn Bay?	**YES**	**YES**	**YES**
II. MINOR-ROAD APPROACH GEOMETRY ANALYSIS			
North Site Driveway			
Peak Hour Inputs:			
Major-Road Volume (NB-SB)	1748	2280	2315
% Right-Turns on Minor (EB)	59	54	57
Minor-Road Approach Volume	158	135	152
Limiting Minor-Road Volume (veh/h)	92	43	43
Consider TWO Approach Lanes?	**YES**	**YES**	**YES**

STUDY FINDINGS AND RECOMMENDATIONS

Based upon the existing conditions data collected on US1, the anticipated traffic volume increases associated with the proposed redevelopment of the subject site with a new gasoline station/convenience store, and the analysis of future traffic conditions at the two site driveway intersections on US1, Pernaw & Company, Inc. finds that:

1. The traffic counts conducted by Pernaw & Company, Inc. at the site driveways on US1 in July 2021 revealed that the peak traffic hours typically occurred from 7:45 to 8:45 AM and from 3:30 to 4:30 PM on a typical weekday. On Saturday the peak traffic hour occurred from 11:15 AM to 12:15 PM. Overall, the busiest traffic hour on US1 occurred during the Saturday midday peak hour south of the subject site with a two-way traffic volume that totaled 2,065 vehicles.

2. Driveway counts conducted at the existing fast-food restaurant revealed that it generated 25 (AM), 64 (PM), and 82 (Saturday) vehicle-trips during those peak hour periods.

3. The trip generation analysis revealed that, on an average weekday basis, the proposed gasoline station/convenience store will generate approximately 316 (AM), 269 (PM) and +298 (SAT) vehicle-trips during the peak hour periods. The majority of these trips (75%) are expected to be "pass-by" type trips; i.e., not new trips to the area.

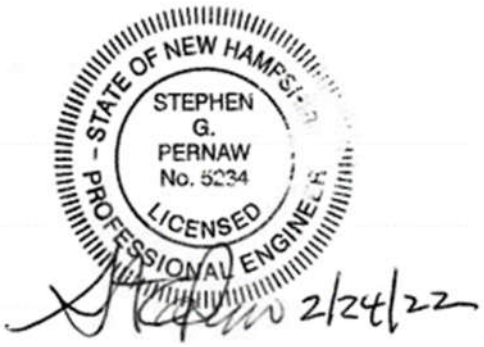
4. Analysis of the horizon year (2033) traffic projections confirmed that left-turn departures from the northerly site driveway will encounter long delays (LOS F) during all three peak hour periods, similar to all other streets and driveways that intersect this corridor. As a result, on-site vehicle queues of up to ten vehicles could occur during the Saturday midday peak hour during the summer months. Analysis of the right-turn departure movement revealed that this movement will operate at LOS C and LOS D (SAT) in the opening year, and at LOS D in 2033 (summer months). Vehicle queues are expected to remain short in the right-turn departure lane. Left-turn arrivals at the southerly site driveway are expected to operate at LOS B or higher during all hours of the day through 2033 and beyond. The 95th percentile queue in the center turn lane on US1 will remain short (1 vehicle) during all three peak hour periods.

5. The auxiliary turn lane warrants analyses contained herein indicates that right-turn treatment is desirable at the southerly site driveway on US1. Recognizing that this type of treatment is <u>not</u> provided at other commercial driveways on the corridor, it may be more appropriate for corridor-wide shoulder widening to be considered as part of NHDOT Project 29640. In the interim, the northbound travel lane on US1 will continue to function as a shared through-right lane, similar to other streets and driveways on this corridor. Providing two exit lanes on the northerly site driveway approach to US1 is advisable given the anticipated traffic volumes, and the capacity analysis results.

6. The northerly site driveway should operate under STOP sign control (MUTCD R1-1). It should be supplemented by a 24-inch white stop line and a short section of 4-inch single white lane line to separate left-turn and right-turn exiting. To correct the situation where vehicles are currently entering the site via the exit-only driveway, it is recommended that

"Do Not Enter" signs (MUTCD R5-1) be installed on both sides of the northerly site driveway, facing US1.

With implementation of the recommendations contained herein, vehicular access and egress at the subject site will be reasonably safe and efficient from a transportation engineering standpoint, for the size and type of development that is proposed.



APPENDIX

Appendix A	**Site Plan**
Appendix B	**Automatic Traffic Recorder Counts**
Appendix C	**Intersection Turning Movement Counts**
Appendix D	**Seasonal Adjustment Factor / Historical Growth Rate / COVID Factor**
Appendix E	**Site Generated Traffic Volumes / Trip Distribution**
Appendix F	**Capacity and Level of Service Calculations – Unsignalized**
Appendix G	**Auxiliary Turn Lane Warrants Analysis**
Appendix H	**Miscellaneous**

Appendix A **Site Plan**

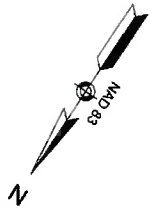


TABLE OF ZONING REGULATIONS - PORTSMOUTH, NH

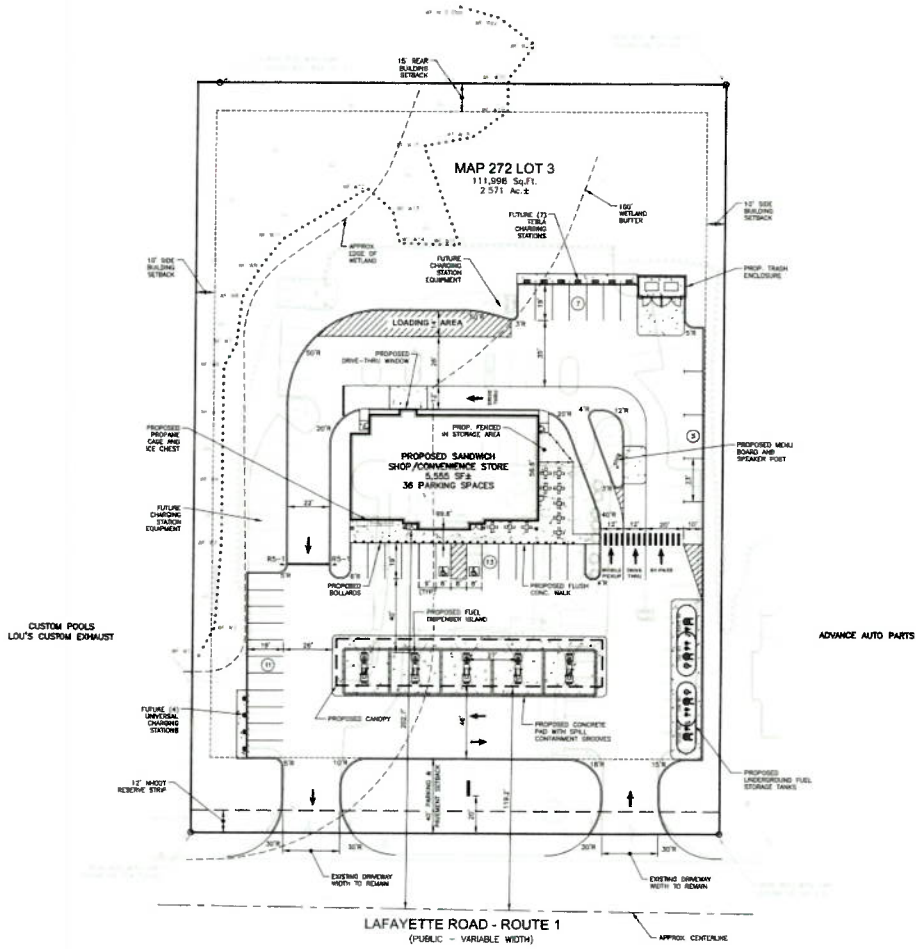
ZONE: GATEWAY CORRIDOR (G1)		
DESCRIPTION	REQUIRED	PROVIDED
MINIMUM LOT AREA - INCHS	1 ACRE	2.57 ACRES
MINIMUM FRONT YARD BUILDING SETBACK	70' TO 90' FROM CENTER OF LAFAYETTE RD	>31'
MINIMUM SIDE YARD BUILDING SETBACK	10'	>10'
MINIMUM REAR YARD BUILDING SETBACK	15'	>15'
MINIMUM NUMBER PARKING SPACES	RETAIL = 4,555 SF x 1 SPACE/300 SF GFA = 15.18 SPACES RESTAURANT = 1,006 SF x 1 SPACE/100 SF = 10 SPACES RETAIL FUEL = 2 SPACES + 6 SF x 1 SPACE/400 SF GFA = 3 SPACES TOTAL SPACES REQUIRED = 28 SPACES	36 SPACES (25 PARKING SPACES + 11 PARKING SPACES/CHARGING STATION SPACES)
MAXIMUM COVERAGE	70%	1.5 +/- ACRES = 58%
MAXIMUM BUILDING HEIGHT	40 FT OR 3 STORIES	<40 FT, 1 STORY

LOCATION MAP
(NOT TO SCALE)

NOTES:

1) THE PURPOSE OF THIS PLAN IS TO SHOW A CONCEPTUAL LAYOUT OF A RETAIL MOTOR FUEL OUTLET AND FUTURE AREA FOR A CAR WASH FACILITY.

2) RELIEF REQUESTED TO ALLOW TWO DRIVEWAYS, TO ALLOW PARKING SPACES BETWEEN PRINCIPAL BUILDING AND ROAD, AND TO ALLOW OVER A 90' BUILDING SETBACK FROM ROAD.



0 30 60 100
SCALE: 1" = 30'

811 DigSafe
NH ME MA RI VT

GPI
Engineering Design Planning Construction Management
603.883.0126 GPINET.COM
Greenman-Pedersen, Inc.
44 Stiles Road, Suite One
Salem, NH 03079

PREPARED FOR
GRANITE STATE CONVENIENCE
25 SPRINGER ROAD
HOOKSETT, NH

PROPOSED RETAIL FUEL OUTLET
2255 LAFAYETTE ROAD
PORTSMOUTH, NH 03801

REVISIONS

NO	REVISION	DATE

AUGUST 24, 2021

DRAWN/DESIGN BY	CHECKED BY
CCC/NID	FCM

PRELIMINARY SITE PLAN

SCALE: 1"=30'

PROJECT NO: NEX-2021183

1 OF 1

SCOPING MEETING FOR TRAFFIC IMPACTS OF DEVELOPMENT

Date: July 28, 2021 Town/City: Portsmouth

Location / District: US 1 / District 6

Consultants: Stephen G. Pernaw & Company, Inc., Greenman-Pederson, Inc.

Size & Type of Development: The existing site at 2255 Lafayette Rd contains a Burger King that will be replaced by a 5,555 SF gas station/convenience store with 10 vehicle fueling positions. The convenience store will include a sandwich shop (Common Man Roadside) with a drive-through.

Site Access: Access provided via two existing driveways from the site onto US 1. NHDOT District 6 requested both site driveways be kept as entrance and exit only instead of being converted into full access driveways. The consultants indicated the change would be incorporated.

Phasing: One phase.

Study Area: The study area will include both driveways at US 1.

Analysis Periods: Weekday AM & PM peak hours.

Opening Year / Future Year: 2022/2032? Consultant to revise as appropriate for what is reasonable for the development project.

Additional data: AM and PM peak hour TMCs should be estimated to evaluate right-turn lane warrants.

Background growth / other development: A background growth rate of 1% compounded annually should be used.

NHDOT Highway Design noted the 29640 Portsmouth project is in the vicinity of the proposed development. The project is still in the early stages and may not change the basic lane use of US 1, but is anticipated to make more accommodations for bikes and pedestrians, such as changes in shoulder width and sidewalks.

Site Trip Generation / Distribution / Pass-by: The consultant should evaluate trip generation at the site driveways based on the existing similar facility in Manchester and provide appropriate supporting data for their trip estimation. Trip composition should also be shown.

Based on an email from District 6, the Burger King ITE trip generation estimate provided by the consultant seemed reasonable to use, as opposed to collecting new TMCs.

Design Considerations: NHDOT Highway Design requested right-turn lane warrant evaluations (NCHRP 457) be conducted.

The consultant needs to demonstrate that drive-through queues will not back up onto US 1.

Other Issues: NHDOT District 6 stated that a 12' reserve easement on the frontage of the property needs to be shown on the site plans in case of future expansion, based on policy from 1984.

Submitted by: Stuart Thompson NHDOT BOT Date: September 7, 2021

cc: All Attendees (Attached)

Appendix B **Automatic Traffic Recorder Counts**

New Hampshire DOT Department of Transportation

MS2

Transportation Data Management System

List View | All DIRs

Record 1 of 1 Goto Record go

Location ID	82379150	**MPO ID**	
Type	SPOT	**HPMS ID**	
On NHS	Yes	**On HPMS**	Yes
LRS ID	U0000001__	**LRS Loc Pt.**	
SF Group	04	**Route Type**	
AF Group	04	**Route**	US 1
GF Group	E	**Active**	Yes
Class Dist Grp	Default	**Category**	3
Seas Clss Grp	Default		
WIM Group	Default		
QC Group	Default		
Fnct'l Class	Other Principal Arterial	**Milepost**	
Located On	Lafayette Rd		
Loc On Alias	US 1 (LAFAYETTE RD) NORTH OF OCEAN RD (SB-NB) (81379211-81379212)		

More Detail

STATION DATA

Directions: 2-WAY | NB | SB

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2020	15,600[3]		9	50	14,196 (91%)	1,404 (9%)	Grown from 2019
2019	18,484	1,674	9	50	16,931 (92%)	1,553 (8%)	
2018	19,865[3]		8	53	18,315 (92%)	1,550 (8%)	Grown from 2017
2017	19,475[3]		8	53	18,075 (93%)	1,400 (7%)	Grown from 2016
2016	19,093	1,621	8	53	17,413 (91%)	1,680 (9%)	

|<< < > >>| 1-5 of 17

Travel Demand Model

	Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

VOLUME COUNT

	Date	Int	Total
	Thu 6/6/2019	60	21,455
	Wed 6/5/2019	60	21,364
	Tue 6/4/2019	60	21,469
	Tue 7/19/2016	60	19,597
	Sun 7/17/2016	60	16,959
	Fri 9/27/2013	60	20,159
	Thu 9/26/2013	60	19,003
	Wed 9/25/2013	60	18,690
	Tue 9/24/2013	60	18,712

VOLUME TREND

Year	Annual Growth
2020	-16%
2019	-7%
2018	2%
2017	2%
2016	7%
2015	3%
2014	2%
2013	-7%

New Hampshire DOT
Department of Transportation

MS2
Transportation Data Management System

Excel Version

Weekly Volume Report			
Location ID:	82379150	**Type:**	SPOT
Located On:	Lafayette Rd	:	
Direction:	2-WAY		
Community:	PORTSMOUTH	**Period:**	Mon 6/3/2019 - Sun 6/9/2019
AADT:	18484		

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	Graph
12:00 AM		88	68	70				75	0.4%
1:00 AM		45	34	35				38	0.2%
2:00 AM		46	28	40				38	0.2%
3:00 AM		84	70	73				76	0.4%
4:00 AM		112	107	87				102	0.5%
5:00 AM		352	338	318				336	1.6%
6:00 AM		631	643	618				631	2.9%
7:00 AM		1197	1218	1093				1,169	5.5%
8:00 AM		1451	1421	1456				1,443	6.7%
9:00 AM		1273	1232	1176				1,227	5.7%
10:00 AM		1373	1333	1331				1,346	6.3%
11:00 AM		1542	1513	1451				1,502	7.0%
12:00 PM		1632	1647	1617				1,632	7.6%
1:00 PM		1500	1569	1583				1,551	7.2%
2:00 PM		1508	1505	1529				1,514	7.1%
3:00 PM		1640	1618	1643				1,634	7.6%
4:00 PM		1617	1576	1562				1,585	7.4%
5:00 PM		1674	1635	1639				1,649	7.7%
6:00 PM		1263	1300	1345				1,303	6.1%
7:00 PM		884	914	991				930	4.3%
8:00 PM		734	754	829				772	3.6%
9:00 PM		474	501	526				500	2.3%
10:00 PM		234	216	270				240	1.1%
11:00 PM		115	124	173				137	0.6%
Total	**0**	**21,469**	**21,364**	**21,455**	**0**	**0**	**0**		
24hr Total		21469	21364	21455				21,429	
AM Pk Hr		11:00	11:00	8:00					
AM Peak		1542	1513	1456				1,504	
PM Pk Hr		5:00	12:00	3:00					
PM Peak		1674	1647	1643				1,655	
% Pk Hr		7.80%	7.71%	7.66%				7.72%	

Δ = 3%

Δ = 2%

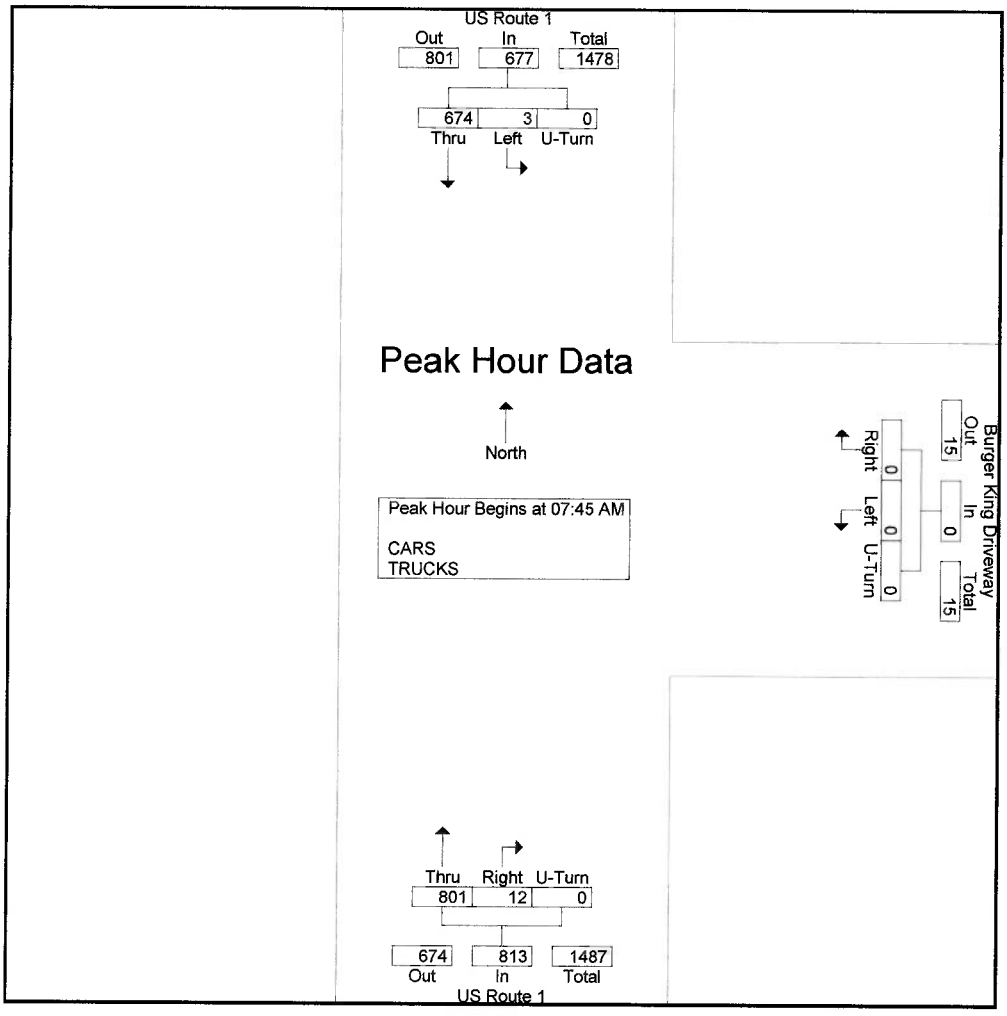
Appendix C **Intersection Turning Movement Counts**

Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Portsmouth, NH

File Name : 2122A_B_King_AM_&_PM
Site Code : 2122A
Start Date : 7/29/2021
Page No : 2

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	170	**2**	0	172	0	0	0	0	2	**224**	0	**226**	**398**
08:00 AM	**173**	1	0	**174**	0	0	0	0	3	197	0	200	374
08:15 AM	167	0	0	167	0	0	0	0	**6**	197	0	203	370
08:30 AM	164	0	0	164	0	0	0	0	1	183	0	184	348
Total Volume	674	3	0	677	0	0	0	0	12	801	0	813	1490
% App. Total	99.6	0.4	0		0	0	0		1.5	98.5	0		
PHF	.974	.375	.000	.973	.000	.000	.000	.000	.500	.894	.000	.899	.936



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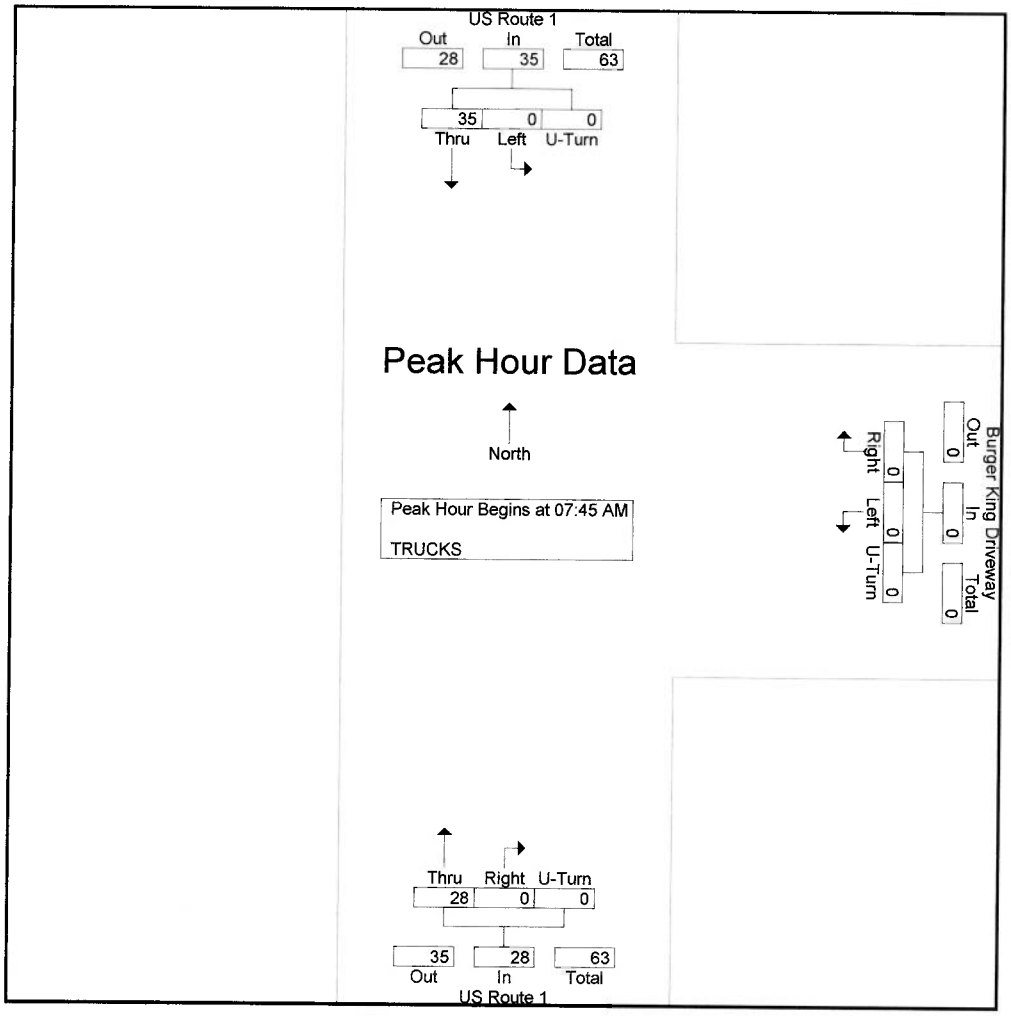
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	**13**	0	0	**13**	0	0	0	0	0	**11**	0	**11**	**24**
08:00 AM	8	0	0	8	0	0	0	0	0	5	0	5	13
08:15 AM	7	0	0	7	0	0	0	0	0	7	0	7	14
08:30 AM	7	0	0	7	0	0	0	0	0	5	0	5	12
Total Volume	35	0	0	35	0	0	0	0	0	28	0	28	63
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.673	.000	.000	.673	.000	.000	.000	.000	.000	.636	.000	.636	.656



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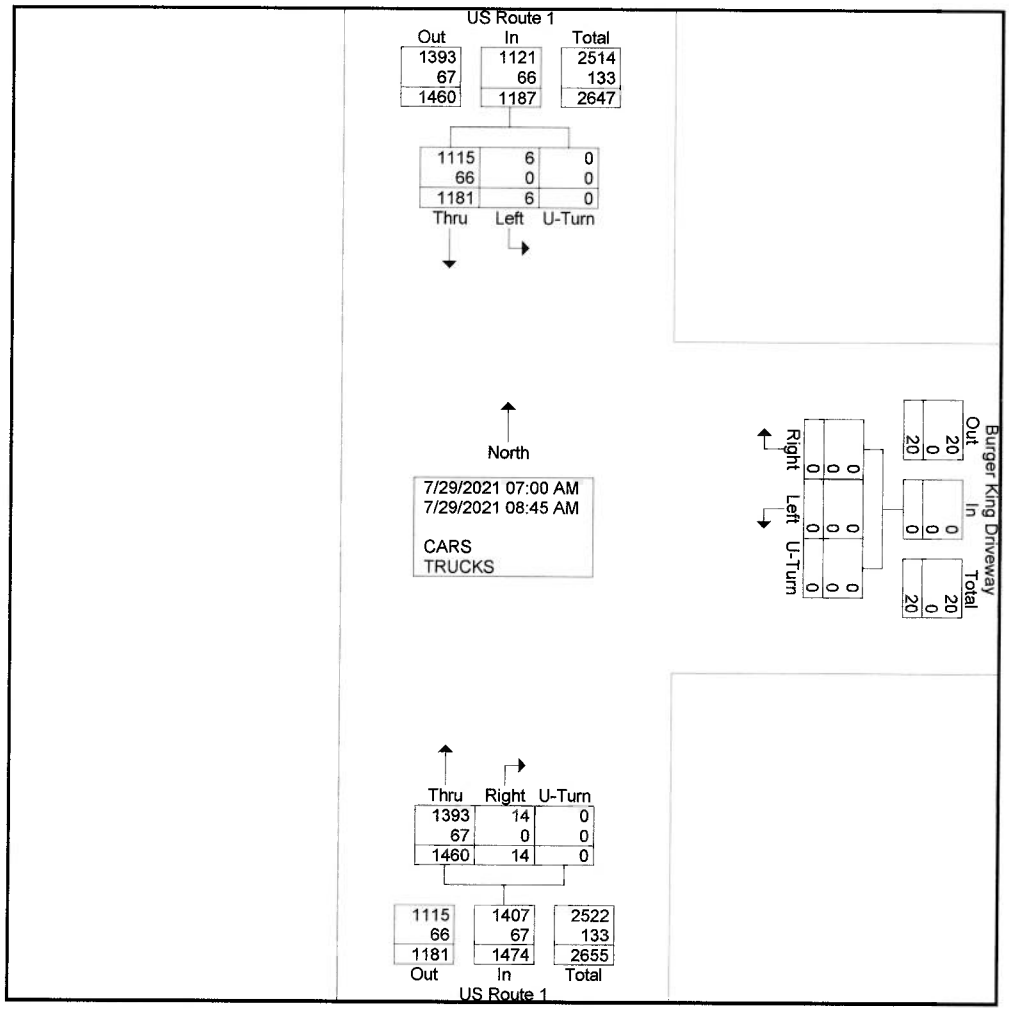
File Name : 2122A_B_King_AM_&_PM
Site Code : 2122A
Start Date : 7/29/2021
Page No : 1

Groups Printed- CARS - TRUCKS

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	91	0	0	91	0	0	0	0	0	115	0	115	206
07:15 AM	105	1	0	106	0	0	0	0	0	142	0	142	248
07:30 AM	146	1	0	147	0	0	0	0	1	195	0	196	343
07:45 AM	170	2	0	172	0	0	0	0	2	224	0	226	398
Total	512	4	0	516	0	0	0	0	3	676	0	679	1195
08:00 AM	173	1	0	174	0	0	0	0	3	197	0	200	374
08:15 AM	167	0	0	167	0	0	0	0	6	197	0	203	370
08:30 AM	164	0	0	164	0	0	0	0	1	183	0	184	348
08:45 AM	165	1	0	166	0	0	0	0	1	207	0	208	374
Total	669	2	0	671	0	0	0	0	11	784	0	795	1466
Grand Total	1181	6	0	1187	0	0	0	0	14	1460	0	1474	2661
Apprch %	99.5	0.5	0		0	0	0		0.9	99.1	0		
Total %	44.4	0.2	0	44.6	0	0	0	0	0.5	54.9	0	55.4	
CARS	1115	6	0	1121	0	0	0	0	14	1393	0	1407	2528
% CARS	94.4	100	0	94.4	0	0	0	0	100	95.4	0	95.5	95
TRUCKS	66	0	0	66	0	0	0	0	0	67	0	67	133
% TRUCKS	5.6	0	0	5.6	0	0	0	0	0	4.6	0	4.5	5



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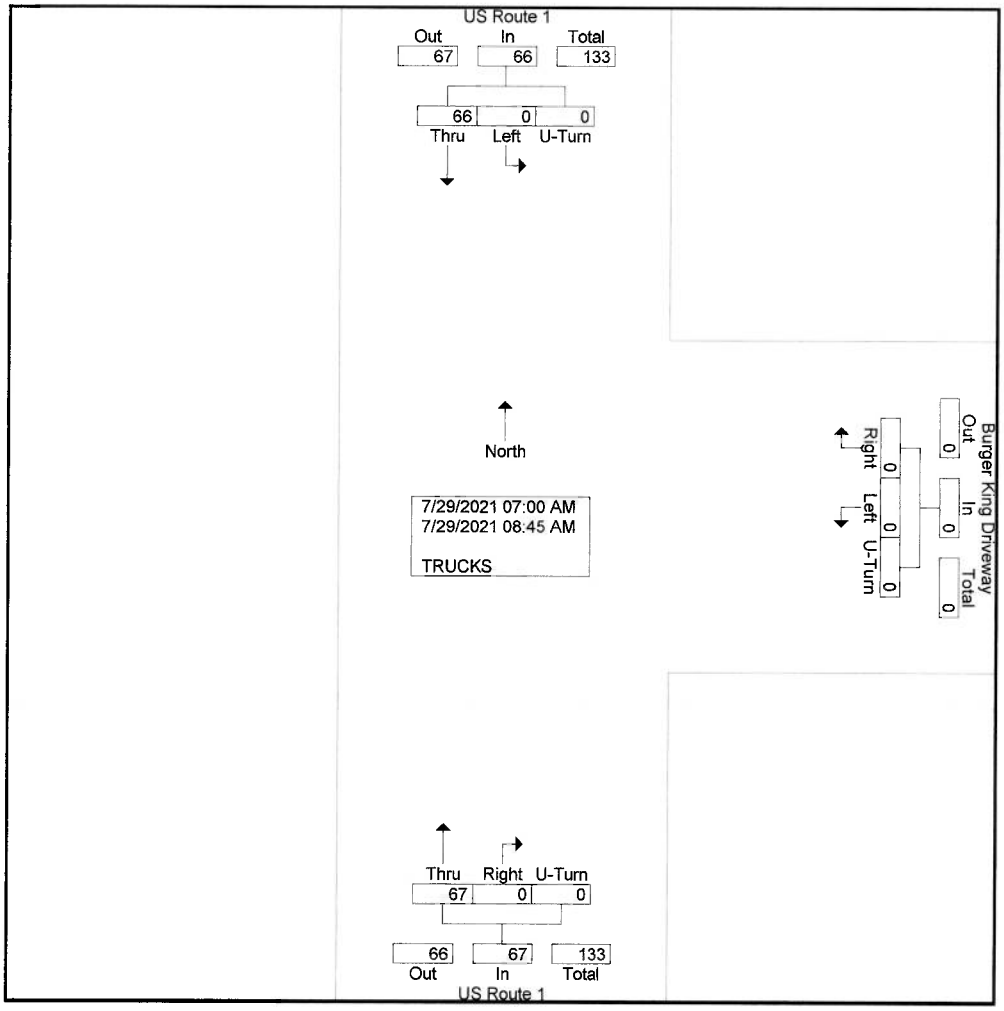
Start Date : 7/29/2021
Page No : 1

Groups Printed- TRUCKS

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	2	0	0	2	0	0	0	0	0	14	0	14	16
07:15 AM	5	0	0	5	0	0	0	0	0	9	0	9	14
07:30 AM	19	0	0	19	0	0	0	0	0	9	0	9	28
07:45 AM	13	0	0	13	0	0	0	0	0	11	0	11	24
Total	39	0	0	39	0	0	0	0	0	43	0	43	82
08:00 AM	8	0	0	8	0	0	0	0	0	5	0	5	13
08:15 AM	7	0	0	7	0	0	0	0	0	7	0	7	14
08:30 AM	7	0	0	7	0	0	0	0	0	5	0	5	12
08:45 AM	5	0	0	5	0	0	0	0	0	7	0	7	12
Total	27	0	0	27	0	0	0	0	0	24	0	24	51
Grand Total	66	0	0	66	0	0	0	0	0	67	0	67	133
Apprch %	100	0	0		0	0	0		0	100	0		
Total %	49.6	0	0	49.6	0	0	0	0	0	50.4	0	50.4	



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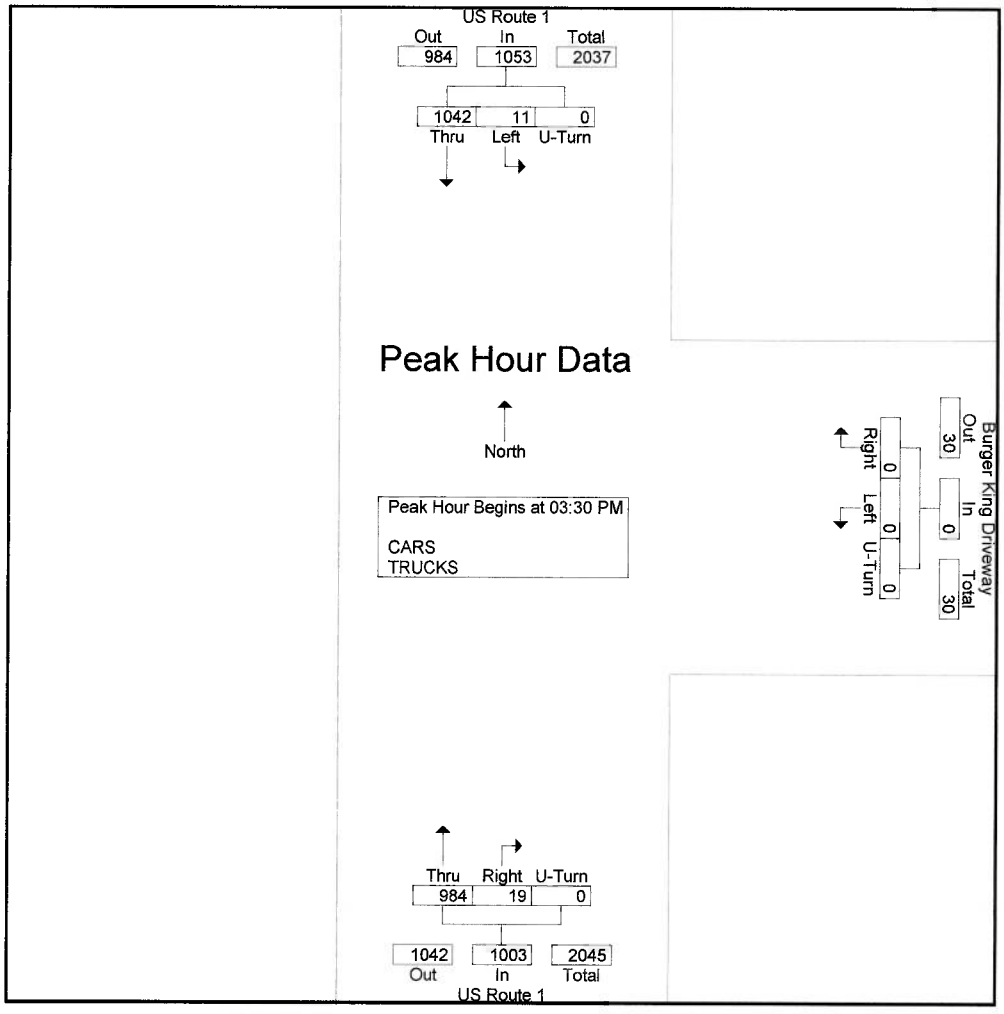
Site Code : 2122A
Start Date : 7/29/2021
Page No : 3

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:30 PM													
03:30 PM	249	2	0	251	0	0	0	0	5	249	0	254	505
03:45 PM	256	3	0	259	0	0	0	0	3	244	0	247	506
04:00 PM	**278**	**4**	0	**282**	0	0	0	0	5	240	0	245	**527**
04:15 PM	259	2	0	261	0	0	0	0	**6**	**251**	0	**257**	518
Total Volume	1042	11	0	1053	0	0	0	0	19	984	0	1003	2056
% App. Total	99	1	0		0	0	0		1.9	98.1	0		
PHF	.937	.688	.000	.934	.000	.000	.000	.000	.792	.980	.000	.976	.975



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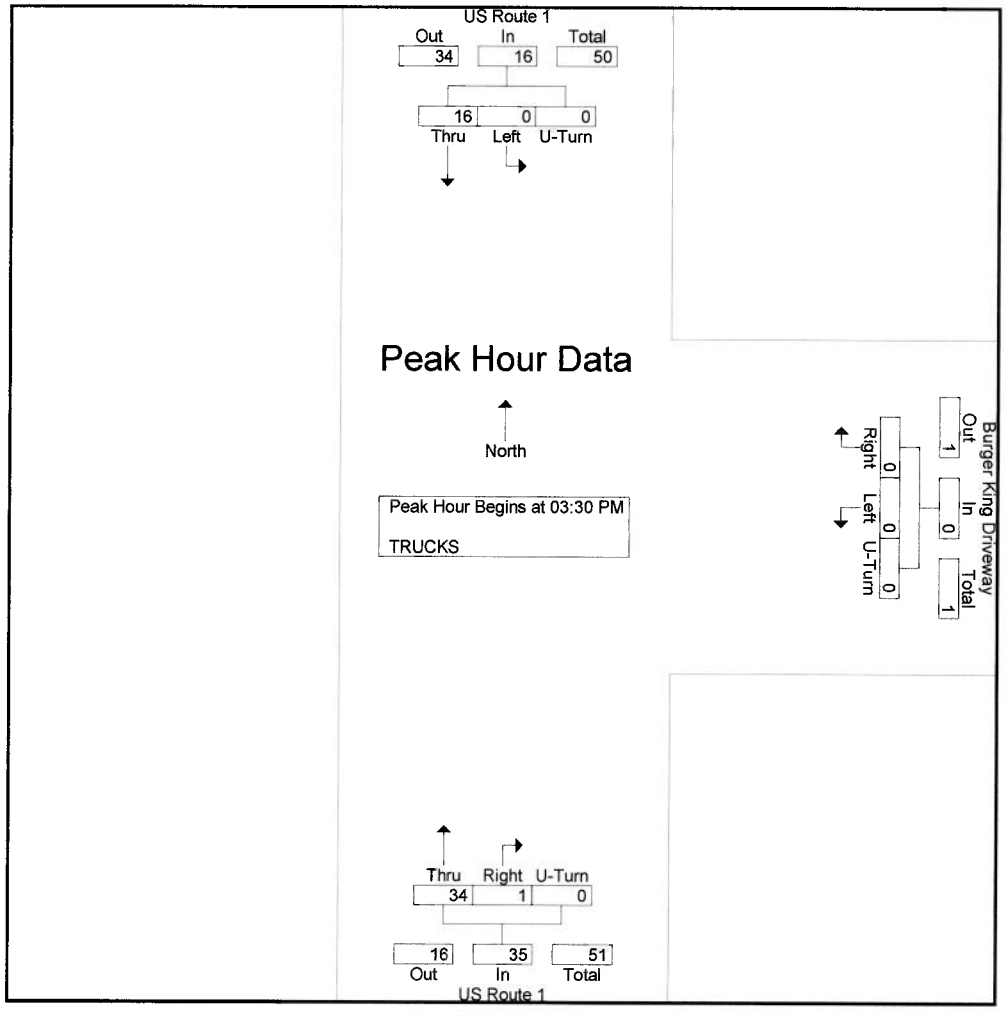
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 04:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:30 PM													
03:30 PM	**6**	0	0	**6**	0	0	0	0	0	**16**	0	**16**	**22**
03:45 PM	5	0	0	5	0	0	0	0	0	10	0	10	15
04:00 PM	1	0	0	1	0	0	0	0	0	5	0	5	6
04:15 PM	4	0	0	4	0	0	0	0	**1**	3	0	4	8
Total Volume	16	0	0	16	0	0	0	0	1	34	0	35	51
% App. Total	100	0	0		0	0	0		2.9	97.1	0		
PHF	.667	.000	.000	.667	.000	.000	.000	.000	.250	.531	.000	.547	.580



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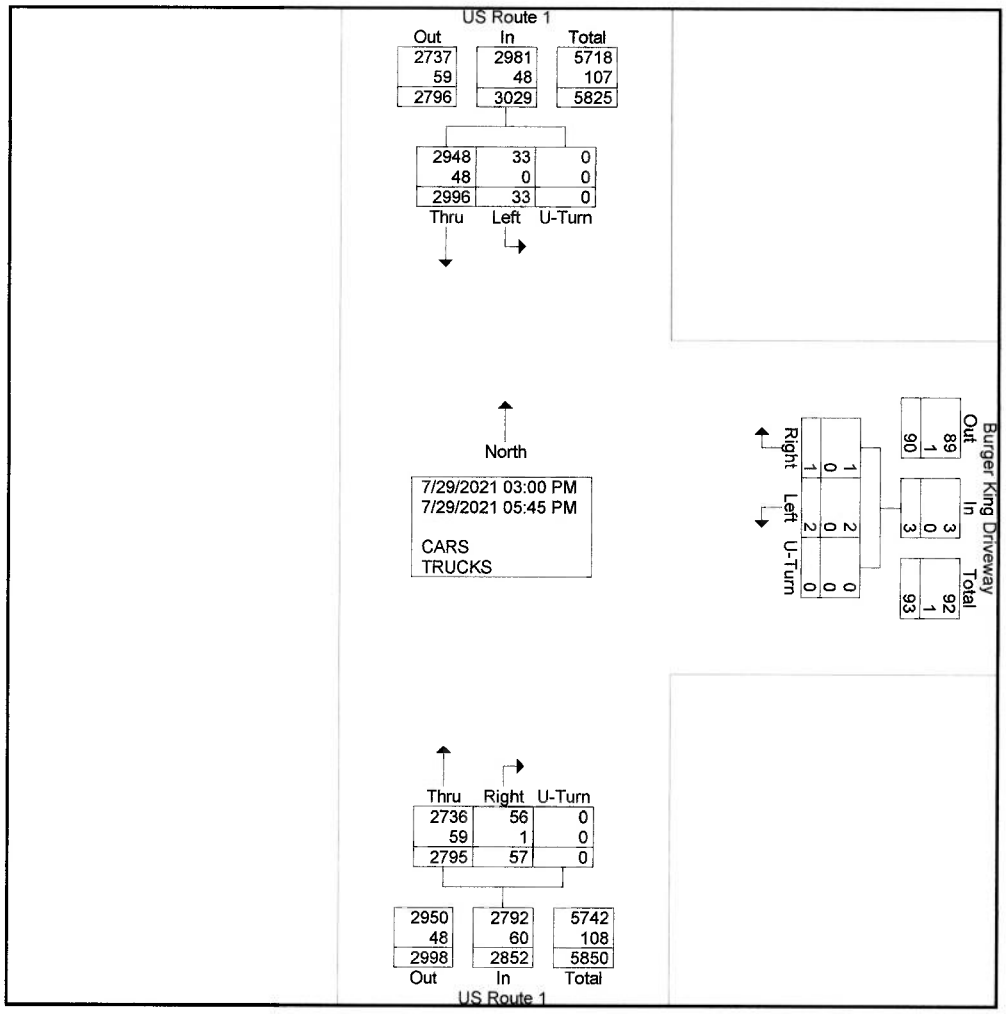
Groups Printed- CARS - TRUCKS

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
03:00 PM	273	3	0	276	0	0	0	0	4	233	0	237	513
03:15 PM	242	3	0	245	0	0	0	0	1	225	0	226	471
03:30 PM	249	2	0	251	0	0	0	0	5	249	0	254	505
03:45 PM	256	3	0	259	0	0	0	0	3	244	0	247	506
Total	1020	11	0	1031	0	0	0	0	13	951	0	964	1995
04:00 PM	278	4	0	282	0	0	0	0	5	240	0	245	527
04:15 PM	259	2	0	261	0	0	0	0	6	251	0	257	518
04:30 PM	259	4	0	263	0	1	0	1	4	223	0	227	491
04:45 PM	261	2	0	263	0	1	0	1	7	222	0	229	493
Total	1057	12	0	1069	0	2	0	2	22	936	0	958	2029
05:00 PM	245	2	0	247	0	0	0	0	5	261	0	266	513
05:15 PM	248	3	0	251	0	0	0	0	9	215	0	224	475
05:30 PM	212	4	0	216	1	0	0	1	2	218	0	220	437
05:45 PM	214	1	0	215	0	0	0	0	6	214	0	220	435
Total	919	10	0	929	1	0	0	1	22	908	0	930	1860
Grand Total	2996	33	0	3029	1	2	0	3	57	2795	0	2852	5884
Apprch %	98.9	1.1	0		33.3	66.7	0		2	98	0		
Total %	50.9	0.6	0	51.5	0	0	0	0.1	1	47.5	0	48.5	
CARS	2948	33	0	2981	1	2	0	3	56	2736	0	2792	5776
% CARS	98.4	100	0	98.4	100	100	0	100	98.2	97.9	0	97.9	98.2
TRUCKS	48	0	0	48	0	0	0	0	1	59	0	60	108
% TRUCKS	1.6	0	0	1.6	0	0	0	0	1.8	2.1	0	2.1	1.8

Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Portsmouth, NH

File Name : 2122A_B_King_AM_&_PM
Site Code : 2122A
Start Date : 7/29/2021
Page No : 2



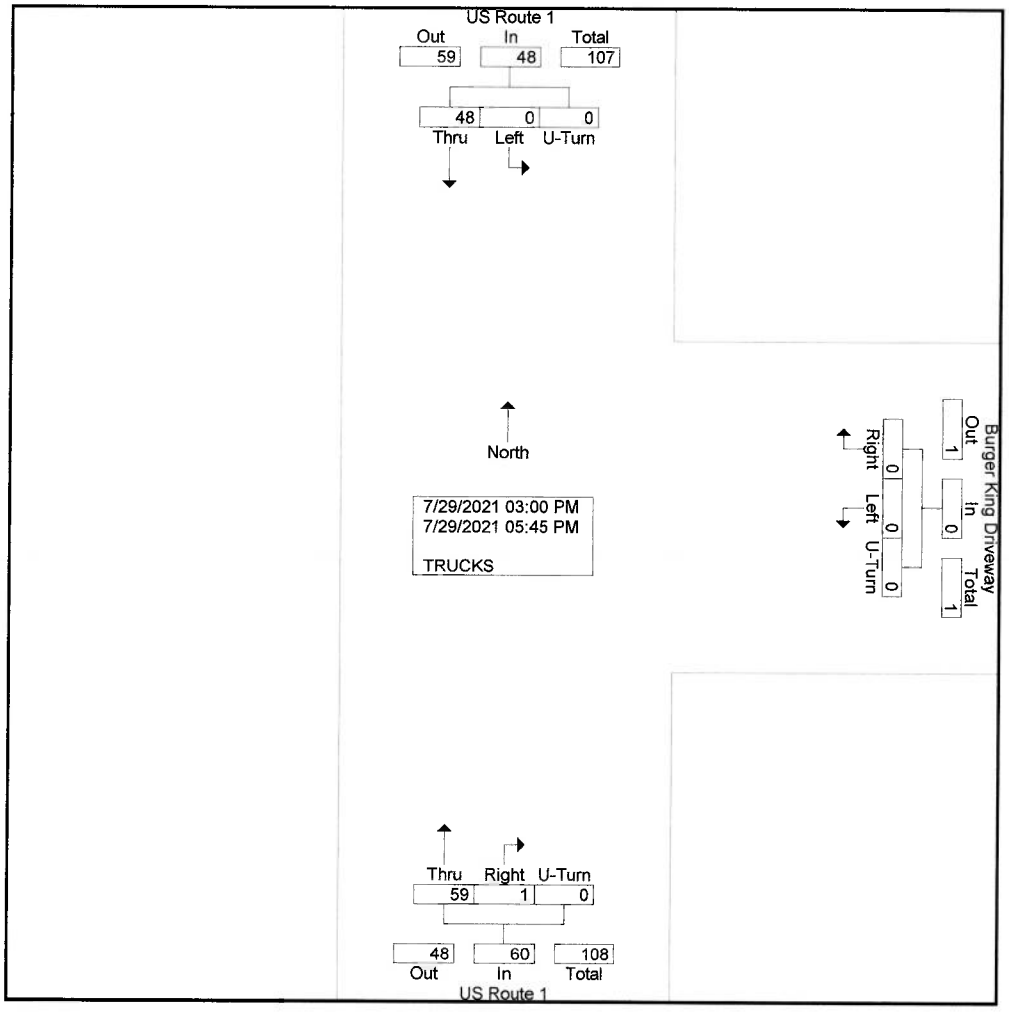
Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Portsmouth, NH

File Name : 2122A_B_King_AM_&_PM
Site Code : 2122A
Start Date : 7/29/2021
Page No : 1

Groups Printed- TRUCKS

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
03:00 PM	14	0	0	14	0	0	0	0	0	11	0	11	25
03:15 PM	6	0	0	6	0	0	0	0	0	3	0	3	9
03:30 PM	6	0	0	6	0	0	0	0	0	16	0	16	22
03:45 PM	5	0	0	5	0	0	0	0	0	10	0	10	15
Total	31	0	0	31	0	0	0	0	0	40	0	40	71
04:00 PM	1	0	0	1	0	0	0	0	0	5	0	5	6
04:15 PM	4	0	0	4	0	0	0	0	1	3	0	4	8
04:30 PM	2	0	0	2	0	0	0	0	0	3	0	3	5
04:45 PM	4	0	0	4	0	0	0	0	0	0	0	0	4
Total	11	0	0	11	0	0	0	0	1	11	0	12	23
05:00 PM	1	0	0	1	0	0	0	0	0	3	0	3	4
05:15 PM	2	0	0	2	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	4	0	4	4
05:45 PM	3	0	0	3	0	0	0	0	0	1	0	1	4
Total	6	0	0	6	0	0	0	0	0	8	0	8	14
Grand Total	48	0	0	48	0	0	0	0	1	59	0	60	108
Apprch %	100	0	0		0	0	0		1.7	98.3	0		
Total %	44.4	0	0	44.4	0	0	0	0	0.9	54.6	0	55.6	

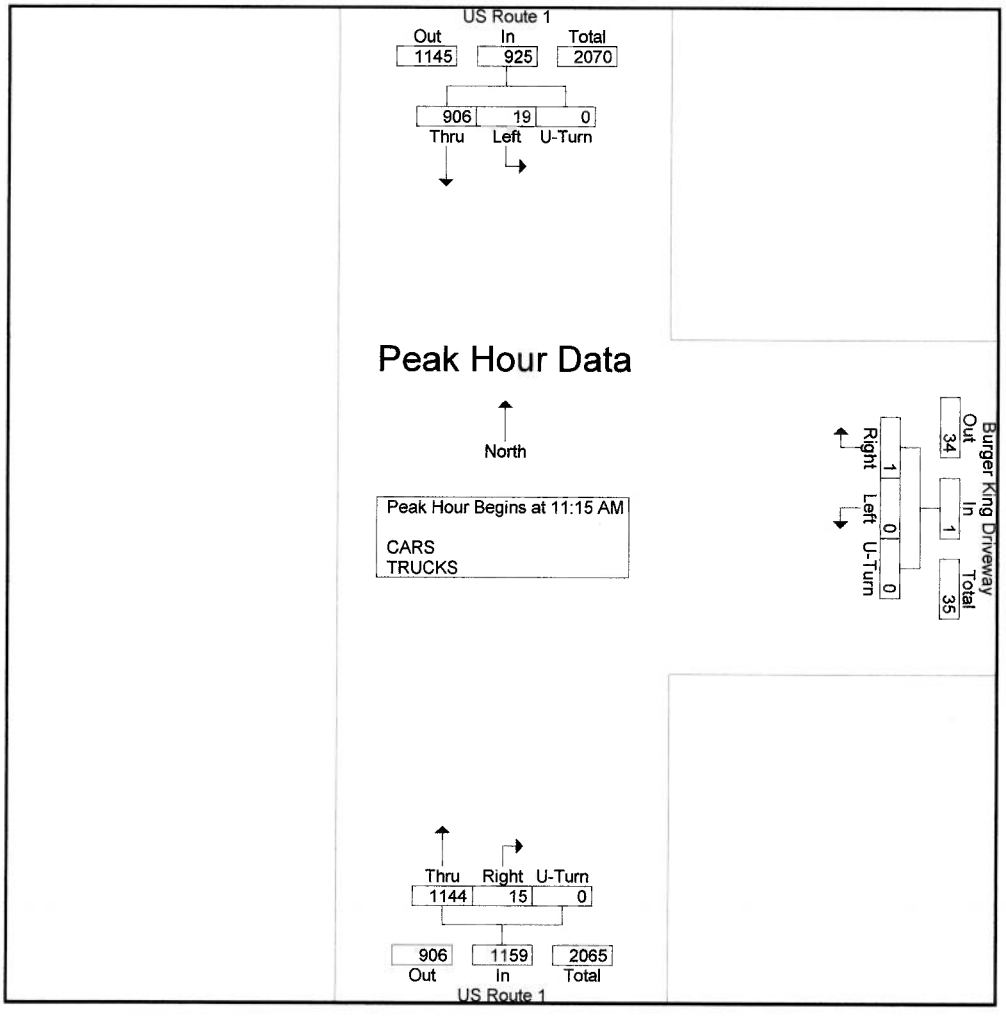


Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Manchester: NH

File Name : 2122A_B King Sat
Site Code : 2122A
Start Date : 7/31/2021
Page No : 3

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 09:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 11:15 AM													
11:15 AM	213	4	0	217	**1**	0	0	**1**	2	289	0	291	509
11:30 AM	232	**6**	0	238	0	0	0	0	**6**	271	0	277	515
11:45 AM	223	6	0	229	0	0	0	0	4	286	0	290	519
12:00 PM	**238**	3	0	**241**	0	0	0	0	3	**298**	0	**301**	**542**
Total Volume	906	19	0	925	1	0	0	1	15	1144	0	1159	2085
% App. Total	97.9	2.1	0		100	0	0		1.3	98.7	0		
PHF	.952	.792	.000	.960	.250	.000	.000	.250	.625	.960	.000	.963	.962

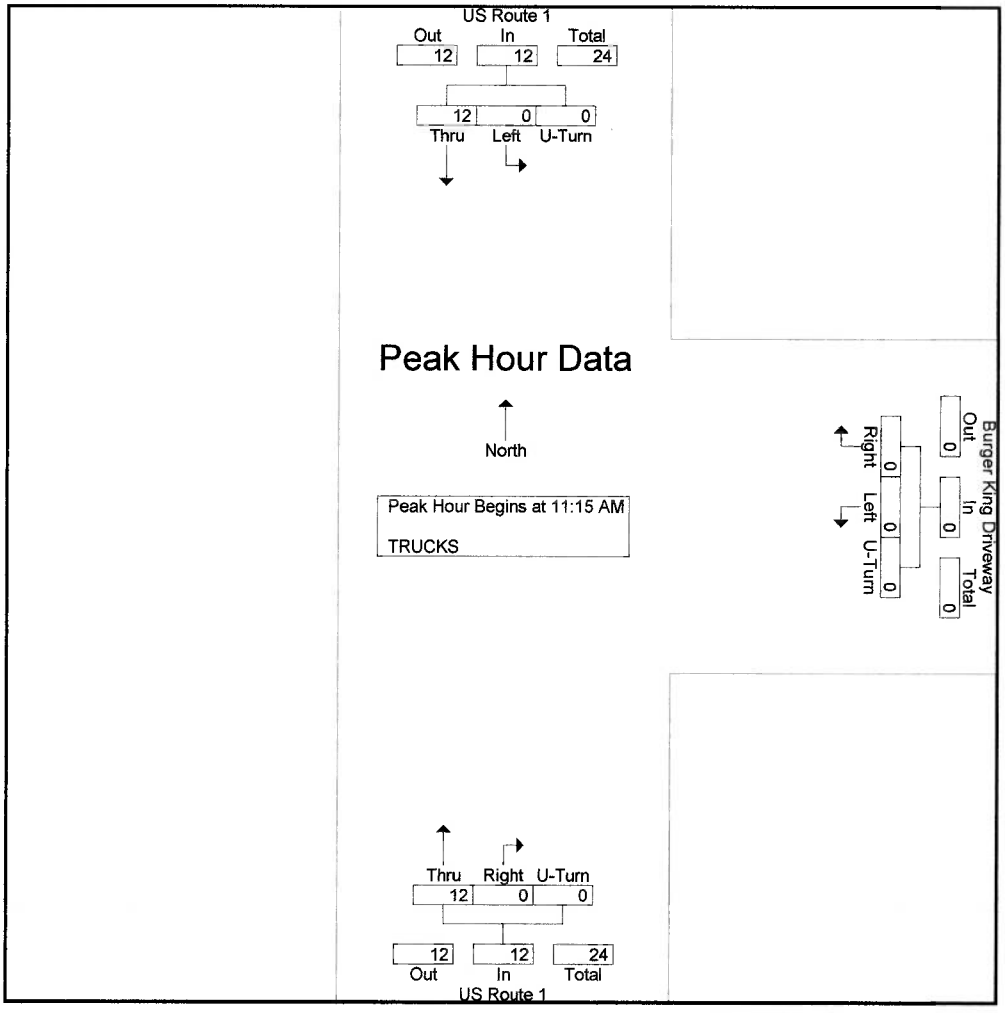


Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Manchester: NH

File Name : 2122A_B King Sat
Site Code : 2122A
Start Date : 7/31/2021
Page No : 3

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 11:15 AM to 12:00 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 11:15 AM													
11:15 AM	**4**	0	0	**4**	0	0	0	0	0	1	0	**1**	5
11:30 AM	2	0	0	2	0	0	0	0	0	**5**	0	**5**	**7**
11:45 AM	2	0	0	2	0	0	0	0	0	4	0	4	6
12:00 PM	4	0	0	4	0	0	0	0	0	2	0	2	6
Total Volume	12	0	0	12	0	0	0	0	0	12	0	12	24
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.750	.000	.000	.750	.000	.000	.000	.000	.000	.600	.000	.600	.857



Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
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Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Manchester: NH

File Name : 2122A_B King Sat
Site Code : 2122A
Start Date : 7/31/2021
Page No : 1

Groups Printed- CARS - TRUCKS

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
09:00 AM	170	1	0	171	0	0	0	0	0	166	0	166	337
09:15 AM	165	4	0	169	0	0	0	0	4	177	0	181	350
09:30 AM	185	4	0	189	1	0	0	1	5	211	0	216	406
09:45 AM	197	3	0	200	0	0	0	0	3	207	0	210	410
Total	717	12	0	729	1	0	0	1	12	761	0	773	1503
10:00 AM	183	2	0	185	0	0	0	0	1	248	0	249	434
10:15 AM	195	2	1	198	0	0	0	0	4	257	0	261	459
10:30 AM	205	3	0	208	0	0	0	0	1	231	0	232	440
10:45 AM	234	5	0	239	1	0	0	1	3	266	0	269	509
Total	817	12	1	830	1	0	0	1	9	1002	0	1011	1842
11:00 AM	217	5	0	222	0	0	0	0	5	240	0	245	467
11:15 AM	213	4	0	217	1	0	0	1	2	289	0	291	509
11:30 AM	232	6	0	238	0	0	0	0	6	271	0	277	515
11:45 AM	223	6	0	229	0	0	0	0	4	286	0	290	519
Total	885	21	0	906	1	0	0	1	17	1086	0	1103	2010
12:00 PM	238	3	0	241	0	0	0	0	3	298	0	301	542
12:15 PM	187	4	0	191	0	0	0	0	7	246	0	253	444
12:30 PM	214	2	0	216	0	0	0	0	5	256	0	261	477
12:45 PM	231	3	0	234	0	0	0	0	9	264	0	273	507
Total	870	12	0	882	0	0	0	0	24	1064	0	1088	1970
01:00 PM	222	2	0	224	0	0	0	0	6	290	0	296	520
01:15 PM	234	8	0	242	0	1	0	1	11	256	0	267	510
01:30 PM	219	5	0	224	1	0	0	1	8	267	0	275	500
01:45 PM	199	0	0	199	0	0	0	0	1	255	0	256	455
Total	874	15	0	889	1	1	0	2	26	1068	0	1094	1985
Grand Total	4163	72	1	4236	4	1	0	5	88	4981	0	5069	9310
Apprch %	98.3	1.7	0		80	20	0		1.7	98.3	0		
Total %	44.7	0.8	0	45.5	0	0	0	0.1	0.9	53.5	0	54.4	
CARS	4115	72	1	4188	4	1	0	5	88	4930	0	5018	9211
% CARS	98.8	100	100	98.9	100	100	0	100	100	99	0	99	98.9
TRUCKS	48	0	0	48	0	0	0	0	0	51	0	51	99
% TRUCKS	1.2	0	0	1.1	0	0	0	0	0	1	0	1	1.1

Stephen G. Pernaw & Company, Inc.
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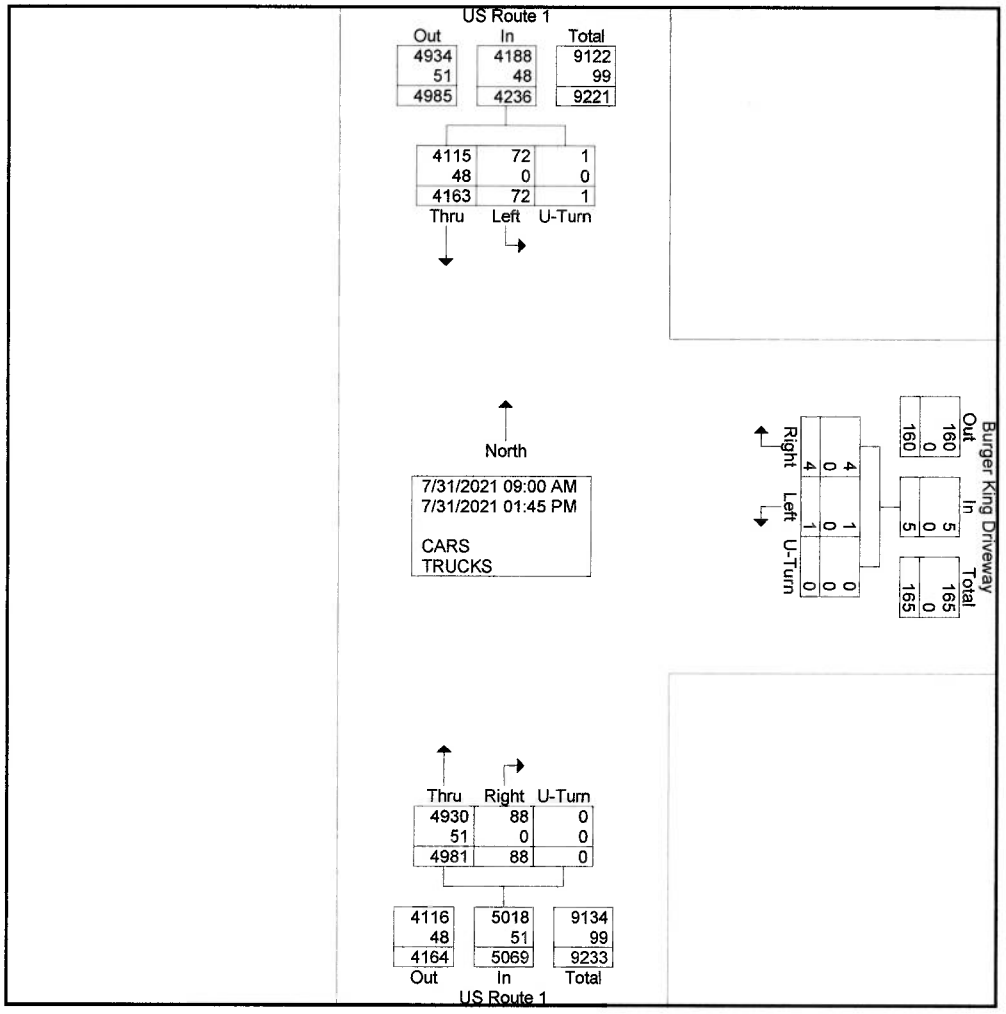
Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Manchester: NH

File Name : 2122A_B King Sat
Site Code : 2122A
Start Date : 7/31/2021
Page No : 2



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Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Manchester: NH

File Name : 2122A_B King Sat
Site Code : 2122A
Start Date : 7/31/2021
Page No : 1

Groups Printed- TRUCKS

	US Route 1 From North				Burger King Driveway From East				US Route 1 From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
09:00 AM	2	0	0	2	0	0	0	0	0	4	0	4	6
09:15 AM	3	0	0	3	0	0	0	0	0	0	0	0	3
09:30 AM	1	0	0	1	0	0	0	0	0	1	0	1	2
09:45 AM	2	0	0	2	0	0	0	0	0	3	0	3	5
Total	8	0	0	8	0	0	0	0	0	8	0	8	16
10:00 AM	1	0	0	1	0	0	0	0	0	2	0	2	3
10:15 AM	3	0	0	3	0	0	0	0	0	1	0	1	4
10:30 AM	1	0	0	1	0	0	0	0	0	4	0	4	5
10:45 AM	3	0	0	3	0	0	0	0	0	1	0	1	4
Total	8	0	0	8	0	0	0	0	0	8	0	8	16
11:00 AM	4	0	0	4	0	0	0	0	0	1	0	1	5
11:15 AM	4	0	0	4	0	0	0	0	0	1	0	1	5
11:30 AM	2	0	0	2	0	0	0	0	0	5	0	5	7
11:45 AM	2	0	0	2	0	0	0	0	0	4	0	4	6
Total	12	0	0	12	0	0	0	0	0	11	0	11	23
12:00 PM	4	0	0	4	0	0	0	0	0	2	0	2	6
12:15 PM	3	0	0	3	0	0	0	0	0	6	0	6	9
12:30 PM	2	0	0	2	0	0	0	0	0	2	0	2	4
12:45 PM	1	0	0	1	0	0	0	0	0	1	0	1	2
Total	10	0	0	10	0	0	0	0	0	11	0	11	21
01:00 PM	2	0	0	2	0	0	0	0	0	3	0	3	5
01:15 PM	5	0	0	5	0	0	0	0	0	4	0	4	9
01:30 PM	2	0	0	2	0	0	0	0	0	1	0	1	3
01:45 PM	1	0	0	1	0	0	0	0	0	5	0	5	6
Total	10	0	0	10	0	0	0	0	0	13	0	13	23
Grand Total	48	0	0	48	0	0	0	0	0	51	0	51	99
Apprch %	100	0	0		0	0	0		0	100	0		
Total %	48.5	0	0	48.5	0	0	0	0	0	51.5	0	51.5	

Stephen G. Pernaw & Company, Inc.
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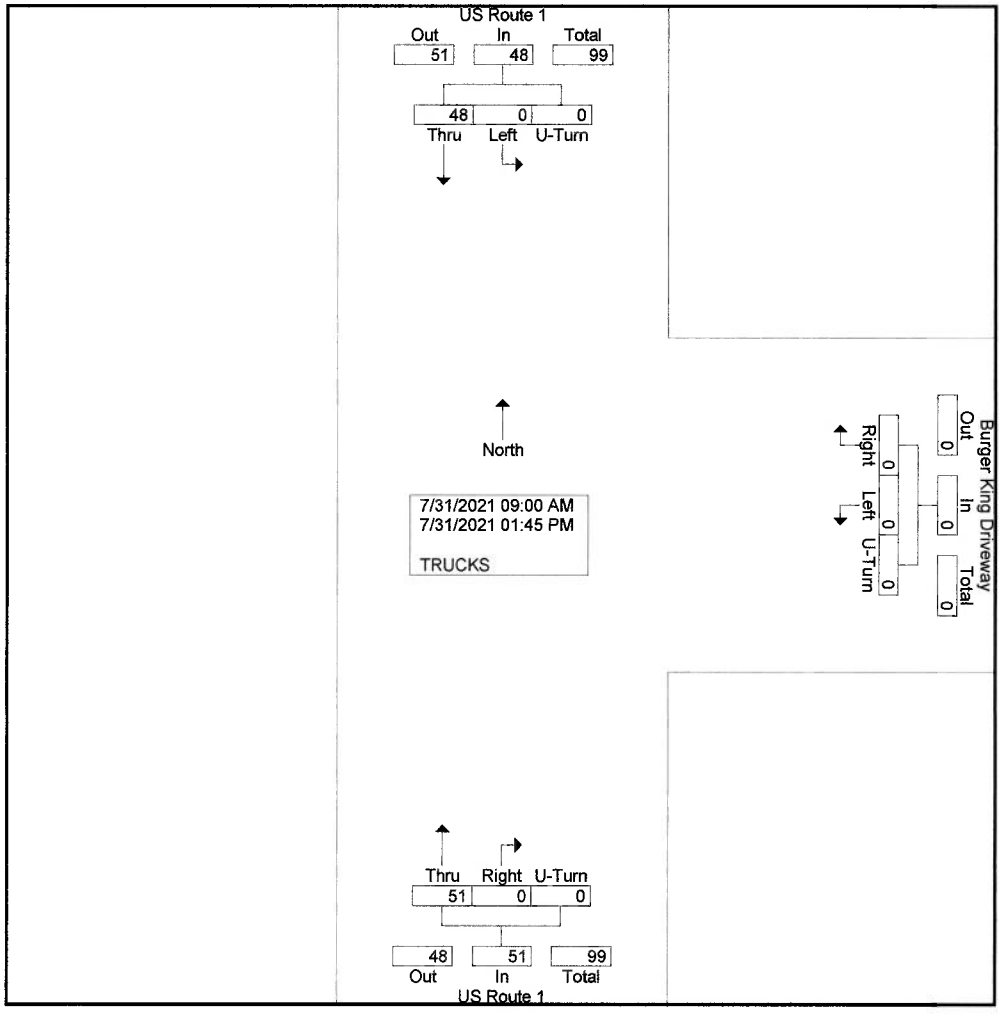
Weather: Clear
Collected By: MV
Job Number: 2122A
Town/State: Manchester: NH

File Name : 2122A_B King Sat
Site Code : 2122A
Start Date : 7/31/2021
Page No : 2



Stephen G. Pernaw & Company, Inc.

Burger King Driveway Volumes (Thursday, 7/29/21)

Lafayette Road, Portsmouth, New Hampshire

	Burger King - North Driveway				Water Country			Sum	
	RO	LO	LI	RI	RI	LI	LO		
7:00 AM	0	0	0	0	0	0	0	0	
7:15 AM	0	2	1	0	0	0	0	3	
7:30 AM	2	0	0	0	0	0	0	2	
7:45 AM	1	1	0	0	0	0	0	2	7
8:00 AM	3	0	0	0	0	1	0	4	11
8:15 AM	2	0	1	0	0	0	0	3	11
8:30 AM	1	1	0	0	1	0	0	3	12
8:45 AM	1	2	0	0	0	0	0	3	13
								20	
Total Count									
7 AM - 9 AM	10	6	2	0	1	1	0	20	
Peak Hour									
7:45 - 8:45 AM	7	2	1	0	1	1	0	12	

Stephen G. Pernaw & Company, Inc.

Burger King Driveway Volumes (Thursday, 7/29/21)

Lafayette Road, Portsmouth, New Hampshire

	Burger King - North Driveway				Water Country			Sum	
	RO	LO	LI	RI	RI	LI	LO		
3:00 PM	5	2	0	0	2	0	0	9	
3:15 PM	4	5	1	0	0	2	0	12	
3:30 PM	5	0	1	0	0	0	0	6	
3:45 PM	3	4	2	0	0	0	1	10	37
4:00 PM	9	3	0	1	0	0	0	13	41
4:15 PM	3	3	0	0	0	1	0	7	36
4:30 PM	4	5	1	0	0	0	0	10	40
4:45 PM	4	2	0	0	0	1	0	7	37
5:00 PM	3	2	0	0	1	0	0	6	30
5:15 PM	8	3	0	0	0	0	0	11	34
5:30 PM	2	3	0	0	0	0	0	5	29
5:45 PM	3	6	0	0	0	2	0	11	33
								107	
Total Count									
3 PM - 6 PM	53	38	5	1	3	6	1	107	
Peak Hour									
3:30 - 4:30 PM	20	10	3	1	0	1	1	36	

Stephen G. Pernaw & Company, Inc.

Burger King Driveway Volumes (Saturday, 7/31/21)

Lafayette Road, Portsmouth, New Hampshire

	Burger King - North Driveway					Water Country			Sum	
	RO	LO	LI	RI	Straight Across	RI	LI	LO		
9:00 AM	1	4	1	0	1	10	6	0	23	
9:15 AM	3	1	0	0	0	23	7	0	34	
9:30 AM	3	1	1	0	5	37	5	0	52	
9:45 AM	5	3	3	0	4	45	19	0	79	188
10:00 AM	3	1	0	0	3	59	36	0	102	267
10:15 AM	4	0	2	0	1	60	21	0	88	321
10:30 AM	0	3	1	0	3	48	22	0	77	346
10:45 AM	4	1	0	0	1	34	2	0	42	309
11:00 AM	3	1	0	0	3	54	19	0	80	287
11:15 AM	3	3	1	0	4	38	30	0	79	278
11:30 AM	6	2	1	1	0	36	27	0	73	274
11:45 AM	10	2	1	0	1	24	34	0	72	304
12:00 PM	7	2	1	1	1	15	29	0	56	280
12:15 PM	5	3	0	0	4	18	28	0	58	259
12:30 PM	4	0	1	0	3	15	27	0	50	236
12:45 PM	3	7	0	1	0	19	22	0	52	216
1:00 PM	6	1	1	0	2	16	44	0	70	230
1:15 PM	3	4	0	0	2	14	18	0	41	213
1:30 PM	5	5	0	0	3	10	20	0	43	206
1:45 PM	7	7	1	0	0	7	22	0	44	198
									1215	
Total Count										
9 AM - 2 PM	85	51	15	3	41	582	438	0	1215	
Peak Hour										
11:15 AM - 12:15 PM	26	9	4	2	6	113	120	0	280	

Stephen G. Pernaw & Company, Inc.

Similar Site Driveway Volumes (Thursday, 7/29/21)

Common Man Roadside Market - S. Willow Street, Manchester, New Hampshire

	S Willow		Goffs Falls Main Driveway				Goffs Falls W Drwy		Sum	
	RI	RO	RI	RO	LO	LI	LO	RO		
7:00 AM	5	4	2	8	0	6	1	1	27	
7:15 AM	9	3	2	8	2	5	2	0	31	
7:30 AM	16	1	2	3	4	3	2	1	32	
7:45 AM	6	9	0	5	4	7	5	0	36	126
8:00 AM	13	3	3	2	4	4	4	0	33	132
8:15 AM	13	2	3	7	4	2	5	1	37	138
8:30 AM	9	3	2	4	1	1	6	1	27	133
8:45 AM	8	3	4	6	3	4	2	1	31	128
									254	
Total Count										
7 AM - 9 AM	79	28	18	43	22	32	27	5	254	
Peak Hour										
7:30 - 8:30 AM	48	15	8	17	16	16	16	2	138	

Total Count	Ins = 129	Peak Hour	Ins = 72
	Outs = 125		Outs = 66
	254		138

Stephen G. Pernaw & Company, Inc.

Similar Site Driveway Volumes (Thursday, 7/29/21)

Common Man Roadside Market - S. Willow Street, Manchester, New Hampshire

	S Willow		Goffs Falls Main Driveway				Goffs Falls W Drwy		Sum	
	RI	RO	RI	RO	LO	LI	LO	RO		
3:00 PM	9	4	5	6	5	2	1	1	33	
3:15 PM	3	3	3	5	3	2	2	0	21	
3:30 PM	16	4	6	5	2	3	2	3	41	
3:45 PM	12	3	5	8	4	5	2	3	42	137
4:00 PM	14	6	2	5	1	5	5	1	39	143
4:15 PM	7	3	2	6	1	2	7	3	31	153
4:30 PM	12	2	3	2	2	5	3	2	31	143
4:45 PM	13	4	3	5	2	3	7	0	37	138
5:00 PM	11	4	1	5	3	2	5	1	32	32
5:15 PM	6	1	5	5	2	4	1	2	26	58
5:30 PM	11	6	4	5	1	3	3	3	36	94
5:45 PM	9	2	2	7	5	4	3	1	33	127
									402	
Total Count										
3 PM - 6 PM	123	42	41	64	31	40	41	20	402	
Peak Hour										
3:30 - 4:30 PM	49	16	15	24	8	15	16	10	153	

Total Count	Ins = 204	Peak Hour	Ins = 79
	Outs = 198		Outs = 74
	402		153

Stephen G. Pernaw & Company, Inc.

Similar Site Driveway Volumes (Saturday, 7/31/21)

Common Man Roadside Market - S. Willow Street, Manchester, New Hampshire

	S Willow		Goffs Falls Main Driveway				Goffs Falls W Drwy		Sum	
	RI	RO	RI	RO	LO	LI	LO	RO		
9:00 AM	6	3	7	4	1	2	2	0	25	
9:15 AM	5	5	3	4	3	3	3	2	28	
9:30 AM	3	2	7	4	2	3	1	1	23	
9:45 AM	10	2	7	9	6	4	3	1	42	118
10:00 AM	7	2	9	5	3	1	3	1	31	124
10:15 AM	7	3	4	8	3	5	1	0	31	127
10:30 AM	7	6	1	1	1	1	2	1	20	124
10:45 AM	11	6	7	5	3	3	3	0	38	120
11:00 AM	5	5	5	5	1	5	1	0	27	116
11:15 AM	9	1	5	4	5	2	3	2	31	116
11:30 AM	11	2	3	6	3	0	1	1	27	123
11:45 AM	13	3	3	11	7	4	1	0	42	127
12:00 PM	4	2	5	5	5	7	4	0	32	132
12:15 PM	6	1	6	7	4	1	2	1	28	129
12:30 PM	10	1	5	9	3	4	3	4	39	141
12:45 PM	10	2	1	4	3	5	4	2	31	130
1:00 PM	12	7	6	8	2	5	2	1	43	141
1:15 PM	9	5	2	3	4	4	3	0	30	143
1:30 PM	10	5	2	11	3	5	2	0	38	142
1:45 PM	8	4	5	4	4	2	2	0	29	140
									635	
Total Count 9 AM - 2 PM	163	67	93	117	66	66	46	17	635	
Peak Hour 12:30 - 1:30 PM	41	15	14	24	12	18	12	7	143	

Total Count	Ins =	322	Peak Hour	Ins =	73
	Outs =	313		Outs =	70
		635			143

Appendix D **Seasonal Adjustment Factor / Historical Growth Rate / COVID Factor**

Seasonal Adjustment Factors
NHDOT Group 4 (Urban Highways)

Stephen G. Pernaw & Company, Inc.

Year 2019 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	11,431	1.12	1.23
Feb	11,848	1.08	1.18
Mar	12,141	1.06	1.15
Apr	12,860	1.00	1.09
May	13,551	0.95	1.03
Jun	13,785	0.93	1.02
Jul	13,942	0.92	1.01
Aug	14,016	0.92	1.00
Sep	13,379	0.96	1.05
Oct	13,339	0.96	1.05
Nov	12,265	1.05	1.14
Dec	11,496	1.12	1.22

Year 2018 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	11,282	1.13	1.24
Feb	11,848	1.08	1.18
Mar	11,828	1.08	1.18
Apr	12,491	1.02	1.12
May	13,587	0.94	1.03
Jun	13,911	0.92	1.00
Jul	13,765	0.93	1.01
Aug	13,945	0.92	1.00
Sep	13,168	0.97	1.06
Oct	13,367	0.96	1.04
Nov	12,215	1.05	1.14
Dec	11,963	1.07	1.17

Year 2017 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	12254	1.21	1.33
Feb	13494	1.10	1.21
Mar	14,335	1.03	1.14
Apr	15004	0.99	1.09
May	15547	0.95	1.05
Jun	16310	0.91	1.00
Jul	15523	0.95	1.05
Aug	15974	0.93	1.02
Sep	15546	0.95	1.05
Oct	15104	0.98	1.08
Nov	14,544	1.02	1.12
Dec	14151	1.05	1.15

Average Peak-Month Factor	**1.02**

Stephen G. Pernaw & Company, Inc.

STEPHEN G. PERNAW & COMPANY, INC.
PROJECT: Proposed Gas Station/Convenience Store, Manchester, New Hampshire
NUMBER: 2122A
COUNT STATION: 82379150

HISTORICAL GROWTH CALCULATIONS

LOCATION : US1 - North of Ocean Rd, Portsmouth, NH
CASE : AADT

ARITHMETIC PROJECTIONS

YEAR	AADT
2016	19093
2017	19475
2018	19865
2019	18484

Regression Output:

Constant	309144
Std Err of Y Est	683.84366
R Squared	0.0994176
No. of Observations	4
Degrees of Freedom	2
X Coefficient	-143.7
Std Err of Coef.	305.82418

PROJECTIONS

2019	19014
2020	18870
2021	18726
2022	18583
2023	18439
2024	18295
2025	18152
2026	18008
2027	17864
2028	17720
2029	17577

RATE = -144 VPD/YEAR

GEOMETRIC PROJECTIONS

YEAR	AADT	Ln AADT
2016	19093	9.85708
2017	19475	9.87689
2018	19865	9.89671
2019	18484	9.82466

Regression Output:

Constant	25.48353
Std Err of Y Est	0.035581
R Squared	0.1058373
No. of Observations	4
Degrees of Freedom	2
X Coefficient	-0.0077421
Std Err of Coef.	0.0159123

PROJECTIONS

2019	19001
2020	18854
2021	18709
2022	18564
2023	18421
2024	18279
2025	18138
2026	17998
2027	17859
2028	17722
2029	17585

CONCLUSION: USE 1%/YEAR

RATE = -0.8 % / YEAR

New Hampshire DOT Department of Transportation

MS2

Transportation Data Management System

List View | All DIRs

Record 4936 of 5746 Goto Record go

Location ID	82379150	**MPO ID**	
Type	SPOT	**HPMS ID**	
On NHS	Yes	**On HPMS**	Yes
LRS ID	U0000001__	**LRS Loc Pt.**	
SF Group	04	**Route Type**	
AF Group	04	**Route**	US 1
GF Group	E	**Active**	Yes
Class Dist Grp	Default	**Category**	3
Seas Clss Grp	Default		
WIM Group	Default		
QC Group	Default		
Fnct'l Class	Other Principal Arterial	**Milepost**	
Located On	Lafayette Rd		
Loc On Alias	US 1 (LAFAYETTE RD) NORTH OF OCEAN RD (SB-NB) (81379211-81379212)		

More Detail

STATION DATA

Directions: 2-WAY | NB | SB

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2020	15,600[3]		9	50	14,196 (91%)	1,404 (9%)	Grown from 2019
2019	18,484	1,674	9	50	16,931 (92%)	1,553 (8%)	
2018	19,865[3]		8	53	18,315 (92%)	1,550 (8%)	Grown from 2017
2017	19,475[3]		8	53	18,075 (93%)	1,400 (7%)	Grown from 2016
2016	19,093	1,621	8	53	17,413 (91%)	1,680 (9%)	

|<< < > >>| 1-5 of 17

Travel Demand Model

	Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

VOLUME COUNT

	Date	Int	Total
	Thu 6/6/2019	60	21,455
	Wed 6/5/2019	60	21,364
	Tue 6/4/2019	60	21,469
	Tue 7/19/2016	60	19,597
	Sun 7/17/2016	60	16,959
	Fri 9/27/2013	60	20,159
	Thu 9/26/2013	60	19,003
	Wed 9/25/2013	60	18,690
	Tue 9/24/2013	60	18,712
	Mon 9/23/2013	60	18,246

VOLUME TREND

Year	Annual Growth
2020	-16%
2019	-7%
2018	2%
2017	2%
2016	7%
2015	3%
2014	2%
2013	-7%
2010	-2%
2007	0%

New Hampshire DOT
Department of Transportation

MS2
Transportation Data Management System

List View | All DIRs

Record 1 of 1 Goto Record go

Location ID	02345001	**MPO ID**	
Type	SPOT	**HPMS ID**	
On NHS	Yes	**On HPMS**	Yes
LRS ID	U0000001__	**LRS Loc Pt.**	
SF Group	04	**Route Type**	
AF Group	04	**Route**	US 1
GF Group	E	**Active**	Yes
Class Dist Grp	Default	**Category**	1
Seas Clss Grp	Default		
WIM Group	Default		
QC Group	Perm		
Fnct'l Class	Other Principal Arterial	**Milepost**	
Located On	Lafayette Rd		
Loc On Alias	US 1 (LAFAYETTE RD) NORTH OF NORTH RD (SB-NB) (01345005-01345006)		

More Detail

STATION DATA Show Data

Directions: 2-WAY | NB 1 | SB 1

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2020	13,985	1,464	10	54	12,726 (91%)	1,259 (9%)	
2019	16,139	1,576	10	50	14,783 (92%)	1,356 (8%)	
2018	16,254	1,620	10	54	14,985 (92%)	1,269 (8%)	
2017	16,356						
2016	16,353						

|<< < > >>| 1-5 of 66

Travel Demand Model

	Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

VOLUME COUNT

	Date	Int	Total
	Mon 1/17/2022	60	10,741
	Sun 1/16/2022	60	9,370
	Sat 1/15/2022	60	10,960
	Fri 1/14/2022	60	15,376
	Thu 1/13/2022	60	14,777
	Wed 1/12/2022	60	14,301
	Tue 1/11/2022	60	13,232
	Mon 1/10/2022	60	14,050
	Sun 1/9/2022	60	7,851
	Sat 1/8/2022	60	11,928

VOLUME TREND

Year	Annual Growth
2020	-13%
2019	-1%
2018	-1%
2017	0%
2016	0%
2015	1%
2014	-1%
2013	-1%
2012	-3%

CALCULATION SHEET

Stephen G. Pernaw & Company, Inc.

Project:	Retail Fuel Outlet	Job Number:	2122A
Calculated By:	SP	Date:	1/25/2022
Checked By:	CA	Date:	1/25/2022
Sheet No:	1	Of:	1
Subject:	Covid-19 Adjustment Factors		

I. Given:

A. NHDOT Count Station 02345001 (US1 North Hampton) July 2021 Volumes (with Covid):

July 2021 AM Volumes				July 2021 PM Volumes				July 2021 SAT Volumes			
7/26/2021	M	1,096	veh	7/26/2021	M	1,423	veh	7/31/2021	S	1,486	veh
7/27/2021	T	1,157	veh	7/27/2021	T	1,490	veh				
7/28/2021	W	1,191	veh	7/28/2021	W	1,517	veh				
7/29/2021	TH	1,174	veh	7/29/2021	TH	1,486	veh				
7/30/2021	F	1,138	veh	7/30/2021	F	1,577	veh				
Average =		1,151	veh	Average =		1,499	veh	Average =		1,486	veh

B. NHDOT Count Station 02345001 (US1 North Hampton) July 2019 Volumes (without Covid):

July 2019 AM Volumes				July 2019 PM Volumes				July 2019 SAT Volumes			
7/22/2019	M	1,219	veh	7/22/2019	M	1,494	veh	7/27/2019	S	1,485	veh
7/23/2019	T	1,258	veh	7/23/2019	T	1,539	veh				
7/24/2019	W	1,363	veh	7/24/2019	W	1,582	veh				
7/25/2019	TH	1,310	veh	7/25/2019	TH	1,545	veh				
7/26/2019	F	1,274	veh	7/26/2019	F	1,663	veh				
Average =		1,285	veh	Average =		1,565	veh	Average =		1,485	veh

II. Factor 2019 volumes to 2021 using a two percent annual growth rate:

Average =		1,336	veh	Average =		1,627	veh	Average =		1,544	veh

III. Calculate Covid Adjustment Factors

AM Factor = 1,336 / 1,115 = 1.16

PM Factor = 1,627 / 1,499 = 1.09

SAT Factor = 1,544 / 1,486 = 1.04

New Hampshire DOT
Department of Transportation

MS2
Transportation Data Management System

Excel Version

Weekly Volume Report			
Location ID:	02345001	**Type:**	SPOT
Located On:	Lafayette Rd	:	
Direction:	2-WAY		
Community:	NORTH HAMPTON	**Period:**	Mon 7/22/2019 - Sun 7/28/2019
AADT:	16139		

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	Graph
12:00 AM	63	58	56	72	83	114	104	79	0.4%
1:00 AM	37	30	57	34	62	53	59	47	0.3%
2:00 AM	41	21	34	36	42	38	31	35	0.2%
3:00 AM	31	22	52	49	50	27	29	37	0.2%
4:00 AM	105	98	85	89	76	59	26	77	0.4%
5:00 AM	265	265	287	288	289	139	98	233	1.2%
6:00 AM	628	597	681	664	615	325	228	534	2.9%
7:00 AM	1097	1095	1165	1114	1104	611	403	941	5.0%
8:00 AM	1219	1258	1363	1310	1274	883	696	1,143	6.1%
9:00 AM	1130	1155	1232	1299	1340	1163	882	1,172	6.3%
10:00 AM	1209	1192	1189	1345	1404	1408	1152	1,271	6.8%
11:00 AM	1242	1342	1257	1305	1410	1485	1179	1,317	7.0%
12:00 PM	1431	1374	1337	1418	1539	1498	1323	1,417	7.6%
1:00 PM	1366	1366	1226	1353	1481	1551	1313	1,379	7.4%
2:00 PM	1263	1468	1390	1440	1592	1499	1352	1,429	7.6%
3:00 PM	1360	1433	1381	1531	1603	1449	1362	1,446	7.7%
4:00 PM	1494	1539	1582	1545	1663	1266	1366	1,494	8.0%
5:00 PM	1484	1498	1513	1540	1606	1128	1347	1,445	7.7%
6:00 PM	1011	1046	1105	1122	1214	1021	1322	1,120	6.0%
7:00 PM	541	728	774	815	857	795	948	780	4.2%
8:00 PM	429	514	576	608	703	681	653	595	3.2%
9:00 PM	310	348	394	408	476	465	359	394	2.1%
10:00 PM	146	211	210	238	241	323	209	225	1.2%
11:00 PM	94	112	127	123	171	152	80	123	0.7%
Total	**17,996**	**18,770**	**19,073**	**19,746**	**20,895**	**18,133**	**16,521**		
24hr Total	17996	18770	19073	19746	20895	18133	16521	18,733	
AM Pk Hr	11:00	11:00	8:00	10:00	11:00	11:00	11:00		
AM Peak	1242	1342	1363	1345	1410	1485	1179	1,338	
PM Pk Hr	4:00	4:00	4:00	4:00	4:00	1:00	4:00		
PM Peak	1494	1539	1582	1545	1663	1551	1366	1,534	
% Pk Hr	8.30%	8.20%	8.29%	7.82%	7.96%	8.55%	8.27%	8.20%	

New Hampshire DOT
Department of Transportation

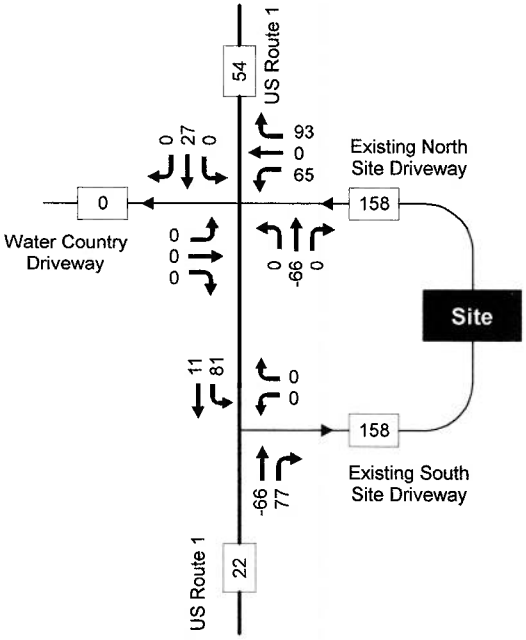
MS2
Transportation Data Management System

Excel Version

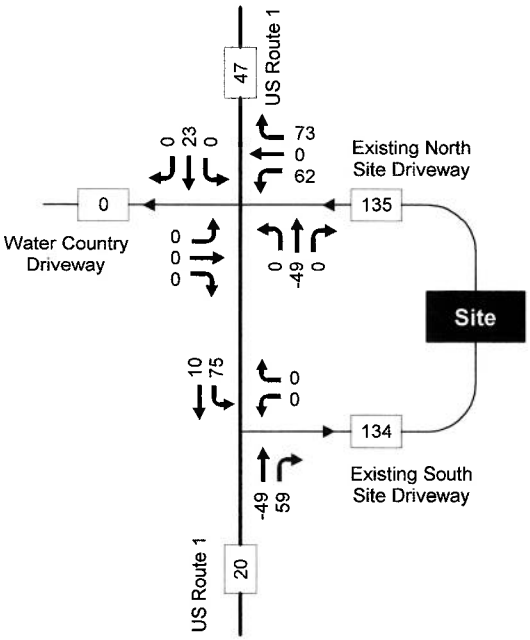
Weekly Volume Report			
Location ID:	02345001	**Type:**	SPOT
Located On:	Lafayette Rd	**:**	
Direction:	2-WAY		
Community:	NORTH HAMPTON	**Period:**	Mon 7/26/2021 - Sun 8/1/2021
AADT:			

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	Graph
12:00 AM	36	61	50	62	57	85	89	63	0.4%
1:00 AM	19	32	30	28	27	51	53	34	0.2%
2:00 AM	21	21	26	18	21	32	31	24	0.1%
3:00 AM	32	37	36	41	42	34	24	35	0.2%
4:00 AM	83	89	87	97	84	57	36	76	0.4%
5:00 AM	259	271	238	221	247	123	94	208	1.2%
6:00 AM	597	610	595	594	531	251	166	478	2.7%
7:00 AM	999	1004	1071	1033	964	509	354	848	4.8%
8:00 AM	1096	1157	1191	1174	1138	820	551	1,018	5.8%
9:00 AM	1064	1136	1111	1093	1140	1073	785	1,057	6.0%
10:00 AM	1164	1215	1183	1233	1294	1324	1030	1,206	6.9%
11:00 AM	1258	1290	1302	1335	1338	1486	1188	1,314	7.5%
12:00 PM	1341	1331	1317	1424	1499	1585	1291	1,398	8.0%
1:00 PM	1249	1316	1328	1341	1424	1600	1228	1,355	7.7%
2:00 PM	1352	1355	1386	1404	1473	1544	1343	1,408	8.0%
3:00 PM	1406	1458	1478	1486	1577	1461	1322	1,455	8.3%
4:00 PM	1423	1490	1508	1452	1462	1349	1348	1,433	8.2%
5:00 PM	1350	1476	1517	1414	1343	1058	1250	1,344	7.7%
6:00 PM	939	960	996	922	979	884	1006	955	5.4%
7:00 PM	643	555	754	562	792	755	695	679	3.9%
8:00 PM	548	418	592	417	574	565	485	514	2.9%
9:00 PM	326	287	365	287	401	404	256	332	1.9%
10:00 PM	187	159	204	180	244	250	169	199	1.1%
11:00 PM	94	81	97	105	142	141	74	105	0.6%
Total	**17,486**	**17,809**	**18,462**	**17,923**	**18,793**	**17,441**	**14,868**		
24hr Total	17486	17809	18462	17923	18793	17441	14868	17,540	
AM Pk Hr	11:00	11:00	11:00	11:00	11:00	11:00	11:00		
AM Peak	1258	1290	1302	1335	1338	1486	1188	1,314	
PM Pk Hr	4:00	4:00	5:00	3:00	3:00	1:00	4:00		
PM Peak	1423	1490	1517	1486	1577	1600	1348	1,492	
% Pk Hr	8.14%	8.37%	8.22%	8.29%	8.39%	9.17%	9.07%	8.52%	

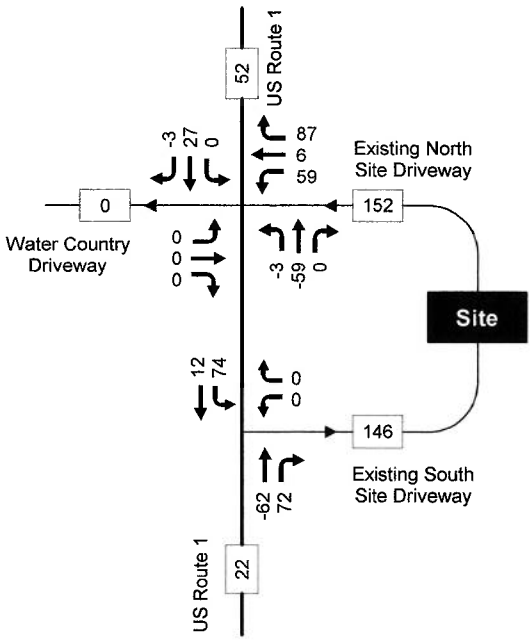
Appendix E **Site Generated Traffic Volumes / Trip Distribution**



AM Peak Hour



PM Peak Hour



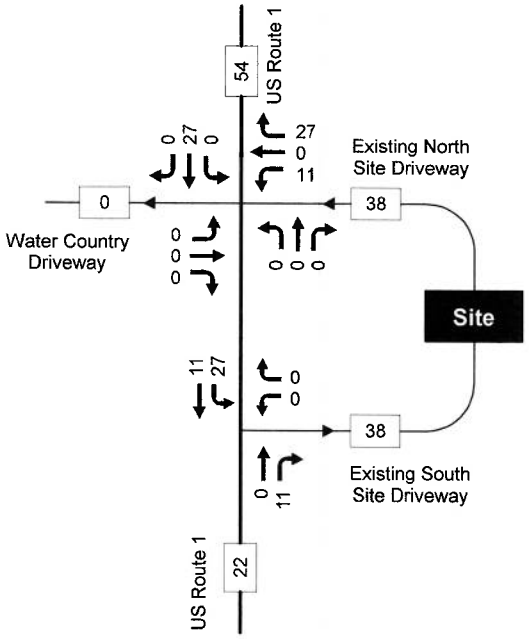
Saturday Peak Hour

2122A

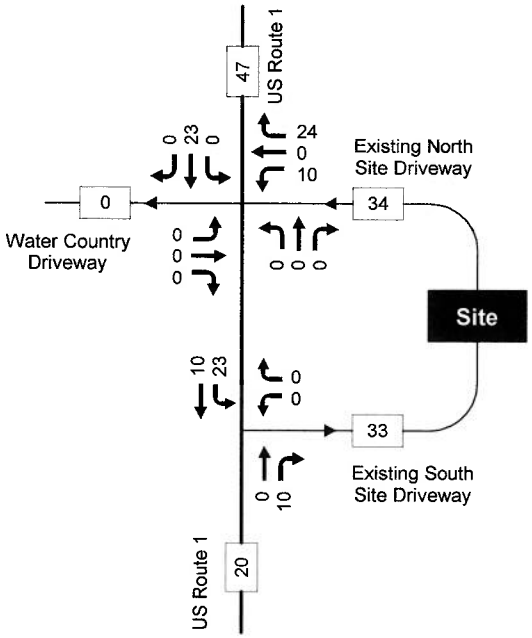
Appendix

Site Generated Traffic Volumes - Total Trips

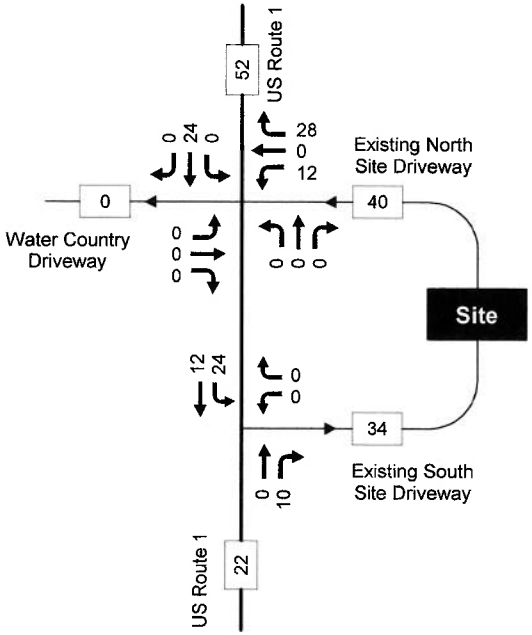
Traffic Impact and Site Access Study, Proposed Common Man Roadside, Portsmouth, New Hampshire



AM Peak Hour



PM Peak Hour



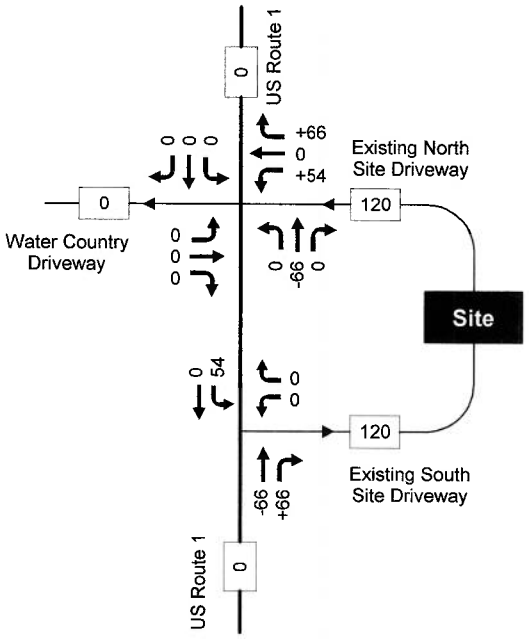
Saturday Peak Hour

2122A

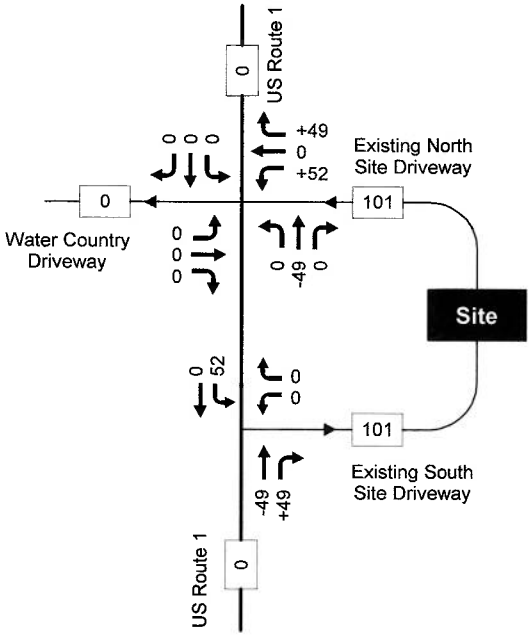
Appendix

Site Generated Traffic Volumes - Primary Trips

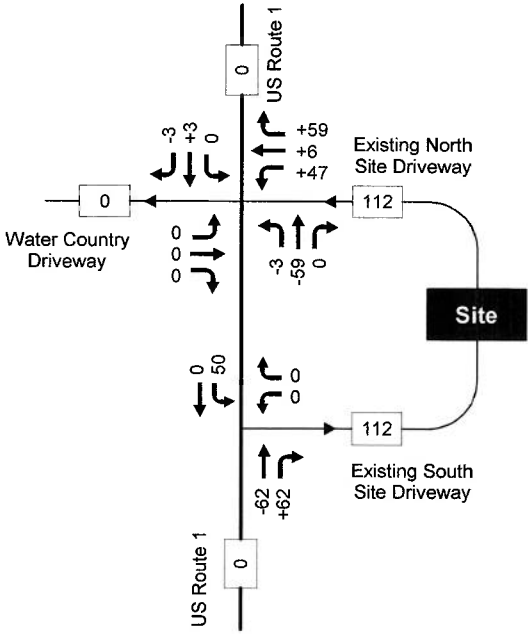
Traffic Impact and Site Access Study, Proposed Common Man Roadside, Portsmouth, New Hampshire



AM Peak Hour



PM Peak Hour



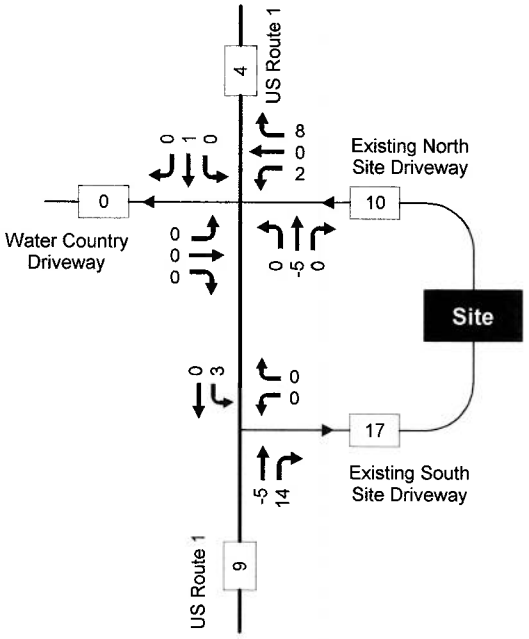
Saturday Peak Hour

2122A

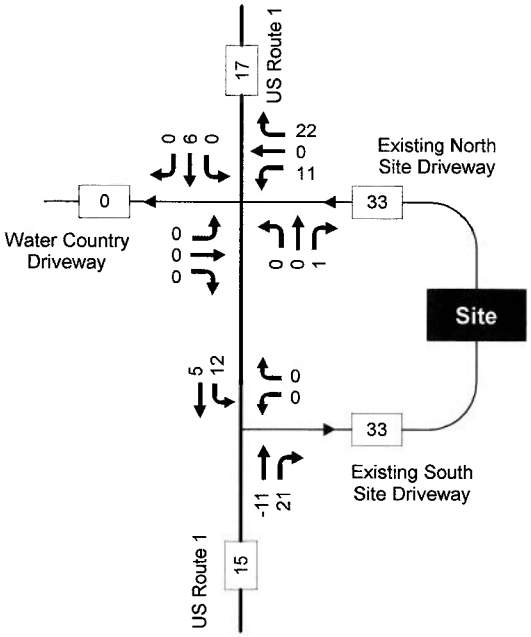
Appendix

Site Generated Traffic Volumes - Pass-By Trips

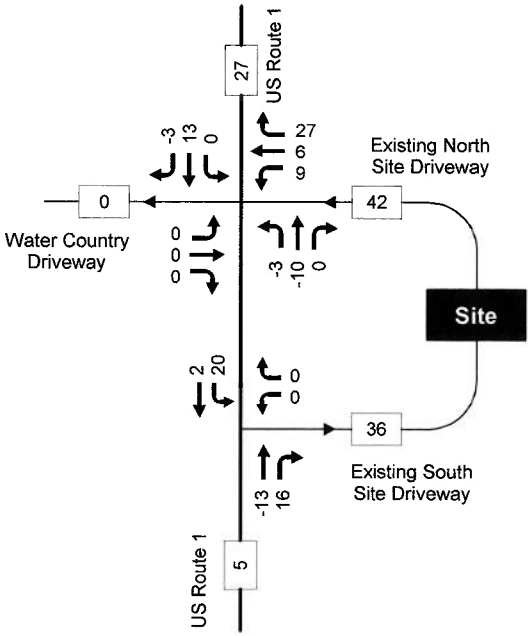
Traffic Impact and Site Access Study, Proposed Common Man Roadside, Portsmouth, New Hampshire



AM Peak Hour



PM Peak Hour



Saturday Peak Hour

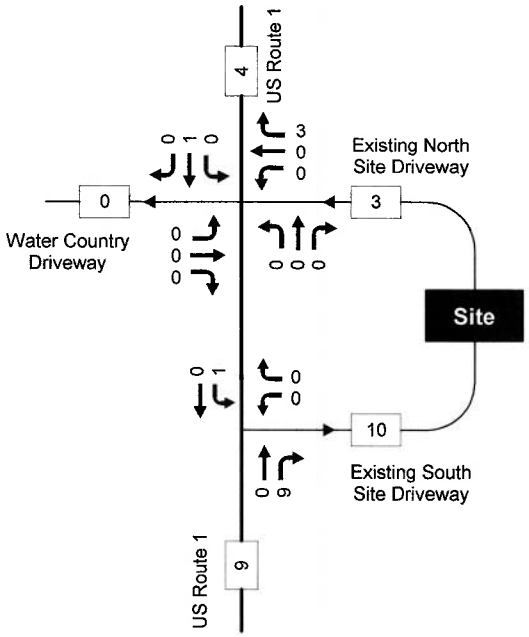
2122A

Note: Reflects raw turning movement count volumes with adjustments for COVID and illegal turns

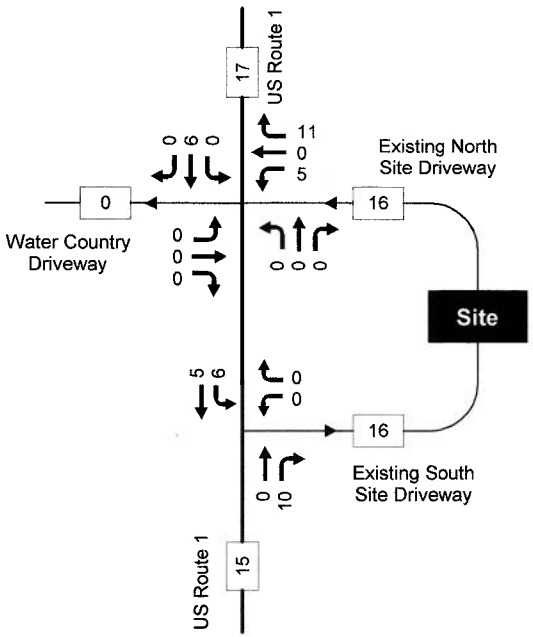
Appendix

Site Generated Traffic Volumes - Burger King-Total Trips

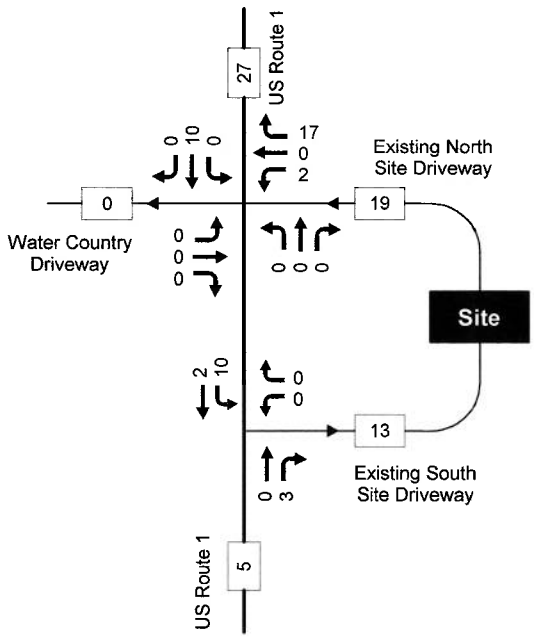
Traffic Impact and Site Access Study, Proposed Common Man Roadside, Portsmouth, New Hampshire



AM Peak Hour



PM Peak Hour



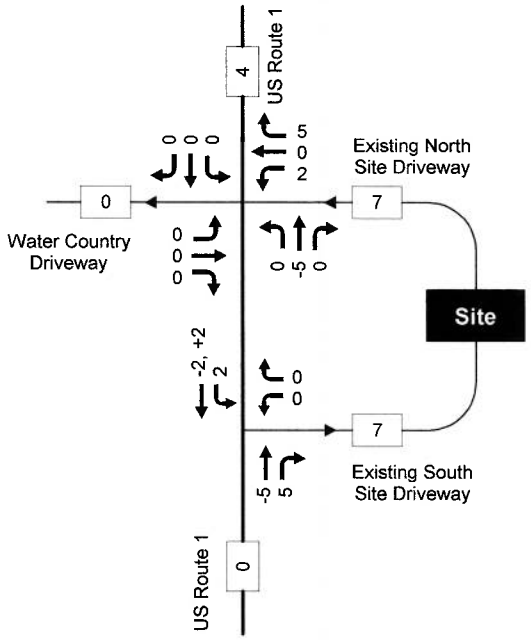
Saturday Peak Hour

2122A

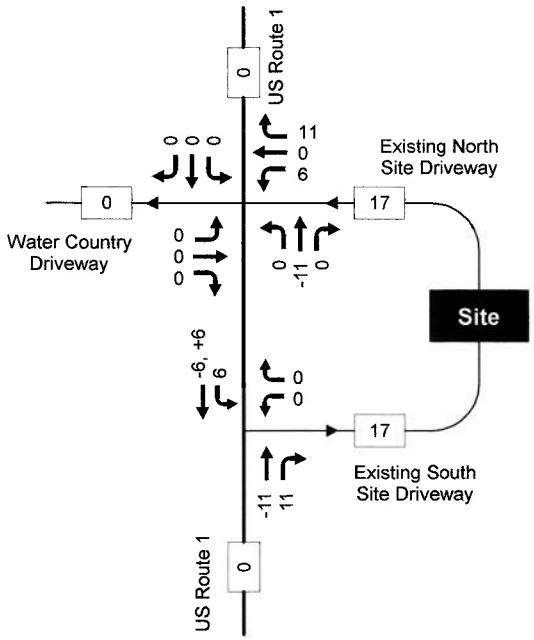
Appendix

Site Generated Traffic Volumes - Burger King-Primary Trips

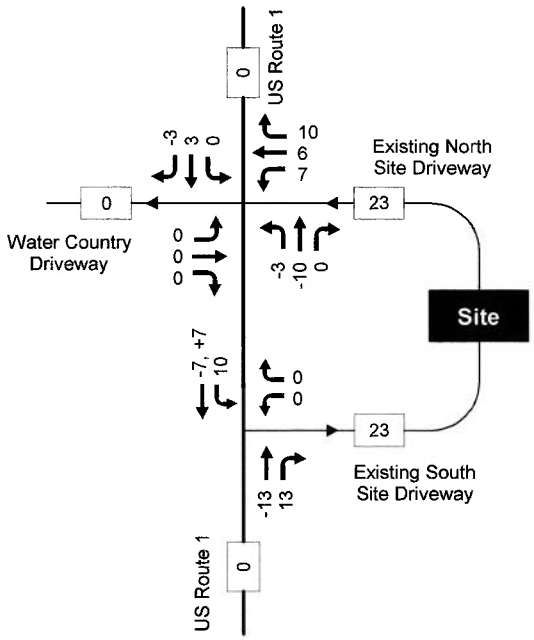
Traffic Impact and Site Access Study, Proposed Common Man Roadside, Portsmouth, New Hampshire



AM Peak Hour



PM Peak Hour



Saturday Peak Hour

2122A

Appendix

Site Generated Traffic Volumes - Burger King-Pass-By Trips

Traffic Impact and Site Access Study, Proposed Common Man Roadside, Portsmouth, New Hampshire

Graph Look Up

Query Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
945

LAND USE GROUP:
(900-999) Services

LAND USE:
945 - Convenience Store/Gas Station

LAND USE SUBCATEGORY:
GFA (5.5-10k)

SETTING/LOCATION:
General Urban/Suburban

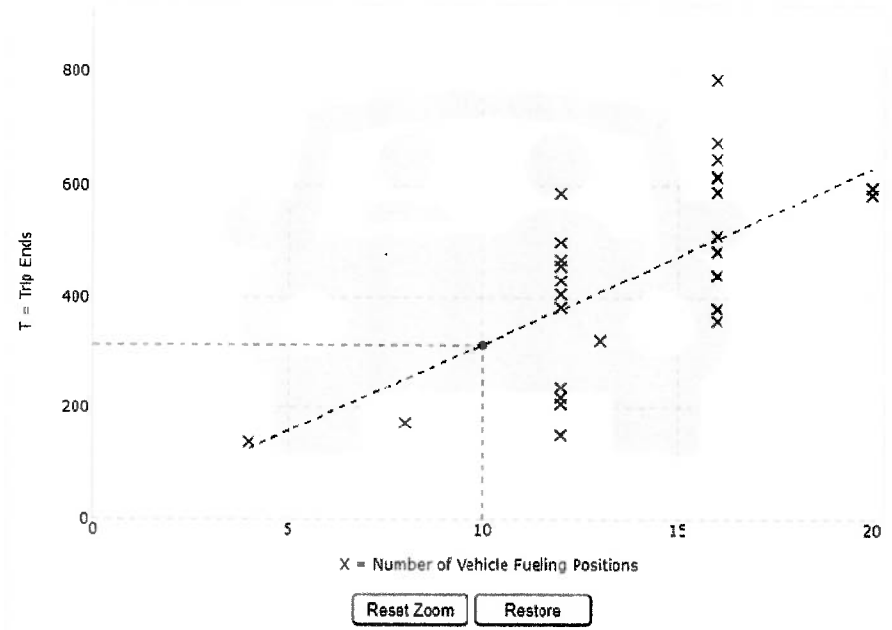
INDEPENDENT VARIABLE (IV):
Vehicle Fueling Positions

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10 Calculate

Data Plot and Equation



DATA STATISTICS

Land Use:
Convenience Store/Gas Station GFA (5.5-10k)
(945) Click for Description and Data Plots

Independent Variable:
Vehicle Fueling Positions

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
20

Avg. Num. of Vehicle Fueling Positions:
14

Average Rate:
31.60

Range of Rates:
12.58 - 49.31

Standard Deviation:
9.10

Fitted Curve Equation:
Not Given

R^2:

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 316 (Total), 158 (Entry), 158 (Exit)

Graph Look Up

Query Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
945

LAND USE GROUP:
(900-999) Services

LAND USE :
945 - Convenience Store/Gas Station

LAND USE SUBCATEGORY:
GFA (5.5-10k)

SETTING/LOCATION:
General Urban/Suburban

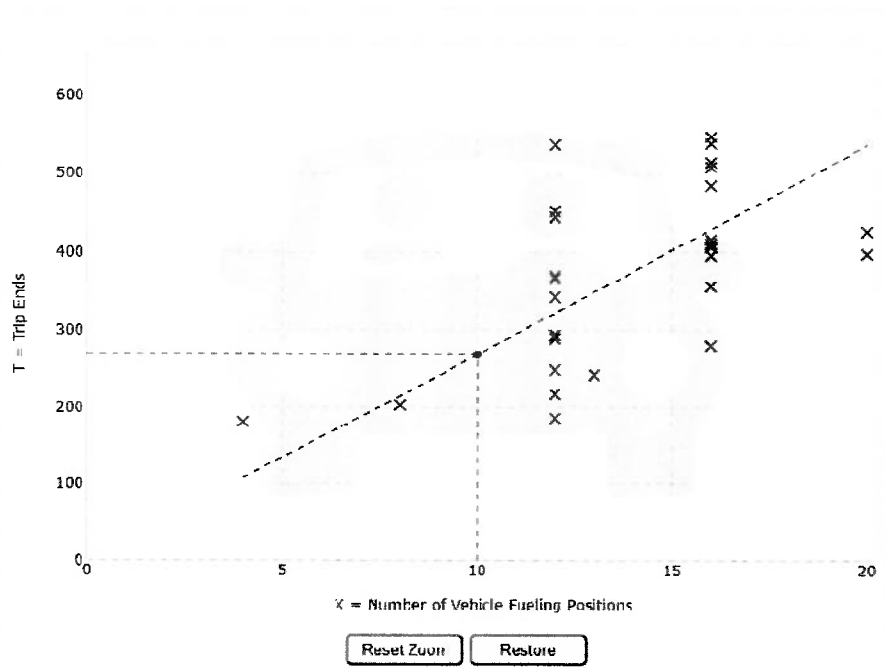
INDEPENDENT VARIABLE (IV):
Vehicle Fueling Positions

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS
10 Calculate

Data Plot and Equation



DATA STATISTICS

Land Use:
Convenience Store/Gas Station - GFA (5.5-10k)
(945) Click for Description and Data Plots

Independent Variable:
Vehicle Fueling Positions

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Vehicle Fueling Positions:
14

Average Rate:
26.90

Range of Rates:
15.50 - 45.25

Standard Deviation:
6.87

Fitted Curve Equation:
Not Given

R^2:
***

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 269 (Total), 134 (Entry), 135 (Exit)

Graph Look Up

Query Filter

DATA SOURCE:
Trip Generation Manual 11th Ed

SEARCH BY LAND USE CODE:
945

LAND USE GROUP:
(900-999) Services

LAND USE :
945 - Convenience Store/Gas Station

LAND USE SUBCATEGORY:
GFA (5.5-10k)

SETTING/LOCATION:
General Urban/Suburban

INDEPENDENT VARIABLE (IV):
Vehicle Fueling Positions

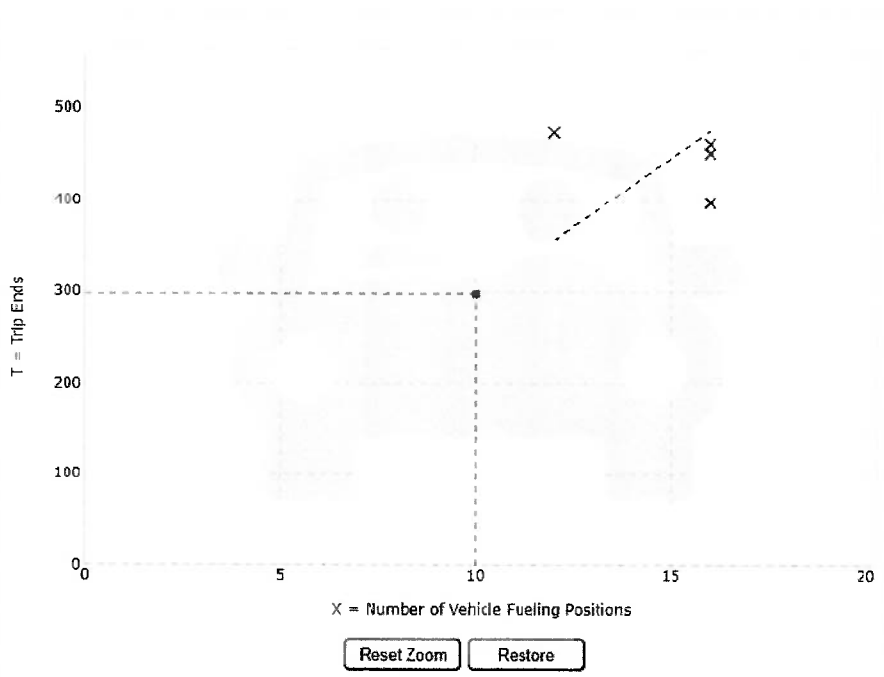
TIME PERIOD:
Saturday, Peak Hour of Generator

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10 Calculate

Data Plot and Equation

Caution – Small Sample Size



DATA STATISTICS

Land Use:
Convenience Store/Gas Station - GFA (5.5-10k)
(945) Click for Description and Data Plots

Independent Variable:
Vehicle Fueling Positions

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
4

Avg. Num. of Vehicle Fueling Positions:
15

Average Rate:
29.77

Range of Rates:
24.88 - 39.50

Standard Deviation:
5.91

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
49% entering, 51% exiting

Calculated Trip Ends:
Average Rate: 298 (Total), 146 (Entry), 152 (Exit)

Graph Look Up

Query Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
945

LAND USE GROUP:
(900-999) Services

LAND USE :
945 - Convenience Store/Gas Station

LAND USE SUBCATEGORY:
GFA (5 5-10k)

SETTING/LOCATION:
General Urban/Suburban

INDEPENDENT VARIABLE (IV):
Vehicle Fueling Positions

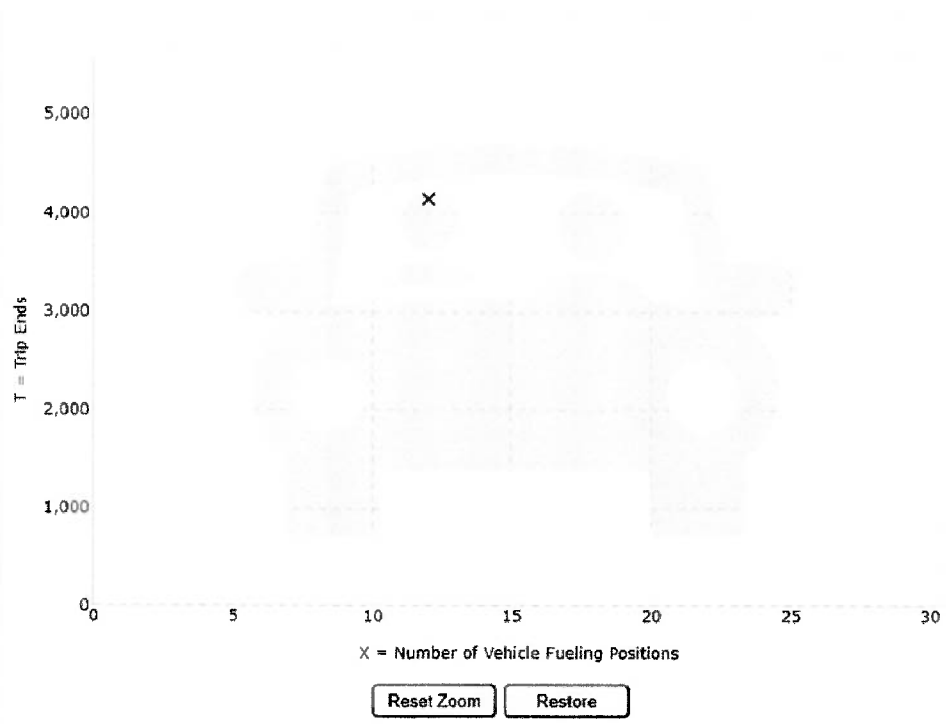
TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10 Calculate

Data Plot and Equation

Caution – Small Sample Size



DATA STATISTICS

Land Use:
Convenience Store/Gas Station - GFA (5 5-10k)
(945) Click for Description and Data Plots

Independent Variable:
Vehicle Fueling Positions

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
1

Avg. Num. of Vehicle Fueling Positions
12

Average Rate
345 75

Range of Rates
345 75 - 345 75

Standard Deviation
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 3458 (Total), 1729 (Entry), 1729 (Exit)

ITETripGen **Web-based App**

Help | Stephen Pernaw | Sign out

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
945

LAND USE GROUP:
(900-999) Services

LAND USE :
945 - Convenience Store/Gas Station

LAND USE SUBCATEGORY:
GFA (4-5 5k)

SETTING/LOCATION:
General Urban/Suburban

INDEPENDENT VARIABLE (IV):
Vehicle Fueling Positions

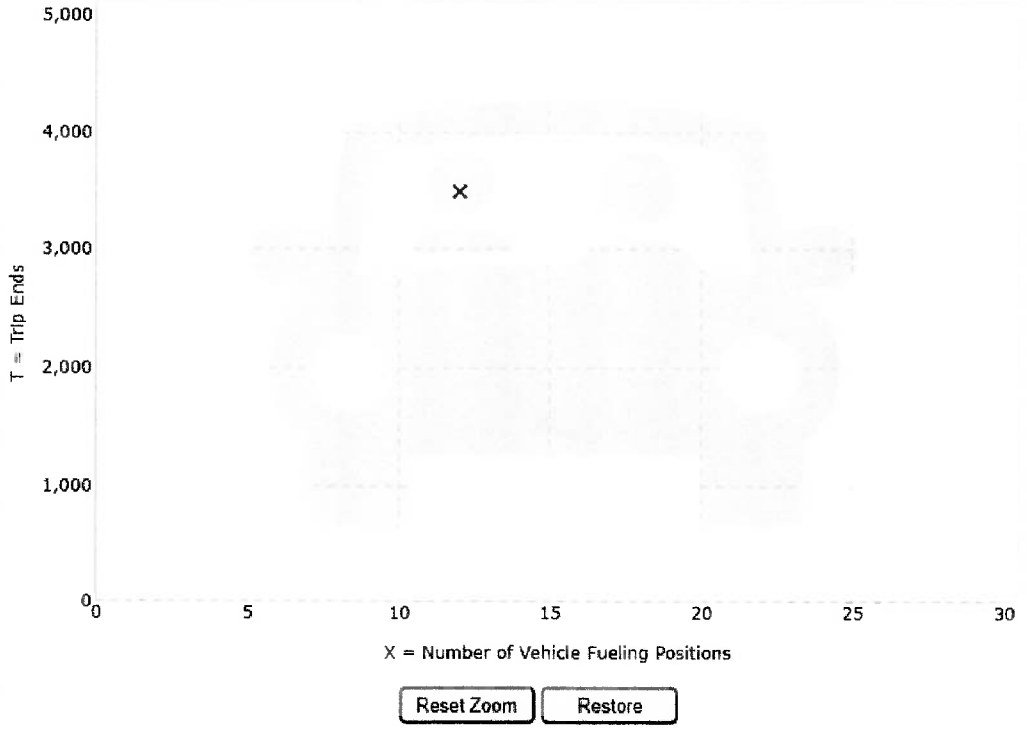
TIME PERIOD:
Saturday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10 Calculate

Data Plot and Equation

Caution – Small Sample Size



Reset Zoom | Restore

× Study Site - - - Average Rate

DATA STATISTICS

Land Use:
Convenience Store/Gas Station - GFA (4-5 5k) (945)
Click for Description and Data Plots

Independent Variable:
Vehicle Fueling Positions

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
1

Avg. Num. of Vehicle Fueling Positions:
12

Average Rate:
291.67

Range of Rates:
291.67 - 291.67

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 2917 (Total), 1458 (Entry), 1459 (Exit)

TRIP DISTRIBUTION ANALYSIS

Home Destination Report - Where Workers Live Who are Employed in the Selection Area - by County Subdivisions

		Gateway %		Gateway Allocation		
		US1 N	US1 S	US1 N	US1 S	
	Count					
Portsmouth city (Rockingham, NH)	4,271	0.85	0.15	3630	641	4271
Dover city (Strafford, NH)	3,058	1.00		3058	0	3058
Rochester city (Strafford, NH)	1,981	1.00		1981	0	1981
Hampton town (Rockingham, NH)	1,111		1.00	0	1111	1111
Somersworth city (Strafford, NH)	1,105	1.00		1105	0	1105
Exeter town (Rockingham, NH)	867		1.00	0	867	867
Newmarket town (Rockingham, NH)	820		1.00	0	820	820
Stratham town (Rockingham, NH)	744		1.00	0	744	744
Kittery town (York, ME)	696	1.00		696	0	696
Manchester city (Hillsborough, NH)	667		1.00	0	667	667
	15320			10470	4850	15320
				68.3%	31.7%	100%
				70	30	100

Appendix F **Capacity and Level of Service Calculations – Unsignalized**

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	2	0	7	1	800	0	1	675	1
Future Vol, veh/h	0	0	0	2	0	7	1	800	0	1	675	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	5	0
Mvmt Flow	0	0	0	2	0	8	1	889	0	1	696	1

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1590	1590	889	697	0	0	889	0	0
Stage 1	891	891	-	-	-	-	-	-	-
Stage 2	699	699	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	120	109	345	909	-	-	771	-	-
Stage 1	404	363	-	-	-	-	-	-	-
Stage 2	497	445	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	120	0	345	909	-	-	771	-	-
Mov Cap-2 Maneuver	120	0	-	-	-	-	-	-	-
Stage 1	404	0	-	-	-	-	-	-	-
Stage 2	497	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	909	-	-	120	345	771	-	-
HCM Lane V/C Ratio	0.001	-	-	0.019	0.023	0.001	-	-
HCM Control Delay (s)	9	-	-	35.6	15.7	9.7	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	2	0	8	1	966	0	1	814	1
Future Vol, veh/h	0	0	0	2	0	8	1	966	0	1	814	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	5	0
Mvmt Flow	0	0	0	2	0	9	1	1073	0	1	839	1

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1917	1917	1073	840	0	0	1073	0	0
Stage 1	1075	1075	-	-	-	-	-	-	-
Stage 2	842	842	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	75	68	270	804	-	-	657	-	-
Stage 1	331	298	-	-	-	-	-	-	-
Stage 2	426	383	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	75	0	270	804	-	-	657	-	-
Mov Cap-2 Maneuver	75	0	-	-	-	-	-	-	-
Stage 1	331	0	-	-	-	-	-	-	-
Stage 2	425	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	804	-	-	75	270	657	-	-
HCM Lane V/C Ratio	0.001	-	-	0.03	0.033	0.002	-	-
HCM Control Delay (s)	9.5	-	-	54.5	18.8	10.5	-	-
HCM Lane LOS	A	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	65	0	93	1	905	0	0	841	1
Future Vol, veh/h	0	0	0	65	0	93	1	905	0	0	841	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	5	0
Mvmt Flow	0	0	0	72	0	103	1	1006	0	0	867	1

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1876	1876	1006	868	0	0	1006	0	0
Stage 1	1008	1008	-	-	-	-	-	-	-
Stage 2	868	868	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	80	72	295	785	-	-	697	-	-
Stage 1	356	321	-	-	-	-	-	-	-
Stage 2	414	372	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	80	0	295	785	-	-	697	-	-
Mov Cap-2 Maneuver	80	0	-	-	-	-	-	-	-
Stage 1	356	0	-	-	-	-	-	-	-
Stage 2	414	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	81.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	785	-	-	80	295	697	-	-
HCM Lane V/C Ratio	0.001	-	-	0.903	0.35	-	-	-
HCM Control Delay (s)	9.6	-	-	165.1	23.6	0	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	4.7	1.5	0	-	-

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	2	0	8	1	1086	0	1	899	1
Future Vol, veh/h	0	0	0	2	0	8	1	1086	0	1	899	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	5	0
Mvmt Flow	0	0	0	2	0	9	1	1207	0	1	927	1

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2139	2139	1207	928	0	0	1207	0	0
Stage 1	1209	1209	-	-	-	-	-	-	-
Stage 2	930	930	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	55	50	226	745	-	-	585	-	-
Stage 1	285	258	-	-	-	-	-	-	-
Stage 2	387	349	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	55	0	226	745	-	-	585	-	-
Mov Cap-2 Maneuver	55	0	-	-	-	-	-	-	-
Stage 1	285	0	-	-	-	-	-	-	-
Stage 2	386	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	31.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	745	-	-	55	226	585	-	-
HCM Lane V/C Ratio	0.001	-	-	0.04	0.039	0.002	-	-
HCM Control Delay (s)	9.8	-	-	73.2	21.6	11.2	-	-
HCM Lane LOS	A	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection												
Int Delay, s/veh	10.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	65	0	93	1	1007	0	0	926	1
Future Vol, veh/h	0	0	0	65	0	93	1	1007	0	0	926	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	5	0
Mvmt Flow	0	0	0	72	0	103	1	1119	0	0	955	1

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2077	2077	1119	956	0	0	1119	0	0
Stage 1	1121	1121	-	-	-	-	-	-	-
Stage 2	956	956	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 60	54	254	727	-	-	632	-	-
Stage 1	314	284	-	-	-	-	-	-	-
Stage 2	376	339	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	~ 60	0	254	727	-	-	632	-	-
Mov Cap-2 Maneuver	~ 60	0	-	-	-	-	-	-	-
Stage 1	314	0	-	-	-	-	-	-	-
Stage 2	376	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	138.9	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	727	-	-	60	254	632	-	-
HCM Lane V/C Ratio	0.002	-	-	1.204	0.407	-	-	-
HCM Control Delay (s)	10	-	-	296.8	28.6	0	-	-
HCM Lane LOS	A	-	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	6	1.9	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	10	0	20	1	982	1	3	1043	0
Future Vol, veh/h	0	0	0	10	0	20	1	982	1	3	1043	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	98	98	98	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	0	0	0	11	0	22	1	1002	1	3	1122	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2133	2133	1003	1122	0	0	1003	0	0
Stage 1	1005	1005	-	-	-	-	-	-	-
Stage 2	1128	1128	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	55	50	297	630	-	-	698	-	-
Stage 1	357	322	-	-	-	-	-	-	-
Stage 2	312	282	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	55	0	297	630	-	-	698	-	-
Mov Cap-2 Maneuver	55	0	-	-	-	-	-	-	-
Stage 1	356	0	-	-	-	-	-	-	-
Stage 2	311	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	40.8	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	630	-	-	55	297	698	-	-
HCM Lane V/C Ratio	0.002	-	-	0.202	0.075	0.005	-	-
HCM Control Delay (s)	10.7	-	-	86.3	18.1	10.2	-	-
HCM Lane LOS	B	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.2	0	-	-

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	11	0	22	1	1114	1	3	1183	0
Future Vol, veh/h	0	0	0	11	0	22	1	1114	1	3	1183	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	98	98	98	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	0	0	0	12	0	24	1	1137	1	3	1272	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2418	2418	1138	1272	0	0	1138	0	0
Stage 1	1140	1140	-	-	-	-	-	-	-
Stage 2	1278	1278	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	36	33	248	553	-	-	621	-	-
Stage 1	308	278	-	-	-	-	-	-	-
Stage 2	264	239	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	36	0	248	553	-	-	621	-	-
Mov Cap-2 Maneuver	36	0	-	-	-	-	-	-	-
Stage 1	307	0	-	-	-	-	-	-	-
Stage 2	263	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	64	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	553	-	-	36	248	621	-	-
HCM Lane V/C Ratio	0.002	-	-	0.34	0.099	0.005	-	-
HCM Control Delay (s)	11.5	-	-	149.7	21.1	10.8	-	-
HCM Lane LOS	B	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0.3	0	-	-

Intersection												
Int Delay, s/veh	17.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	62	0	73	1	1076	0	0	1203	0
Future Vol, veh/h	0	0	0	62	0	73	1	1076	0	0	1203	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	98	98	98	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	0	0	0	69	0	81	1	1098	0	0	1294	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2394	2394	1098	1294	0	0	1098	0	0
Stage 1	1100	1100	-	-	-	-	-	-	-
Stage 2	1294	1294	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 38	34	261	542	-	-	643	-	-
Stage 1	322	290	-	-	-	-	-	-	-
Stage 2	260	235	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	~ 38	0	261	542	-	-	643	-	-
Mov Cap-2 Maneuver	~ 38	0	-	-	-	-	-	-	-
Stage 1	321	0	-	-	-	-	-	-	-
Stage 2	260	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	296.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	542	-	-	38	261	643	-	-
HCM Lane V/C Ratio	0.002	-	-	1.813	0.311	-	-	-
HCM Control Delay (s)	11.7	-	-	$ 615.4	24.9	0	-	-
HCM Lane LOS	B	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	7.4	1.3	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	11	0	22	1	1231	1	3	1307	0
Future Vol, veh/h	0	0	0	11	0	22	1	1231	1	3	1307	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	98	98	98	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	0	0	0	12	0	24	1	1256	1	3	1405	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2670	2670	1257	1405	0	0	1257	0	0
Stage 1	1259	1259	-	-	-	-	-	-	-
Stage 2	1411	1411	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	25	23	211	492	-	-	560	-	-
Stage 1	270	244	-	-	-	-	-	-	-
Stage 2	228	206	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	25	0	211	492	-	-	560	-	-
Mov Cap-2 Maneuver	25	0	-	-	-	-	-	-	-
Stage 1	269	0	-	-	-	-	-	-	-
Stage 2	227	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	98.2	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	492	-	-	25	211	560	-	-
HCM Lane V/C Ratio	0.002	-	-	0.489	0.116	0.006	-	-
HCM Control Delay (s)	12.3	-	-	245.9	24.3	11.5	-	-
HCM Lane LOS	B	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.5	0.4	0	-	-

Intersection												
Int Delay, s/veh	27.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	62	0	73	1	1193	0	0	1327	0
Future Vol, veh/h	0	0	0	62	0	73	1	1193	0	0	1327	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	98	98	98	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	0	0	0	69	0	81	1	1217	0	0	1427	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2646	2646	1217	1427	0	0	1217	0	0
Stage 1	1219	1219	-	-	-	-	-	-	-
Stage 2	1427	1427	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 26	24	223	483	-	-	580	-	-
Stage 1	282	255	-	-	-	-	-	-	-
Stage 2	224	203	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	~ 26	0	223	483	-	-	580	-	-
Mov Cap-2 Maneuver	~ 26	0	-	-	-	-	-	-	-
Stage 1	281	0	-	-	-	-	-	-	-
Stage 2	224	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 505.3	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	483	-	-	26	223	580	-	-
HCM Lane V/C Ratio	0.002	-	-	2.65	0.364	-	-	-
HCM Control Delay (s)	12.5	-	-	$ 1064.9	30.1	0	-	-
HCM Lane LOS	B	-	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	8.4	1.6	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	9	6	26	120	1023	2	4	916	113
Future Vol, veh/h	0	0	0	9	6	26	120	1023	2	4	916	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	10	7	29	125	1066	2	4	954	118

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2338	2397	1067	1072	0	0	1068	0	0
Stage 1	1317	1317	-	-	-	-	-	-	-
Stage 2	1021	1080	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	41	34	272	658	-	-	660	-	-
Stage 1	253	229	-	-	-	-	-	-	-
Stage 2	351	297	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	33	0	272	658	-	-	660	-	-
Mov Cap-2 Maneuver	33	0	-	-	-	-	-	-	-
Stage 1	205	0	-	-	-	-	-	-	-
Stage 2	349	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	84.1	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	658	-	-	33	272	660	-	-
HCM Lane V/C Ratio	0.19	-	-	0.505	0.106	0.006	-	-
HCM Control Delay (s)	11.8	-	-	195.6	19.8	10.5	-	-
HCM Lane LOS	B	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-	1.7	0.4	0	-	-

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	9	6	27	125	1112	2	4	991	118
Future Vol, veh/h	0	0	0	9	6	27	125	1112	2	4	991	118
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	10	7	30	130	1158	2	4	1032	123

Major/Minor	Minor1		Major1				Major2		
Conflicting Flow All	2521	2582	1159	1155	0	0	1160	0	0
Stage 1	1419	1419	-	-	-	-	-	-	-
Stage 2	1102	1163	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	31	26	241	612	-	-	610	-	-
Stage 1	226	205	-	-	-	-	-	-	-
Stage 2	321	271	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	24	0	241	612	-	-	610	-	-
Mov Cap-2 Maneuver	24	0	-	-	-	-	-	-	-
Stage 1	178	0	-	-	-	-	-	-	-
Stage 2	319	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	126.1	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	612	-	-	24	241	610	-	-
HCM Lane V/C Ratio	0.213	-	-	0.694	0.124	0.007	-	-
HCM Control Delay (s)	12.5	-	-	$ 313.4	22.1	10.9	-	-
HCM Lane LOS	B	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0.8	-	-	2.1	0.4	0	-	-

Intersection												
Int Delay, s/veh	33											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	59	6	87	125	1063	0	0	1009	118
Future Vol, veh/h	0	0	0	59	6	87	125	1063	0	0	1009	118
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	66	7	97	130	1107	0	0	1051	123

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2480	2541	1107	1174	0	0	1107	0	0
Stage 1	1367	1367	-	-	-	-	-	-	-
Stage 2	1113	1174	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 33	27	258	602	-	-	638	-	-
Stage 1	239	217	-	-	-	-	-	-	-
Stage 2	317	268	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	~ 26	0	258	602	-	-	638	-	-
Mov Cap-2 Maneuver	~ 26	0	-	-	-	-	-	-	-
Stage 1	187	0	-	-	-	-	-	-	-
Stage 2	317	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 494.7	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	602	-	-	26	258	638	-	-
HCM Lane V/C Ratio	0.216	-	-	2.778	0.375	-	-	-
HCM Control Delay (s)	12.6	-	-	$ 1120.6	27.1	0	-	-
HCM Lane LOS	B	-	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	8.8	1.7	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	9	6	27	125	1242	2	4	1094	118
Future Vol, veh/h	0	0	0	9	6	27	125	1242	2	4	1094	118
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	10	7	30	130	1294	2	4	1140	123

Major/Minor	Minor1		Major1				Major2		
Conflicting Flow All	2765	2826	1295	1263	0	0	1296	0	0
Stage 1	1555	1555	-	-	-	-	-	-	-
Stage 2	1210	1271	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	22	18	200	557	-	-	541	-	-
Stage 1	194	176	-	-	-	-	-	-	-
Stage 2	285	241	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	17	0	200	557	-	-	541	-	-
Mov Cap-2 Maneuver	17	0	-	-	-	-	-	-	-
Stage 1	149	0	-	-	-	-	-	-	-
Stage 2	283	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	201.8	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	557	-	-	17	200	541	-	-
HCM Lane V/C Ratio	0.234	-	-	0.98	0.15	0.008	-	-
HCM Control Delay (s)	13.4	-	-	$ 518	26.2	11.7	-	-
HCM Lane LOS	B	-	-	F	D	B	-	-
HCM 95th %tile Q(veh)	0.9	-	-	2.5	0.5	0	-	-

Intersection												
Int Delay, s/veh	47.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	59	6	87	125	1192	0	0	1112	118
Future Vol, veh/h	0	0	0	59	6	87	125	1192	0	0	1112	118
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	50	-	-	625	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	66	7	97	130	1242	0	0	1158	123

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2722	2783	1242	1281	0	0	1242	0	0
Stage 1	1502	1502	-	-	-	-	-	-	-
Stage 2	1220	1281	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 23	19	215	549	-	-	568	-	-
Stage 1	206	187	-	-	-	-	-	-	-
Stage 2	282	238	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	~ 18	0	215	549	-	-	568	-	-
Mov Cap-2 Maneuver	~ 18	0	-	-	-	-	-	-	-
Stage 1	157	0	-	-	-	-	-	-	-
Stage 2	282	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 784.7	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	549	-	-	18	215	568	-	-
HCM Lane V/C Ratio	0.237	-	-	4.012	0.45	-	-	-
HCM Control Delay (s)	13.6	-	-	$ 1788.6	34.7	0	-	-
HCM Lane LOS	B	-	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	9.6	2.1	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	801	12	3	674
Future Vol, veh/h	0	0	801	12	3	674
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	97	97
Heavy Vehicles, %	0	0	4	0	0	5
Mvmt Flow	0	0	890	13	3	695

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1251	897	0	0	903	0
Stage 1	897	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	179	341	-	-	761	-
Stage 1	401	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	178	341	-	-	761	-
Mov Cap-2 Maneuver	178	-	-	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	684	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	761	-
HCM Lane V/C Ratio	-	-	-	0.004	-
HCM Control Delay (s)	-	-	0	9.8	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	967	14	3	813
Future Vol, veh/h	0	0	967	14	3	813
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	97	97
Heavy Vehicles, %	0	0	4	0	0	5
Mvmt Flow	0	0	1074	16	3	838

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1507	1082	0	0	1090	0
Stage 1	1082	-	-	-	-	-
Stage 2	425	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	124	267	-	-	648	-
Stage 1	328	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	123	267	-	-	648	-
Mov Cap-2 Maneuver	123	-	-	-	-	-
Stage 1	328	-	-	-	-	-
Stage 2	630	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	648	-
HCM Lane V/C Ratio	-	-	-	0.005	-
HCM Control Delay (s)	-	-	0	10.6	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	906	77	81	824
Future Vol, veh/h	0	0	906	77	81	824
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	97	97
Heavy Vehicles, %	0	0	4	0	0	5
Mvmt Flow	0	0	1007	86	84	849

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1643	1050	0	0	1093	0
Stage 1	1050	-	-	-	-	-
Stage 2	593	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	101	278	-	-	646	-
Stage 1	340	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	88	278	-	-	646	-
Mov Cap-2 Maneuver	88	-	-	-	-	-
Stage 1	340	-	-	-	-	-
Stage 2	453	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	646	-
HCM Lane V/C Ratio	-	-	-	0.129	-
HCM Control Delay (s)	-	-	0	11.4	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1069	14	3	898
Future Vol, veh/h	0	0	1069	14	3	898
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	97	97
Heavy Vehicles, %	0	0	4	0	0	5
Mvmt Flow	0	0	1188	16	3	926

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1665	1196	0	0	1204	0
Stage 1	1196	-	-	-	-	-
Stage 2	469	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	98	229	-	-	587	-
Stage 1	289	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	98	229	-	-	587	-
Mov Cap-2 Maneuver	98	-	-	-	-	-
Stage 1	289	-	-	-	-	-
Stage 2	599	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	587	-
HCM Lane V/C Ratio	-	-	-	0.005	-
HCM Control Delay (s)	-	-	0	11.2	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1008	77	81	909
Future Vol, veh/h	0	0	1008	77	81	909
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	97	97
Heavy Vehicles, %	0	0	4	0	0	5
Mvmt Flow	0	0	1120	86	84	937

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1800	1163	0	0	1206	0
Stage 1	1163	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	80	239	-	-	586	-
Stage 1	300	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	69	239	-	-	586	-
Mov Cap-2 Maneuver	69	-	-	-	-	-
Stage 1	300	-	-	-	-	-
Stage 2	423	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	586	-
HCM Lane V/C Ratio	-	-	-	0.143	-
HCM Control Delay (s)	-	-	0	12.2	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.5	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	984	19	11	1042
Future Vol, veh/h	0	0	984	19	11	1042
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	98	98	93	93
Heavy Vehicles, %	0	0	4	0	0	2
Mvmt Flow	0	0	1004	19	12	1120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1598	1014	0	0	1023	0
Stage 1	1014	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	108	292	-	-	686	-
Stage 1	353	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	106	292	-	-	686	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	353	-	-	-	-	-
Stage 2	517	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	686	-
HCM Lane V/C Ratio	-	-	-	0.017	-
HCM Control Delay (s)	-	-	0	10.3	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1116	21	12	1182
Future Vol, veh/h	0	0	1116	21	12	1182
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	98	98	93	93
Heavy Vehicles, %	0	0	4	0	0	2
Mvmt Flow	0	0	1139	21	13	1271

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1812	1150	0	0	1160	0
Stage 1	1150	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	79	244	-	-	610	-
Stage 1	304	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	77	244	-	-	610	-
Mov Cap-2 Maneuver	77	-	-	-	-	-
Stage 1	304	-	-	-	-	-
Stage 2	470	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	610	-
HCM Lane V/C Ratio	-	-	-	0.021	-
HCM Control Delay (s)	-	-	0	11	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1078	59	75	1187
Future Vol, veh/h	0	0	1078	59	75	1187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	98	98	93	93
Heavy Vehicles, %	0	0	4	0	0	2
Mvmt Flow	0	0	1100	60	81	1276

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1930	1130	0	0	1160	0
Stage 1	1130	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	66	250	-	-	610	-
Stage 1	311	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	57	250	-	-	610	-
Mov Cap-2 Maneuver	57	-	-	-	-	-
Stage 1	311	-	-	-	-	-
Stage 2	354	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	610	-
HCM Lane V/C Ratio	-	-	-	0.132	-
HCM Control Delay (s)	-	-	0	11.8	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.5	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1233	21	12	1306
Future Vol, veh/h	0	0	1233	21	12	1306
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	98	98	93	93
Heavy Vehicles, %	0	0	4	0	0	2
Mvmt Flow	0	0	1258	21	13	1404

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1997	1269	0	0	1279	0
Stage 1	1269	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	60	208	-	-	550	-
Stage 1	267	-	-	-	-	-
Stage 2	444	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	59	208	-	-	550	-
Mov Cap-2 Maneuver	59	-	-	-	-	-
Stage 1	267	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	550	-
HCM Lane V/C Ratio	-	-	-	0.023	-
HCM Control Delay (s)	-	-	0	11.7	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.4					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1194	59	75	1311
Future Vol, veh/h	0	0	1194	59	75	1311
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	98	98	93	93
Heavy Vehicles, %	0	0	4	0	0	2
Mvmt Flow	0	0	1218	60	81	1410

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2115	1248	0	0	1278	0
Stage 1	1248	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	50	213	-	-	550	-
Stage 1	273	-	-	-	-	-
Stage 2	377	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	43	213	-	-	550	-
Mov Cap-2 Maneuver	43	-	-	-	-	-
Stage 1	273	-	-	-	-	-
Stage 2	322	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	550	-
HCM Lane V/C Ratio	-	-	-	0.147	-
HCM Control Delay (s)	-	-	0	12.7	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.5	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	1144	15	19	906
Future Vol, veh/h	0	1	1144	15	19	906
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	1	1192	16	20	944

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1712	1200	0	0	1208	0
Stage 1	1200	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	92	228	-	-	585	-
Stage 1	288	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	89	228	-	-	585	-
Mov Cap-2 Maneuver	89	-	-	-	-	-
Stage 1	288	-	-	-	-	-
Stage 2	553	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.9	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	228	585	-
HCM Lane V/C Ratio	-	-	0.005	0.034	-
HCM Control Delay (s)	-	-	20.9	11.4	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	1238	16	20	980
Future Vol, veh/h	0	1	1238	16	20	980
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	1	1290	17	21	1021

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1852	1299	0	0	1307	0
Stage 1	1299	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	74	199	-	-	536	-
Stage 1	258	-	-	-	-	-
Stage 2	546	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	71	199	-	-	536	-
Mov Cap-2 Maneuver	71	-	-	-	-	-
Stage 1	258	-	-	-	-	-
Stage 2	525	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.2	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	199	536	-
HCM Lane V/C Ratio	-	-	0.006	0.039	-
HCM Control Delay (s)	-	-	23.2	12	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1187	72	74	990
Future Vol, veh/h	0	0	1187	72	74	990
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	1236	75	77	1031

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1944	1274	0	0	1311	0
Stage 1	1274	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	65	206	-	-	534	-
Stage 1	265	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	206	-	-	534	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	265	-	-	-	-	-
Stage 2	407	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	534	-
HCM Lane V/C Ratio	-	-	-	0.144	-
HCM Control Delay (s)	-	-	0	12.9	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.5	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	1368	16	20	1083
Future Vol, veh/h	0	1	1368	16	20	1083
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	1	1425	17	21	1128

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2040	1434	0	0	1442	0
Stage 1	1434	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	56	166	-	-	476	-
Stage 1	222	-	-	-	-	-
Stage 2	513	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	54	166	-	-	476	-
Mov Cap-2 Maneuver	54	-	-	-	-	-
Stage 1	222	-	-	-	-	-
Stage 2	490	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.8	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	166	476	-
HCM Lane V/C Ratio	-	-	0.007	0.044	-
HCM Control Delay (s)	-	-	26.8	12.9	-
HCM Lane LOS	-	-	D	B	-
HCM 95th %tile Q(veh)	-	-	0	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1317	72	74	1093
Future Vol, veh/h	0	0	1317	72	74	1093
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	1372	75	77	1139

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2134	1410	0	0	1447	0
Stage 1	1410	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Critical Hdwy	6.6	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	49	171	-	-	474	-
Stage 1	228	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	41	171	-	-	474	-
Mov Cap-2 Maneuver	41	-	-	-	-	-
Stage 1	228	-	-	-	-	-
Stage 2	374	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	474	-
HCM Lane V/C Ratio	-	-	-	0.163	-
HCM Control Delay (s)	-	-	0	14.1	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.6	-

Appendix G **Auxiliary Turn Lane Warrants Analysis**

Stephen G. Pernaw & Company, Inc.

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

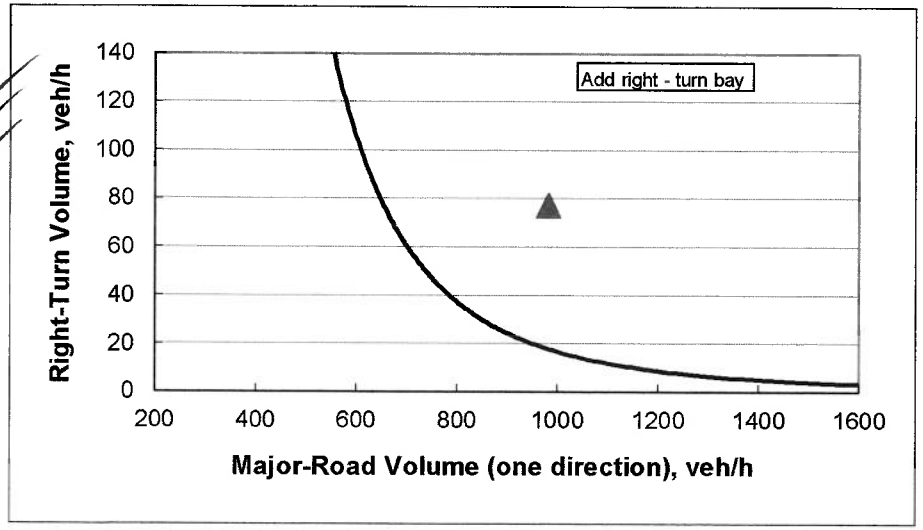
INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	983
Right-turn volume, veh/h:	77

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	18
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Stephen G. Pernaw & Company, Inc.

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

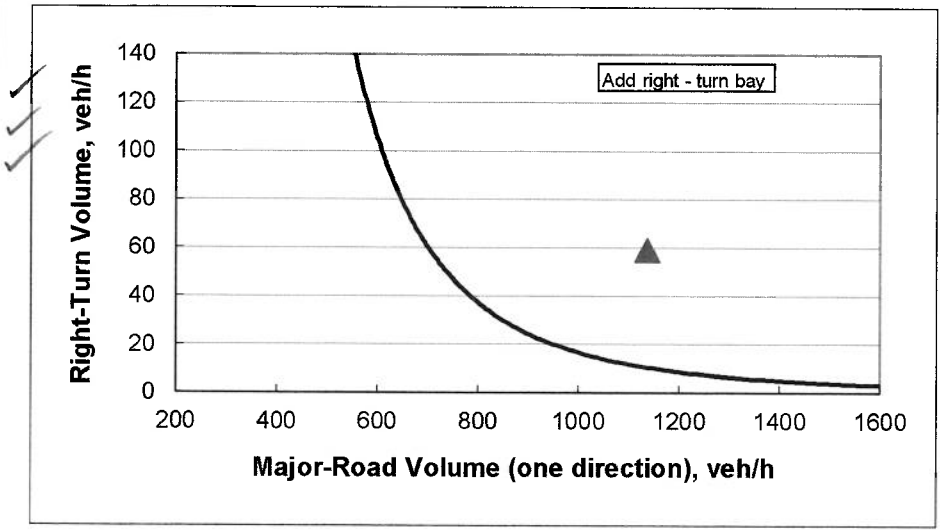
INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	1137
Right-turn volume, veh/h:	59

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Stephen G. Pernaw & Company, Inc.

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

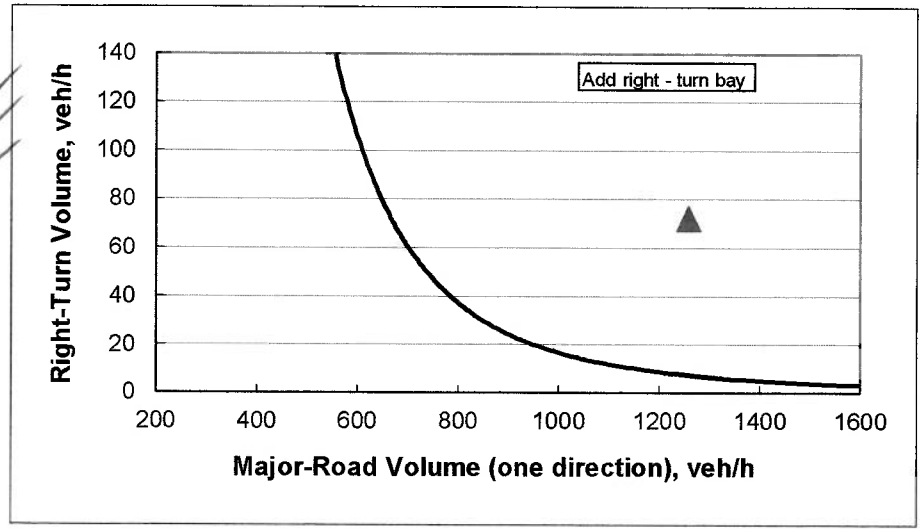
INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	1259
Right-turn volume, veh/h:	72

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	7
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Stephen G. Pernaw & Company, Inc.

Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	1748
Percentage of right-turns on minor road, %:	59%
Minor-road volume (one direction), veh/h:	158

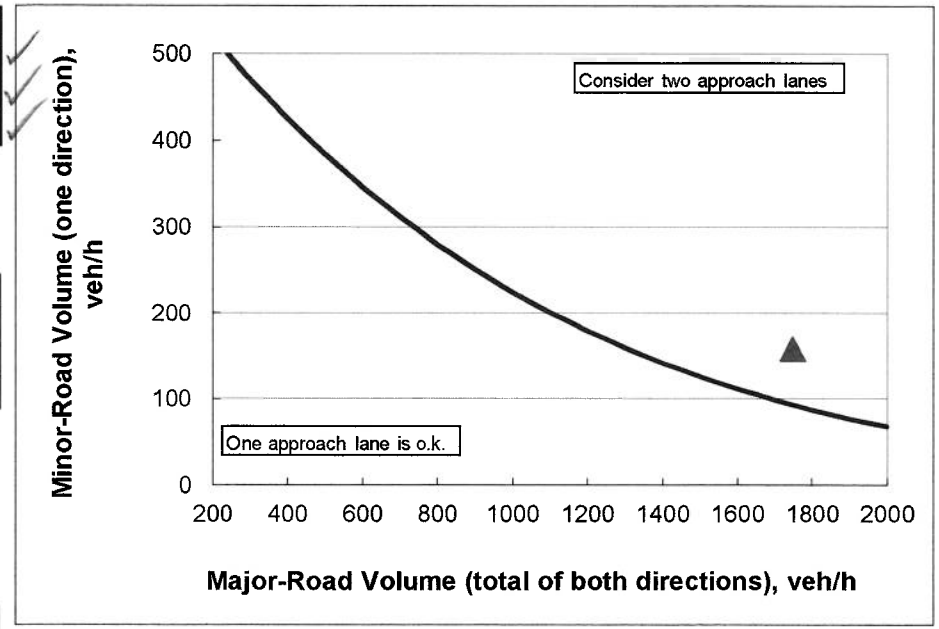
OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	92
Guidance for determining minor-road approach geometry:	
Consider TWO approach lanes	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM



Stephen G. Pernaw & Company, Inc.

Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	2280
Percentage of right-turns on minor road, %:	54%
Minor-road volume (one direction), veh/h:	135

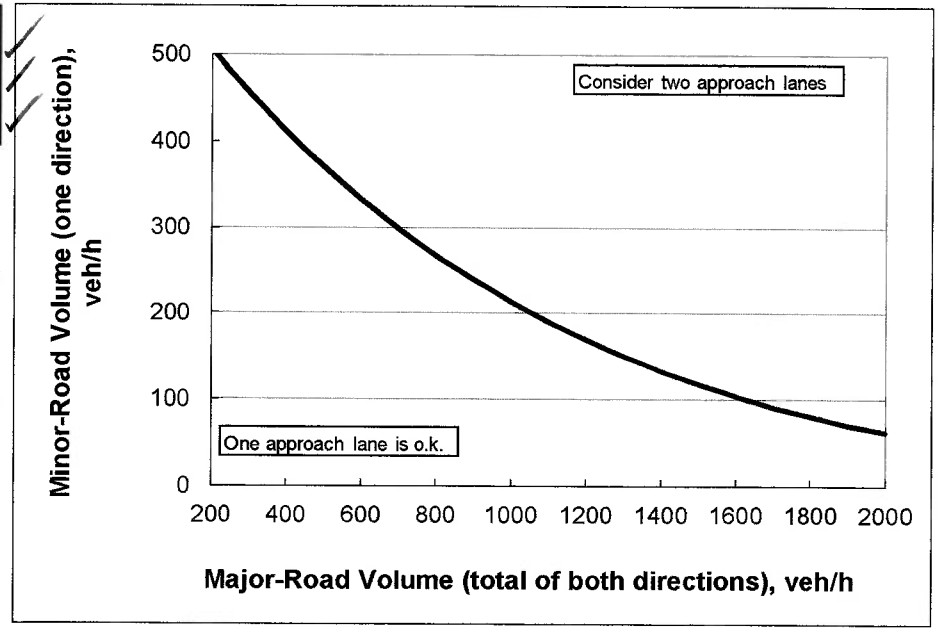
OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	43
Guidance for determining minor-road approach geometry:	
Consider TWO approach lanes	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM



Stephen G. Pernaw & Company, Inc.

Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	2315
Percentage of right-turns on minor road, %:	57%
Minor-road volume (one direction), veh/h:	152

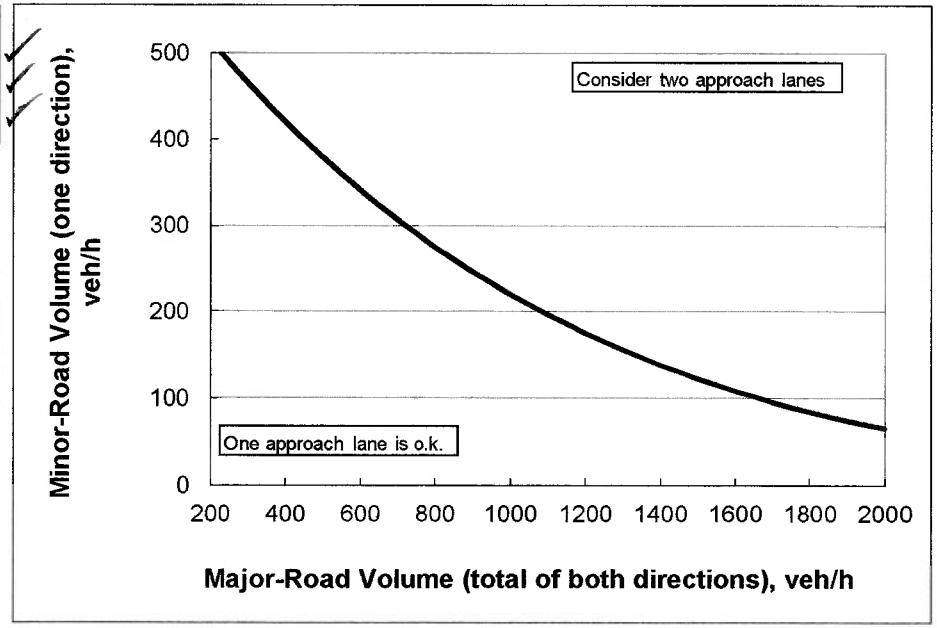
OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	43
Guidance for determining minor-road approach geometry:	
Consider TWO approach lanes	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM



Appendix H **Miscellaneous**

Stephen G. Pernaw & Company, Inc.

DRIVE-THROUGH QUEUEING ANALYSIS

INTERSECTION: Common Man Roadside
MOVEMENT: Drive Through Lane

	SERVICE TIME (Minutes)			
S	TOTAL ELAPSED TIME (SEC).....:	3600		
F	SIDE STREET ARRIVALS	47		30% drive-throughs
C	SIDE STREET CAPACITY	80		service ratte = 45 sec/veh
I	ARRIVAL RATE	0.0131		
u	SERVICE RATE	0.0222		
P	TRAFFIC INTENSITY FACTOR	0.5875		
1	AVERAGE QUEUE LENGTH	0.83674		
2	AVERAGE NUMBER IN SYSTEM	1.42424		
3	VARIANCE OF # IN SYSTEM	3.45271		
4	AVERAGE WAITING TIME	64.0909		
5	AVERAGE TIME IN SYSTEM	109.091		
6	PROBABILTY OF 0 VEHICLES IN QUEUE	41.3%	41.3%	
7	PROBABILTY OF 1 VEHICLES IN QUEUE	24.2%	65.5%	
8	PROBABILTY OF 2 VEHICLES IN QUEUE	14.2%	79.7%	
9	PROBABILTY OF 3 VEHICLES IN QUEUE	8.4%	88.1%	
10	PROBABILTY OF 4 VEHICLES IN QUEUE	4.9%	93.0%	
11	PROBABILTY OF 5 VEHICLES IN QUEUE	2.9%	95.9%	95th percentile queue = 5 veh.
12	PROBABILTY OF 6 VEHICLES IN QUEUE	1.7%	97.6%	
13	PROBABILTY OF 7 VEHICLES IN QUEUE	1.0%	98.6%	
14	PROBABILTY OF 8 VEHICLES IN QUEUE	0.6%	99.2%	
15	PROBABILTY OF 9 VEHICLES IN QUEUE	0.3%	99.5%	
16	PROBABILTY OF 10 VEHICLES IN QUEUE	0.2%	99.7%	
17	PROBABILTY OF 11 VEHICLES IN QUEUE	0.1%	99.8%	
18	PROBABILTY OF 12 VEHICLES IN QUEUE	0.1%	99.9%	
19	PROBABILTY OF 13 VEHICLES IN QUEUE	0.0%	99.9%	
20	PROBABILTY OF 14 VEHICLES IN QUEUE	0.0%	100.0%	
21	PROBABILTY OF 15 VEHICLES IN QUEUE	0.0%	100.0%	

Ross Engineering, LLC
Civil / Structural Engineering
909 Islington Street **603-433-7560**
Portsmouth, NH 03801 **alexross@comcast.net**

806 US Route 1 Bypass
Project Description

May 25, 2022

This site review application is for minor improvements to an existing fully developed site. The existing lot includes a retail building and an asphalt parking lot. A 400 SF walk-in cooler is proposed off the rear of the existing building. The entire 400 SF footprint is currently asphalt. Currently, there is a drainage line underneath the existing building. The line would be cut, and filled with concrete, with new catch basins and lines installed to direct the flow around the building rather than under it. No increase in impervious surface is proposed.

Improvements include:

- Re-routing and correcting odd drainage line configuration
- Create fenced in dumpster location
- Configure correct conforming parking on site
- Add landscaping so that open space will meet City regulations
- Square off rear of building for addition

We have met with the Technical Advisory Committee and have incorporated all of the items listed in the TAC May 2022 letter.

Sincerely,

Alex Ross, P.E.

Ross Engineering
Civil/Structural Engineering & Surveying

909 Islington Street **603-433-7560**
Portsmouth, NH 03801 **alexross@comcast.net**

May 25, 2022

Beverly Mesa-Zendt - Planning Director
City of Portsmouth, Planning Department
1 Junkins Ave
Portsmouth, NH 03801

RE: Site Plan Approval for property located at 806 US Route 1 Bypass, Tax Map 161, Lot 43 (LU-22-81)

Dear Ms. Beverly,

I am writing in response to your TAC letter dated May 9th , 2022. Your concerns are italicized with our comments below in bold.

1. *Dumpsters will be relocated to parking spaces 24 and 23 with a 20 foot setback from rear lot line and at least 10 feet from side lot line. Applicant will request a waiver from the Planning Board for Section 9.3 of the Site Plan regulations to have the dumpsters located within 20' of the side lot line.*

   The dumpsters have been relocated and we have included a request for a waiver.

2. *A note will be added to the plans regarding the use of non-combustible mulch.*

   Note 9 has been added to the landscape plan.

3. *Applicant will work with DPW to correct the sewer lateral connection and location.*

   We have been in contact with DPW and have revised the sewer.

4. *Applicant will work with DPW staff (Eric Eby) to reconfigure handicap parking and accessibility (two spaces needed).*

   The handicap parking has been revised so that spaces 13 and 14 will serve as handicap spaces. This has been reviewed and accepted by Eric Eby.

5. *Applicant will extend landscaping and curbing at the front lot line.*

   The landscaping and curbing have been extended to the front lot line.

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Portsmouth, NH 03801 **alexross@comcast.net**

6. *Parking spaces 18 and 19 will be relocated and be replaced with landscaping and 3 bike racks.*
   Spaces 18 and 19 have been relocated, and landscaping with 3 bike racks have been added.

7. *Entryway will be striped.*

   The front entryway has been striped.

8. *Raised sidewalk will be extended to connect to front entryway.*

   The raised sidewalk has been extended.

9. *Light Pole 3 (LP3) located at the rear of the building shall be limited to a height of 16' with cur off shields.*

   Note 3 has been added to the utility plan.

10. *Lighting on the rear wall will not exceed a height of 9'.*

    Note 3 has been added to the utility plan.

11. *Curbing is added to proposed landscape islands.*

    Curbing has been added to the landscape inlands.

Sincerely,

Alex Ross, P.E.

Site Plan Review
806 Route 1 Bypass
Portsmouth, New Hampshire

PREPARED FOR:

RIGZ ENTERPRISES LLC

PREPARED BY:

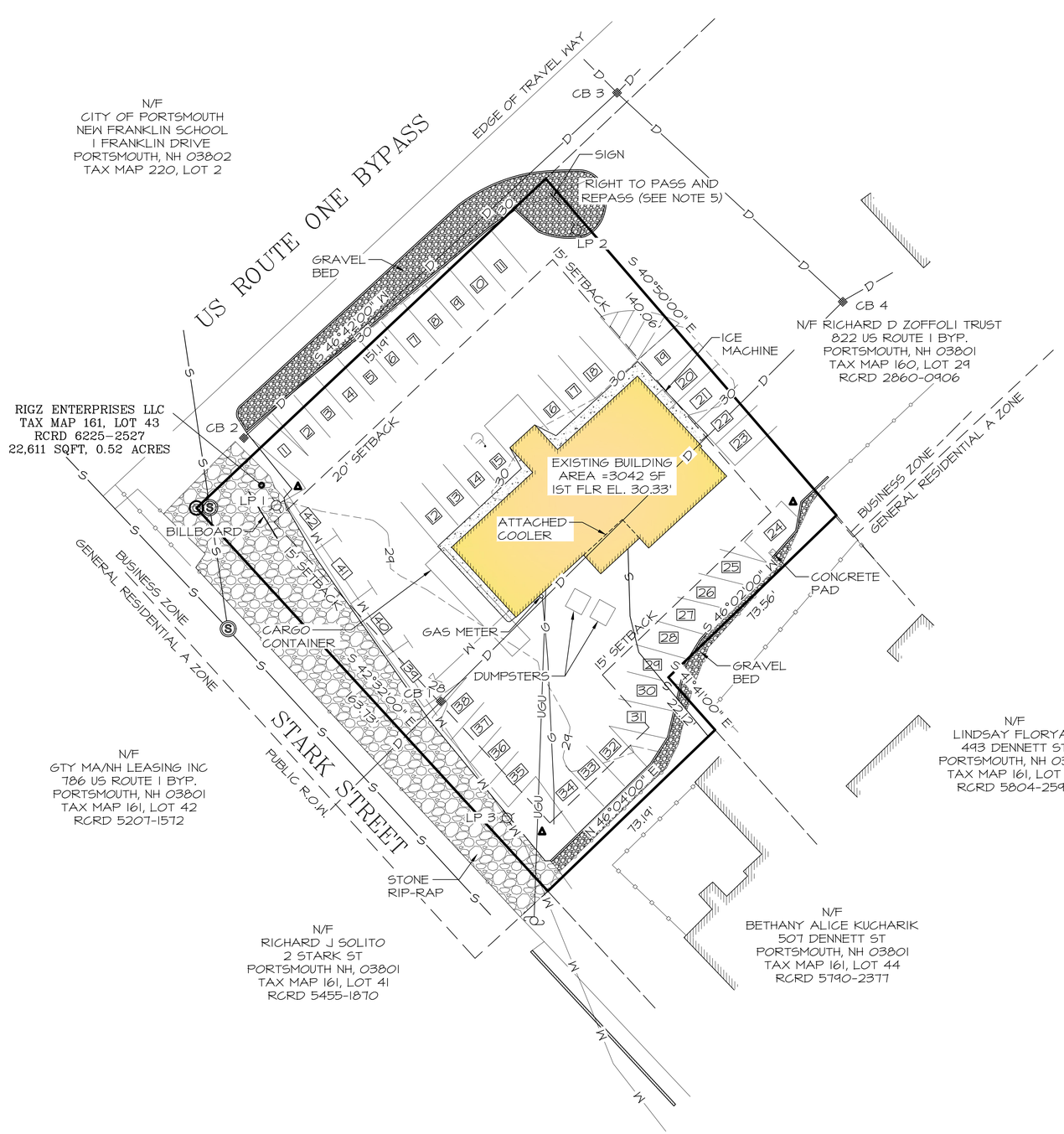
ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

May 25, 2022

LIST OF PROJECT PLANS:

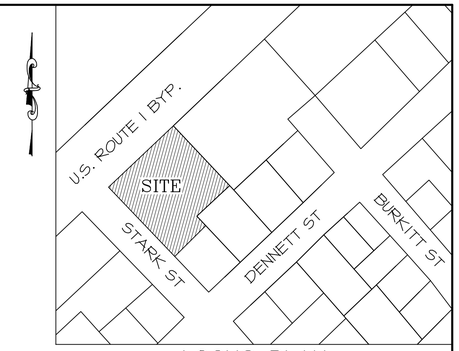
SITE PLAN SET

STRUCTURAL PLAN SET



LEGEND

- MONUMENT FOUND
- 6' STOCKADE FENCE
- ASPHALT CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN
- WATER VALVE



LOCUS PLAN
N.T.S.

EXISTING STRUCTURES
CATCH BASIN

CB 1
RIM EL. 27.49
INV. IN 21.86 (20" PIPE) SW
INV. OUT 20.91 (20" PIPE) NE

CB 2
RIM EL. 29.46
INV. OUT 25.81 (12" CMP)

CB 3
RIM EL. 29.27
INV. IN 23.83 (12" CMP) SW
INV. IN 22.72 (12" CMP) NE
INV. IN 22.68 (20" RCP) NW
INV. OUT 22.62 (20" RCP) SE

CB 4
RIM EL. 30.48
INV. IN 18.20 (20" RCP) SW
INV. IN 18.20 (20" RCP) NW
INV. OUT 18.15 (20" RCP) NE

NOTES

1) OWNER OF RECORD:
RIGZ ENTERPRISES
18 DIXON LANE
DERRY, NH 03038

TAX MAP 161, LOT 43
806 US ROUTE 1 BYPASS
PORTSMOUTH, NH 03801
RCRD: 6225-2527
AREA: 22,611 SF, 0.52 ACRES

2) BASIS OF BEARING HELD FROM PLAN REFERENCE #1.

3) PARCEL IS IN BUSINESS ZONE (B):

MINIMUM LOT AREA	20,000 SF
MIN. LOT AREA PER DWELLING UNIT	2,500 SF
MINIMUM FRONTAGE	100 FT
MINIMUM DEPTH	80 FT
SETBACKS:	
FRONT	20 FT
SIDE	15 FT
REAR	15 FT
MAXIMUM BUILDING HEIGHT	50 FT
MAXIMUM BUILDING COVERAGE	35%
MINIMUM OPEN SPACE	15%

4) THE PARCEL IS NOT WITHIN A FEMA FLOOD ZONE, AS PER FLOOD INSURANCE RATE MAP #33015C0259F, PANEL 259 OF 681, DATED JANUARY 29, 2021. VERTICAL DATUM IS NAVD 1988.

5) A RIGHT TO PASS AND REPASS FROM THE INTERSTATE HIGHWAY USING THE EXITS IN COMMON WITH OTHERS LOCATED ON LAND FORMERLY OF D. RICHARD ZOFFOLI FOR PURPOSES OF PASSING AND REPASSING TO THE INTERSTATE HIGHWAY EXISTS TO THE BENEFIT OF LOT 43 OVER LAND OF LOT 29. SEE RCRD 2781-1490.

REFERENCE PLANS

1) "SITE PLAN FOR HENRY S. DUTKOWSKI MOMMA D'S CASA DI PASTA, 806 US ROUTE 1 BYPASS & STARK STREET" BY MILLETTE, SPRAGUE & COLWELL, INC. DATED JULY 15, 2004.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
SCALE: 1" = 20'

ISS.	DATE	DESCRIPTION OF ISSUE	
4	5/25/2022	FOR PB	
3	4/26/2022	FOR TAC	
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1	4/5/2022	FOR TAC	

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN I.C.A.
CHECKED

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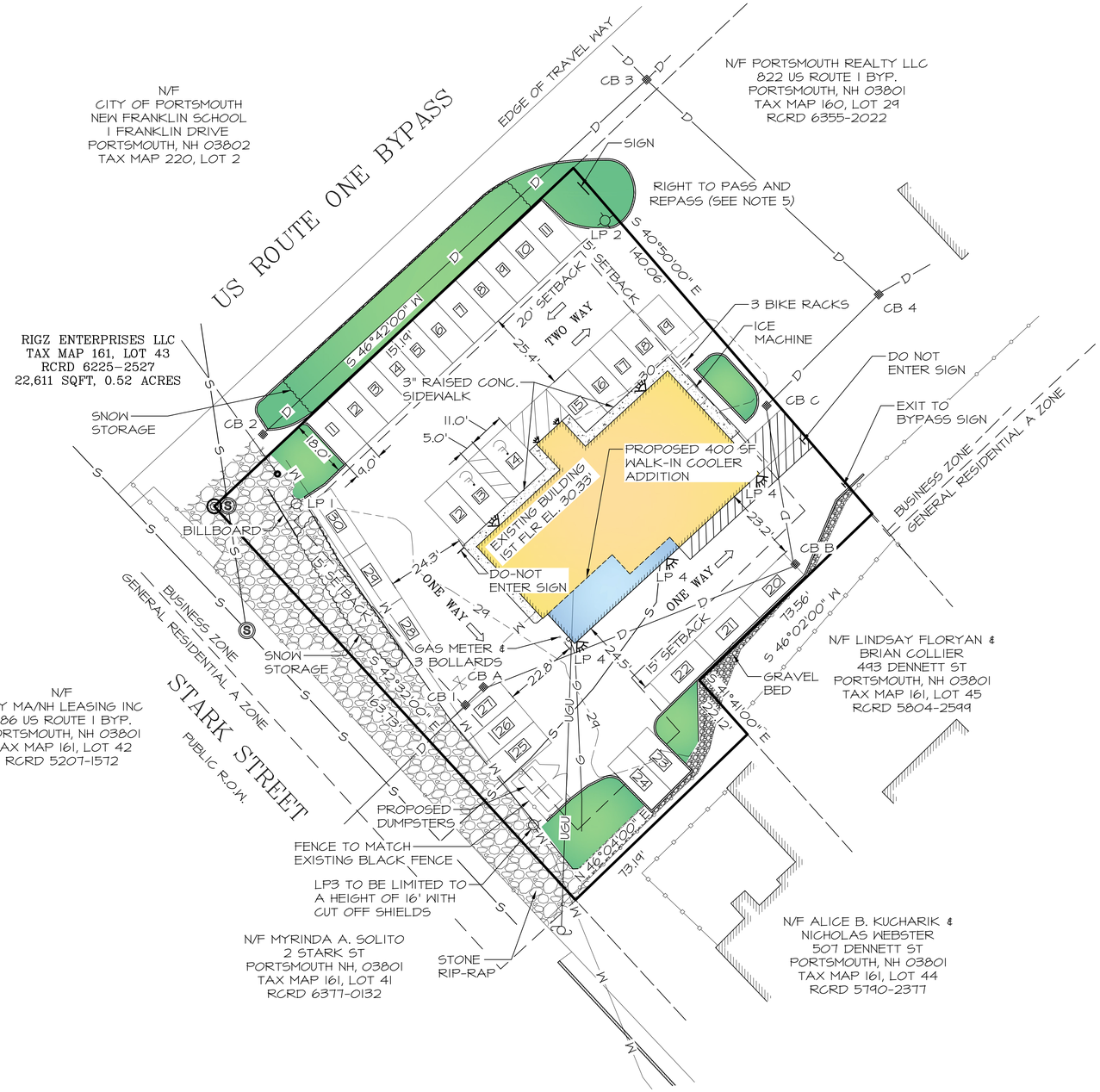
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
EXISTING CONDITIONS PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

STATE OF NEW HAMPSHIRE · R. ALEX ROSS No. 9409 · LICENSED PROFESSIONAL ENGINEER

JOB NUMBER	DWG. NO.	ISSUE
21-072	1 OF 6	4



NOTES

1) OWNER OF RECORD:
RIGZ ENTERPRISES
18 DIXON LANE
DERRY, NH 03038

TAX MAP 161, LOT 43
806 US ROUTE 1 BYPASS
PORTSMOUTH, NH 03801
RCRD: 6225-2527
AREA: 22,611 SF, 0.52 ACRES

2) PARCEL IS IN BUSINESS ZONE (B):

MINIMUM LOT AREA	20,000 SF
MIN. LOT AREA PER DWELLING UNIT	2,500 SF
MINIMUM FRONTAGE	100 FT
MINIMUM DEPTH	80 FT
SETBACKS:	
FRONT	20 FT
SIDE	15 FT
REAR	15 FT
MAXIMUM BUILDING HEIGHT	50 FT
MAXIMUM BUILDING COVERAGE	35%
MINIMUM OPEN SPACE	15%

3) COVERAGES:

BUILDING COVERAGE

EXISTING BUILDING COVERAGE

BUILDING & COOLER	3,042 SF
EXISTING STRUCTURE	3,042 SF

BUILDING COVERAGE= 3,042 / 22,611 = 13.5%

PROPOSED BUILDING COVERAGE

BUILDING & COOLER	3,442 SF

BUILDING COVERAGE 3,442 / 22,611 = 15.2%

OPEN SPACE

EXISTING OPEN SPACE

BUILDING COVERAGE	3,042 SF
CONCRETE SIDEWALK	455 SF
ASPHALT PARKING	15,958 SF
ASPHALT CURB	83 SF
CONCRETE PAD	3 SF
TOTAL LOT COVERAGE	19,541 SF

EXISTING OPEN SPACE= 22,611-19,541 = 3,070 SF
EXISTING OPEN SPACE= 3,070 / 22,611 = 13.6%

PROPOSED OPEN SPACE

BUILDING COVERAGE	3,442 SF
CONCRETE SIDEWALK	457 SF
ASPHALT PARKING	14,500 SF
ASPHALT CURB	171 SF
TOTAL LOT COVERAGE	18,570 SF

PROPOSED OPEN SPACE=22,611-18,570= 4,041 SF
PROPOSED OPEN SPACE = 4,041 / 22,611 = 17.9%

4) PARKING SPACES:
AS PER PORTSMOUTH ZONING ORDINANCE 10.1112.321, PARKING SPACES FOR RETAIL USE SHALL BE 1 SPACE PER 300 SF GROSS FLOOR AREA.

3,442 SF / 300 SF/SPACE = 11.47 = 12 SPACES
12 SPACES REQUIRED
30 SPACES PROVIDED

5) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.

6) ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

7) ALL PROPOSED CURBING TO BE ASPHALT AND MATCH EXISTING. MINIMUM 5" REVEAL.

8) PLAN TO INCORPORATE GIS DATA IN REFERENCE TO THE NEW HAMPSHIRE STATE PLAN COORDINATE SYSTEM.

LEGEND

	MONUMENT FOUND
	6' STOCKADE FENCE
	ASPHALT CURB
	6' CHAIN LINK FENCE
	UTILITY POLE
	CATCH BASIN
	WATER VALVE
S	SEWER MANHOLE
	LAMP POST
UGU	UNDERGROUND UTILITIES
G	GAS LINE
D	DRAIN LINE
W	WATER LINE
S	SEWER LINE
	LIGHT

WAIVERS

1) A WAIVER IS REQUESTED FROM THE CITY OF PORTSMOUTH SITE PLAN REVIEW REGULATIONS SECTION 7.4, TO NOT PROVIDE A STORMWATER MANAGEMENT PLAN AS THE IMPERVIOUS COVER IS PROPOSED TO BE REDUCED.

2) A WAIVER IS REQUESTED FROM THE CITY OF PORTSMOUTH SITE PLAN REVIEW REGULATIONS SECTION 9.3.5 TO LOCATE A DUMPSTER 12.2' FROM THE WESTERN PROPERTY LINE WHERE 20' IS REQUIRED.

ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
SCALE: 1" = 20'

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

R. ALEX ROSS No. 9409 LICENSED PROFESSIONAL ENGINEER - STATE OF NEW HAMPSHIRE -

ISS.	DATE	DESCRIPTION OF ISSUE
4	5/25/2022	FOR PB
3	4/26/2022	FOR TAC
2	4/19/2022	FOR TAC
1	4/5/2022	FOR TAC

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

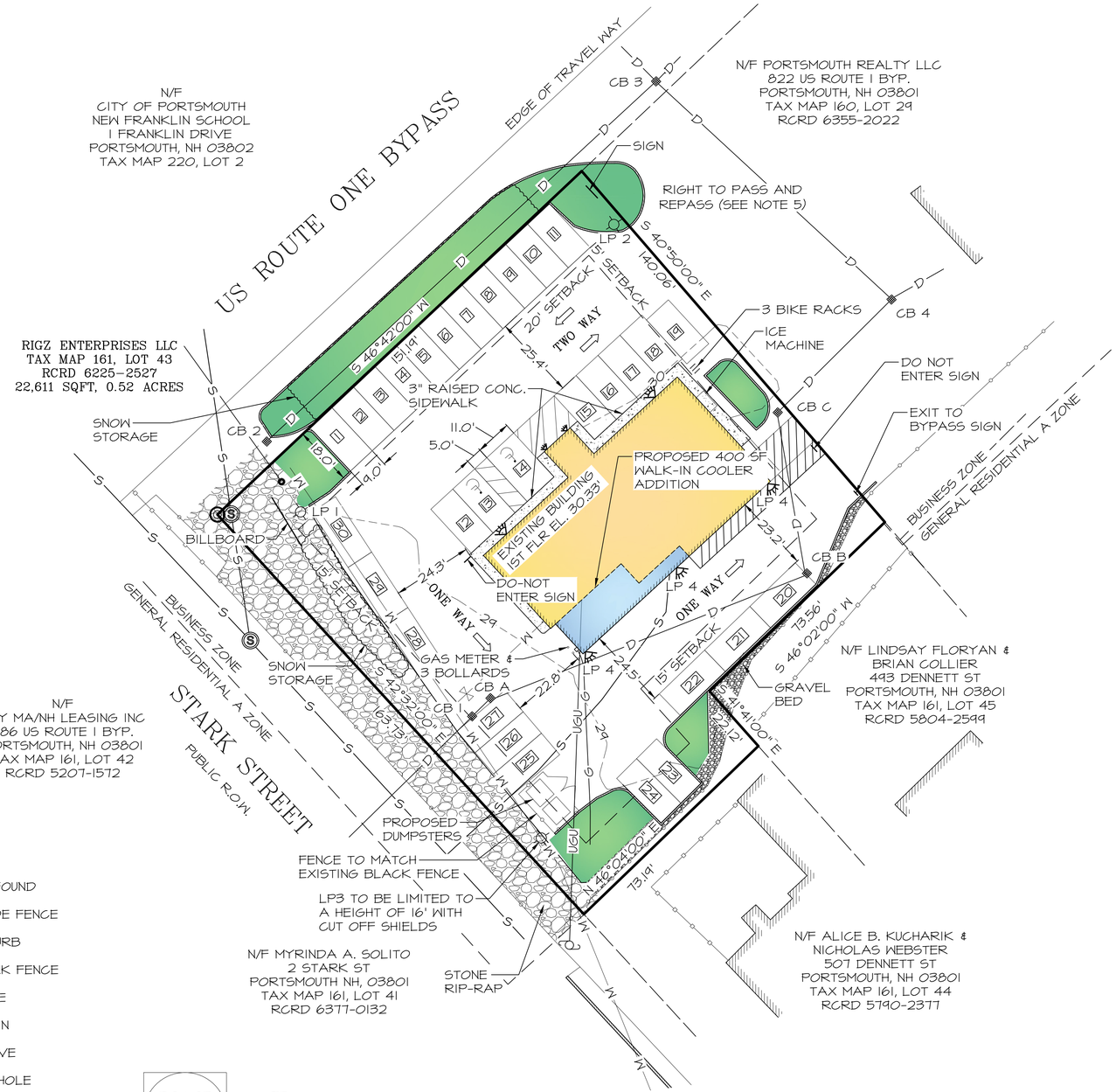
CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE

SITE PLAN

806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER	DWG. NO.	ISSUE
21-072	2 OF 6	4



LEGEND

- MONUMENT FOUND
- 6' STOCKADE FENCE
- ASPHALT CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN
- WATER VALVE
- SEWER MANHOLE
- LAMP POST
- —UGU— UNDERGROUND UTILITIES
- —G— GAS LINE
- —D— DRAIN LINE
- —W— WATER LINE
- —S— SEWER LINE
- LIGHT

R5-1
30"x30"
RED & WHITE

CUSTOM
20"x20"
BLACK & WHITE

SIGN DETAILS

SCALE: NTS

GENERAL NOTES

1) CONTRACTOR TO REVIEW ALL SURFACING TYPES, AND MATERIAL SPECIFICATIONS WITH COMMISSIONER OF PUBLIC WORKS.
2) ALL NECESSARY NHDOT, NHDES & TOWN PERMITS MUST BE OBTAINED.
3) ALL CONSTRUCTION SHALL BE PER NH-DOT, STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION. LATEST REVISION.
4) CONTRACTOR SHALL MEET STATE AND TOWN REQUIREMENTS. TO ASSURE TYPE, SEPARATION, COVER, ETC. ALWAYS CALL DIGSAFE PRIOR TO DIGGING. UTILITIES SHOWN ARE APPROXIMATE AND MUST BE VERIFIED.
5) SIZE ALL LINES AS PER REQUIREMENTS AND ASSURE THAT PROPOSED LOADING AND PRESSURE DEMANDS WILL BE MET.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
SCALE: 1" = 20'

UTILITIES:

CONTACT LIST:

GAS: UNITIL: SUSAN L. DUPLISEA.....603-294-5147
WATER: PORTSMOUTH DPW: 603-427-1530
SEWER: PORTSMOUTH DPW: 603-427-1530
STORMWATER: PORTSMOUTH DPW: 603-427-1530
ELECTRIC: EVERSOURCE: CASEY MCDONALD.....603-436-7708 EXT 5641

PROPOSED UTILITIES:

1. STORMWATER:
   EXISTING DRAINAGE LINE UNDER THE BUILDING TO BE TAKEN OUT OF SERVICE AND FILLED WITH CONCRETE.

   SILTSACKS TO BE INSTALLED ON CATCH BASINS 1 & 4 PRIOR TO CONSTRUCTION. SILTSACKS TO REMAIN IN PLACE UNTIL DRAINAGE SYSTEM IS FULLY OPERATIONAL.

   3 NEW CATCH BASINS TO BE INSTALLED CONNECTED EXISTING CB1 TO EXISTING CB4. SILTSACKS TO BE INSTALLED ON ALL 3 PROPOSED CATCH BASINS DURING CONSTRUCTION UNTIL DRAINAGE SYSTEM IS FULLY OPERATIONAL.

   ALL PROPOSED DRAINAGE LINE SIZES TO MATCH EXISTING DRAINAGE LINE SIZES. EXISTING DRAINAGE LINE SIZE IS ±20".

2. GAS:
   A NEW METER WILL BE INSTALLED ON THE SIDE OF THE WALK-IN COOLER. THE EXISTING GAS LINE WILL BE RE-ROUTED TO THE NEW METER.

3. LIGHTING:
   LP3 WILL BE LIMITED TO A HEIGHT OF 16' WITH CUT-OFF SHIELDS.
   LP4 WILL NOT EXCEED A HEIGHT OF 9'.

3. SEWER:
   ACCORDING TO DPW, THE EXISTING SEWER LINE TRAVELS TOWARDS DENNETT STREET. A NEW SEWER LINE SHALL BE INSTALLED TO THE LATERAL BY PARKING SPACE 25. PROPER SIZE, TYPE, AND CONNECTION AS PER CITY DPW.

EXISTING STRUCTURES CATCH BASIN

CB 1
RIM EL. 27.49
INV. IN 21.86 (±20" PIPE) SW
INV. OUT 20.91 (±20" PIPE) NE

CB 2
RIM EL. 29.46
INV. OUT 25.81 (12" CMP)

CB 3
RIM EL. 29.27
INV. IN 23.83 (12" CMP) SW
INV. IN 22.72 (12" CMP) NE
INV. IN 22.68 (±20") NW
INV. OUT 22.62 (±20") SE

CB 4
RIM EL. 30.48
INV. IN 18.20 (±20") SW
INV. IN 18.20 (±20") NW
INV. OUT 18.15 (±20") NE

PROPOSED STRUCTURES CATCH BASIN

CB A
RIM EL.
INV. IN 20.82
INV. OUT 20.75
STRUCTURE: CONCRETE BASIN - DIAMETER TO MATCH CB 1 (MIN 4' Ø)

CB B
RIM EL.
INV. IN 19.72
INV. OUT 19.60
STRUCTURE: CONCRETE BASIN - DIAMETER TO MATCH CB 1 (MIN 4' Ø)

CB C
RIM EL.
INV. IN 19.15
INV. OUT 18.91
STRUCTURE: CONCRETE BASIN - DIAMETER TO MATCH CB 1 (MIN 4' Ø)

THE EXISTING LINE EXITING CB 1 APPEARS TO BE AN ODD SIZE & MATERIAL. SITE CONTRACTOR INSPECTED THE PIPE & DETERMINED IT WAS A 20" CAST IRON PIPE. NEW HDPE MAY NOT BE AVAILABLE IN 20" DIAMETER. INSTALL NEXT LARGER SIZE

EXISTING LIGHT POLE HEIGHTS

LP 1 - 19.6'
LP 2 - 28.41'
LP 3 - 27.9'

PROPOSED LIGHTING

DESCRIPTION	CATALOG NUMBER	QUANTITY
WALL LIGHT (LP4)	KT-WPLED60-M2-8XX-VDIM	3
LIGHT POLE (LP1-LP3)	KT-ALED140-MI-X-NM-8XX-VDIM	3

ISS.	DATE	DESCRIPTION OF ISSUE
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1	4/5/2022	FOR TAC

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

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CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

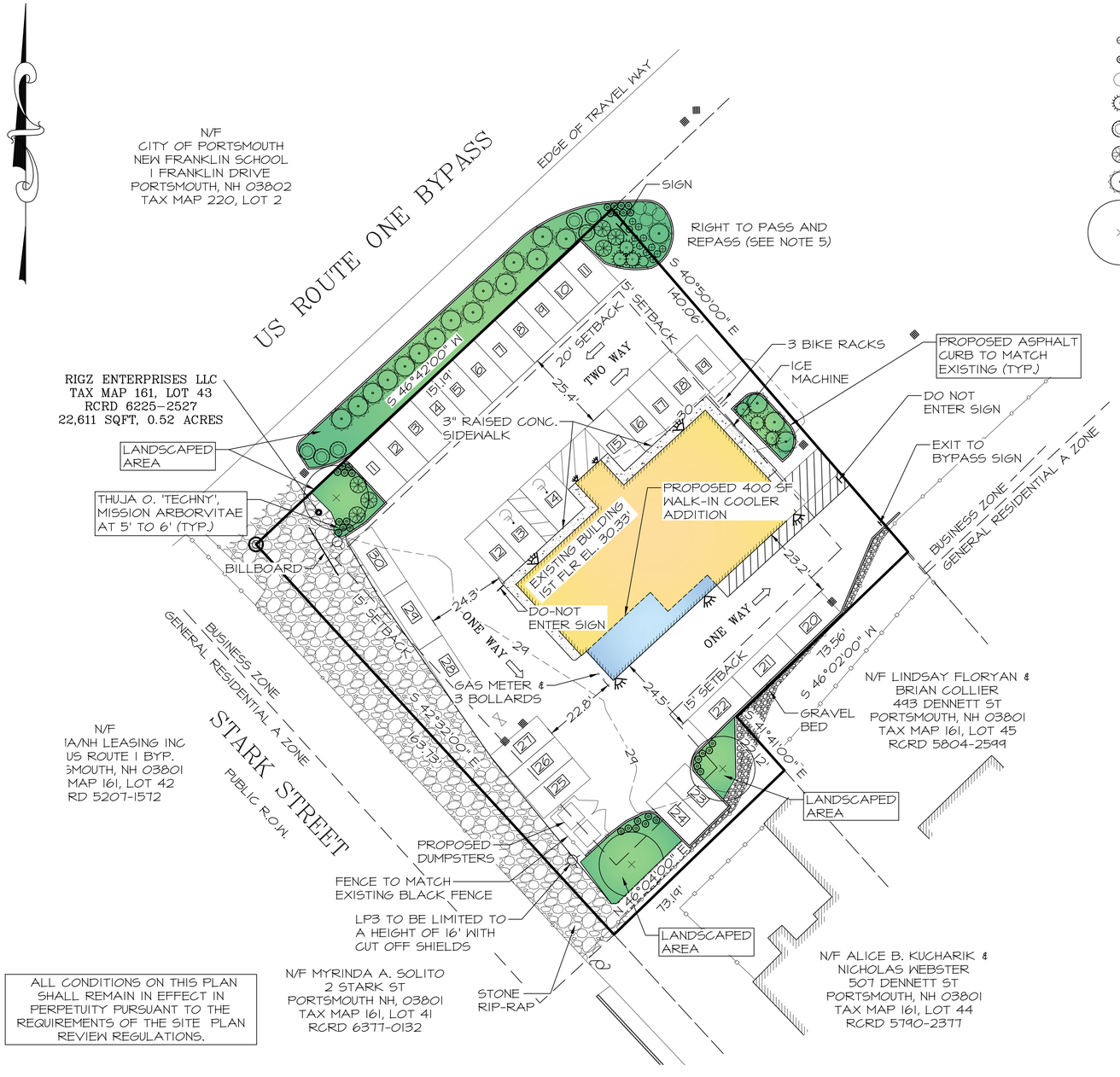
TITLE

UTILITY PLAN

806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

STATE OF NEW HAMPSHIRE · R. ALEX ROSS No. 9409 · LICENSED PROFESSIONAL ENGINEER

JOB NUMBER	DWG. NO.	ISSUE
21-072	3 OF 6	4

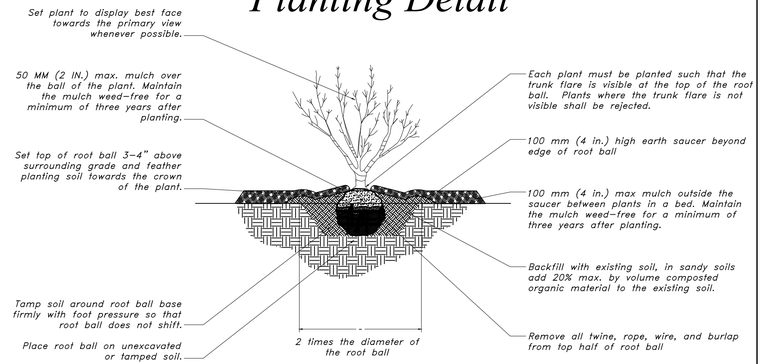


ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

LEGEND

- SEDUM 'AUTUMN JOY'
- HEMEROCALLIS
- ARCTOSTAPHYLOS UVA-URSI
- CALAMAGROSTIS
- ROSA RUGOSA
- SYRINGA MEYERI 'PALIBIN'
- JUNIPERUS HORIZONTALIS
- GLEDITSIA

Planting Detail



PLANTING NOTES

1. ALL PLANT MATERIALS SHALL BE FIRST QUALITY NURSERY GROWN STOCK.
2. ALL PLANTS SHALL BE PLANTED IN ACCORDANCE WITH NEW HAMPSHIRE LANDSCAPE ASSOCIATION STANDARDS AND GUARANTEED FOR ONE YEAR BY THE LANDSCAPE CONTRACTOR.
3. AFTER PLANTING, ALL PLANTS SHALL BE FLOODED AT THE BASE WITH WATER FROM A SLOW-RUNNING HOSE FOR 5 MINUTES EACH.
4. ALL PLANTS SHALL BE INSTALLED BEFORE ANY GRASS IS SEEDED.
5. ALL SHRUBS AND PLANTING BEDS SHALL BE MULCHED WITH 3" OF DARK BROWN AGED BARK MULCH AS A FINAL STEP. MULCH MUST BE KEPT 2" AWAY FROM BASE OF EACH PLANT.
6. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
7. ALL REQUIRED PLANT MATERIALS SHALL BE TENDED AND MAINTAINED IN A HEALTHY GROWING CONDITION, REPLACED WHEN NECESSARY, AND KEPT FREE OF REFUSE AND DEBRIS. ALL REQUIRED FENCES AND WALLS SHALL BE MAINTAINED IN GOOD REPAIR.
8. THE PROPERTY OWNER SHALL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE, AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED, AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.
9. MULCH USED WILL BE NON-COMBUSTIBLE OR APPROVED BY THE PORTSMOUTH FIRE DEPARTMENT.

NOTES

1) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.

2) ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

INSTALLATION REQUIREMENTS:

1. THE INSTALLATION OF A DRIP IRRIGATION SYSTEM IS RECOMMENDED TO ASSURE WELL GROWN PLANTS.
2. IN CASE OF DROUGHT (DEFINED AS TWO WEEK PERIOD WITHOUT RAIN) ALL NEW PLANTS SHALL BE WATERED THROUGH NOVEMBER 1ST DURING THE FIRST SEASON IN WHICH THE ARE INSTALLED. THEY SHALL BE WATERED ONE TIME PER DAY FOR THE FIRST WEEK AFTER INSTALLATION AND THREE TIMES PER WEEK FOR THE REMAINDER OF THE SEASON. AFTER THE FIRST SEASON WHEN THE ROOTS OF THE PLANTS ARE ESTABLISHED THEY WILL NOT REQUIRE WATERING.
3. SOAKER HOSES WOUND THROUGH THE BED NEAR THE BASE OF EACH PLANT ARE THE RECOMMENDED METHOD OF WATERING DURING THE FIRST SEASON. THESE CA BE REMOVED AFTER NOVEMBER 30TH WHEN THE PLANTS ARE ESTABLISHED.

BOTANICAL NAME	COMMON NAME	SIZE	QTY:
SEDUM 'AUTUMN JOY'	STONECROP	1 QT	11
HEMEROCALLIS 'ROSY RETURNS'	REBLOOMING DAYLILY	1 QT	31
ARCTOSTAPHYLOS UVA-URSI 'BEARBERRY'	BEAR BERRY	1 GAL	4
CALAMAGROSTIS ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	1 GAL	6
ROSA RUGOSA	SALT SPRAY ROSE	1 GAL	6
SYRINGA MEYERI 'PALIBIN'	DWARF KOREAN LILAC	2 GAL	6
JUNIPERUS HORIZONTALIS 'BAR HARBOR'	'BAR HARBOR' GROUND-COVER JUNIPER	1 GAL	19
GLEDITSIA T.I. 'STREET KEEPER'	'STREET KEEPER' HONEY LOCUST TREE	2-3" C	3

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
SCALE: 1" = 20'

LEGEND

- MONUMENT FOUND
- 6' STOCKADE FENCE
- ASPHALT CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN
- WATER VALVE
- SEWER MANHOLE

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

STATE OF NEW HAMPSHIRE
R. ALEX ROSS
No. 9409
LICENSED PROFESSIONAL ENGINEER

ISS.	DATE	DESCRIPTION OF ISSUE
4	5/25/2022	FOR PB
3	4/26/2022	FOR TAC
2	4/19/2022	FOR TAC
1	4/5/2022	FOR TAC

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
LANDSCAPE PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER 21-072 | DWG. NO. 4 OF 6 | ISSUE 4

TRENCH NOTES - STORM DRAIN:

1) BEDDING: BEDDING FOR PIPES SHALL CONSIST OF PREPARING THE BOTTOM OF THE TRENCH TO SUPPORT THE ENTIRE LENGTH OF THE PIPE AT A UNIFORM SLOPE AND ALIGNMENT. CRUSHED STONE SHALL BE USED TO BED THE PIPE TO THE ELEVATION SHOWN ON THE DRAWINGS. NORMAL PIPE BEDDING IS CRUSHED STONE TO THE HAUNCH OF THE PIPE AND SAND BEDDING 6" ABOVE THE CROWN. IF THE TOP OF THE PIPE IS LESS THAN 30" FROM FINISH GRADE, BED PIPE COMPLETELY IN STONE UP TO 6" ABOVE PIPE CROWN. UNDERDRAIN TO HAVE 4" MIN" OF STONE OVER PIPE OR AS NECESSARY TO BE IN CONTACT WITH GRAVEL LAYER OF SELECTS ABOVE. FILTER FABRIC TO BE PLACED IN BETWEEN ALL STONE BEDDING MATERIAL AND SUBSEQUENT LAYERS OF FILL MATERIAL.

2) COMPACTION: ALL BACKFILL SHALL BE COMPACTED AT OR NEAR OPTIMUM MOISTURE CONTENT BY PNEUMATIC TAMPERS, VIBRATORY COMPACTORS OR OTHER APPROVED MEANS. BACKFILL BENEATH PAVED SURFACES SHALL BE COZMPACTED TO NOT LESS THAN 95 PERCENT OF AASHTO T99, METHOD C.

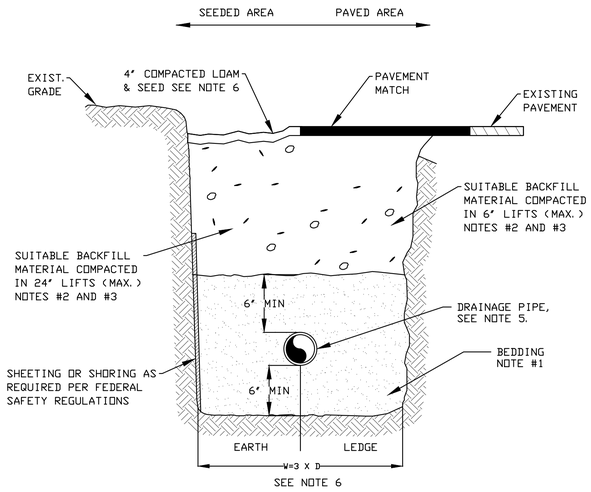
3) SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ROCKS OVER 6 INCHES IN LARGEST DIMENSION; FROZEN EARTH AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.

   IN SEEDED AREAS, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAD, ROCKS UNDER 12", FROZEN EARTH OR CLAY, IF HE/SHE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EAST ACCESS TO THE PIPE WILL BE PRESERVED.

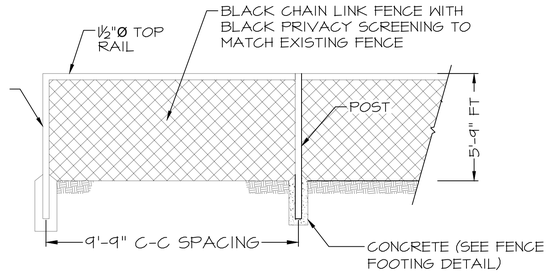
4) BASE COURSE AND PAVEMENT: SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY.

5) DRAINAGE PIPE: PIPE MATERIALS SHALL BE POLYETHYLENE (SEE SPECIFICATIONS).

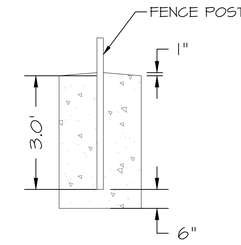
6) W=MAXIMUM ALLOWABLE TRENCH WIDTH: W SHALL BE THE MAXIMUM PAYMENT WIDTH FOR ROCK EXCAVATION (TRENCH) AND FOR ORDERED EXCAVATION BELOW GRADE.



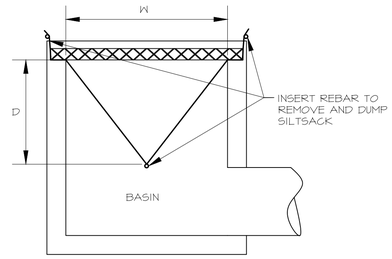
TRENCH DETAIL-STORM DRAIN
Scale : N.T.S.



CHAIN LINK FENCE DETAIL
SCALE: NTS



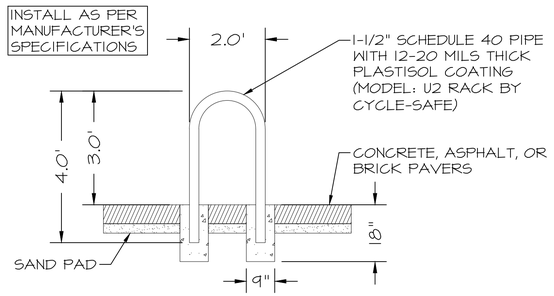
FENCE FOOTING DETAIL
SCALE: NTS



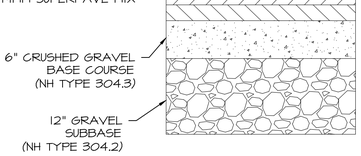
SILTSACK IS TO BE SECURED BY WEIGHT OF BASIN GRATE TO PREVENT SEDIMENT FROM ENTERING THE DRAIN LINE

INSTALL SILTSACK TO CATCH BASINS 1 & 4 PRIOR TO CONSTRUCTION & TO CATCH BASINS A, B, & C DURING CONSTRUCTION. DO NOT REMOVE SILTSACK UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE LINE IS FULLY OPERATIONAL (SEE SHEET 3)

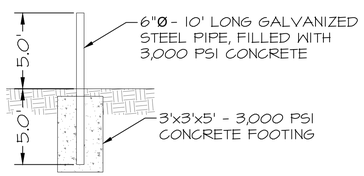
Siltsack
N.T.S.



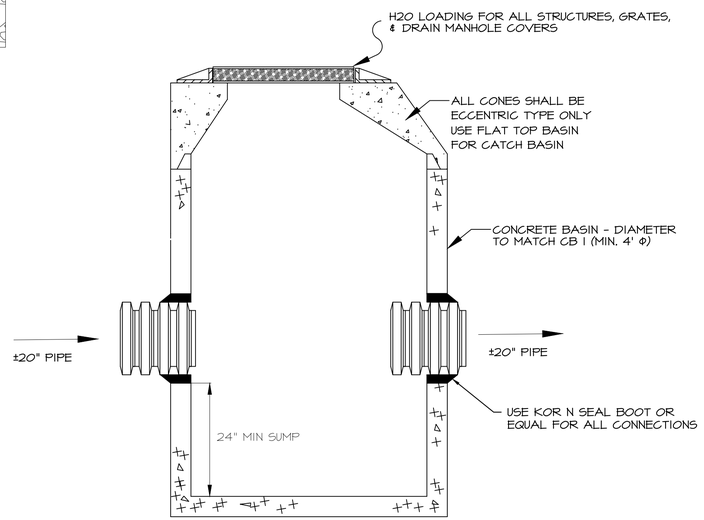
UPTURNED "U" BICYCLE RACK
SCALE: NTS



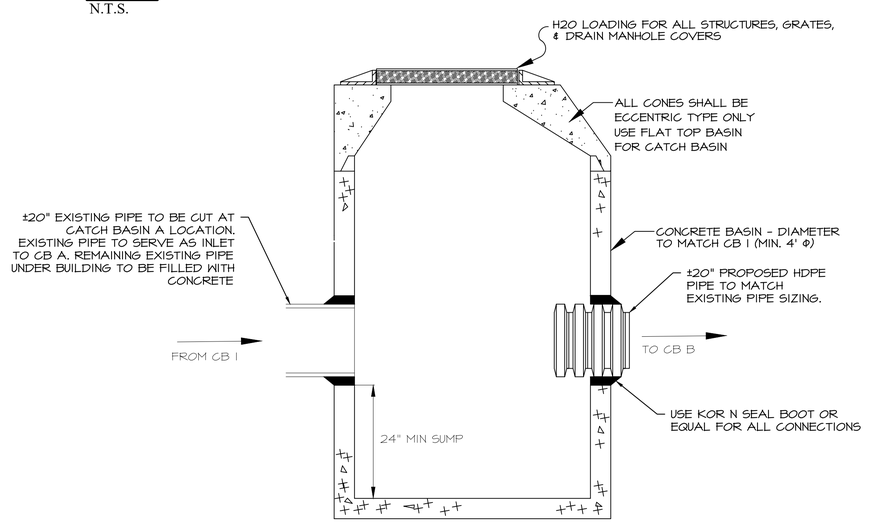
ASPHALT PAVEMENT DETAIL
Scale : N.T.S.



BOLLARD DETAIL
SCALE: NTS



PROPOSED CATCH BASIN (TYP.)
NTS



CATCH BASIN A CONNECTION DETAIL
NTS

ISS.	DATE	DESCRIPTION OF ISSUE
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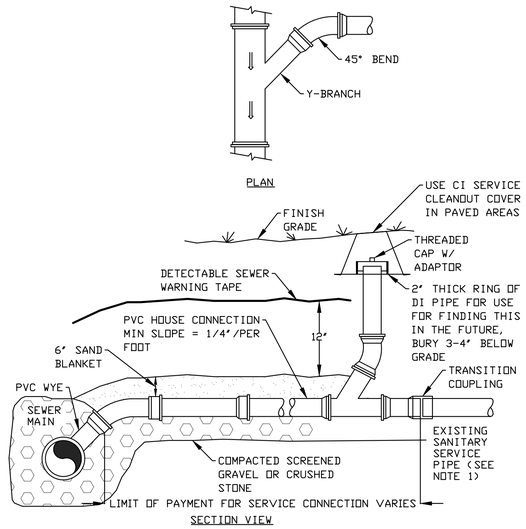
NOTES & DETAILS
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER 21-072 | DWG. NO. 5 OF 6 | ISSUE 4

STATE OF NEW HAMPSHIRE - R. ALEX ROSS No. 9409 LICENSED PROFESSIONAL ENGINEER



TYPICAL SERVICE CONNECTION

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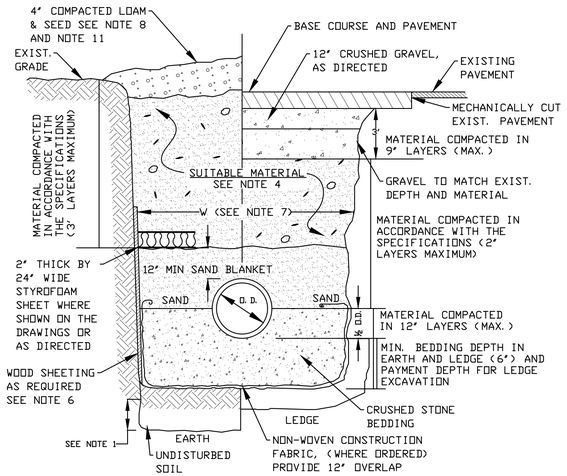

TRENCH DETAIL- GRAVITY SEWER

Scale : N.T.S.

GRAVITY SEWER TRENCH NOTES:

1) ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE: BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWINGS.

2) BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING ASTM C33. STONE SIZE NO. 67.
   100% PASSING 1 INCH SCREEN
   0-10% PASSING #4 SIEVE
   90-100% PASSING 3/4 INCH SCREEN
   0-5% PASSING #8 SIEVE
   20-55% PASSING 3/8 INCH SCREEN
   WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1-1/2 INCH TO 1/2 INCH SHALL BE USED.

3) SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90-100% PASSES A 1/2 INCH SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE. NO STONE LARGER THAN 2" SHOULD BE IN CONTACT WITH THE PIPE.

4) SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION; AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN CROSS-COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK, OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLY RECONSTRUCTION, WILL BE PRESERVED.

5) BASE COURSE AND PAVEMENT SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY AND LOCAL REGULATION.

6) WOOD SHEATHING, IF REQUIRED: WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, NUT NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE.

7) W = MAXIMUM ALLOWABLE TRENCH PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 12 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.) ALSO, W SHALL BE THE PAYMENT WIDTH.

8) FOR CROSS COUNTRY CONSTRUCTION, BACKFILL OR FILL SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.

9) CONCRETE FOR ENCASEMENT SHALL CONFORM TO THE REQUIREMENTS OF SECTION 520, (NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.

10) CONCRETE FULL ENCASEMENT: IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I.D. (4" MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.

11) GRAVEL DRIVEWAY AND SHOULDER RESTORATION: CRUSHED GRAVEL IN DRIVEWAYS AND ROAD SHOULDERS SHALL MATCH EXISTING WITH A MINIMUM OF 12". GRAVEL REPLACEMENT SHALL BE SUBSIDIARY TO SEWER CONSTRUCTION AND WILL NOT BE MEASURED FOR PAYMENT.

ISS.	DATE	DESCRIPTION OF ISSUE	
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SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

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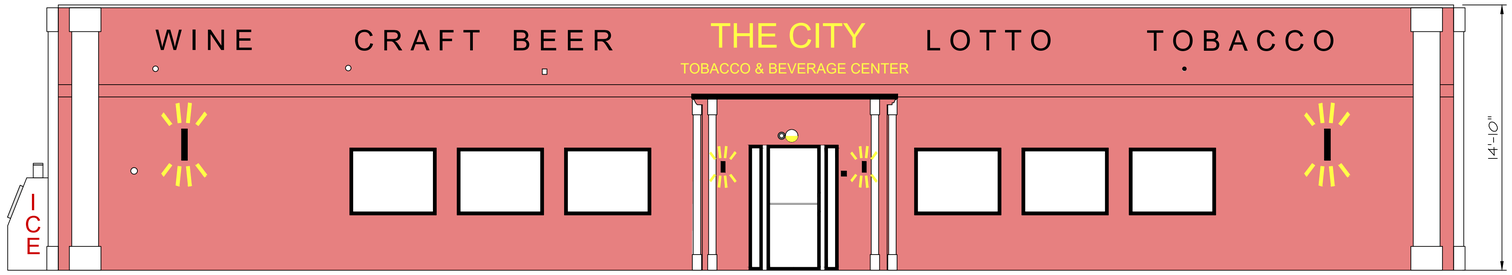
TITLE
SEWER NOTES
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

STATE OF NEW HAMPSHIRE - R. ALEX ROSS No. 9409 LICENSED PROFESSIONAL ENGINEER

JOB NUMBER	DWG. NO.	ISSUE
21-072	6 OF 6	4



FRONT ELEVATION
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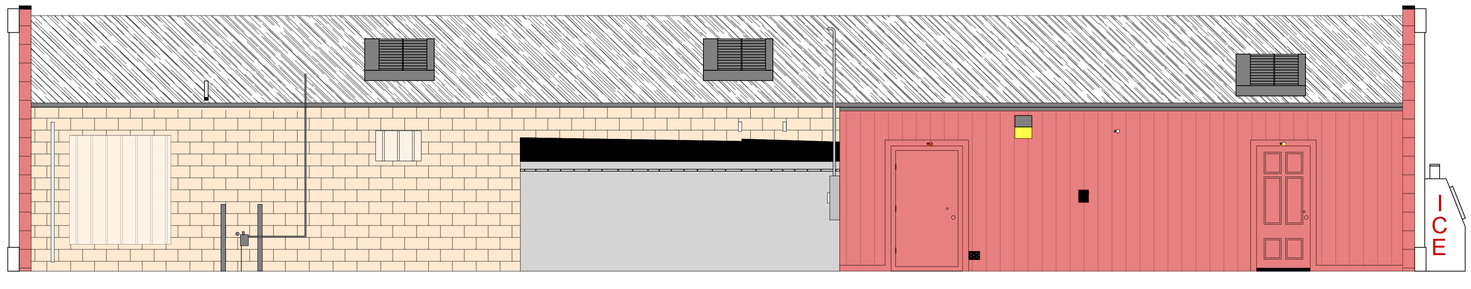

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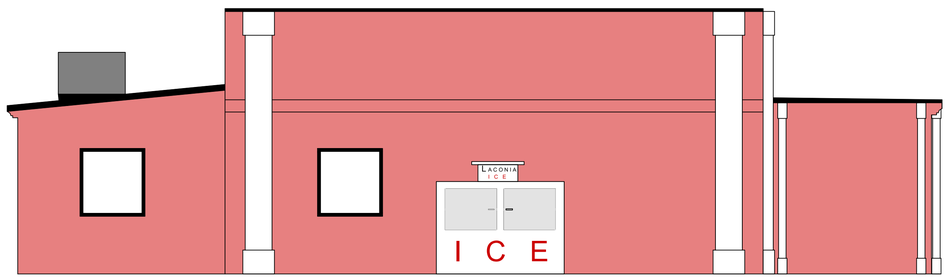

LEFT ELEVATION
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RIGHT ELEVATION
Scale : ¼"=1'-0"

REVISION HISTORY

REV.	DATE	DESCRIPTION	CHK
1	6/15/2021	FOR PERMITS	
2	6/22/2021	FOR REVIEW	
3	4/12/2022	FOR TAC	
4	4/26/2022	REVISIONS	
5	5/25/2022	REVISIONS	

ROSS ENGINEERING, LLC
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EXISTING ELEVATIONS

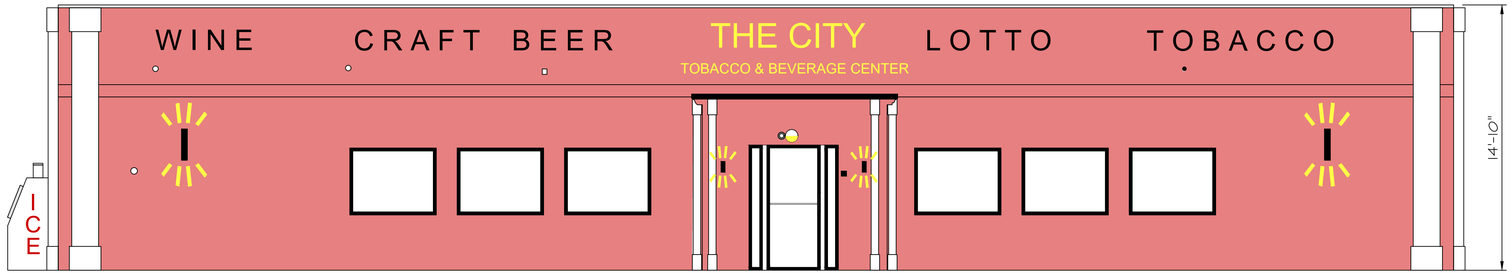
THE CITY TOBACCO & BEVERAGE CENTER
806 US-1 BYPASS
PORTSMOUTH NEW HAMPSHIRE

PREPARED FOR:
DAVID GRZYBOWSKI

DESIGNED BY: MGP	5/27/2021
DRAFTED BY: MGP	5/27/2021
CHECKED BY: AR	5/27/2021

STATE OF NEW HAMPSHIRE
R. ALEX ROSS
No. 9409
LICENSED PROFESSIONAL ENGINEER

JOB #:	21-072
SCALE:	AS NOTED
SHEET:	1 OF 1
DRAWING:	S1



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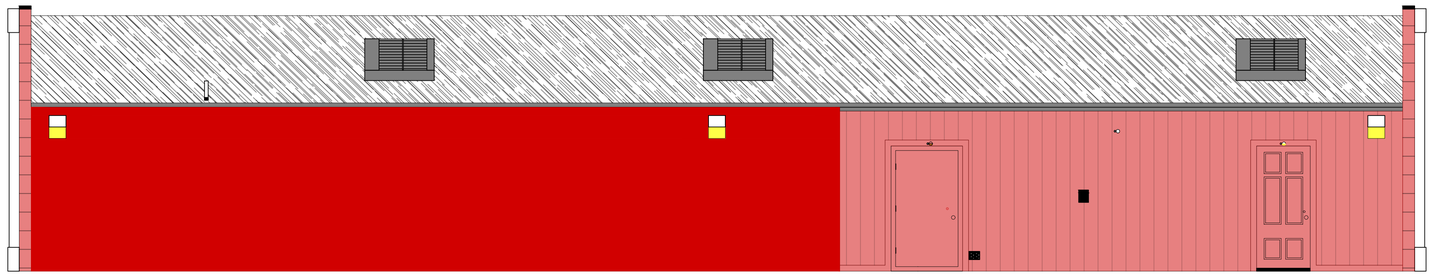

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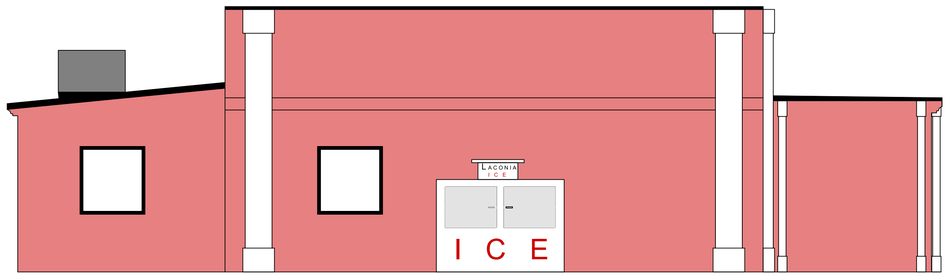

LEFT ELEVATION
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RIGHT ELEVATION
Scale : ¼"=1'-0"

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PROPOSED ELEVATIONS

THE CITY TOBACCO & BEVERAGE CENTER
806 US-1 BYPASS
PORTSMOUTH NEW HAMPSHIRE

PREPARED FOR:
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DESIGNED BY: MGP 5/27/2021
DRAFTED BY: MGP 5/27/2021
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STATE OF NEW HAMPSHIRE
R. ALEX ROSS
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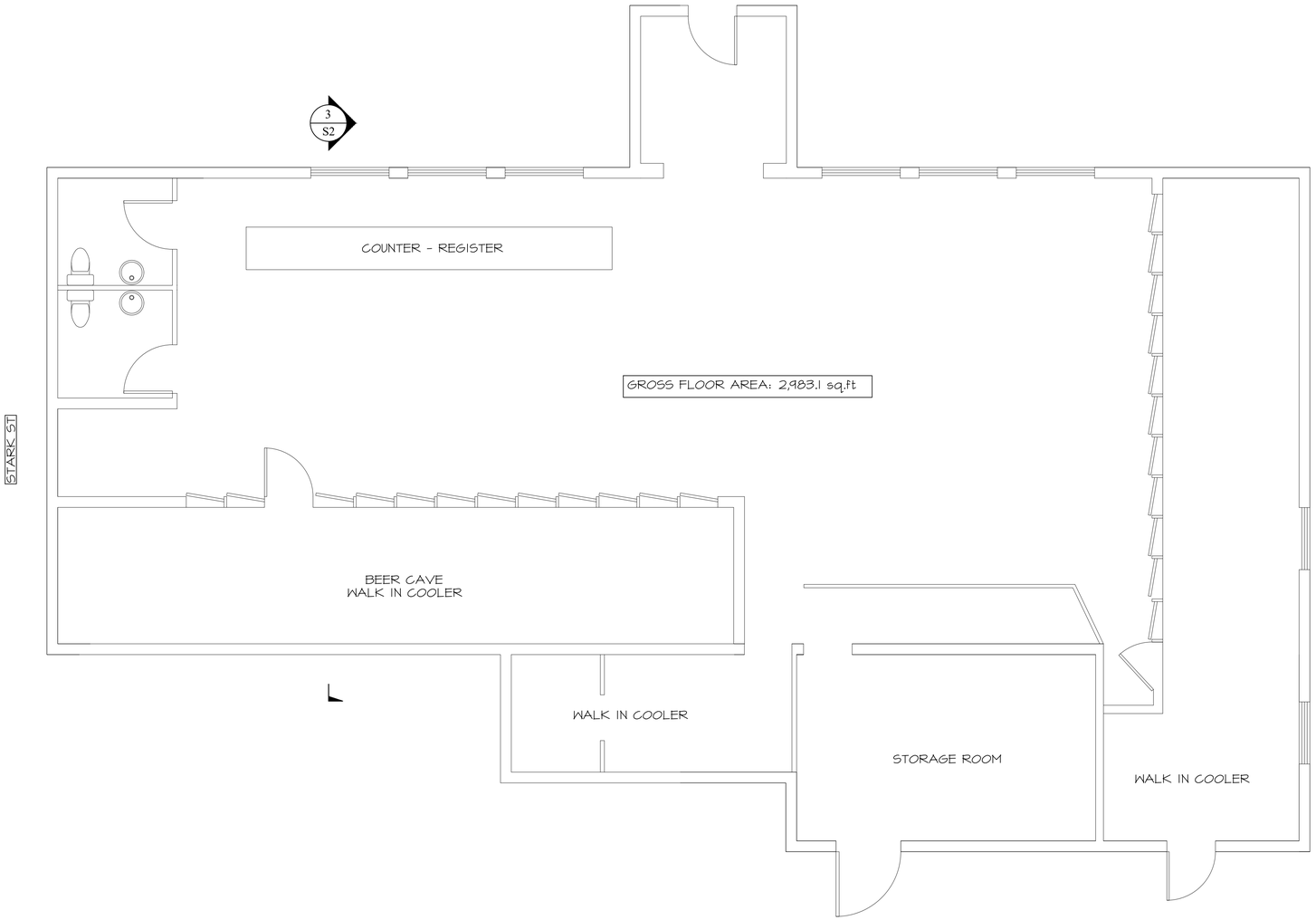
LICENSED PROFESSIONAL ENGINEER

JOB #: 21-072
SCALE: AS NOTED
SHEET: 2 OF 7
DRAWING:

S2



EXISTING FLOOR PLAN

Scale : ¼"=1'-0"

REVISION HISTORY

REV	DATE	DESCRIPTION	CHK
1	6/15/2021	FOR PERMITS	
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EXISTING FLOOR PLAN

THE CITY TOBACCO & BEVERAGE CENTER

806 US-1 BYPASS

PORTSMOUTH

NEW HAMPSHIRE

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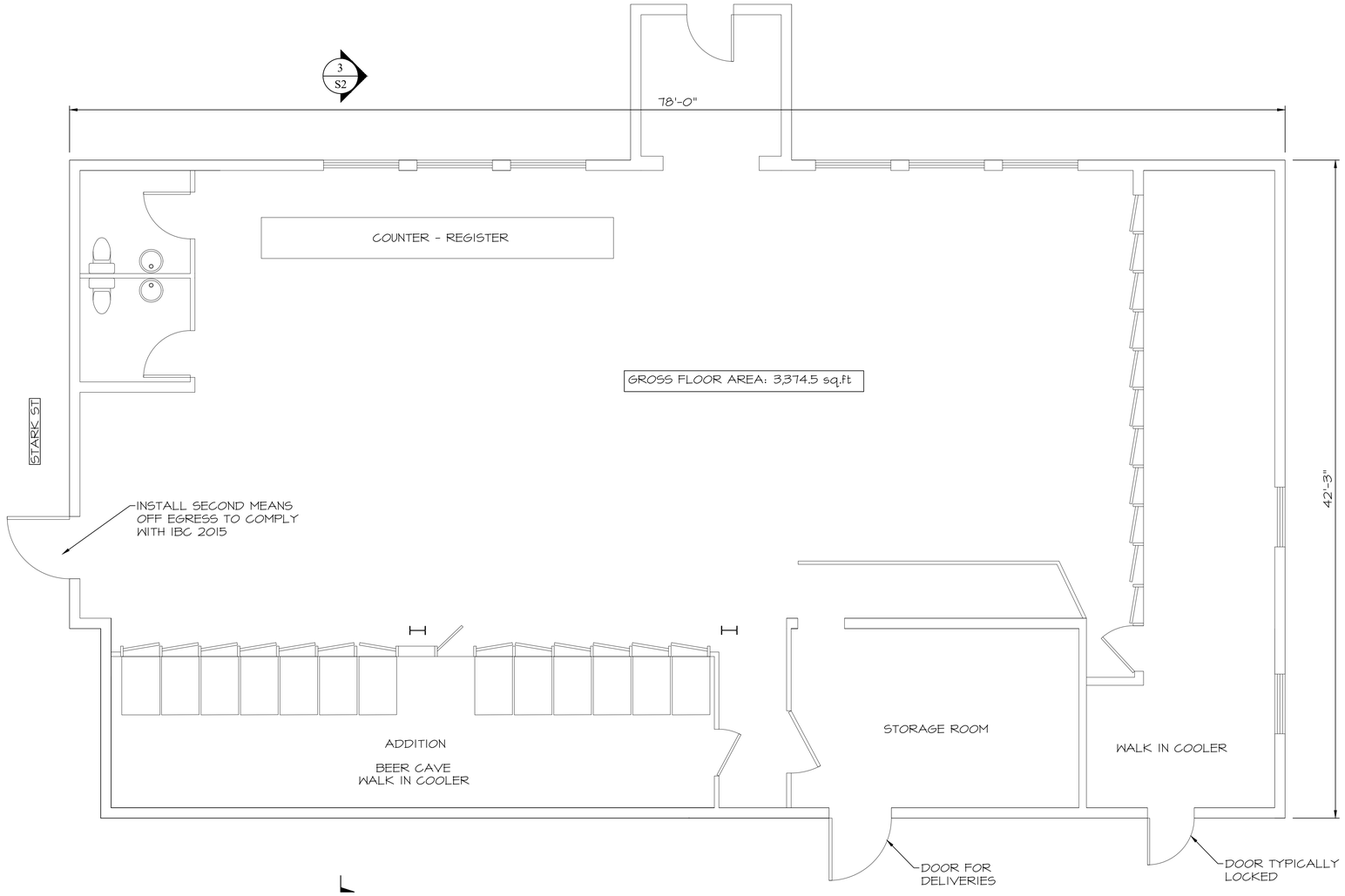
STATE OF NEW HAMPSHIRE
R. ALEX ROSS
No. 9409
LICENSED
PROFESSIONAL ENGINEER

JOB #:	21-072
SCALE:	AS NOTED
SHEET:	3 OF 7
DRAWING:	S3



PROPOSED FLOOR PLAN

Scale : ¼"=1'-0"

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PROPOSED FLOOR PLAN

THE CITY TOBACCO & BEVERAGE CENTER

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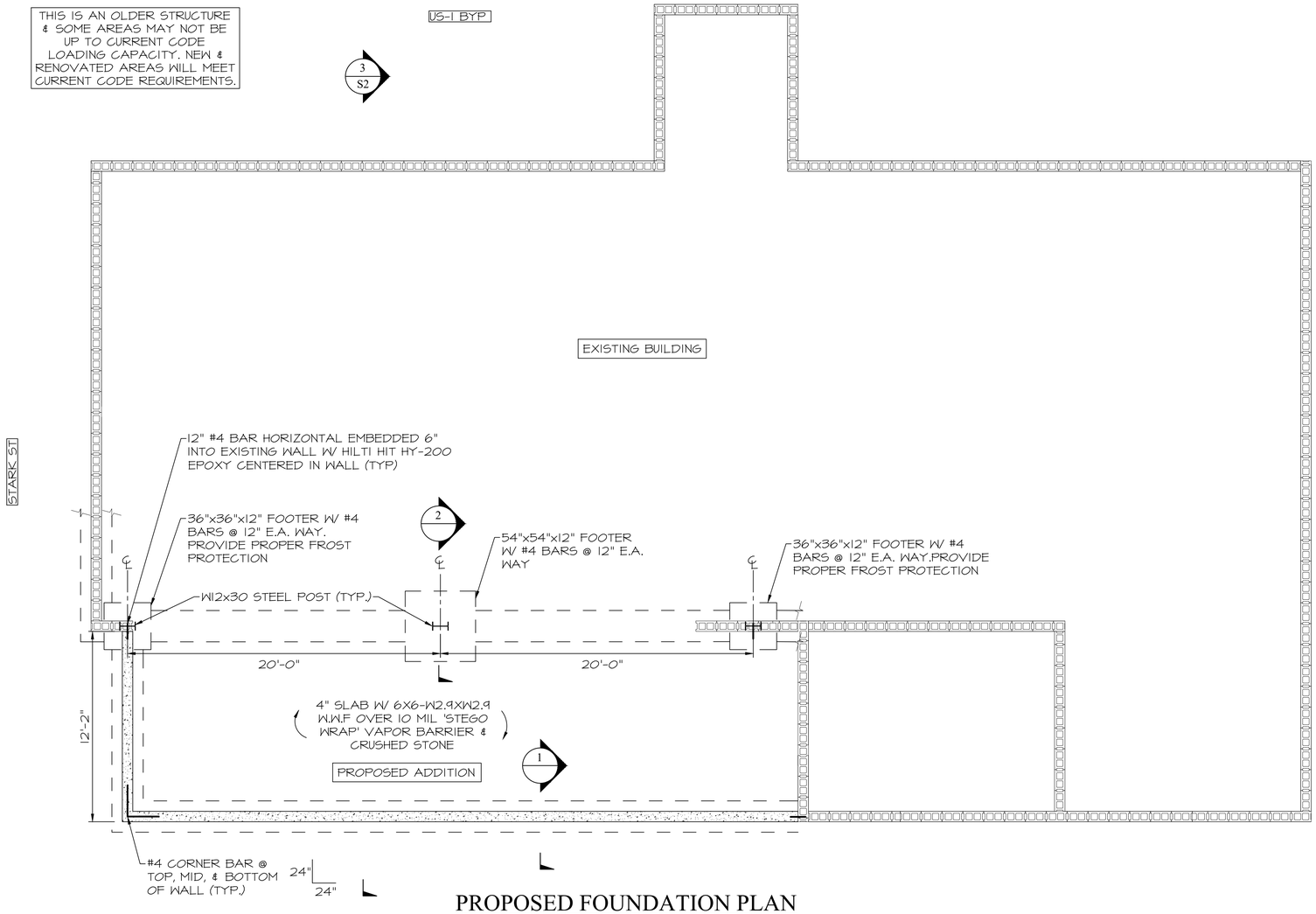
SCALE:	AS NOTED
SHEET:	4 OF 7

DRAWING:

S4

THIS IS AN OLDER STRUCTURE & SOME AREAS MAY NOT BE UP TO CURRENT CODE LOADING CAPACITY. NEW & RENOVATED AREAS WILL MEET CURRENT CODE REQUIREMENTS.



PROPOSED FOUNDATION PLAN

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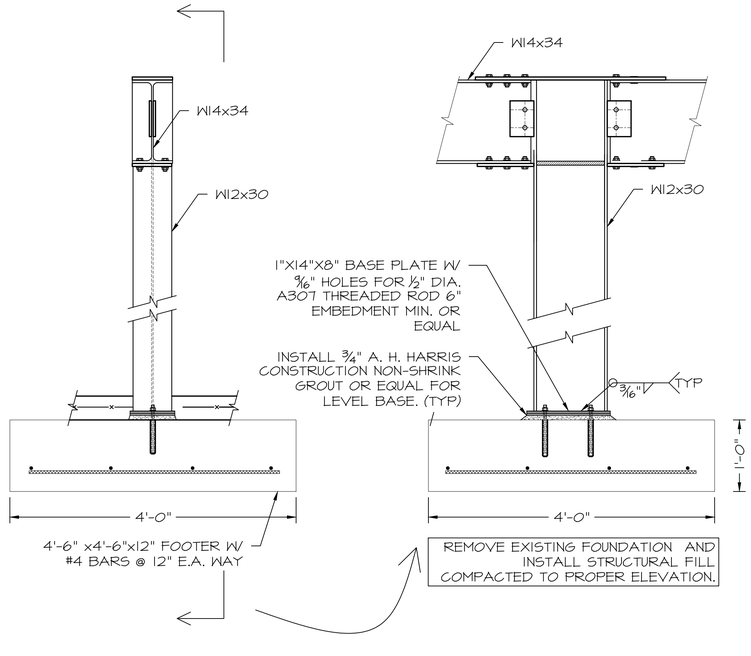

SECTION 2

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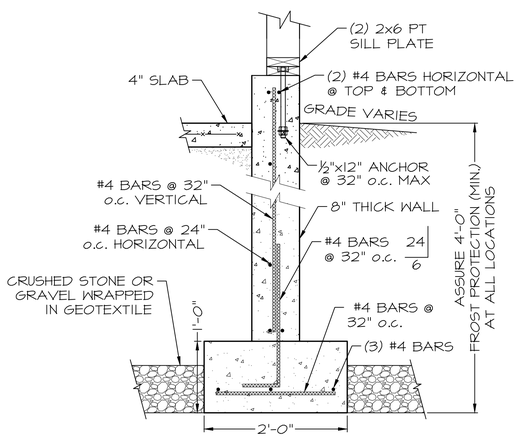

SECTION 1

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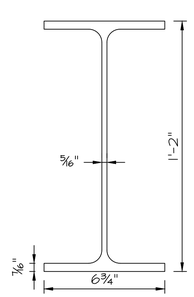
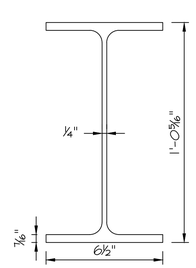


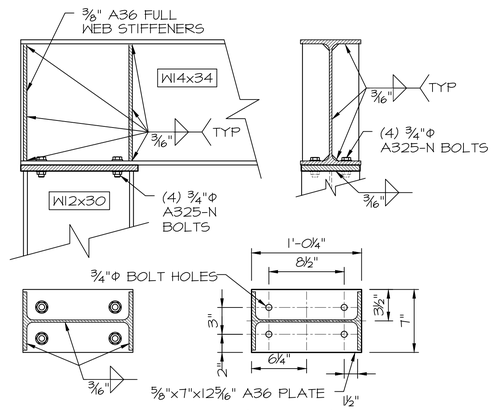
W14x34 PROFILE

Scale: 3"=1'-0"



W12x30 PROFILE

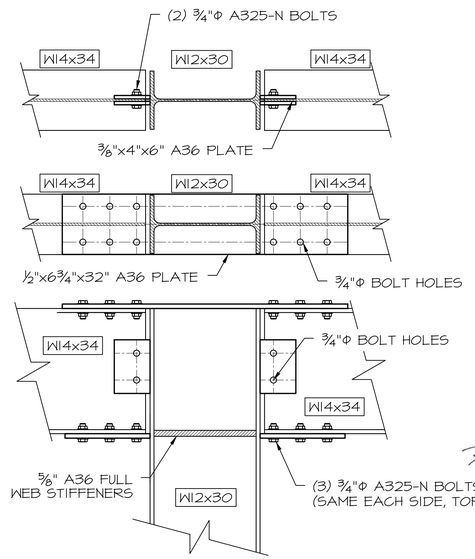
Scale: 3"=1'-0"



MOMENT CONNECTION W14x34 TO W12x30

CONNECTION DETAIL

Scale: 1½"=1'-0"



MOMENT CONNECTION W12x30 TO W14x34

CONNECTION DETAIL

Scale: 1½"=1'-0"

REVISION HISTORY

REV.	DATE	DESCRIPTION	CHK
1	6/15/2021	FOR PERMITS	
2	6/22/2021	FOR REVIEW	
3	4/12/2022	FOR TAC	
4	4/26/2022	REVISIONS	
5	5/25/2022	REVISIONS	

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

FOUNDATION PLAN

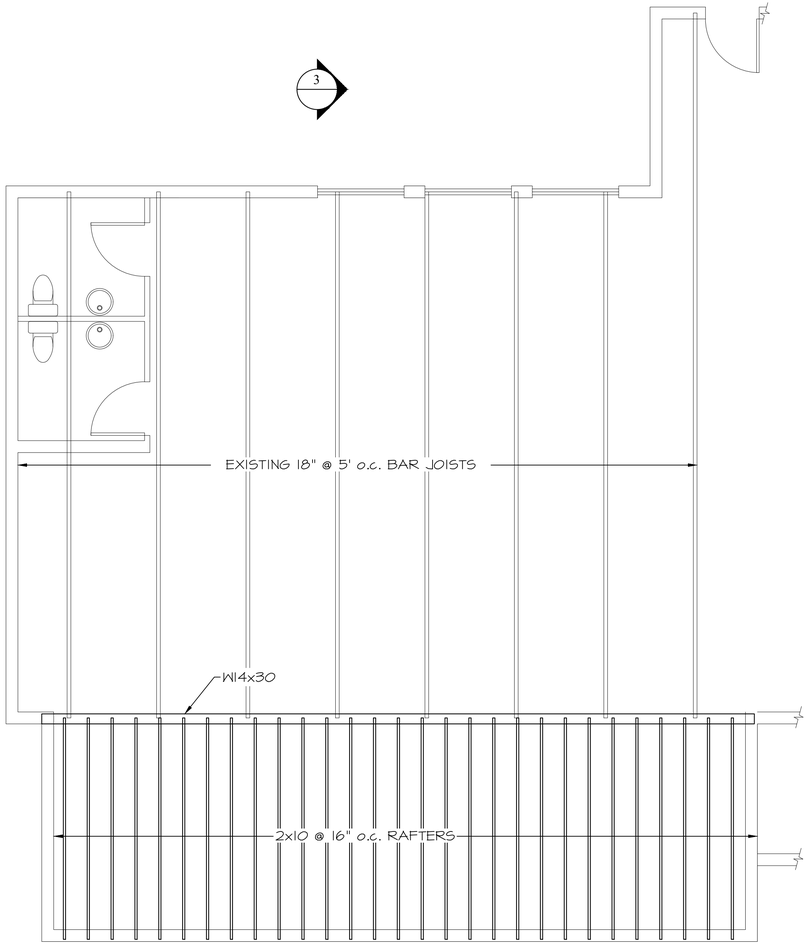
THE CITY TOBACCO & BEVERAGE CENTER
806 US-1 BYPASS
PORTSMOUTH NEW HAMPSHIRE

PREPARED FOR: DAVID GRZYBOWSKI

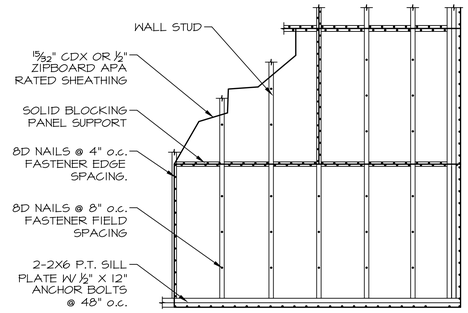
DESIGNED BY: MGP	5/27/2021
DRAFTED BY: MGP	5/27/2021
CHECKED BY: AR	5/27/2021

R. ALEX ROSS No. 9409 LICENSED PROFESSIONAL ENGINEER - STATE OF NEW HAMPSHIRE

JOB #:	21-072
SCALE:	AS NOTED
SHEET:	5 OF 7
DRAWING:	S5



ROOF FRAMING PLAN
Scale : ¼"=1'-0"

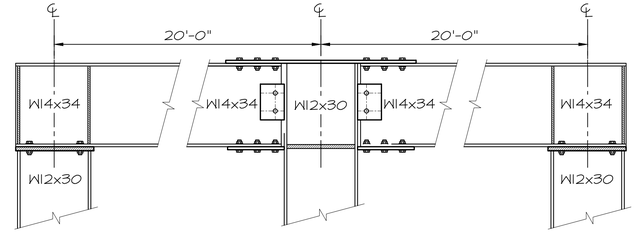


NOTE:
NO PLYWOOD JOINTS SHALL OCCUR WITHIN 2 FT OF PLATE LINE.

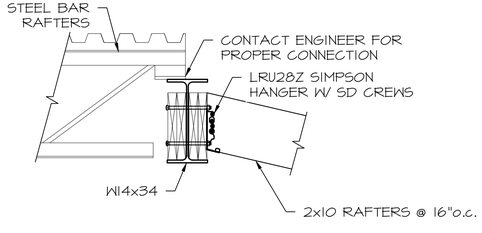
ALL NAILS TO BE DRIVEN IN FLUSH W/ PLYWOOD SURFACE. DO NOT FRACTURE SURFACE OF SHEATHING W/ NAIL HEADS.

APPLIES TO ALL EXTERIOR WALLS AND SPECIFIED INTERIOR WALLS

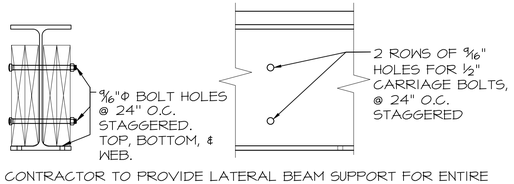
WALL SHEATHING NAILING PATTERN
Scale : ½"=1'-0"



MOMENT FRAME
Scale: 1"=1'-0"

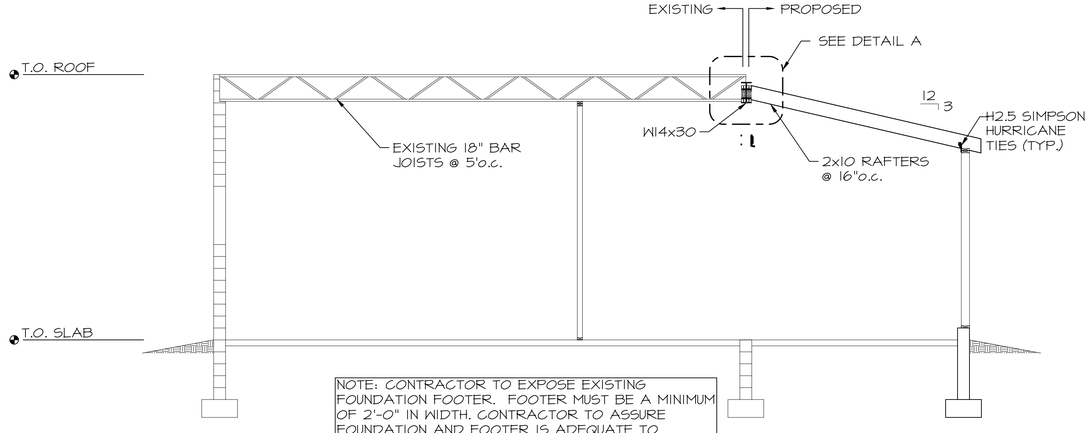


DETAIL A
Scale: 1"=1'-0"



CONTRACTOR TO PROVIDE LATERAL BEAM SUPPORT FOR ENTIRE LENGTH OF BEAM, WHILE MINIMIZING STIFFNESS DIFFERENTIAL BETWEEN WOOD AND STEEL MEMBERS. SIDE PADDING SHALL BEAR FULLY ON THE BOTTOM FLANGE OF THE STEEL BEAM

W14x34 NAILER DETAIL
Scale : 1½"=1'-0"



NOTE: CONTRACTOR TO EXPOSE EXISTING FOUNDATION FOOTER. FOOTER MUST BE A MINIMUM OF 2'-0" IN WIDTH. CONTRACTOR TO ASSURE FOUNDATION AND FOOTER IS ADEQUATE TO SUPPORT PROPOSED ADDITIONAL FRAMING SHOWN.

SECTION 3/S1
Scale: ¼"=1'-0"

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STATE OF NEW HAMPSHIRE · R. ALEX ROSS No. 9409 · LICENSED PROFESSIONAL ENGINEER

JOB #:	21-072
SCALE:	AS NOTED
SHEET:	6 OF 7
DRAWING:	S6

GENERAL NOTES:

SCOPE OF ENGINEERING SERVICE:

ROSS ENGINEERING IS ONLY RESPONSIBLE FOR THE STRUCTURAL DESIGN AND ENGINEERING AS SHOWN ON THESE DRAWINGS.

THE INTENT OF THIS DRAWING SET IS TO DEPICT THE STRUCTURAL MEMBERS REQUIRED.

GENERAL:

1. ALL WORK SHALL CONFORM TO THE FOLLOWING REFERENCE STANDARDS.:
   - "INTERNATIONAL BUILDING CODE" - 2015 EDITION.
   - "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES" - ASCE 7-10.
   - "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" - ACI 301-05.
   - "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" - ACI 318-11.
   - "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" - AF&PA NDS-2005.

2. ALL CONTRACTORS SHALL VERIFY AND COORDINATE ALL DIMENSIONS AND DETAILS RELATED TO THIS PROJECT. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER PRIOR TO PROCEEDING WITH THE AFFECTED WORK. ANY CHANGES OR SUBSTITUTIONS OF MATERIALS OR DETAILS FROM THOSE INDICATED ON THE CONTRACT DOCUMENTS MAY BE MADE ONLY WITH PRIOR APPROVAL OF THE PROJECT ENGINEER.

3. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, COORDINATION OF OTHER TRADES AND THE TECHNIQUES TO PRODUCE A SOUND AND QUALITY PROJECT. SHORING IS THE RESPONSIBILITY OF THE CONTRACTOR.

4. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR ALL JOB SAFETY DURING CONSTRUCTION INCLUDING BUT NOT LIMITED TO SHEETING, SHORING, AND GUYING STRUCTURES, BARRIERS AND SIGNAGE.

5. ALL DETAILS AND NOTES SHOWN ON THE CONTRACT DOCUMENTS SHALL BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS EXCEPT WHERE SPECIFICALLY REQUIRED OTHERWISE.

6. NO MAIN FRAMING OR STRUCTURAL MEMBERS ARE TO BE MODIFIED, ALTERED, OR CUT WITHOUT THE APPROVAL OF THE PROJECT ENGINEER.

STRUCTURAL LOADS:

1. SNOW LOADS
   PER INTERNATIONAL BUILDING CODE - 2015 EDITION AND MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES - ASCE 7-05
   - EXPOSURE.....B
   - GROUND SNOW LOAD.....50 PSF

FOUNDATIONS:

1. FOUNDATION DESIGN IS BASED ON AN ASSUMED NET ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF. VARYING CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER PRIOR TO WORK BEING CARRIED OUT. IT IS RECOMMENDED THAT THE OWNER HIRE A CONSULTANT TO PERFORM SOIL BORINGS AND ASSOCIATED TESTING TO VERIFY THE ASSUMED VALUES. THE CONTRACTOR OR OWNER SHALL ASSUME ALL RESPONSIBILITY IF A GEOTECHNICAL ENGINEER IS NOT RETAINED.

2. FOUNDATIONS SHALL BE FOUNDED ON NATURALLY UNDISTURBED SOIL OR CONTROLLED STRUCTURAL FILL HAVING A NET ALLOWABLE BEARING CAPACITY OF 2000 PSF.

3. MAINTAIN CONTINUOUS CONTROL OF SURFACE AND SUBSURFACE WATER DURING CONSTRUCTION SUCH THAT FOUNDATION WORK IS IN DRY AND UNDISTURBED SUB-GRADE MATERIAL, AS APPLICABLE.

4. ALL FOOTINGS EXPOSED TO FROST TO BE PLACED AT A MINIMUM DEPTH OF 4'-0" BELOW FINISH GRADE. ANY DISCREPANCIES OR ADJUSTMENTS TO THE FOOTING ELEVATIONS TO BE BROUGHT TO THE PROJECT ENGINEER PRIOR TO PLACEMENT OF CONCRETE.

5. ALL FOOTINGS SHALL BE CENTERED UNDER SUPPORTED STRUCTURAL MEMBERS UNLESS OTHERWISE NOTED ON THE DRAWINGS.

6. BACKFILL THE EXCAVATION WITH APPROVED GRANULAR MATERIAL PLACED IN 6 INCH LIFTS AND COMPACTED TO 95% DENSITY AT OPTIMUM MOISTURE CONTENT, AS DEFINED BY ASTM D1557, METHOD D AFTER BOTTOM OF EXCAVATION HAS BEEN APPROVED BY THE PROJECT ENGINEER.

7. BACKFILL SHALL BE PLACED TO EQUAL ELEVATIONS ON BOTH SIDES OF FOUNDATION WALLS. WHERE BACKFILL IS ON ONE SIDE ONLY, WORK SHALL BE SHORED OR HAVE PERMANENT ADJACENT CONSTRUCTION IN PLACE BEFORE BACKFILLING.

CONCRETE NOTES:

1. CONCRETE WORK SHALL CONFORM TO THE FOLLOWING REFERENCE STANDARDS:
   - "INTERNATIONAL BUILDING CODE" - 2015 EDITION.
   - "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" - ACI 301-05.
   - "COLD WEATHER CONCRETING" - ACI-306.
   - "DETAILING REINFORCING STEEL" - ACI 315-05.
   - "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" - ACI 318-11.
   - "BUILDING CODE REQUIREMENTS FOR PLAIN CONCRETE" - ACI 322-05.
   - "FORMWORK" - ACI 347-05.

2. COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 4000 PSI AFTER 28 DAYS. WITH A SLUMP SHALL OF 4" TO 6" AND IN ACCORDANCE WITH ASTM C143.

3. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615 GRADE 60. EXCEPT TIES AND STIRRUPS MAY BE GRADE 40. WELDED WIRE FABRIC (W.W.F.) SHALL BE SHEETS ONLY, IN ACCORDANCE WITH ASTM A185. LAP TWO SQUARES AT ALL JOINTS AND TIE AT 3'-0" ON CENTER.

4. CEMENT MIXTURE FOR CONCRETE SHALL CONTAIN TYPE II CEMENT CONFORMING WITH ASTM-C 150. THE WATER CEMENT RATIO SHALL NOT EXCEED 0.45.

5. AGGREGATE SHALL BE SOUND AND COMFORM TO THE PROVISIONS OF ASTM C33. COARSE AGGREGATE SIZE SHALL NOT EXCEED ¾". (NO. 67)

6. PLACING OF CONCRETE SHALL BE IN ACCORDANCE WITH ACI 304-05 AND SHALL BE A CONTINUOUS OPERATION AVOIDING ANY HORIZONTAL JOINTS. FORMWORK SHALL BE SMOOTH PLYWOOD FORMS FOR EXPOSED SLABS OR VERTICAL SURFACES. BOARD FORMS FOR FOOTINGS OR UNEXPOSED CONCRETE SURFACES. NO EARTH FORMS SHALL BE PERMITTED. ALL CONCRETE SHALL BE VIBRATED.

7. PLACE REINFORCING USING STANDARD BAR SUPPORTS TO PROVIDE PROPER CLEARANCE AND PREVENT DISPLACEMENT DURING CONCRETE OPERATIONS. LAP CONTINUOUS BARS 40 DIAMETERS.

8. REINFORCING BARS SHALL BE PLACED IN ACCORDANCE WITH THE LATEST EDITION OF THE CRSI "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS".

9. PROPERLY BRACE AND SHORE FORMWORK TO MAINTAIN ALIGNMENT AND TOLERANCES IN ACCORDANCE WITH ACI 347-05.

CONCRETE CONTINUED:

10. PROVIDE TWO #5 BARS EACH SIDE OF ALL OPENINGS IN WALLS AND SLABS. BARS TO EXTEND 24" BEYOND EDGE OF OPENINGS. (FOR SIZE AND LOCATION OF OPENINGS, SEE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS).

11. MINIMUM CONCRETE COVER REQUIREMENTS OVER REINFORCING STEEL ARE AS FOLLOWS:
   - FORMED CONCRETE EXPOSED TO EARTH, WEATHER, OR WATER - 2"
   - UNFORMED CONCRETE PLACED AGAINST THE EARTH - 3"
   - UNFORMED CONCRETE PLACED AGAINST VAPOR BARRIER - 2"
   - SLABS ON GRADE - 1" FROM TOP

12. DETAILS NOT SHOWN ON DRAWINGS SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL (ACI 315-05).

13. CONTRACTOR TO NOTIFY THE OWNER'S ENGINEER 48 HOURS IN ADVANCE OF CONCRETE PLACEMENT SO THAT THE FORMWORK AND REINFORCING MAY BE INSPECTED PRIOR TO BEING COVERED.

14. CONSULT PROJECT OWNER FOR SURFACE FINISHES REQUIRED FOR CONCRETE SLAB.

15. UNDERSLAB VAPOR BARRIER SHALL BE AS MANUFACTURED BY STEGO INDUSTRIES OR EQUAL CONSISTING OF 10 MIL STEGO WRAP VAPOR BARRIER SEAMS SHALL BE OVERLAPPED A MINIMUM OF 6" AND TAPED WITH STEGO VAPOR BARRIER TAPE OR EQUAL AS REQ'D.

16. QUALITY CONTROL SPECIFICATIONS ARE AS FOLLOWS:
   - CONTRACTOR SHALL MAKE PROVISIONS TO HAVE FOUR CYLINDERS CAST FOR EACH 50 CUBIC YARDS OR FOR ANY ONE DAYS OPERATION.
   - TESTING LABORATORY SHALL BE RESPONSIBLE FOR MAKING AND CURING SPECIMENS IN CONFORMANCE TO ASTM C31 AND TESTING SPECIMENS IN ACCORDANCE WITH ASTM C29.
   - ALL TESTING ASSOCIATED WITH CONCRETE SHALL BE IN ACCORDANCE WITH CHAPTER 17 OF "INTERNATIONAL BUILDING CODE" - 2009 EDITION.
   - THE COSTS OF ALL TESTS AND INSPECTIONS SHALL BE THE RESPONSIBILITY OF THE OWNER.

WOOD FRAMING:

1. ALL WOOD FRAMING SHALL CONFORM TO THE FOLLOWING REFERENCE STANDARDS.:
   - "INTERNATIONAL BUILDING CODE - 2015 EDITION"
   - "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" - AF&PA NDS-2005

2. ALL FRAMING MEMBERS SHALL BE No.1 / No. 2 OR BETTER SPRUCE-PINE-FIR WITH A MAXIMUM MOISTURE CONTENT OF 19% UNLESS NOTED OTHERWISE.
   - BASE DESIGN VALUES:
     Fb=875 (1,000 REP) PSI, Fv=70 PSI, E=1,400 KSI

3. ALL LUMBER AND PLYWOOD SHALL BE GRADE-STAMPED BY THE APPROPRIATE MANUFACTURER'S ASSOCIATION FOR THE APPROPRIATE USE.
   - ROOF: 19/32" SQUARE EDGE PLYWOOD W/ FRAMING CLIPS
   - FLOORS: 23/32" TONGUE & GROOVE PLYWOOD
   - WALLS: 15/32" PLYWOOD

4. ROOF AND WALL SHEATHING SHALL COMPLY WITH THE FOLLOWING:
   - APA RATED SHEATHING, EXPOSURE 1 OR 2
   - ROOF SHEATHING SHALL HAVE A 40/20 SPAN RATING
   - ROOF SHEATHING SHALL HAVE (1) PANEL EDGE CLIP BETWEEN EACH SUPPORT
   - A 1/8" EXPANSION GAP SHALL BE LEFT BETWEEN ALL PANELS AS REQUIRED BY APA
   - SHEETS SHALL BE INSTALLED WITH FACE GRAIN PERPENDICULAR TO SUPPORTING MEMBERS

5. ALL WOOD IN CONTACT WITH CONCRETE, MASONRY, OR EARTH SHALL BE PRESSURE TREATED (PT) WITH A CCA-C 0.40 PROCESS.

6. ALL FRAMING SHALL BE PLUMB, TRUE, AND ADEQUATELY BRACED SUCH THAT THE STRUCTURE IS RIGID AND BEARS FULLY WITHOUT THE USE OF SHIMS.

7. SPIKE TOGETHER ALL FRAMING MEMBERS WHICH ARE BUILT UP WITH 16d NAILS AT 16" O.C. MAX. UNLESS NOTED OTHERWISE. PROVIDE PLYWOOD FILLERS BETWEEN 2x MEMBERS TO MATCH WALL THICKNESS.

8. PROVIDE A MINIMUM OF TWO 2x STUDS AT THE END OF ALL BUILT-UP 2x BEAMS AND LVL BEAMS, UNLESS NOTED OTHERWISE.

9. CORNERS OF EXTERIOR WALLS SHALL HAVE A MINIMUM OF (3) 2x STUDS.

10. PROVIDE SOLID BLOCKING UNDER ALL CONCENTRATED LOADS. PROVIDE CONTINUITY TO TOP OF FOUNDATION WALL OR FOOTING.

11. PROVIDE A DOUBLE TOP PLATE FOR ALL EXTERIOR WALLS w/ SPLICES STAGGERED BY 4'-0" MIN.

12. NON-STRUCTURAL INTERIOR WALLS SHALL BE CONSTRUCTED w/ 2x4 STUDS.

13. ENGINEERED LUMBER PRODUCTS SHALL BE MANUFACTURED BY BOISE CASCADE OR APPROVED EQUAL, INCLUDING ALL I-JOISTS AND LVL's. ALL BOISE CASCADE PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS AND STANDARD DETAILS AS PUBLISHED BY BOISE CASCADE.
   - BASE DESIGN VALUES:
     - 1¾" WIDE VERSA-LAM BEAMS GRADE 3100 Fb SP
       Fb=3,100 PSI, Fv=285 PSI, E=2,000 KSI
     - 3½" AND WIDER VERSA-LAM BEAMS GRADE 3100 Fb SP
       Fb=3,100 PSI, Fv=285 PSI, E=2,000 KSI
     - VERSA-LAM COLUMNS GRADE 3100 Fb SP
       Fb=3,100 PSI, Fc⊥=3,000 PSI, E=1,800 KSI

14. FASTENERS SHALL COMPLY WITH THE FOLLOWING:
   - NAILS SHALL BE COMMON WIRE NAILS, GALVANIZED @ EXPOSED FRAMING
   - BOLTS, NUTS AND WASHERS SHALL BE ASTM A-307, HOT DIP GALVANIZED AT EXTERIOR EXPOSED FRAMING CONFORMING TO ASTM A153
   - METAL CONNECTORS SHALL BE AS MANUFACTURED BY SIMPSON OR APPROVED EQUAL
   - STAINLESS STEEL NAILS FOR ATTACHING EXTERIOR TRIM AND SIDING
   - ALL WOOD MEMBERS TO BE NAILED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE - 2009 EDITION APPENDIX C

15. PLYWOOD SHALL BE NAILED AT 6" OC AT ALL JOINTS AND EDGES & AT 10" OC AT OTHER SUPPORTS. PLYWOOD SUB-FLOORS SHALL BE GLUED TO JOISTS, BEFORE NAILING WITH CONSTRUCTION ADHESIVE.

16. LIGHTWEIGHT RESIDENTIAL LALLY COLUMNS - 3½" OUTER DIAMETER 16 GAGE STEEL PIPE CONFORMING TO ASTM A513 FILLED WITH CONCRETE HAVING A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS. (UNLESS OTHERWISE NOTED.)

17. PROVIDE DOUBLE JOISTS UNDER PARALLEL PARTITION WALLS AT ALL FLOORS UNLESS OTHERWISE NOTED.

18. NEW PRESSURE TREATING PROCESSES REQUIRED FOR WOOD ARE HIGHLY CORROSIVE. SEE NOTE 5. AND MANUFACTURER'S RECOMMENDATIONS FOR FASTENING TO PT WOOD.

STRUCTURAL STEEL:

1. ALL STEEL FRAMING WORK SHALL CONFORM TO THE FOLLOWING REFERENCE STANDARDS.:
   - "INTERNATIONAL BUILDING CODE" - IBC 2015 EDITION.
   - "SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN" - AISC-ASD 13TH ED.
   - "D1.1 STRUCTURAL WELDING CODE / STEEL" - AWS 1998.

2. ALL STEEL FRAMING SHALL CONSIST OF THE FOLLOWING:
   - WF AND WT SHAPES - ASTM A992
   - TUBE COLUMNS - ASTM A500 - GRADE B - Fy=46 KSI
   - PIPE COLUMNS - ASTM A53 - GRADE B - TYPE E OR S, SCHEDULE 80
   - ALL OTHER STRUCTURAL SHAPES AND PLATES - ASTM A36
   - BOLTS - CONNECTIONS ASTM A325, ANCHOR BOLTS ASTM A307
   - WELDING ELECTRODES - E70XX SERIES

3. SHOP FABRICATE TO THE GREATEST EXTENT POSSIBLE BY WELDING. PROVIDE ALL BEAM COLUMN STIFFENERS, COLUMN CAPS AND BASE PLATES WITH HOLES AS REQUIRED. PROVIDE ALL NECESSARY CONNECTION HARDWARE FOR CONNECTIONS.

4. SUBMIT SHOP DRAWINGS FOR ALL STEEL MEMBERS PREPARED FROM FIELD DIMENSIONS, FOR APPROVAL BEFORE PROCEEDING WITH FABRICATION. CONNECTIONS SHALL BE DESIGNED AND STAMPED BY A ENGINEER REGISTERED IN THE STATE OF NEW HAMPSHIRE AND SUBMITTED TO SER PRIOR TO FABRICATION. CONNECTIONS SHALL BE BOLTED WITH A325-N BOLTS

5. PROVIDE ALL ANCHOR BOLTS, LEVELING PLATES, AND ALL NECESSARY HARDWARE TO ERECT THE STEEL PLUMB, LEVEL AND SQUARE. PROVIDE TEMPORARY BRACING UNTIL ROOF AND PERMANENT BRACING IS IN PLACE.

6. CONTRACTOR SHALL FIELD TOUCH UP ALL ABRASIONS, BURNS AND SIMILAR DEFECTS IN PAINT OF ALL STRUCTURAL STEEL.

7. QUALITY CONTROL SPECIFICATIONS ARE AS FOLLOWS:
   - PROVIDE SERVICE OF INDEPENDENT TESTING LABORATORY FOR THE FOLLOWING:
     - VISUAL INSPECTION OF FILLET WELDS.
     - INSPECTION OF BOLT INSTALLATION AND BOLT TENSION.
   - ALL TESTING ASSOCIATED WITH STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE APPROPRIATE SECTION OF IBC 2015.
   - THE COSTS OF ALL TESTS AND INSPECTIONS SHALL BE THE RESPONSIBILITY OF THE OWNER.

8. ERECTION NOTES: TOUCH-UP AND REPAIR FOR METAL-COATED SURFACES, CLEAN WELDS, BOLTED CONNECTIONS AND ABRADED AREAS; APPLY ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65% ZINC BY WEIGHT. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL NOT BE LESS THAN COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.

9. ALL WELDING SHALL BE PERFORMED BY AWS-CERTIFIED WELDERS.

10. SHOP FABRICATE TO THE GREATEST EXTENT POSSIBLE BY WELDING. PROVIDE ALL BEAM COLUMN CAPS AND BASES WITH HOLES AS REQUIRED. PROVIDE ALL NECESSARY CONNECTION HARDWARE FOR CONNECTIONS.

11. PAINT - NON-GALVANIZED STEEL SHALL RECEIVE APPROVED PRIMER - 2 MILS THICK. ALL STRUCTURAL STEEL SHALL BE SHOP PAINTED WITH ONE COAT OF SHERWIN WILLIAMS STRUCTURAL STEEL PRIMER, GRAY (PRODUCT NUMBER B50AV11).

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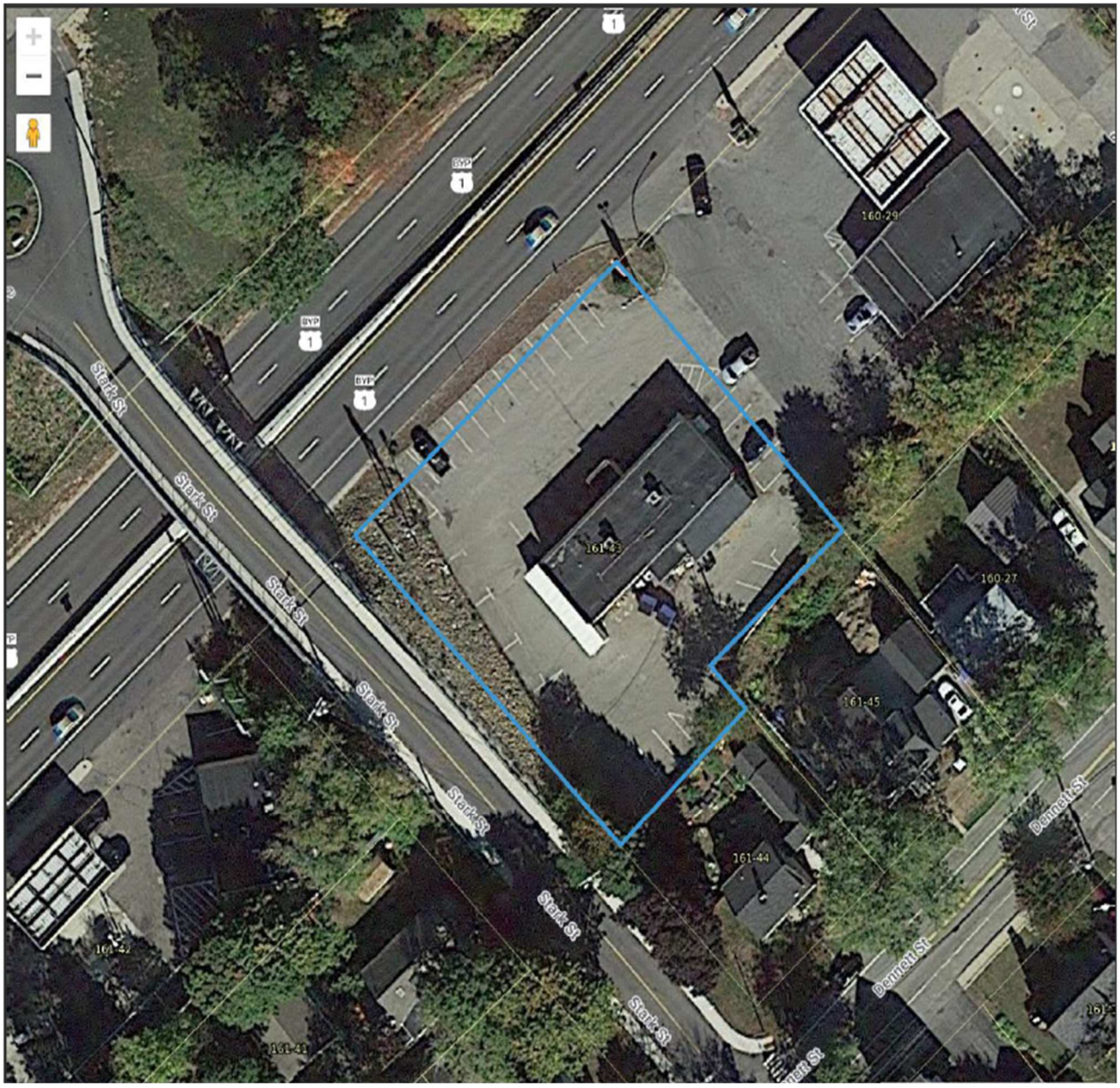

Aerial view of site

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View from Stack Street Bridge

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View of existing building looking to the southwest

View of front of existing building looking to the southeast

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View of right front side of existing building looking to the southeast

View of existing building looking to the east

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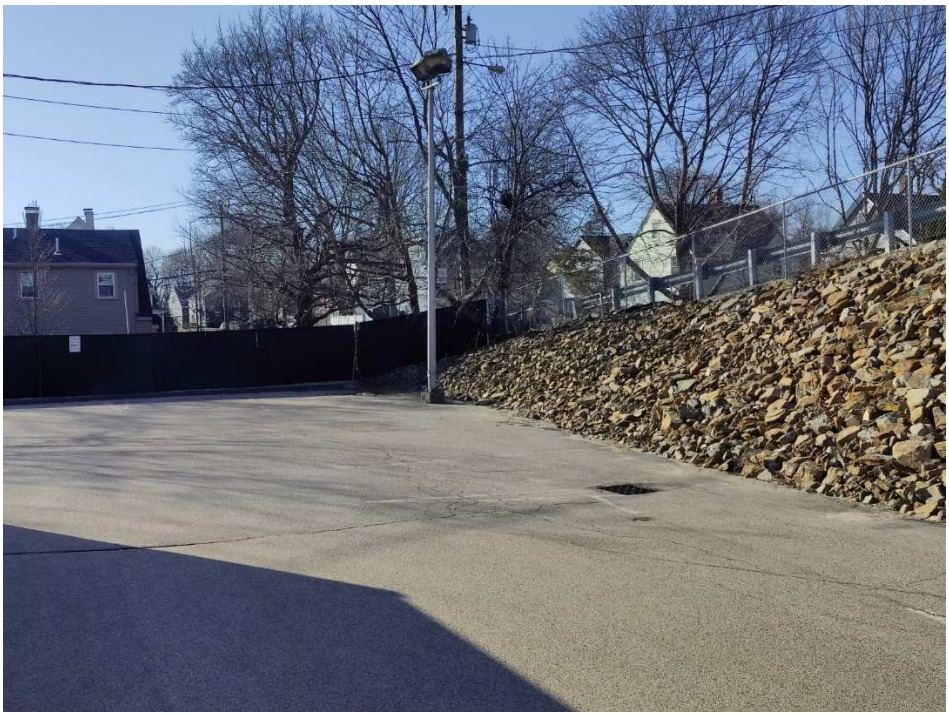

View of southwest corner of parking lot

View of existing building looking to the southwest

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Civil / Structural Engineering
909 Islington Street
Portsmouth, NH 03801
603-433-7560
alexross@comcast.net

View of rear of existing building looking to the north

Ross Engineering
Civil/Structural Engineering & Surveying

909 Islington Street **603-433-7560**
Portsmouth, NH 03801 **alexross@comcast.net**

May 25, 2022

Planning Department
City of Portsmouth
1 Junkins Ave
Portsmouth, NH 03801
Waiver Request Letter

Re:806 US Route 1 Bypass
Portsmouth, NH 03801
Tax Map 161, Lot 43

Planning Board Members, we are requesting waivers from the following regulations:

- *Section 2.5.3.1A "Statement that lists and describes "green" building components and systems."*
  This project does not involve building a completely new structure from the ground up. What is proposed is a very small addition to an existing building. The existing commercial structure was built in 1965. The addition will be compliant with current code requirements and make the building much more energy efficient with proper insulation in the addition walls and roof. Uninsulated concrete block walls will be replaced with fully insulated standard construction walls.

- *Section 2.5.3.2D Utility service providers*
  The demand for utility services will not change from existing.

- *Section 7.4.4.1 & Section 2.5.3.2B "Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to….."*
  This site is unique in that it has been fully developed form many decades. We are adding landscaping and open space will now be in compliance. By adding landscaped areas, the drainage and infiltration will be improved. Previous uses have been more intense in use. This project went through an extensive TAC review process.

- *Section 9.3,5 "Dumpster of other waste container pads shall be a minimum of 20 feet from any property line or yard"*
  The dumpster enclosure will be 10 feet from the side property line. On this parcel the side parcel line abuts a stone embankment along Stark Street and the Stark Street bridge. A waiver is necessary to locate the dumpsters in this area. This location will be far away from residential use, still allow traffic to function, and was recommended by TAC.

Thank you for your consideration.
Sincerely, Alex Ross, P.E.

Ross Engineering
Civil / Structural Engineering

909 Islington Street **603-433-7560**
Portsmouth, NH 03801 **alexross@comcast.net**

List of Abutters

Dated 5-25-2022
To: New Hampshire Department of Environmental Services

Applicant & Land Owner's Name:
Rigz Enterprises LLC
18 Dixon Ln
Derry, NH 03038

Location of Land:
806 Route 1 Bypass
Portsmouth, NH 03801
Tax Map 161, Lot 43

Abutters:

Portsmouth Realty LLC
1100 William Penn Dr
Bensalem, PA 19020
Tax Map 160, Lot 29

Myrinda A. Solito
2 Stark St
Portsmouth, NH 03801
Tax Map 161, Lot 41

GTY MA/NH Leasing, Inc.
326 Clark St
Worcester, MA 01606
Tax Map 161, Lot 42

Alice B. Kucharik & Nicolas Webster
507 Dennett St
Portsmouth, NH 03801
Tax Map 161, Lot 44

Lindsay Floryan & Brian Collier
439 Dennett St
Portsmouth, NH 03801-3691
Tax Map 161, Lot 45

City of Portsmouth
New Franklin School
PO Box 628
Portsmouth, NH 03802
Tax Map 220, Lot 2

Civil Engineer & Surveyor
Alex Ross
Ross Engineering
Certified Professional Engineer
Licensed Land Surveyor
909 Islington Street
Portsmouth, NH 03801

SINCE 1945
KEYSTONE
LIGHT MADE EASY

XFIT | HIGH-PERFORMANCE LED AREA LIGHTS

KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

DESCRIPTION

Compact 140W High-Performance LED Area Light | 120–277V Input | Bronze Housing | Multiple Mounting, Optics, and Control options

APPLICATION

Pole-mount or structure-mount outdoor illumination needs (including parking lots, auto dealerships, pathways, roadways, recreational venues, and other general area lighting requirements)

RoHS Compliant | UL CERTIFIED | DLC PREMIUM | 5 YEAR WARRANTY | TRUSTED NLB WARRANTY

PRODUCT FEATURES

- Compact, low-profile design delivers high-performance illumination and improves application site aesthetics
- Heavy-duty, die-cast aluminum housing with ample heat sinking for enhanced thermal performance
- True U0 design for Dark Sky compliant performance eliminates undesirable sky glow
- Integrated NEMA/ANSI C136.10 3-pin twist-lock receptacle with shorting cap, standard on all fixtures, simplifies ordering requirements for photo control needs
- Precision-crafted optics, available with type II, III, IV, and V patterns, to meet diverse requirements from general purpose to specification-grade applications
- Integral latch design for hassle-free, hinged access to driver compartment
- Four contractor-friendly mounting options available (sold separately): slip fitter mount, adjustable pole mount for square and round poles, fixed pole mount for square and round poles, and trunnion mount
- Bi-level occupancy sensor and twist-lock photocell accessories available
- Reversible glare shield available, suitable for backside (house-side) or frontside (street-side) shielding
- Powered by Keystone 0–10V dimming LED driver featuring 12V AUX power tap, 6kV surge protection
- Ambient operating temperature: –40ºC/–40ºF to 50ºC/122ºF
- UL Certified for wet locations, IP65
- 0–10V dimming, 10% min
- Power factor: >0.95
- THD: <20%
- LED chip lifetime: L70 >100,000 hrs @ 25Cº/77Fº ambient fixture temp
- Meets FCC Part 15, Part B, Class A standards for conducted and radiated emissions

ELECTRICAL SPECIFICATIONS

Catalog Number	Wattage	Lumens	Efficacy	Dimming	Color Temp	CRI	Dist Type*	Input Voltage	Rated Life	Legacy Equivalent	Housing Color**	Additional Feature
KT-ALED140-M1-3-NM-840-VDIM	140W	19,320 lm	138 lm/W	0–10V	4000K	>80	III	120–277V	50,000 hrs	400W	Bronze	10kV external surge protection included
KT-ALED140-M1-3-NM-850-VDIM		19,600 lm	140 lm/W		5000K		III					
KT-ALED140-M1-5-NM-840-VDIM		19,460 lm	139 lm/W		4000K		V					
KT-ALED140-M1-5-NM-850-VDIM		19,740 lm	141 lm/W		5000K		V					

* *Fixtures with Type 2 (II) and Type 4 (IV) optics are available and assembled to order. Lead times may apply. Please see catalog number breakdown for full ordering code details.*

** *Fixtures (and mounts) with alternate housing colors are available and made to order. Extended lead times apply. Please see catalog number breakdown for full ordering code details.*

SINCE 1945
KEYSTONE
LIGHT MADE EASY

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KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

MOUNTING BRACKET OPTIONS (SOLD SEPARATELY)

SLIP FITTER MOUNT

Fits 2 3/8" tennon; Bronze

Catalog Number	UPC	Easy Code
KT-ALED-SF-1-KIT	843654131641	JRH-74

ADJUSTABLE POLE MOUNT

For round or square pole; Bronze

Catalog Number	UPC	Easy Code
KT-ALED-PMA-1-KIT	843654131634	DAQ-87

FIXED POLE MOUNT

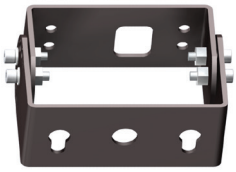
For round or square pole; Bronze

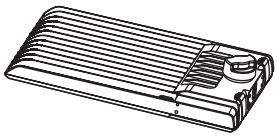
Catalog Number	UPC	Easy Code
KT-ALED-PM-1-KIT	843654131627	QVG-29

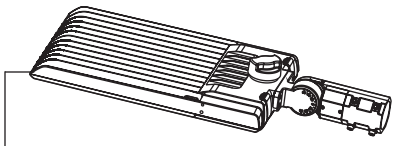
TRUNNION MOUNT

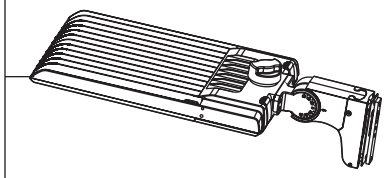
Bronze

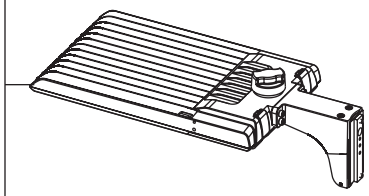
Catalog Number	UPC	Easy Code
KT-ALED-TM-1-KIT	843654131658	GTH-37

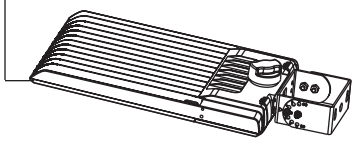












SINCE 1945 KEYSTONE LIGHT MADE EASY

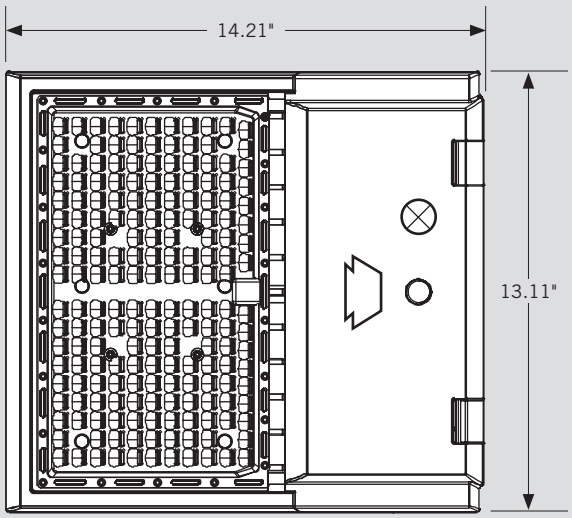
XFIT | HIGH-PERFORMANCE LED AREA LIGHTS

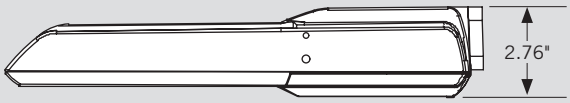
KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

PHYSICAL SPECIFICATIONS

LED AREA LIGHT FIXTURE

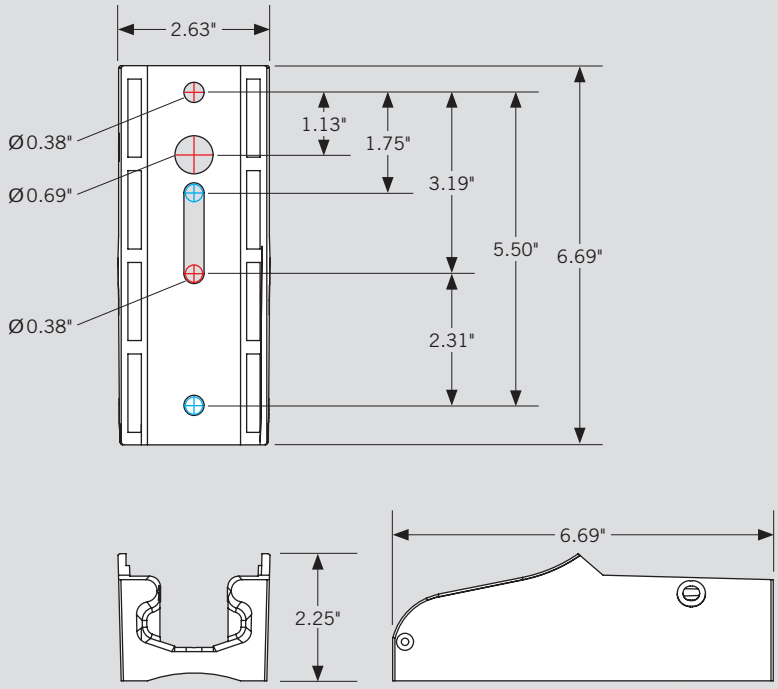




PACKAGING

Carton Quantity	1 piece
Carton Dimensions	6.1"H × 15.15"W × 19.68"L
Carton Weight	11.02 lbs

POLE MOUNT (ADJUSTABLE OR FIXED) DRILLING HOLES

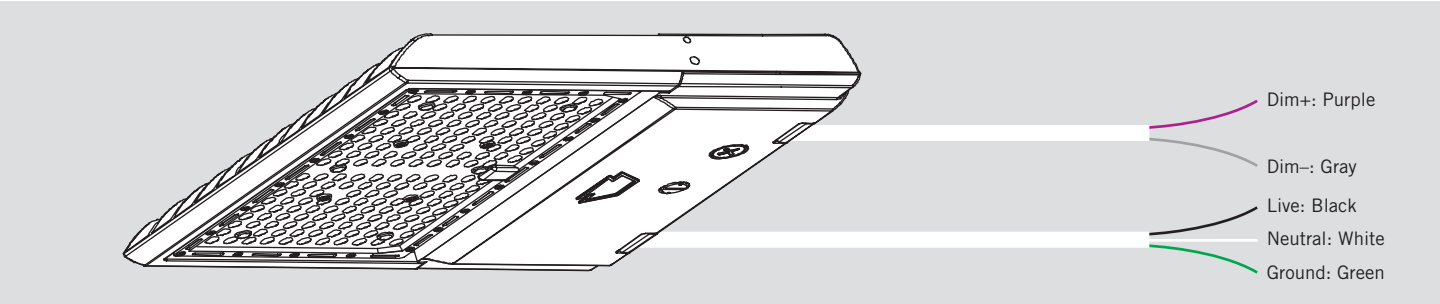


SINCE 1945
KEYSTONE
LIGHT MADE EASY

XFiT | HIGH-PERFORMANCE LED AREA LIGHTS

KT-ALED140-M1-X-NM-8XX-VDIM
LED AREA LIGHT FIXTURES

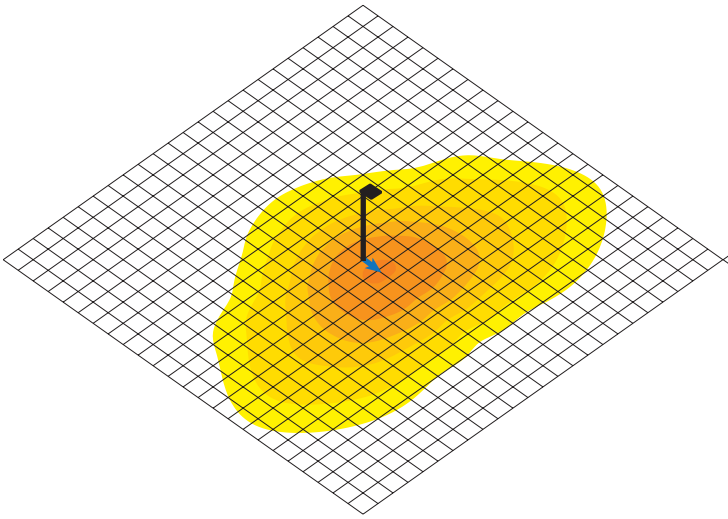
WIRING DIAGRAM



LIGHT DISTRIBUTION PATTERN

TYPE 3 (III)

Pole-mount view from above; Area light mounted at 30'

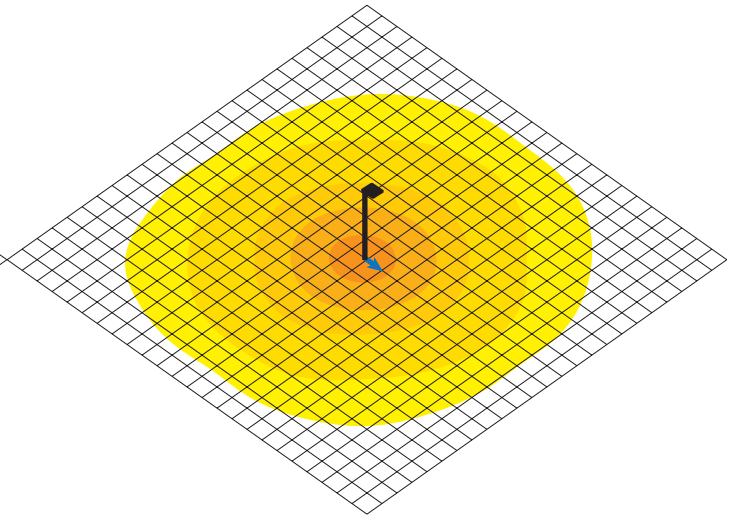


- Photometric layout for general reference only
- Grid dimension: 10 × 10 sq ft

0.1 fc
0.2 fc
0.5 fc
1.0 fc
2.0 fc
5.0 fc

TYPE 5 (V)

Pole-mount view from above; Area light mounted at 30'



- Photometric layout for general reference only
- Grid dimension: 10 × 10 sq ft

0.1 fc
0.2 fc
0.5 fc
1.0 fc
2.0 fc

KEYSTONE SINCE 1945 LIGHT MADE EASY

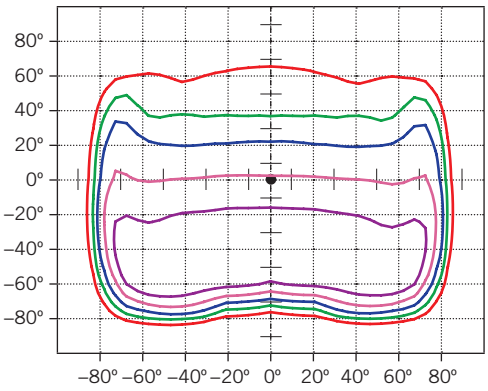
XFIT | HIGH-PERFORMANCE LED AREA LIGHTS

KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

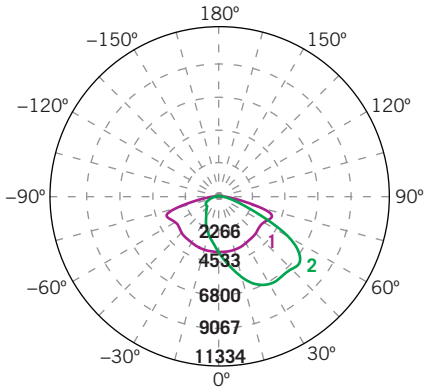
PHOTOMETRIC SPECIFICATIONS (TYPE 3 [III])

ISOCANDELA PLOT



Cd: 907 (10%)
Cd: 1,451 (16%)
Cd: 2,267 (25%)
Cd: 3,627 (40%)
Cd: 5,713 (63%)
Cd: 9,068 (100%)

LUMINOUS INTENSITY DISTRIBUTION



Average diffuse angle (50%): **110.8°**
1 **Violet** C0–C180
2 **Green** C90–C270
Unit: cd

FLUX DISTRIBUTION

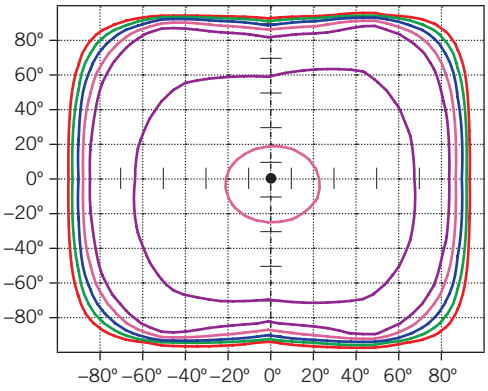
Zone	Lumens	% Luminaire
Forward Light	15,114 lm	77.8%
0°–30°	2,165 lm	11.2%
30°–60°	7,491 lm	38.6%
60°–80°	5,044 lm	26.1%
80°–90°	414 lm	2.1%
Back Light	4,301 lm	22.2%
0°–30°	1,151 lm	5.9%
30°–60°	1,961 lm	10.1%
60°–80°	1,090 lm	5.6%
80°–90°	98 lm	0.5%
Up Light	0 lm	0.0%
90°–100°	0 lm	0.0%
100°–180°	0 lm	0.0%

BUG* Rating	
Asymmetrical Luminare Types	
Type I, II, III, IV	B3 U0 G3
Quadrilateral Symmetrical Luminare Types	
Type V, Area Light	B3 U0 G3

* ***B**acklight, **U**plight, **G**lare*

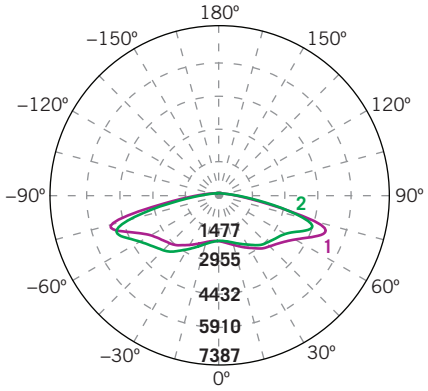
PHOTOMETRIC SPECIFICATIONS (TYPE 5 [V])

ISOCANDELA PLOT



Cd: 591 (10%)
Cd: 946 (16%)
Cd: 1,478 (25%)
Cd: 2,364 (40%)
Cd: 3,723 (63%)
Cd: 5,910 (100%)

LUMINOUS INTENSITY DISTRIBUTION



Average diffuse angle (50%): **156.1°**
1 **Violet** C0–C180
2 **Green** C90–C270
Unit: cd

FLUX DISTRIBUTION

Zone	Lumens	% Luminaire
Forward Light	9,388 lm	48.8%
0°–30°	987 lm	5.1%
30°–60°	3,501 lm	18.2%
60°–80°	4,167 lm	21.6%
80°–90°	733 lm	3.8%
Back Light	9,862 lm	51.2%
0°–30°	1,030 lm	5.4%
30°–60°	3,813 lm	19.8%
60°–80°	4,421 lm	23.0%
80°–90°	598 lm	3.1%
Up Light	0 lm	0.0%
90°–100°	0 lm	0.0%
100°–180°	0 lm	0.0%

BUG* Rating	
Asymmetrical Luminare Types	
Type I, II, III, IV	B4 U0 G4
Quadrilateral Symmetrical Luminare Types	
Type II	B4 U0 G4

* ***B**acklight, **U**plight, **G**lare*

SINCE 1945 KEYSTONE LIGHT MADE EASY

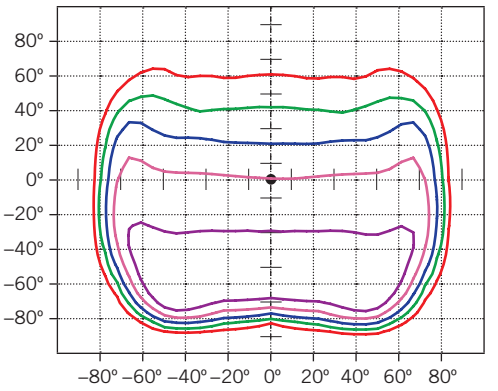
XFIT | HIGH-PERFORMANCE LED AREA LIGHTS

KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

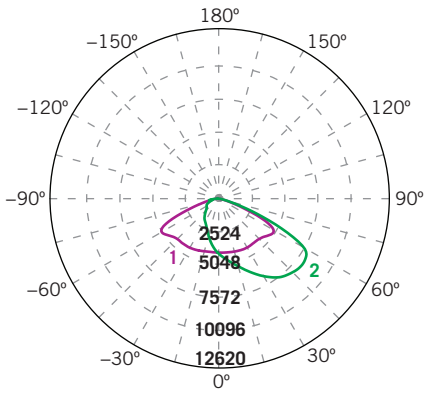
PHOTOMETRIC SPECIFICATIONS (TYPE 4 [IV])

ISOCANDELA PLOT



Cd: 1,010 (10%)
Cd: 1,615 (16%)
Cd: 2,524 (25%)
Cd: 4,039 (40%)
Cd: 6,361 (63%)
Cd: 10,097 (100%)

LUMINOUS INTENSITY DISTRIBUTION



Average diffuse angle (50%): **102.7°**
1 Violet C0–C180
2 Green C90–C270
Unit: cd

FLUX DISTRIBUTION

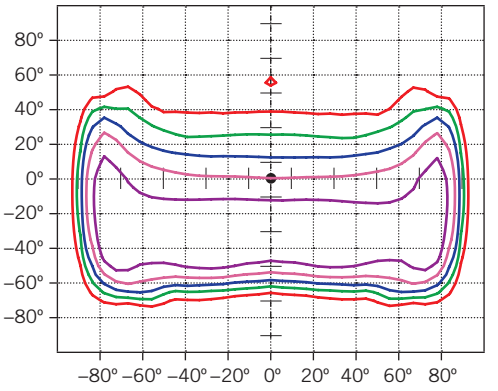
Zone	Lumens	% Luminaire
Forward Light	14,983 lm	76.1%
0°–30°	2,124 lm	10.8%
30°–60°	7,670 lm	39.0%
60°–80°	4,963 lm	25.2%
80°–90°	226 lm	1.1%
Back Light	4,707 lm	23.9%
0°–30°	1,258 lm	6.4%
30°–60°	2,314 lm	11.8%
60°–80°	1,030 lm	5.2%
80°–90°	105 lm	0.5%
Up Light	0 lm	0.0%
90°–100°	0 lm	0.0%
100°–180°	0 lm	0.0%

BUG* Rating	
Asymmetrical Luminare Types	
Type I, II, III, IV	B3 U0 G3
Quadrilateral Symmetrical Luminare Types	
Type V, Area Light	B3 U0 G3

* ***B**acklight, **U**plight, **G**lare*

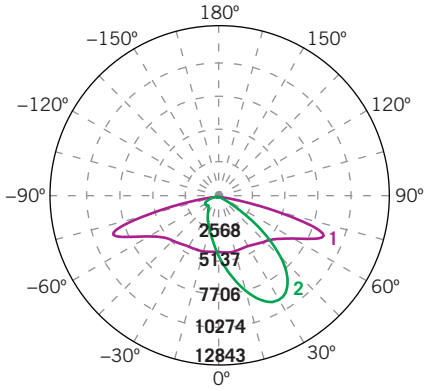
PHOTOMETRIC SPECIFICATIONS (TYPE 2 [II])

ISOCANDELA PLOT



Cd: 1,027 (10%)
Cd: 1,644 (16%)
Cd: 2,569 (25%)
Cd: 4,110 (40%)
Cd: 6,473 (63%)
Cd: 10,275 (100%)

LUMINOUS INTENSITY DISTRIBUTION



Average diffuse angle (50%): **104.2°**
1 Violet C0–C180
2 Green C90–C270
Unit: cd

FLUX DISTRIBUTION

Zone	Lumens	% Luminaire
Forward Light	15,217 lm	77.4%
0°–30°	2,778 lm	14.1%
30°–60°	8,524 lm	43.3%
60°–80°	3,698 lm	18.8%
80°–90°	217 lm	1.1%
Back Light	4,446 lm	22.6%
0°–30°	1,126 lm	5.7%
30°–60°	1,921 lm	9.8%
60°–80°	1,318 lm	6.7%
80°–90°	82 lm	0.4%
Up Light	0 lm	0.0%
90°–100°	0 lm	0.0%
100°–180°	0 lm	0.0%

BUG* Rating	
Asymmetrical Luminare Types	
Type I, II, III, IV	B3 U0 G3
Quadrilateral Symmetrical Luminare Types	
Type V, Area Light	B3 U0 G2

* ***B**acklight, **U**plight, **G**lare*

KEYSTONE SINCE 1945 LIGHT MADE EASY

XFIT | HIGH-PERFORMANCE LED AREA LIGHTS

KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

EPA SPECIFICATIONS

Medium-Size Fixture Housing

Conditions: Horizontal winds only for calculations. Worst case total projected area used for calculations. All drag coefficients are set as worst case 1.2.
For details on exact EPA calculations and assumptions, please contact productsupport@keystonetech.com

EPA Calcs (1.2*ft^2 I View)		Single Fixture	2 Fixtures at 90°	2 Fixtures at 180°	3 Fixtures at 90°	3 Fixtures at 120°	4 Fixtures at 90°	2 Fixtures Side-by-Side	3 Fixtures Side-by-Side	4 Fixtures Side-by-Side
Mounting Application	**Fixture Position**									
Adjustable Pole Mount 	Horizontal	0.50 sq. ft.	0.78 sq. ft.	1.01 sq. ft.	1.19 sq. ft.	1.28 sq. ft.	1.19 sq. ft.	0.74 sq. ft.	1.11 sq. ft.	1.48 sq. ft.
Adjustable Pole Mount 	45°	1.27 sq. ft.	1.73 sq. ft.	1.27 sq. ft.	2.20 sq. ft.	3.10 sq. ft.	2.20 sq. ft.	2.53 sq. ft.	3.80 sq. ft.	5.07 sq. ft.
Slip Fitter Mount 	Horizontal	0.48 sq. ft.	0.87 sq. ft.	0.97 sq. ft.	1.30 sq. ft.	1.37 sq. ft.	1.30 sq. ft.	0.86 sq. ft.	1.30 sq. ft.	1.73 sq. ft.
Slip Fitter Mount 	45°	1.34 sq. ft.	1.80 sq. ft.	1.34 sq. ft.	2.28 sq. ft.	3.06 sq. ft.	2.28 sq. ft.	2.67 sq. ft.	4.01 sq. ft.	5.35 sq. ft.
Slip Fitter Mount 	Vertical	1.76 sq. ft.	2.25 sq. ft.	1.76 sq. ft.	2.73 sq. ft.	2.94 sq. ft.	2.73 sq. ft.	3.53 sq. ft.	5.29 sq. ft.	7.06 sq. ft.

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KEYSTONE
LIGHT MADE EASY

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KT-ALED140-M1-X-NM-8XX-VDIM
LED AREA LIGHT FIXTURES

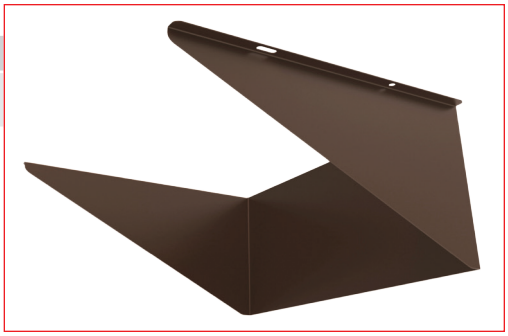
ACCESSORIES (SOLD SEPARATELY)

TWIST-LOCK AREA LIGHT CONTROL

Catalog Number	Description	UPC	Easy Code
KT-TLP-UV-3PN	NEMA Type Twist-Lock 3-Pin Photocell 120–277V, 1800VA Max; Blue Housing	843654131825	NQT-46

GLARE SHIELD

Catalog Number	Description	UPC	Easy Code
KT-ALED-GS-M1-KIT	Reversible Glare Shield Kit; Medium (fits "M1" fixture bodies); Bronze Housing	843654131801	DHT-23



MICROWAVE OCCUPANCY SENSOR

Catalog Number	Description	UPC	Easy Code
KTS-MW3-12V-PKO	12V Microwave Occupancy Sensor	843654130637	TRM-32

REMOTE CONTROL

Catalog Number	Description	UPC	Easy Code
KTS-MW3-REMOTECONTROL	Remote Control for KTS-MW3-12V-XX Sensors, Sets/adjusts all sensor performance parameters	843654132020	XSR-61

SINCE 1945 KEYSTONE LIGHT MADE EASY

XFIT | HIGH-PERFORMANCE LED AREA LIGHTS

KT-ALED140-M1-X-NM-8XX-VDIM

LED AREA LIGHT FIXTURES

ORDERING INFORMATION

ORDER CODE	PACK QTY.	UPC	Easy Code
KT-ALED140-M1-3-NM-840-VDIM	1	843654131405	WCA-01
KT-ALED140-M1-3-NM-850-VDIM	1	843654131412	BOS-17
KT-ALED140-M1-5-NM-840-VDIM	1	843654131429	XWH-36
KT-ALED140-M1-5-NM-850-VDIM	1	843654131436	VBT-79

CATALOG NUMBER BREAKDOWN

KT-ALED140-M1-X-NM-8XX-VDIM

1 2 3 4 5 6 7 8 9 10 11 12 13

1 Keystone Technologies
2 Fixture Type
3 LED Technology
4 Wattage
5 Size/Shape
6 Style/Design Designation
7 Distribution Type
8 Mounting
9 CRI
10 Color Temp
11 Dimming
12 Housing Color
13 Options

2 Fixture Type

A	Area Light

5 Size/Shape

M	Medium

6 Style/Design Designation

1	Series 1

7 Distribution Type

2	Type 2 (II)
3	Type 3 (III)
4	Type 4 (IV)
5	Type 5 (V)

8 Mounting

NM	No Mounting

9 CRI

8	>80

10 Color Temp

40	4000K
50	5000K

11 Dimming

VDIM	0–10V

12 Housing Color

Blank	Bronze
B	Black
W	White

13 Options

Blank	No Options
/7PRS	7-Pin Receptacle and Shorting Cap installed
/MW3	Factory-installed Microwave Sensor

KT-WPLED60-M2-8XX-VDIM

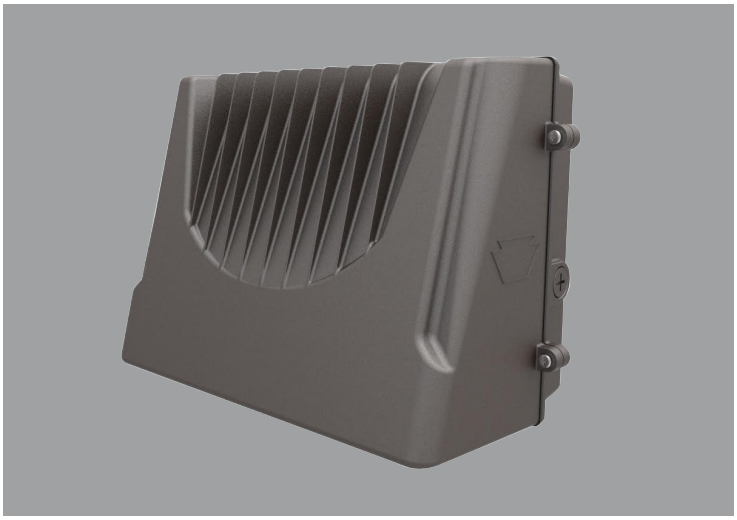
ARCHITECTURAL 60W FULL-CUTOFF LED WALL PACK

DESCRIPTION

Architectural 60W Full-Cutoff LED Wall Pack | 120–277V Input | 4000–5000K | Medium-Size Bronze Housing | Wide Optic Lens

APPLICATION

Building Mount for exterior illumination (perimeters, pathways, loading docks, and other general security lighting requirements)



PRODUCT FEATURES

- Architectural full-cutoff design improves the appearance of building exteriors and optimizes functional light distribution
- Heavy-duty, die-cast aluminum housing features modern aesthetics while retaining (5) available 1/2" threaded conduit hubs: (1) on back and (1) on all four sides
- Powered by Keystone 0–10V dimming LED drivers
- Dark Sky friendly performance, eliminates undesirable sky glow and glare
- Features one translucent 3/4" threaded plug with anti-yellowing agent for use with photocell accessory KT-WPLED-PS-UV-KO
- Precision-crafted optical lens provides wide distribution pattern ideal for increased fixture spacing and uniformity
- Covers footprint of mid-size HID wallpacks
- Ambient operating temperature: –20ºC/–4ºF to 45ºC/113ºF
- UL listed for wet locations, IP65
- 0–10V dimming, 10% min
- Power Factor: >0.95
- THD: <20%
- LED chip lifetime: L70 >100,000 hrs @ 25ºC/77ºF ambient fixture temp
- Meets FCC Part 15, Part B, Class A standards for conducted and radiated emissions

ELECTRICAL SPECIFICATIONS

Catalog Number	Wattage	Lumens	Lumens Below 90º	Dimming	CCT	Efficacy	CRI	Housing Color	Input Voltage	Rated Life	Legacy Equivalent
KT-WPLED60-M2-840-VDIM	60W	7500 lm	7445 lm	0–10V	4000K	125 lm/W	>80	Bronze	120–277V	50,000 hrs	250W MH
KT-WPLED60-M2-850-VDIM		7800 lm	7745 lm		5000K	130 lm/W					

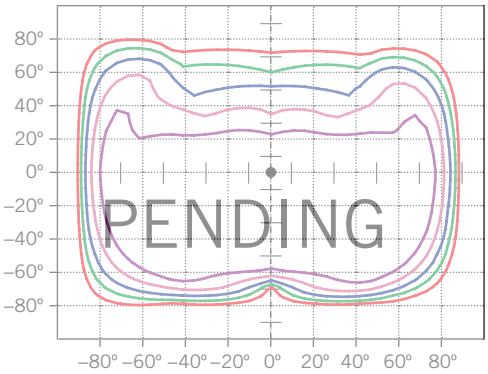
SINCE 1945 KEYSTONE LIGHT MADE EASY | XFIT

KT-WPLED60-M2-8XX-VDIM

ARCHITECTURAL 60W FULL-CUTOFF LED WALL PACK

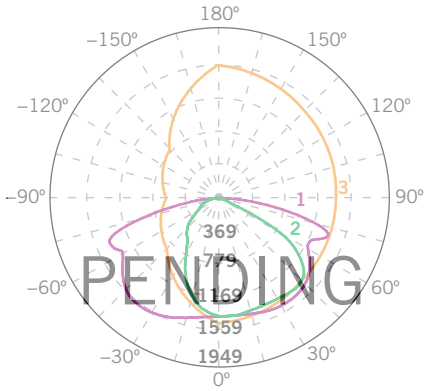
PHOTOMETRIC SPECIFICATIONS

ISOCANDELA PLOT



Cd: 156 (10%)
Cd: 250 (16%)
Cd: 390 (25%)
Cd: 624 (40%)
Cd: 983 (63%)
Cd: 1,560 (100%)

LUMINOUS INTENSITY DISTRIBUTION



Average diffuse angle (50%): **125.1°**
1 Violet C0–C180
2 Green C90–C270
3 Orange G36
Unit: cd

FLUX DISTRIBUTION

Zone	Lumens	% Luminaire
Forward Light	3,171 lm	62.0%
0°–30°	596 lm	11.6%
30°–60°	1,594 lm	31.2%
60°–80°	912 lm	17.8%
80°–90°	70 lm	1.4%
Back Light	1,905 lm	37.2%
0°–30°	514 lm	10.1%
30°–60°	876 lm	17.1%
60°–80°	460 lm	9.0%
80°–90°	54 lm	1.1%
Up Light	39 lm	0.8%
90°–100°	3 lm	0.1%
100°–180°	36 lm	0.7%

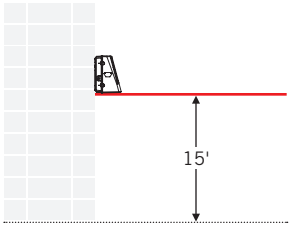
PENDING

BUG* Rating	
Asymmetrical Luminare Types	
Type I, II, III, IV	B2 U2 G1
Quadrilateral Symmetrical Luminare Types	
Type V, Area Light	B2 U2 G1

** **B**acklight, **U**plight, **G**lare*

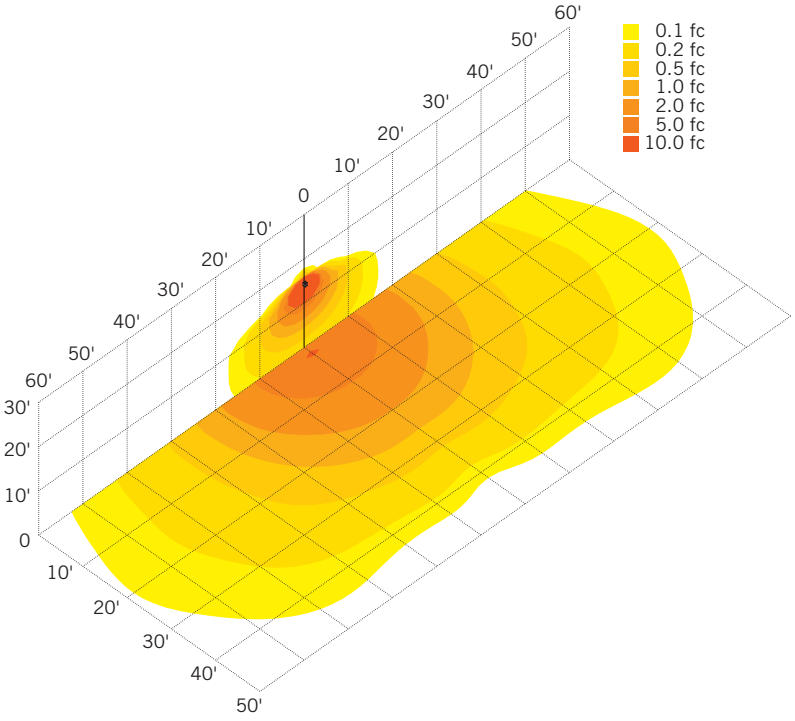
MOUNTING

Side view



LIGHT DISTRIBUTION PATTERN

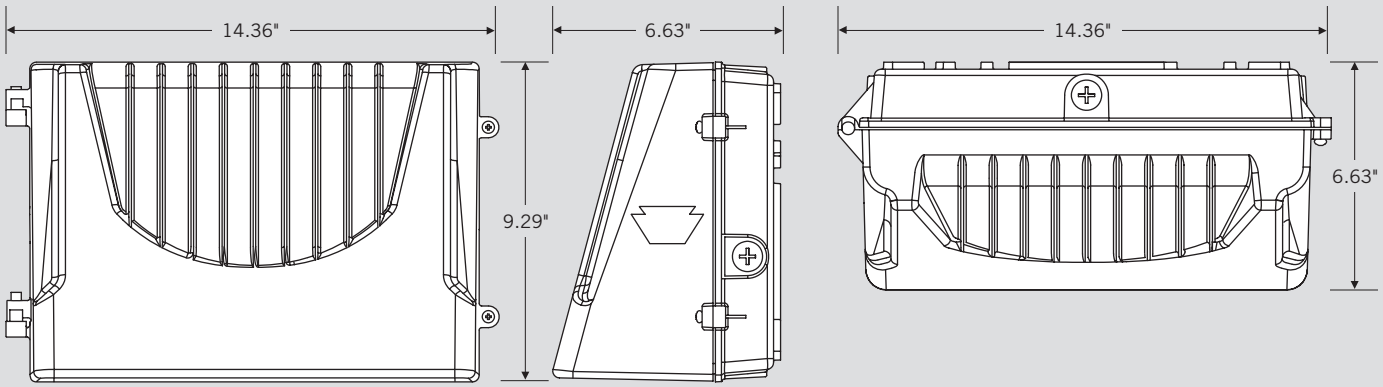
Isometric view from above; Luminaire mounted at 15'



KT-WPLED60-M2-8XX-VDIM

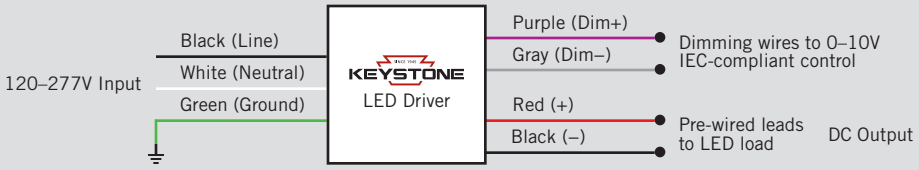
ARCHITECTURAL 60W FULL-CUTOFF LED WALL PACK

PHYSICAL SPECIFICATIONS



GENERAL SETUP INSTRUCTIONS

GENERAL WIRING DIAGRAM



Caution: Before installing, make certain that AC power to the fixture is off.

Caution: The electrical rating of this product is 120–277V. Installer must confirm that there is 120–277V at the fixture before installation.

ACCESSORIES (SOLD SEPARATELY)

Catalog Number	Description
KTSP-10KV-C	Wallpack 10kV Surge Protector, Compact Design
KT-WPLED-PS-UV-KO	Keystone Wall Pack Button Photocell

KT-WPLED60-M2-8XX-VDIM

ARCHITECTURAL 60W FULL-CUTOFF LED WALL PACK

ORDERING INFORMATION

ORDER CODE	PACK QTY.	ITEM STATUS
KT-WPLED60-M2-840-VDIM	1	Quick Ship
KT-WPLED60-M2-850-VDIM	1	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-WPLED60-M2-8XX-VDIM

1 2 3 4 5 6 7 8 9

1 Keystone Technologies
2 Fixture Type
3 LED Lamp
4 Max Wattage
5 Size
6 Style
7 CRI
8 Color
9 Dimming

2 Fixture Type

F	Flood
WP	Wallpack

5 Size

S	Small
M	Medium
L	Large

6 Style

1	Non-Cutoff
2	Full-Cutoff

7 CRI

8	>80
9	>90

8 Color

40	4000K
50	5000K

9 Dimming

VDIM	0–10V

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
	3	KT-WPLED60-M2-840-VDIM	Single	7267.4	0.900	60W Full Cut Off - Modified to 5K
	3	KT-ALED140-M1-4-NM-840-VDIM-2L	2 @ 90 degrees	19667.6	0.900	140W Type 4 Area Light - 2 90 Degree

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPts_1	Illuminance	Fc	4.97	19	0	N.A.	N.A.

Luminaire Location Summary							
LumNo	Label	Insertion Point	X	Y	Mounting Height	Orient	Tilt
1	KT-ALED140-M1-4-NM-840-VDIM-2L		275	313	20	225	0
2	KT-ALED140-M1-4-NM-840-VDIM-2L		161	307	20	315	0
3	KT-ALED140-M1-4-NM-840-VDIM-2L		163	197	20	45	0
4	KT-WPLED60-M2-840-VDIM		204	229.5	12	270	0
5	KT-WPLED60-M2-840-VDIM		263	229.5	12	270	0
6	KT-WPLED60-M2-840-VDIM		233	229.5	12	270	0

Project : NorthEast Dover
KT-ALED140-M1-4 , MH is 20'
KT-WPLED60-M2 , MH is 12'

Keystone Technologies Lighting Layout
2750 Morris Road
Lansdale, PA 19446
Phone 1-800-464-2680
Email: LightingLayouts@keystonetech.com

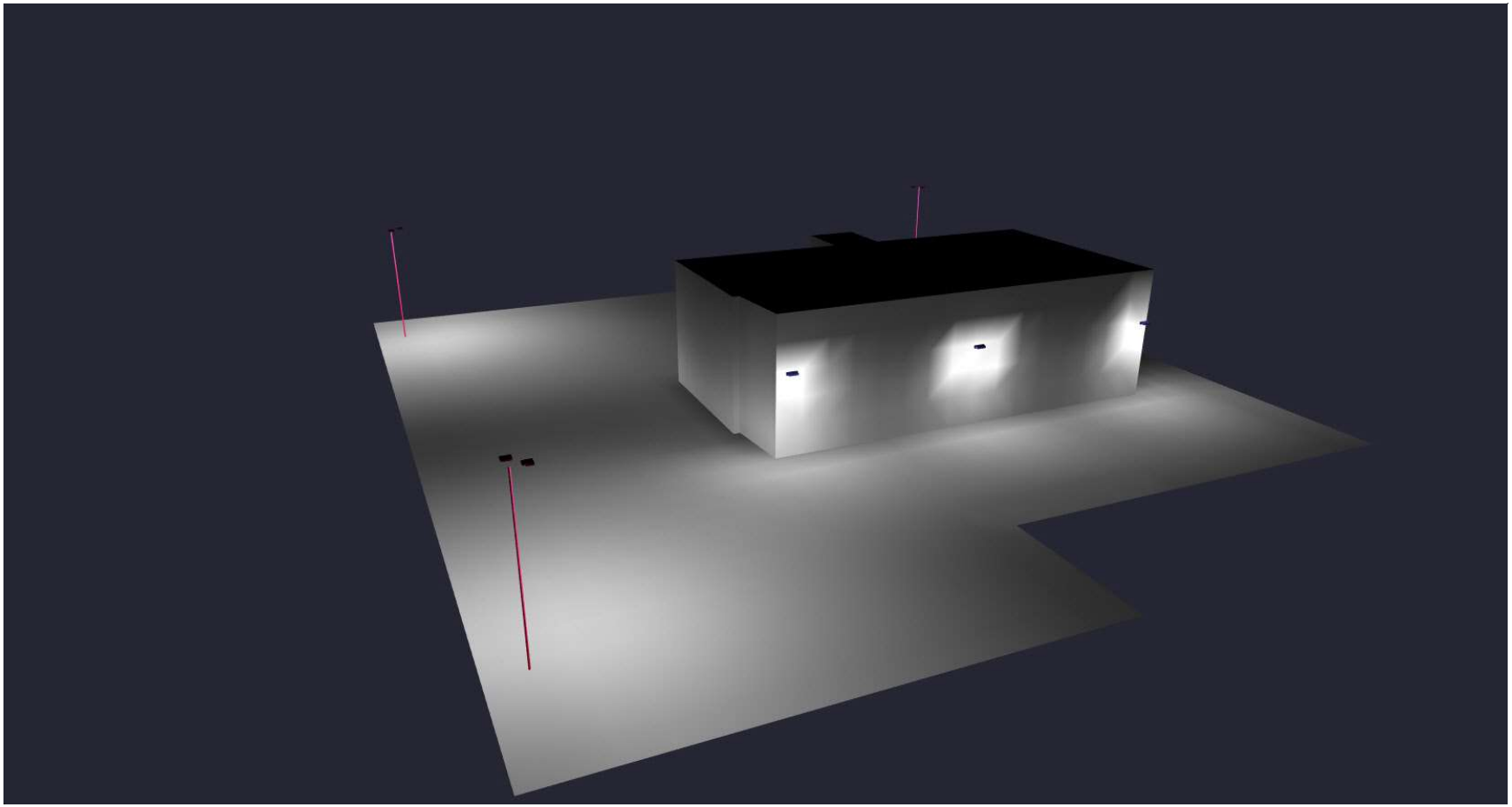
SINCE 1945
KEYSTONE
LIGHT MADE EASY™

Date:4/25/2022

View of point by point

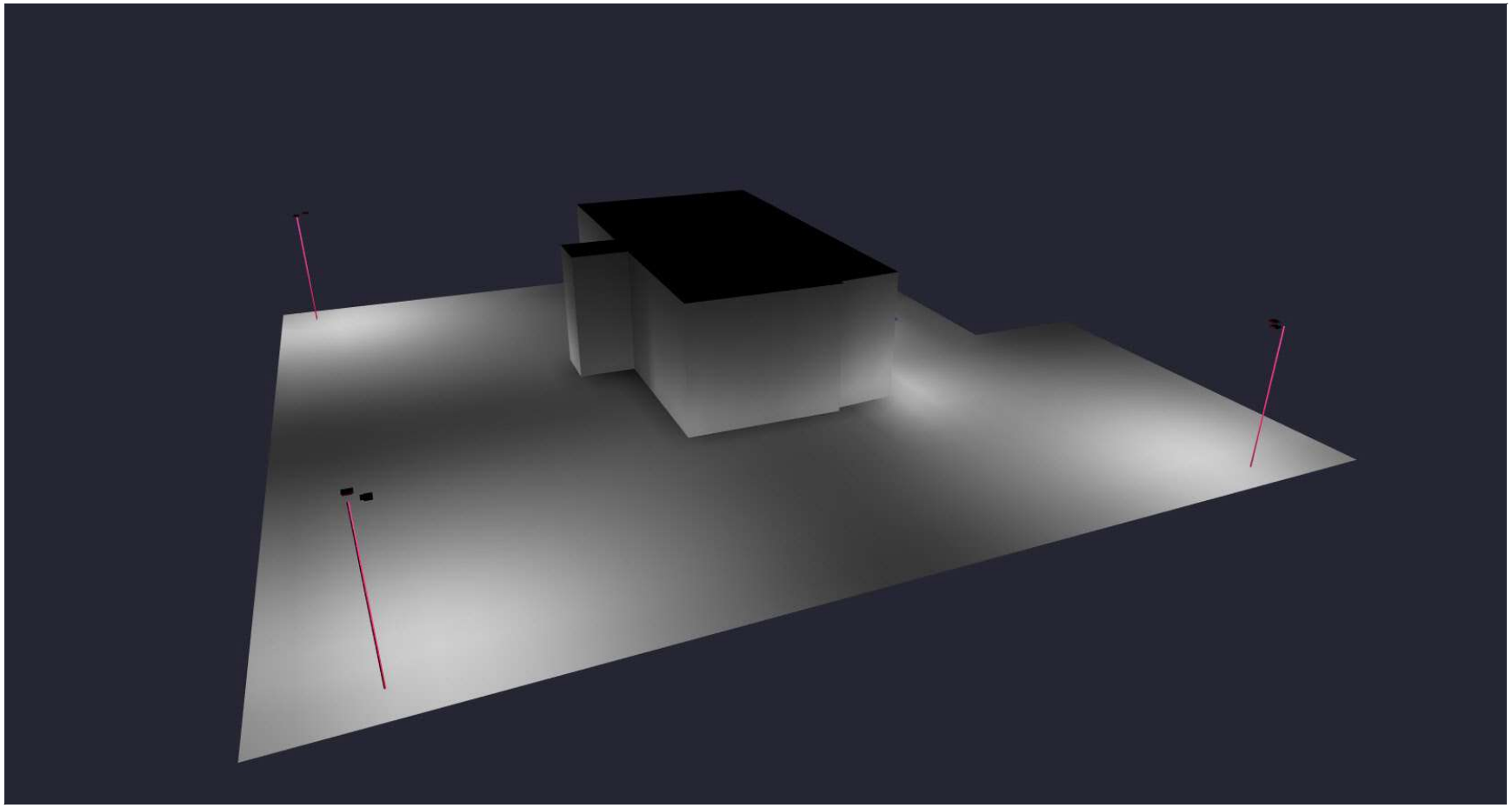
Project : NorthEast Dover KT-ALED140-M1-4 , MH is 20' KT-WPLED60-M2 , MH is 12' RED = 8+ FC, BLUE = 4 FC GREEN = 2 FC , VIOLET = 1 FC	Keystone Technologies Lighting Layout 2750 Morris Road Lansdale, PA 19446 Phone 1-800-464-2680 Email: LightingLayouts@keystonetech.com

SINCE 1945
KEYSTONE
LIGHT MADE EASY™



Project : NorthEast Dover KT-ALED140-M1-4 , MH is 20' KT-WPLED60-M2 , MH is 12'	Keystone Technologies Lighting Layout 2750 Morris Road Lansdale, PA 19446 Phone 1-800-464-2680 Email: LightingLayouts@keystonetech.com

SINCE 1945
KEYSTONE
LIGHT MADE EASY™



Project : NorthEast Dover KT-ALED140-M1-4 , MH is 20' KT-WPLED60-M2 , MH is 12'	Keystone Technologies Lighting Layout 2750 Morris Road Lansdale, PA 19446 Phone 1-800-464-2680 Email: LightingLayouts@keystonetech.com

SINCE 1945
KEYSTONE
LIGHT MADE EASY™

Thank you for allowing Keystone Technologies the opportunity to create and provide this Lighting Layout report.

Illumination results shown on this lighting design are based on project parametrics provided to Keystone used in conjunction with luminaire photometric testing conducted under laboratory conditions. Actual project conditions differing from these design parameters may affect field results, such as (but not limited to) windows, furnishings, floor/ceiling/wall surface texture reflectivity, site cleanliness, and lighting component tolerances. Illumination results shown have not been field verified by Keystone and therefore the actual measured results may vary from actual field conditions.

The customer is responsible for verifying dimensional accuracy along with compliance with any applicable electrical, lighting, or energy code. In no event will Keystone Technologies be held responsible for any loss resulting from any use of this lighting design.

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

NEW HAMPSHIRE 200

May 25, 2022

Rick Chellman, Chair
City of Portsmouth Planning Board
1 Junkins Ave, 3rd Floor
Portsmouth, NH 03801

RE: Planning Board Subdivision & Site Plan Review Applications
Proposed 3-Lot Subdivision, 437 Lafayette Road, Portsmouth, Tax Map 229, Lot 1

Dear Mr. Chellman:

On behalf of the Applicant, Artwill, LLC, TFMoran, Inc. is submitting the following plans and supporting documents for the above-referenced project. Hard copies of the following materials have been delivered to the City Planning Department and digital copies have been uploaded to the City's online Land Use Application (LU-22-82) via Viewpoint:

- **Letter of Authorization (1 copy)**
- **Site Plan Application Checklist (1 copy)**
- **Subdivision Application Checklist (1 copy)**
- **TAC Notice of Decision Letters (1 copy)**
- **Abutters List (1 copy) & Abutters Address Labels (3 set of labels)**
- **Eversource Will Serve Letter (1 copy)**
- **Unitil Will Serve Letter (1 copy)**
- **Road Maintenance Agreement (1 copy)**
- **Drainage Report dated April 19, 2022 (1 copy)**
- **Plans titled "Site Development Plans, Tax Map 229 Lot 1, Proposed 3 Lot Subdivision, 437 Lafayette Road, Portsmouth, New Hampshire", prepared by TFMoran, Inc., dated April 19, 2022, last revised May 25, 2022 (1 copy - 22"x34")**
- **Architectural Drawings, prepared by Smithfield Construction, Inc. (1 copy)**
- **NHDES Sewer Connection Permit Application (1 copy)**

Project Description

This proposal is for the subdivision of a single lot into three proposed lots, and the construction of two single-family dwelling units and an attached accessory dwelling unit. Other improvements associated with this project include, but not limited to grading, utility installation, stormwater management, landscaping, and paving. The existing lot is located at 437 Lafayette Road and is identified on the City of Portsmouth Assessor's Map 229 as Lot 1, and is approximately 65,365 sf (1.50 ac) in size. The site is located in the Single Residence B (SRB) Zone and currently contains one single-family residential building and a detached garage.

Planning Board Subdivision & Site Plan Review Applications **May 25, 2022**
Proposed 3-Lot Subdivision, 437 Lafayette Road, Portsmouth, Tax Map 229, Lot 1

The site is bordered by Lafayette Road to the west, Andrew Jarvis Drive to the north, Artwill Avenue to the south, and Saint Nicholas Greek Orthodox Church to the east. The immediate area surrounding the site consists primarily of residential buildings, while the Portsmouth High School is located at the end of Andrew Jarvis Drive approximately 500 feet to the east.

Based on our review of the City of Portsmouth's Zoning Ordinance, Site Plan Review Regulations, and Subdivision Regulations, it is our understanding that this project requires the following Planning Board approvals:

- Site Plan Review
- Subdivision Review
- Conditional Use Permit for an Attached Accessory Dwelling Unit (AADU)

Previous Review & Comments

This project has had reviews and/or meetings with City Staff and the Technical Advisory Committee (TAC). A list of our meetings to dates is shown below:

- March 8, 2022 –TAC Work Session Meeting (received preliminary comments)
- May 3, 2022 – TAC Meeting (received approval to proceed to Planning Board)

Comments were received from TAC on May 2, 2022 prior to the TAC Meeting. These comments were discussed during the meeting and strategies for resolving each item were addressed. To facilitate your review of the materials submitted, we have provided TAC's comments below, along with our responses, which are shown in ***bold blue italics***.

Comments Received from TAC on May 2, 2022

Items to be addressed prior to Planning Board approval:

1. Gas line to be installed under Artwill Ave and service shall come from that side.
   A new gas main will be installed on Artwill Avenue with service connections made to the proposed houses on Lot 1 and Lot 3. The proposed gas main will connect to an existing gas main located in Lafayette Road at the intersection of Artwill Avenue and Lafayette Road. Unitil has reviewed our plan and approved the layout. Please see sheet C-05.
2. Ensure easements are provided for access across all proposed lots.
   Access easements are provided for all proposed lots and are shown and described on the Subdivision Plan. Please see sheet S-03.
3. Provide maintenance agreement for proposed road maintenance.
   A road maintenance agreement is provided with this submittal.
4. Provide an easement plan that identifies each easement with a unique identifier and corresponds to an easement table.
   Existing and proposed easements are shown and described on the Subdivision Plan. After discussing this matter with TAC at the May 2, 2022 meeting, it was determined that a separate Easement Plan is not necessary. Please see sheet S-03.

Planning Board Subdivision & Site Plan Review Applications **May 25, 2022**
Proposed 3-Lot Subdivision, 437 Lafayette Road, Portsmouth, Tax Map 229, Lot 1

Items to be addressed Prior to Construction:

5. Coordinate final connections of water and sewer services with Portsmouth Water.
   Further coordination with the City Water Department has transpired with regards to final water and sewer service connections. The Water Department has approved the water and sewer connections shown on our plans.
6. Final connection to which main under Andrew Jarvis Dr will be determined by Portsmouth Water.
   Through additional coordination, the City Water Department has requested that the 8" water main on Andrew Jarvis Drive be used for water service connections. The Utility Plans have been revised accordingly. Please see sheet C-05.

We trust that the above responses satisfy the concerns expressed in the comments received from TAC on May 2, 2022. We appreciate you consideration of these matters and respectfully request to be placed on the upcoming agenda for the Planning Board meeting on June 16, 2022.

If you have any questions or concerns, please do not hesitate to contact us.

Respectfully,
TFMoran, Inc.

Justin Macek, EIT
Project Manager

JSM/jcc

cc:

Joe Caldarola, Smithfield Construction, Inc. (via joe@smithfieldconstruction.com)

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

NEW HAMPSHIRE 200

Letter of Authorization

I, Joeseph Caldarola of Artwill, LLC, PO Box 370, Portsmouth, NH, hereby authorize TFMoran, Inc., 170 Commerce Way, Suite 102, Portsmouth, NH, to act on my behalf concerning property owned by Artwill, LLC, located at 437 Lafayette Road, Portsmouth, NH, known as Tax Map 229, Lot 1.

I hereby appoint TFMoran, Inc. as my agent to act on my behalf in the review process, to include any required signatures.

Joseph Caldarola — Client Name

3/1/22 — Date

TFMoran, Inc.
48 Constitution Drive, Bedford, NH 03110
NH 03801
T(603) 472-4488 www.tfmoran.com

TFMoran, Inc. Seacoast Division
170 Commerce Way–Suite 102, Portsmouth,
T(603) 431-2222

City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. The checklist is required to be completed and uploaded to the Site Plan application in the City's online permitting system. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Applicant: Artwill, LLC Date Submitted: 4/19/2022

Application # (in City's online permitting): LU-22-82

Site Address: 437 Lafayette Road Map: 229 Lot: 1

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☑	Complete application form submitted via the City's web-based permitting program (2.5.2.1**(2.5.2.3A)**	Submitted via Viewpoint	N/A
☑	All application documents, plans, supporting documentation and other materials uploaded to the application form in viewpoint in digital Portable Document Format (PDF). One hard copy of all plans and materials shall be submitted to the Planning Department by the published deadline. **(2.5.2.8)**	Submitted digitally via Viewpoint, and one hard copy submitted to Planning Dept.	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Statement that lists and describes "green" building components and systems. **(2.5.3.1B)**	N/A	N/A
☑	Existing and proposed gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. **(2.5.3.1C)**	C-03	N/A
☑	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1D)**	S-01 (Existing) C-03 (Proposed)	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1E)**	C-00	N/A
☑	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1F)**	S-01	N/A
☑	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1G)**	C-00	N/A
☑	List of reference plans. **(2.5.3.1H)**	S-01 & S-03	N/A
☑	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1I)**	C-01	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director.. **(2.5.4.1A)**	Required on all plan sheets	N/A
☑	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Required on all plan sheets	N/A
☑	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**	S-01	N/A
☑	Plans shall be drawn to scale and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	Required on all plan sheets	N/A
☐	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	No wetlands within project vicinity	N/A
☑	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	All plan sheets	N/A
☑	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	C-00	N/A
☑	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Required on all plan sheets	N/A
☑	Source and date of data displayed on the plan. **(2.5.4.2D)**	S-01	N/A

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	**1. Existing Conditions: (2.5.4.3A)** • Surveyed plan of site showing existing natural and built features; • Existing building footprints and gross floor area; • Existing parking areas and number of parking spaces provided; • Zoning district boundaries; • Existing, required, and proposed dimensional zoning requirements including building and open space coverage, yards and/or setbacks, and dwelling units per acre; • Existing impervious and disturbed areas; • Limits and type of existing vegetation; • Wetland delineation, wetland function and value assessment (including vernal pools); • SFHA, 100-year flood elevation line and BFE data, as required.	S-01 & S-03	
☑	**2. Buildings and Structures: (2.5.4.3B)** • Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation; • Elevations: Height, massing, placement, materials, lighting, façade treatments; • Total Floor Area; • Number of Usable Floors; • Gross floor area by floor and use.	- Plan sheet C-03 -Architectural Drawings	
☑	**3. Access and Circulation: (2.5.4.3C)** • Location/width of access ways within site; • Location of curbing, right of ways, edge of pavement and sidewalks; • Location, type, size and design of traffic signing (pavement markings); • Names/layout of existing abutting streets; • Driveway curb cuts for abutting prop. and public roads; • If subdivision; Names of all roads, right of way lines and easements noted; • AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	C-03 & C-09	
☑	**4. Parking and Loading: (2.5.4.3D)** • Location of off street parking/loading areas, landscaped areas/buffers; • Parking Calculations (# required and the # provided).	C-03	
☑	**5. Water Infrastructure: (2.5.4.3E)** • Size, type and location of water mains, shut-offs, hydrants & Engineering data; • Location of wells and monitoring wells (include protective radii).	S-01 & C-05	
☑	**6. Sewer Infrastructure: (2.5.4.3F)** • Size, type and location of sanitary sewage facilities & Engineering data, including any onsite temporary facilities during construction period.	S-01 & C-05	

☑	**7. Utilities: (2.5.4.3G)** • The size, type and location of all above & below ground utilities; • Size type and location of generator pads, transformers and other fixtures.	S-01, C-05, C-11	
☐	**8. Solid Waste Facilities: (2.5.4.3H)**	N/A (Residential Trash Pickup)	
	• The size, type and location of solid waste facilities.		
☑	**9. Storm water Management: (2.5.4.3I)** • The location, elevation and layout of all storm-water drainage. • The location of onsite snow storage areas and/or proposed off-site snow removal provisions. • Location and containment measures for any salt storage facilities • Location of proposed temporary and permanent material storage locations and distance from wetlands, water bodies, and stormwater structures.	C-03: Snow storage C-04: Stormwater design C-11: Stormwater design	
☐	**10. Outdoor Lighting: (2.5.4.3J)** • Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and photometric plan.	N/A	
☐	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	N/A	
☑	**12. Landscaping: (2.5.4.3K)** • Identify all undisturbed area, existing vegetation and that which is to be retained; • Location of any irrigation system and water source.	S-01, C-02, C-06, C-15	
☑	**13. Contours and Elevation: (2.5.4.3L)** • Existing/Proposed contours (2 foot minimum) and finished grade elevations.	S-01, C-04	
☑	**14. Open Space: (2.5.4.3M)** • Type, extent and location of all existing/proposed open space.	S-01, S-03, C-03	
☑	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	S-01 & S-03	
☐	**16. Character/Civic District (All following information shall be included): (2.5.4.3P)** • Applicable Building Height (10.5A21.20 & 10.5A43.30); • Applicable Special Requirements (10.5A21.30); • Proposed building form/type (10.5A43); • Proposed community space (10.5A46).	N/A	
☐	**17. Special Flood Hazard Areas (2.5.4.3Q)** • The proposed development is consistent with the need to minimize flood damage; • All public utilities and facilities are located and construction to minimize or eliminate flood damage; • Adequate drainage is provided so as to reduce exposure to flood hazards.	N/A	

Other Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Traffic Impact Study or Trip Generation Report, as required. **(3.2.1-2)**	N/A	
☑	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	-C-05 (Drainage Plan) -Drainage Report	
☑	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. **(7.3.1)**	Drainage Report Appendix J (NHDES OneStop Map)	
☑	Stormwater Management and Erosion Control Plan. **(7.4)**	-C-05, C-07, C-08, C-10 -Drainage Report	
☑	Inspection and Maintenance Plan **(7.6.5)**	Drainage Report Appendix L	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	All local approvals, permits, easements and licenses required, including but not limited to: • Waivers; • Driveway permits; • Special exceptions; • Variances granted; • Easements; • Licenses. **(2.5.3.2A)**	C-00	
☑	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: a. Calculations relating to stormwater runoff; b. Information on composition and quantity of water demand and wastewater generated; c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; d. Estimates of traffic generation and counts pre- and post-construction; e. Estimates of noise generation; f. A Stormwater Management and Erosion Control Plan; g. Endangered species and archaeological / historical studies; h. Wetland and water body (coastal and inland) delineations; i. Environmental impact studies. **(2.5.3.2B)**	a. Drainage Report b. NHDES Sewer Connection Application and Water Demand Report to be provided at Planning Board submittal. c. N/A d. N/A e. N/A f. C-04, C-07, C-08; and Drainage Report g. N/A h. N/A i. N/A	
☑	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. **(2.5.3.2D)**	Will Serve Letters (Eversource and Unitil)	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	A list of any required state and federal permit applications required for the project and the status of same. **(2.5.3.2E)**	C-00	
☑	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." **(2.5.4.2E)**	C-03 Note #5	N/A
☐	For site plans that involve land designated as "Special Flood Hazard Areas" (SFHA) by the National Flood Insurance Program (NFIP) confirmation that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334. **(2.5.4.2F)**	N/A	
☑	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." **(2.13.3)**	C-03 Note #6 Note #7	N/A

Applicant's Signature: _____ **Date:** 4/19/2022

City of Portsmouth, New Hampshire

Subdivision Application Checklist

This subdivision application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all subdivision review requirements. Please refer to the Subdivision review regulations for full details.

Applicant Responsibilities (Section III.C): Applicable fees are due upon application submittal along with required number of copies of the Preliminary or final plat and supporting documents and studies. Please consult with Planning staff for submittal requirements.

Owner: Artwill, LLC Date Submitted: 4/19/2022

Applicant: Joe Cardarola

Phone Number: 603-674-5204 E-mail: joe@smithfieldconstruction.com

Site Address 1: 437 Lafayette Road Map: 229 Lot: 1

Site Address 2: _____ Map: _____ Lot: _____

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
✓	Completed Application form. **(III.C.2-3)**	Submitted online & (1) copy to City	N/A
✓	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF) on compact disc, DVD or flash drive. **(III.C.4)**	Submitted online & (1) copy to City	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	Name and address of record owner, any option holders, descriptive name of subdivision, engineer and/or surveyor or name of person who prepared the plat. **(Section IV.1/V.1)**	C-00	☑ Preliminary Plat ☑ Final Plat	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	**Preliminary Plat** Names and addresses of all adjoining property owners. **(Section IV.2)** **Final Plat** Names and addresses of all abutting property owners, locations of buildings within one hundred (100) feet of the parcel, and any new house numbers within the subdivision. **(Section V.2)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A
✓	North point, date, and bar scale. **(Section IV.3/V3)**	Required on all Plan Sheets	☑ Preliminary Plat ☑ Final Plat	N/A
✓	Zoning classification and minimum yard dimensions required. **(Section IV.4/V.4)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A
✓	**Preliminary Plat** Scale (not to be smaller than one hundred (100) feet = 1 inch) and location map (at a scale of 1" = 1000'). **(Section IV.5)** **Final Plat** Scale (not to be smaller than 1"=100'), Location map (at a scale of 1"=1,000') showing the property being subdivided and its relation to the surrounding area within a radius of 2,000 feet. Said location map shall delineate all streets and other major physical features that my either affect or be affected by the proposed development. **(Section V.5)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A
✓	Location and approximate dimensions of all existing and proposed property lines including the entire area proposed to be subdivided, the areas of proposed lots, and any adjacent parcels in the same ownership. **(Section IV.6)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A
✓	Dimensions and areas of all lots and any and all property to be dedicated or reserved for schools, parks, playgrounds, or other public purpose. Dimensions shall include radii and length of all arcs and calculated bearing for all straight lines. **(Section V.6/ IV.7)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A
✓	Location, names, and present widths of all adjacent streets, with a designation as to whether public or private and approximate location of existing utilities to be used. Curbs and sidewalks shall be shown. **(Section IV.8/V.7)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	Location of significant physical features, including bodies of water, watercourses, wetlands, railroads, important vegetation, stone walls and soils types that my influence the design of the subdivision. **(Section IV.9/V.8)**	S-01 & S-03	☑ Preliminary Plat ☑ Final Plat	N/A
✓	**Preliminary Plat** Proposed locations, widths and other dimensions of all new streets and utilities, including water mains, storm and sanitary sewer mains, catch basins and culverts, street lights, fire hydrants, sewerage pump stations, etc. **(Section IV.10)** **Final Plat** Proposed locations and profiles of all proposed streets and utilities, including water mains, storm and sanitary sewer mains, catchbasins and culverts, together with typical cross sections. Profiles shall be drawn to a horizontal scale of 1"=50' and a vertical scale of 1"=5', showing existing centerline grade, existing left and right sideline grades, and proposed centerline grade. **(Section V.9)**	S-03, C-03, C-05	☑ Preliminary Plat ☑ Final Plat	N/A
✓	When required by the Board, the plat shall be accompanied by profiles of proposed street grades, including extensions for a reasonable distance beyond the subject land; also grades and sizes of proposed utilities. **(Section IV.10)**	S-01 & C-04 (Existing & Proposed contours and grades shown on plans)	☑ Preliminary Plat ☑ Final Plat	N/A
☐	Base flood elevation (BFE) for subdivisions involving greater than five (5) acres or fifty (50) lots. **(Section IV.11)**	N/A	☑ Preliminary Plat ☑ Final Plat	N/A
☐	For subdivisions of five (5) lots or more, or at the discretion of the Board otherwise, the preliminary plat shall show contours at intervals no greater than two (2) feet. Contours shall be shown in dotted lines for existing natural surface and in solid lines for proposed final grade, together with the final grade elevations shown in figures at all lot corners. If existing grades are not to be changed, then the contours in these areas shall be solid lines. **(Section IV.12/ V.12)**	S-01 (Subdivision only contains 3 proposed lots)	☑ Preliminary Plat ☑ Final Plat	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	Dates and permit numbers of all necessary permits from governmental agencies from which approval is required by Federal or State law. **(Section V.10)**	C-00 (Dates and permit numbers pending)	☐ Preliminary Plat ☑ Final Plat	N/A
	For subdivisions involving greater than five (5) acres or fifty (50) lots, the final plat shall show hazard zones and shall include elevation data for flood hazard zones. **(Section V.11)**	N/A (Subdivision only contains 3 proposed lots)	☐ Preliminary Plat ☑ Final Plat	N/A
✓	Location of all permanent monuments. **(Section V.12)**	S-01	☐ Preliminary Plat ☑ Final Plat	N/A

General Requirements[1]			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	**1. Basic Requirements: (VI.1)**		N/A
☑	a. Conformity to Official Plan or Map	All sheets	
☐	b. Hazards	N/A	
☑	c. Relation to Topography	S-01	
☐	d. Planned Unit Development	NA	
☑	**2. Lots: (VI.2)**		N/A
☑	a. Lot Arrangement	S-03 & C-03	
☑	b. Lot sizes	S-03 & C-03	
☐	c. Commercial and Industrial Lots	N/A	
☑	**3. Streets: (VI.3)**		N/A
☑	a. Relation to adjoining Street System	a. S-03 & C-03	
☑	b. Street Rights-of-Way	b. S-03 & C-03	
☑	c. Access	c. S-03 & C-03	
☑	d. Parallel Service Roads	d. S-03 & C-03	
☑	e. Street Intersection Angles	e. S-03 (To be prov.)	
☑	f. Merging Streets	f. S-03 & C-03	
☑	g. Street Deflections and Vertical Alignment	g. S-03 & C-03	
☐	h. Marginal Access Streets	h. N/A	
☐	i. Cul-de-Sacs	i. N/A	
☑	j. Rounding Street Corners	j. C-03	
☐	k. Street Name Signs	k. NA	
☑	l. Street Names	l. S-03 & C-03	
☐	m. Block Lengths	m. N/A	
☐	n. Block Widths	n. N/A	
☑	o. Grade of Streets	o. S-01 & C-04	
☐	p. Grass Strips	p. N/A	
☑	**4. Curbing: (VI.4)**	C-03 & C-04	N/A
☑	**5. Driveways: (VI.5)**	S-03 & C-03	N/A
☑	**6. Drainage Improvements: (VI.6)**	C-04	N/A
☑	**7. Municipal Water Service: (VI.7)**	S-01 & C-05	N/A
☑	**8. Municipal Sewer Service: (VI.8)**	S-01 & C-05	N/A
☑	**9. Installation of Utilities: (VI.9)**	C-05	N/A
☐	a. All Districts		
☐	b. Indicator Tape		
☑	**10. On-Site Water Supply: (VI.10)**	C-05	N/A
☐	**11. On-Site Sewage Disposal Systems: (VI.11)**	N/A	N/A
☑	**12. Open Space: (VI.12)**	S-03 & C-03	N/A
☑	a. Natural Features	a. S-01	
☑	b. Buffer Strips	b. C-03 & C-06	
☐	c. Parks	c. NA	
☑	d. Tree Planting	d. C-06	
☐	**13. Flood Hazard Areas: (VI.13)**	N/A	N/A
☐	a. Permits		
☐	b. Minimization of Flood Damage		
☐	c. Elevation and Flood-Proofing Records		
☐	d. Alteration of Watercourses		
☑	**14. Erosion and Sedimentation Control (VI.14)**	C-07 & C-08	N/A

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☑ ☑ ☐	**15. Easements (VI.15)** a. Utilities b. Drainage	a. S-03 b. NA	N/A
☑	**16. Monuments: (VI.16)**	S-01	N/A
☑	**17. Benchmarks: (VI.17)**	S-01	N/A
☑	**18. House Numbers (VI.18)**	S-03 & C-03 (Final unit numbers TBD)	N/A

Design Standards			
	Required Items for Submittal	**Indicate compliance and/or provide explanation as to alternative design**	**Waiver Requested**
☑	**1. Streets have been designed according to the design standards required under Section (VII.1).** a. Clearing b. Excavation c. Rough Grade and Preparation of Sub-Grade d. Base Course e. Street Paving f. Side Slopes g. Approval Specifications h. Curbing i. Sidewalks j. Inspection and Methods	Yes	N/A
☑	**2. Storm water Sewers and Other Drainage Appurtenances have been designed according to the design standards required under Section (VII.2).** a. Design b. Standards of Construction	Yes	
☑	**3. Sanitary Sewers have been designed according to the design standards required under Section (VII.3).** a. Design b. Lift Stations c. Materials d. Construction Standards	Yes	
☑	**4. Water Mains and Fire Hydrants have been designed according to the design standards required under Section (VII.4).** a. Connections to Lots b. Design and Construction c. Materials d. Notification Prior to Construction	Yes	

Applicant's/Representative's Signature: _____ **Date:** 4/19/2022

[1] See City of Portsmouth, NH Subdivision Rules and Regulations for details.

CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801
(603) 610-7216

TECHNICAL ADVISORY COMMITTEE

May 9, 2022

Artwill, LLC
PO Box 370
Portsmouth , New Hampshire 03801

RE: Preliminary and Final Subdivision approval for property located at 437 Lafayette Road (LU-22-82)

Dear Property Owner:

The Technical Advisory Committee, at its regularly scheduled meeting of Thursday, May 3, 2022, considered your application for Preliminary and Final Subdivision approval to subdivide one existing lot with 65,365 square feet of lot area and 123.92 of frontage on Lafayette Road and 336.61 feet of frontage on Andrew Jarvis Drive into three lots as follows: Proposed Lot 1 with 18,434 square feet of lot area and 123.92 feet of frontage on Lafayette Road and 129.57 feet of frontage on Andrew Jarvis Drive, Proposed Lot 2 with 16,606 square feet of lot area and 102.04 feet of frontage on Andrew Jarvis Drive, and Proposed Lot 3 with 30,325 square feet of lot area and 107 feet of frontage on Andrew Jarvis Drive. Said property is shown on Assessor Map 229 Lot 1 and lies within the Single Residence B (SRB) District. As a result of said consideration, the Committee voted to **recommend approval** to the Planning Board with the following stipulations:

Items to be addressed prior to Planning Board approval:

1. Access easements will be will be provided to allow access across all proposed lots for travel along Artwill Ave.

2. A maintenance agreement will be provided for proposed Artwill Ave. maintenance.

3. All easements will be identified with unique identifiers and corresponding easement table that lists all easements and their purpose.

4. Gas line is to be installed under Artwill Ave and service shall come from the new line and explore feasibility of servicing the existing unit from Artwill Ave.

This matter will be placed on the agenda for the Planning Board meeting scheduled for **Thursday, June 16, 2022**. One (1) hard copy of all plans and supporting reports and exhibits as well as an updated electronic file (in a PDF format) must be filed in the Planning Department and uploaded to the online permit system no later than **Wednesday, May 25, 2022**.

Per Section 2.5 of the Site Plan Regulations, a site plan review application to the Planning Board must include all applicable information and supporting materials including but not limited to the following items:

- *Full updated plan set*
- *Draft Easements*
- *Drainage Analysis*
- *Traffic Studies*
- *Etc.*

All comments, corrections, and conditions identified as "Items to be addressed before Planning Board submittal' must be resolved/corrected for the Planning Board application submittal to be deemed complete.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Beverly Mesa-Zendt,
Planning Director

cc:

Justin Macek, TF Moran, Inc.

#45407.120

CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801
(603) 610-7216

TECHNICAL ADVISORY COMMITTEE

May 9, 2022

Artwill, LLC
PO Box 370
Portsmouth , New Hampshire 03801

RE: Site Plan approval and Conditional Use Permit approval for property located at 437 Lafayette Road (LU-22-82)

Dear Property Owner:

The Technical Advisory Committee, at its regularly scheduled meeting of Thursday, May 3, 2022, considered your application for Site Plan approval and Conditional Use Permit approval as permitted under Section 10814.40 of the Zoning Ordinance to subdivide the lot and construct two new single-family dwellings (one includes an attached dwelling unit) in addition to the existing single-family dwelling. Said property is shown on Assessor Map 229 Lot 1 and lies within the Single Residence B (SRB) District. As a result of said consideration, the Committee voted to **recommend approval** to the Planning Board with the following stipulations:

Items to be addressed prior to Planning Board approval:
1. All easements will be identified with unique identifiers and corresponding easement table that lists all easements and their purpose.

Prior to Building Permit Issuance:
2. Applicant will coordinate final water and sewer connections with Portsmouth Water.
3. The final water main connection under Andrew Jarvis Dr. will be determined by Portsmouth Water.

This matter will be placed on the agenda for the Planning Board meeting scheduled for **Thursday, June 16, 2022**. One (1) hard copy of all plans and supporting reports and exhibits as well as an updated electronic file (in a PDF format) must be filed in the Planning Department and uploaded to the online permit system no later than **Wednesday, May 25, 2022**.

Per Section 2.5 of the Site Plan Regulations, a site plan review application to the Planning Board must include all applicable information and supporting materials including but not limited to the following items:

- *Full updated plan set*
- *Draft Easements*
- *Drainage Analysis*
- *Traffic Studies*
- *Etc.*

All comments, corrections, and conditions identified as "Items to be addressed before Planning Board submittal' must be resolved/corrected for the Planning Board application submittal to be deemed complete.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Beverly Mesa-Zendt,
Planning Director

cc:

Justin Macek, TF Moran, Inc.

Artwill
PO Box 370
PORTSMOUTH, NH 03801

ST. NICHOLAS GREEK
ORTHODOX CHURCH
40 ANDREW JARVIS DRIVE
PORTSMOUTH, NH 03801

KARONA LLC
36 ARTWILL AVENUE
PORTSMOUTH, NH 03801

KRISTIN M. &
CHRISTOPHER M. CHASE
34 ARTWILL AVENUE
PORTSMOUTH, NH 03801

FRIENDS OF LAFAYETTE HOUSE
PO BOX 4545
PORTSMOUTH, NH 03802

CHURCH OF JESUS CHRIST
C/O TAX DIVISION
50E NORTH TEMPLE STREET
FLOOR 22
SALT LAKE CITY, UT 84150

TERRY A. & ANDREA C. SMITH
7 ANDREW JARVIS DRIVE
PORTSMOUTH, NH 03801

VINCENT A. & ALICIA B. RICCO
440 LAFAYETTE ROAD
PORTSMOUTH, NH 03801

CINDI S. BLANCHETTE
95 GREENLEAF AVENUE
PORTSMOUTH, NH 03801

TFMORAN, INC.
170 COMMERCE WAY - SUITE 102
PORTSMOUTH, NH 03801

Artwill
PO Box 370
PORTSMOUTH, NH 03801

ST. NICHOLAS GREEK
ORTHODOX CHURCH
40 ANDREW JARVIS DRIVE
PORTSMOUTH, NH 03801

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CINDI S. BLANCHETTE
95 GREENLEAF AVENUE
PORTSMOUTH, NH 03801

TFMORAN, INC.
170 COMMERCE WAY - SUITE 102
PORTSMOUTH, NH 03801

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

Abutters List

Smithfield Construction
437 Lafayette Road, Portsmouth, NH
May 24, 2022
45407-120

Assessors Map		Abutter Name	Mailing Address
Map	Lot		
229	1	Artwill	PO Box 370 PORTSMOUTH, NH 03801
229	2	ST. NICHOLAS GREEK ORTHODOX CHURCH	40 ANDREW JARVIS DRIVE PORTSMOUTH, NH 03801
229	4	KARONA LLC	36 ARTWILL AVENUE PORTSMOUTH, NH 03801
229	5	KRISTIN M. & CHRISTOPHER M. CHASE	34 ARTWILL AVENUE PORTSMOUTH, NH 03801
230	23A	FRIENDS OF LAFAYETTE HOUSE	PO BOX 4545 PORTSMOUTH, NH 03802
230	24	CHURCH OF JESUS CHRIST C/O TAX DIVISION	50E NORTH TEMPLE STREET FLOOR 22 SALT LAKE CITY, UT 84150
230	25	TERRY A. & ANDREA C. SMITH	7 ANDREW JARVIS DRIVE PORTSMOUTH, NH 03801
231	1	VINCENT A. & ALICIA B. RICCO	440 LAFAYETTE ROAD PORTSMOUTH, NH 03801
231	59	CINDI S. BLANCHETTE	95 GREENLEAF AVENUE PORTSMOUTH, NH 03801
Civil Engineers / Surveyor		TFMoran, Inc.	170 Commerce Way - Suite 102 Portsmouth, NH 03801

EVERSOURCE ENERGY

March 1, 2022

1700 Lafayette Road
Portsmouth, NH 03801

Michael J Busby
603-436-7708 x555-5678
michael.busby@eversource.com

Joseph Caldarola, Manager
Artwill LLC
170 Dennett Street #2
Portsmouth, NH 03801

Dear Mr. Caldarola:

I am responding to your request to confirm the availability of electric service for the proposed 437 Lafayette Road Lots 1, 2 and 3, Portsmouth, NH project being constructed for/by Artwill LLC.

The proposed project consists of two new single family building lots, each with one residential unit. The proposed development will be constructed along Artwill Street.

The developer will be responsible for the installation of all underground facilities and infrastructure required to service the new building. The service will be as shown on attached marked up utility plan. The proposed building service will be fed from a new riser pole to be determined by Eversource Engineering as depicted on Site Layout Plan 3 lot subdivision. The developer will work with Eversource to obtain all necessary easements and licenses for the proposed overhead and underground facilities listed above.

This letter serves as confirmation that Eversource has sufficient capacity in the area to provide service to this proposed development. The cost of extending service to the aforementioned location and any associated infrastructure improvements necessary to provide service will be borne by the developer unless otherwise agreed upon.

The attached drawing titled "Proposed 3 Lot Subdivision 437 Lafayette Rd Portsmouth NH" dated April 19,2022 shows transformer locations to service your proposed project.

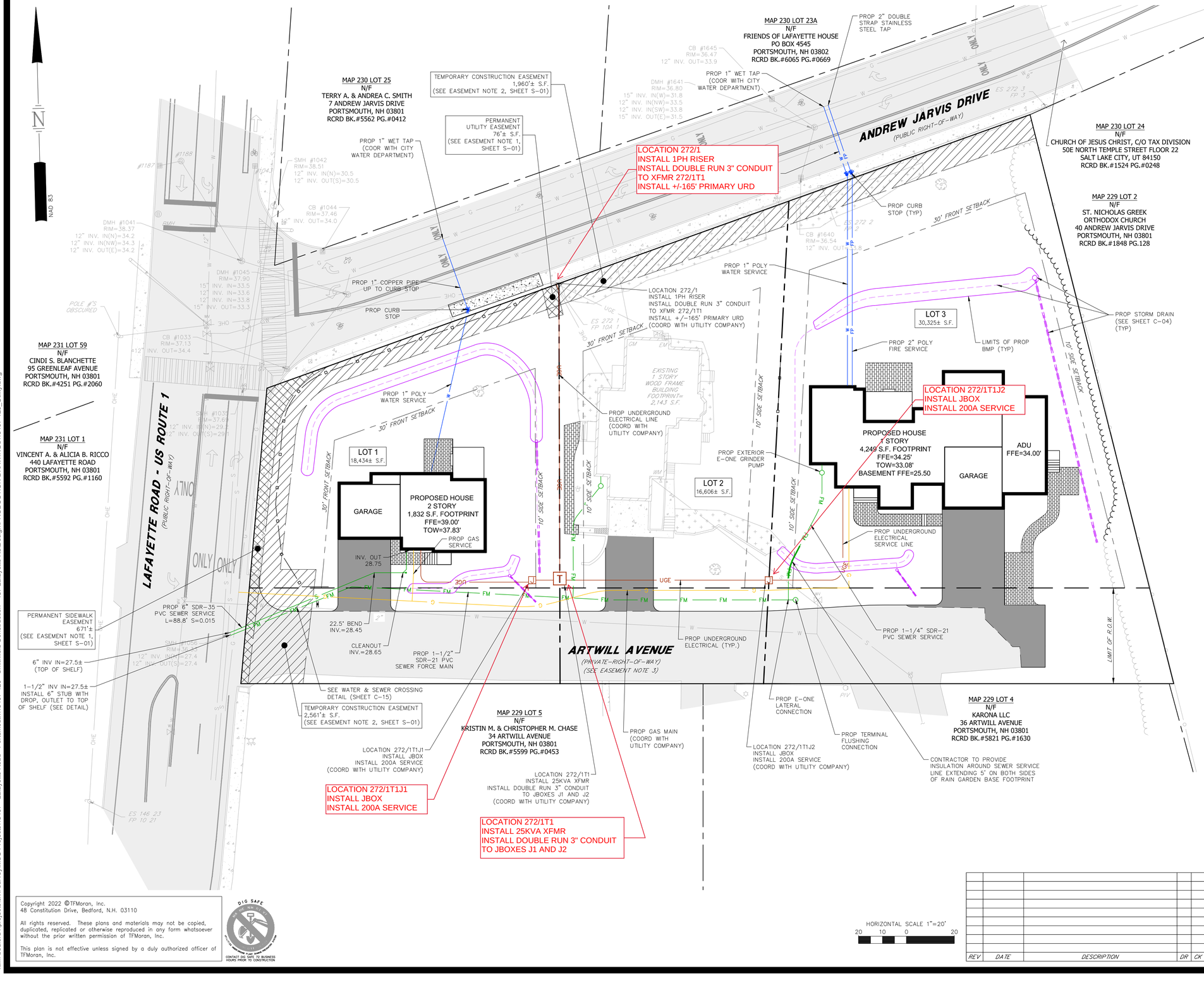
Eversource approves the locations shown; assuming the final installed locations meet all clearances, physical protection, and access requirements as outlined in Eversource's "Information & Requirements For Electric Supply" (https://www.eversource.com/content/docs/default-source/pdfs/requirements-for-electric-service-connections.pdf?sfvrsn=2).

If you require additional information or I can be of further assistance please do not hesitate to contact me at our Portsmouth Office, 603-436-7708 Ext. 555-5678

Respectfully.

Paul Bednarz
NH Eastern Regional Engineering, Eversource

cc: (via e-mail)
Thomas Boulter, Eastern Region Operations Manager, Eversource
Nickolai Kosko, Field Supervisor, Electric Design, Eversource



NOTES

1. SEE UTILITY NOTES ON SHEET C-01.
2. CONTRACTOR SHALL COORDINATE WITH CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTING SEWER MANHOLE CONNECTION.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

UTILITY PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

DIG SAFE
811 OR 1-888-DIG-SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

PROJ. #	45407-120	DR	JSM	FB		C-05
		CK	JCC	CADFILE	45407-120_UTILITY	

February 24, 2022

Artwill LLC
PO Box 267
Portsmouth NH 03802-0267

RE: Natural Gas Availability to 437 Lafayette Rd Portsmouth NH Project

Dear Mr. Caldarola

Unitil's natural gas division has reviewed the requested site for natural gas service.

Unitil hereby confirms natural gas service will be available to 437 Lafayette Rd Portsmouth NH Project, to serve two single family homes.

Installation is pending an authorized installation agreement with Artwill, LLC and a street opening approval from the City of Portsmouth DPW.

Let me know if you have any questions. You can email me at oliver@unitil.com. My phone number is 603-294-5174.

Sincerely,

Janet Oliver
Senior Business Development Representative

CUSTOMER ENERGY SOLUTIONS
325 West Road
Portsmouth, NH 03801

T 888.486.4845 www.unitil.com

Transfer Stamps: $0.00
Non-Contractual Transfer

ACCESS AND UTILITY EASEMENT AGREEMENT

This Access and Utility Easement Agreement is made by and between Artwill LLC, a New Hampshire Limited Liability Company, of 437 Lafayette Road, Portsmouth, NH 03801, Karona LLC, a New Hampshire Limited Liability Company, of 36 Artwill Avenue, Portsmouth, NH 03801, and Christopher M. Chase and Kristin M. Chase, a married couple, of 34 Artwill Avenue, Portsmouth, NH 03801 ("Chase")

WITNESSETH

WHEREAS, Artwill LLC is the owner of three (3) parcels of land with the buildings thereon located in the City of Portsmouth, County of Rockingham, State of New Hampshire, identified as "Lot 1", "Lot 2", and "Lot 3" on a subdivision plan entitled, "Tax Map 229, Lot 1 Subdivision Plan Proposed 3-Lot Subdivision 437 Lafayette Road, Portsmouth, New Hampshire County of Rockingham Owned by Artwill LLC", dated April 19, 2022, as revised May 25, 2022 or, and recorded in Rockingham County Registry of Deeds (the "RCRD") as Plan #D-_____ (the "Subdivision Plan"). *See* Warranty Deed, dated September 27, 2021, and recorded in the RCRD at Book 6334, Page 455; and

WHEREAS, Karona LLC is the owner of real property at 36 Artwill Avenue, Portsmouth, NH 03801, identified on Portsmouth Tax Map 229 as Lot 4 (the "Karona Property"). *See* Foreclosure Deed, dated May 18, 2017, recorded in the RCRD at Book 5821, Page 1630; and

WHEREAS, Chase is the owner of real property at 34 Artwill Avenue, Portsmouth, NH 03801, identified on Portsmouth Tax Map 229, as Lot 5 (the "Chase Property"). *See* Warranty Deed, dated March 3, 2015, recorded in the RCRD at Book 5599, Page 0453; and

WHEREAS, Lot 1, Lot 2, Lot 3, the Karona Property and the Chase Property are all accessed by a private street known referred to and known as "Artwill Avenue", as shown on the Subdivision Plan; and

WHEREAS, Artwill Avenue comprises portions of Lot 1, Lot 2, and Lot 3 as shown on the Subdivision Plan; and

WHEREAS, Artwill LLC is the owner of Artwill Avenue by virtue of its ownership of Lot 1, Lot 2 and Lot 3; and

WHEREAS, Artwill LLC wishes to enter into an agreement with Karona LLC and Chase to clarify, grant, reserve and agree upon certain easement rights and landowner obligations in Artwill Avenue relative to access and utilities.

NOW THEREFORE, in consideration for the mutual covenants, promises and representations contained herein and other good and valuable consideration, the Parties hereby enter into the following Access and Utility Easement Agreement.

I. ACCESS EASEMENTS

A. Reservation of Access Easement for Lot 2

Artwill LLC hereby reserves a perpetual access easement for the benefit of Lot 2 and its future owners across Lot 1 to pass and repass by vehicle, foot, and other lawful modes of transportation over that portion of Artwill Avenue that is located within the boundaries of Lot 1. This access easement right shall be held in common with the future owner of Lot 3, Karona LLC and Chase.

B. Reservation of Access Easement for Lot 3

Artwill LLC hereby reserves a perpetual access easement for the benefit of Lot 3 and its future owners across Lot 1 and Lot 2 to pass and repass by vehicle, foot, and other lawful modes of transportation over that portion of Artwill Avenue that is located within the boundaries of Lot 1 and Lot 2. This access easement right shall be held in common with the future owner of Lot 2, Karona LLC, and Chase.

C. Access Easement for Chase Property

Chase shall have a perpetual access easement across Lot 1 and Lot 2 to pass and repass by vehicle, foot, and other lawful modes of transportation over that portion of Artwill Avenue that is located within the boundaries of Lot 1 and Lot 2. This access easement right shall be held in common with the future owners of Lot 2 (as to access across Lot 1) and Lot 3, and Karona LLC.

D. Access Easement for Karona LLC Property

Karona LLC shall have a perpetual access easement across Lot 1, Lot 2, and Lot 3 to pass and repass by vehicle, foot, and other lawful modes of transportation over that portion of Artwill Avenue that is located within the boundaries of Lot 1, Lot 2 and Lot 3. This access easement right shall be held in common with the future owners of Lot 2 (as to access across Lot 1), Lot 3 (as to access across Lot 1 and Lot 2), and Chase (as to access across Lot 1 and Lot 2).

E. Easement Area Maintenance Responsibilities

The owners of Lot 1, Lot 2, Lot 3, the Chase Property and the Karona LLC Property (each a "Lot Owner" and collectively the "Lot Owners") shall be equally responsible to:

(1) Remove snow, ice and debris from Artwill Avenue in a timely fashion if such service is not provided for by the City of Portsmouth;

(2) Periodically inspect and assess the condition of Artwill Avenue;

(3) Maintain, repair, replace and improve Artwill Avenue as necessary, in accordance with City standards for roadway maintenance, repair, replacement and/or improvement standards, to provide for safe and convenient access; and

(4) Prohibit any encroachments from being located within Artwill Avenue that would interfere with, frustrate, or make difficult the intended use of the street as contemplated herein; and

(5) Contribute equally to the costs associated with performing the obligations set forth herein.

F. Easement Area Financial Responsibilities

The Lot Owners shall be equally financially responsible for the necessary maintenance, repair, replacement and improvement of Artwill Avenue, except as otherwise provided for herein. If any Lot Owner incurs a greater share of costs associated with necessary maintenance, repair, replacement or improvement of the street as a result of any other Lot Owner's failure to contribute its share of the costs, the Lot Owner(s) paying the greater share of costs shall be entitled to reimbursement from the other Lot Owner(s) for their proportionate share of the costs within thirty (30) days of delivering written notice of the costs incurred together with receipts or other reasonable evidence thereof. If any written request for reimbursement remains unpaid beyond thirty (30) days from when written notice was delivered, the Lot Owner paying the greater share of costs may bring legal action to collect the unpaid balance against the other Lot Owner and shall be entitled to a lien for the same. The prevailing party in any such action shall be entitled to reasonable costs and attorney fees incurred.

II. UTILITY EASEMENTS

A. Wastewater Discharge

1. Reservation of Easement for Lot 2 to Force Main

Artwill LLC hereby reserves a perpetual easement for the benefit of Lot 2 to discharge wastewater through the Force Main running through that portion of Artwill Avenue located within the boundaries of Lot 1. This easement right shall be held in common with the owners of the *benefiting lots*, as that term is more specifically defined below in Section 5. If any damage or

disturbance is caused to any portion of Artwill Avenue as a result of the owner of Lot 2 exercising its easement rights, including but not limited to maintenance or repair of any sewer pipe benefiting Lot 2, the owner shall comply with the obligations set forth in Section I.E(3) above, which is hereby incorporated by reference.

2. Reservation of Easement for Lot 3 to Force Main

Artwill LLC hereby reserves a perpetual easement for the benefit of Lot 3 to discharge wastewater through the Force Main running through that portion of Artwill Avenue located within the boundaries of Lot 1 and Lot 2. This easement right shall be held in common with the owners of the *benefiting lots,* as that term is more specifically defined below in Section 5. If any damage or disturbance is caused to any portion of Artwill Avenue as a result of the owner of Lot 2 exercising its easement rights, including but not limited to maintenance or repair of any sewer pipe benefiting Lot 2, the owner shall comply with the obligations set forth in Section I.E(3) above, which is hereby incorporated by reference

3. Reservation of Easement for Chase Property to Force Main

Artwill LLC hereby reserves a perpetual easement for the benefit of the Chase Property to install a sewer pipe through Lot 1 to connect to the Force Main, to discharge wastewater through the Force Main running through that portion of Artwill Avenue located within the boundaries of Lot 1, and to maintain, repair, replace and improve said sewer line. The right to discharge wastewater through the Force Main shall be held in common with the owners of the other *benefiting lots.*

The easement area shall be five feet (5') in width on either side of the sewer pipe running through Lot 1 to the point of connection to the Force Main. The owner of the Chase Property shall be responsible for restoring any damage or disturbance caused to Lot 1 after exercising their rights within the easement area and shall comply with the obligations set forth in Section I.E(3) above, which is hereby incorporated by reference.

4. Reservation of Easement for Karona LLC Property to Force Main

Artwill LLC hereby reserves a perpetual easement for the benefit of the Karona LLC Property to install a sewer pipe through Lot 2 to connect to the Force Main, to discharge wastewater through the Force Main running through that portion of Artwill Avenue located within the boundaries of Lot 1 and Lot 2, and to maintain, repair, replace and improve said sewer line. The right to discharge wastewater through the Force Main shall be held in common with the owners of the other *benefiting lots.*

The easement area shall be five feet (5') in width on either side of the sewer pipe running through Lot 2 to the point of connection with the Force Main. The owner of the Karona LLC Property shall be responsible for restoring any damage or disturbance caused to Lot 2 after exercising their rights within the easement area and shall comply with the obligations set forth in Section I.E(3) above, which is hereby incorporated by reference.

5. Easement in Common to Force Main

The owners of the *benefiting lots* (individually a "Lot Owner" and collectively the "Lot Owners") shall have an easement in common with one another a width of feet (5') on either side of the Force Main through Lot 1, Lot 2, and Lot 3 to perform necessary maintenance, repair, replacement and improvement to the Force Main. The Lot Owners shall be collectively responsible for performing necessary maintenance, repair, replacement and improvement to the Force Main.

For purposes of Section II of this Easement Agreement, "benefiting lots" shall mean those lots those that are actually connected to and discharge wastewater through the Force Main.

Any portions of Lot 1, Lot 2 or Lot 3 that are damaged or disturbed as a result of performing necessary maintenance, repair, replacement and improvement to the Force Main shall be restored by the Lot Owners within a reasonable time, in accordance with Section I.A(3) above, which is hereby incorporated by reference.

Each Lot Owner shall be individually responsible for the maintenance, repair, replacement and improvement of any sewer line or portion thereof benefiting their lot to the point of connection to the Force Main and any costs associated therewith.

6. Easement Area Maintenance Responsibilities

The owners of the *benefiting lots* shall be equally responsible to:

(a) Periodically inspect and assess the condition of the Force Main;

(b) Maintain, repair, replace and improve the Force Main as necessary so that it functions properly for its intended purpose;

(c) Prohibit any encroachments from being located within Artwill Avenue that would interfere with, frustrate, or make difficult access, maintenance, repair, replacement and improvement of the Force Main;

(d) Contribute to the costs associated with performing the obligations set forth herein.

Any owner of a *benefiting lot* causing damage to the Force Main shall be responsible to the owners of the other *benefiting lots* for any repair costs.

7. Easement Area Financial Responsibilities

The owners of the *benefiting lots* shall be equally financially responsible for the maintenance, repair, replacement and improvement of the Force Main, except as otherwise provided for herein. If any owner of a *benefiting lot* incurs a greater share of costs associated with necessary maintenance, repair, replacement or improvement of the Force Main as a result of any other *benefiting lot* owner's failure to contribute its share of the costs, the owner of the *benefiting*

lot paying the greater share of costs shall be entitled to reimbursement from the other *benefiting lot* owners for their proportionate share of the costs within thirty (30) days of delivering written notice of the costs incurred together with receipts or other reasonable evidence thereof. If any written request for reimbursement remains unpaid beyond thirty (30) days from when written notice was delivered, the owner of the *benefiting lot* paying the greater share of costs may bring legal action to collect the unpaid balance against the other *benefiting lot* owners and shall be entitled to a lien for the same. The prevailing party in any such action shall be entitled to reasonable costs and attorney fees incurred.

B. Electricity

1. Reservation of Reciprocal Easements for Lot 1 and Lot 2

Artwill LLC hereby reserves perpetual easements that are reciprocal in nature benefiting and burdening Lot 1 and Lot 2 for purposes of drawing electricity from any underground electric lines installed along the common boundary of Lot 1 and Lot 2. Said easements shall be subject to any future restrictions and obligations placed upon Lot 1, Lot 2 and Lot 3 by the utility company as a condition of supplying electricity through the underground electric lines.

2. Reservation of Easement for Lot 3

Artwill LLC hereby reserves a perpetual easement for the benefit of Lot 3 for the purpose of drawing electricity from any underground electric lines installed along the common boundary of Lot 1 and Lot 2. The benefit of said easement shall be held in common with the owners of Lot 1 and Lot 2 and shall be subject to any future restrictions and obligations placed upon Lot 1, Lot 2 and Lot 3 by the utility company as a condition of supplying electricity through the underground electric lines.

III. MISCELLANOUS

A. Written Notice

Any written notice required under this Easement Agreement shall be valid if sent by certified mail or hand-delivered to the Party's last known address listed with the City of Portsmouth Assessing Department.

B. Amendment

This Easement Agreement and the rights contained herein may only be amended by written agreement of the Party(ies) that would be affected thereby, which agreement shall be recorded in the Rockingham County Registry of Deeds.

C. Bind and Inure

This Easement Agreement and the rights and obligations contained herein shall be binding upon and inure to the benefit of the Parties hereto and their respective heirs, successors and assigns.

D. **Non-Contractual Transfer**

This foregoing is a non-contractual transfer that is exempt from the New Hampshire Real Estate Transfer Tax pursuant to RSA 78-B:2, IX.

[SEPARATE SIGNATURE PAGES TO FOLLOW]

Executed this _____day of _____, 2022.

ARTWILL LLC

_____
Joseph S. Caldarola, Member/Manager
Duly Authorized

_____
Nicola Douglass, Member/Manager
Duly Authorized

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

This _____day of _____, 2022 personally appeared, Joseph S. Caldarola and Nicola Douglass, in their capacities as members/managers of Artwill LLC, duly authorized, known to me, or satisfactorily proven, to be the persons whose names are subscribed to the foregoing instrument and acknowledged that they executed the same for the purposes therein contained.

Before me,

_____
Notary Public:
Commission expires:

Executed this _____day of _____, 2022.

KARONA LLC

_____
[Insert Name] [Insert Title, Duly Authorized]

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

This _____day of _____, 2022 personally appeared, _____, in their capacity as member/manager of Karona LLC, duly authorized, known to me, or satisfactorily proven, to be the persons whose names is subscribed to the foregoing instrument and acknowledged that they executed the same for the purposes therein contained.

Before me,

_____
Notary Public:
Commission expires:

Executed this _____day of _____, 2022.

_____
Kristin M. Chase

_____
Christopher M. Chase

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

This _____day of _____, 2022 personally appeared, Christopher M. Chase and Kristin M. Chase, known to me, or satisfactorily proven, to be the persons whose names are subscribed to the foregoing instrument and acknowledged that they executed the same for the purposes therein contained.

Before me,

_____
Notary Public:
Commission expires:

Project #45407.120

DRAINAGE ANALYSIS

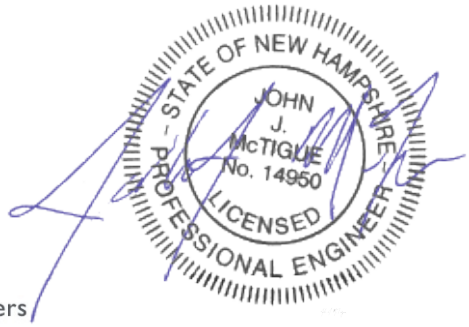
F O R

Proposed 3 Lot Subdivision

437 Lafayette Road
Portsmouth, NH
Rockingham County

Tax Map 229, Lot 1

April 19, 2022



Prepared By:

TFM Since 1968

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

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Contents

Table of Figures

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1.0 - SUMMARY & PROJECT DESCRIPTION

This project includes the subdivision of a single lot into three proposed lots, and the construction of two new homes. The existing lot is located at 437 Lafayette Road and is identified on the City of Portsmouth Assessor's Map 229 as Lot 1, and is approximately 65,365 sf (1.50 ac) in size. The site is located in the Single Residence B (SRB) Zone and currently contains one residential building. The site is bordered by Lafayette Road to the west, Andrew Jarvis Drive to the north, Artwill Avenue to the south, and Saint Nocholas Greek Orthodox Church to the east. The immediate area surrounding the site consists of mostly residential buildings, and the Portsmouth High School is located at the end of Andrew Jarvis Drive to the east.

The proposed subdivision includes three lots in total with access being provided through Artwill Avenue. The first lot is located at the intersection of Lafayette Road and Artwill Avenue and is 18,434 sf (0.42 ac) in size. A two-story residential house (1,832 sf footprint) is proposed on the first lot, with a screened porch and backyard patio area. The second lot is located in the middle of the subdivision and is 16,606 sf (0.38 ac) in size. This lot contains the existing one-story residential house (2,143 sf footprint). The existing house footprint is to remain the same in proposed conditions, and a new walkway is being proposed along the west property line. The third lot is located to the east of lot two and is 30,325 sf (0.70 ac) in size. A one-story residential house (4,249 sf footprint) is proposed on the third lot, with an attached accessory dwelling unit (AADU), backyard patio, and deck. The ADDU is located on the east side of the principle dwelling unit and has a gross area of 747 sf. Associated improvements include, but are not limited to, utility installation, stormwater management, grading, residential driveways, and landscaping.

This analysis has been completed to verify the project will not pose adverse stormwater effects on-site and off-site. The post-development stormwater management system has been designed to reduce peak runoff rates, runoff volume, risk of erosion and sedimentation, and to improve stormwater runoff quality. There is no increase in runoff from the post-development conditions compared to the pre-development conditions in any of the analyzed storm events. In addition, Best Management Practices will be employed to assure stormwater quality both during and after construction. The following summarizes the findings from the study.

2.0 - CALCULATION METHODS

The design storms analyzed in this study are the 2-year, 10-year, 25-year and 50-year 24-hour storm events. The software program, HydroCAD version 10.10-7a[1] was utilized to calculate the peak runoff rates from these storm events. The program estimates the peak rates using the TR-20 method. A Type III storm pattern was used in the model. Rainfall frequencies for the analyzed region were also incorporated into the model. Rainfall frequencies from the higher of the Extreme Precipitation Rates from Cornell University's Northeast Regional Climate Center (see Appendix A) were used to determine the storm-event intensities, see Table 1. The site lies within the Great Bay Region, and the rainfalls were increased to take this into account. Design standards were taken from the New Hampshire Stormwater Manual, December 2008[2].

[1] HydroCAD version 10.10-7a, HydroCAD Software Solutions LLC, Chocorua, NH, 2013.
[2] New Hampshire Stormwater Manual: Volume One - Stormwater and Antidegradation, December 2008; Volume Two - Post-Construction Best Management Practices Selection and Design, December 2008; Volume Three - Erosion and Sediment Controls During Construction, December 2008.

	24-HOUR RAINFALL RATES		
Storm-Event (year)	Cornell University Rainfall (in)	Factor of Increase For the Great Bay Region	Design Rainfall (in)
2	3.22	115%	3.70
10	4.88	115%	5.61
25	6.19	115%	7.12
50	7.41	115%	8.52

Table 1 – 24-Hour Rainfall Rates

Time of Concentration (Tc) is the time it takes for water to flow from the hydraulically most remote point in the watershed (with the longest travel time) to the watershed outlet. This time is determined by calculating the time it takes runoff to travel this route under one of three hydrologic conditions: sheet flow, shallow concentrated flow, or channel flow. Because the Intensity-Duration-Frequency (IDF) curve is steep with short Tc's, estimating the actual intensity is subject to error and overestimates actual runoff. Due to this, the Tc's are adjusted to a minimum of 6 minutes.

The proposed stormwater management system has been designed to capture the majority of new impervious area introduced to the site as part of this development, consisting of residential roofs, driveways, patios, and walkways. Within the drainage analysis limits, the amount of impervious area not treated in pre-development conditions (18,435 s.f.) is less than the impervious area not treated in post-development conditions (14,689 s.f.).

3.0 – EXISTING SITE CONDITIONS

The soils within the proposed area of disturbance are identified in accordance with the Natural Resources Conservation Service (NRCS) Web Soil Survey Report (see Appendix H). This report identifies the soils within the disturbed project area entirely as Urban Land-Canton Complex. The soil composition is estimated to consist of approximately 55% urban land, 20% canton and similar soils, and 25% minor components. This soil type is considered to be well drained and NRCS categorizes the soil as hydrologic soil group (HSG) A. Test pits were performed throughout the project site, and the western half of the existing lot displayed significantly higher infiltration rates than the eastern half. To account for these field observations, the western half of the analysis area was modeled as HSG-A soils and the eastern half as HSG-B soils in both pre- and post-development conditions.

Due to existing grade along the north and west borders of the subject lot, very minimal runoff enters the project analysis area from off-site locations. The site currently drains to the southeast corner of the property to a flatter area where runoff ultimately discharges to adjacent properties to the south and east. The NRCS Web Soil Survey Report identifies an area downstream of the analysis limits as Udorthents (smoothed). Limited information is provided with regards to this soil's physical and hydrologic attributes.

4.0 - PRE-DEVELOPMENT CONDITIONS

The pre-development condition is characterized by three watersheds. Pre-development subcatchment areas are depicted on the attached plan entitled "Pre-Development Drainage Map," Sheet D-01 (see Appendix K).

Stormwater runoff from the site that does not infiltrate into the ground, drains to the southeast corner of the site to existing point of interest (EPOI-01). Runoff throughout the existing site is generated from grassed and paved areas, as well as the roof of the existing house.

In the pre-development conditions, the total impervious area is 18,434 sf over a total drainage analysis area of 65,306 sf.

5.0 - POST-DEVELOPMENT CONDITIONS

The post-development condition is characterized by seven watersheds. Post-development subcatchment areas are depicted on the attached plan entitled "Post-Development Drainage Map," sheet D-02 (see Appendix K).

In the post-development condition, the total impervious area is 23,198 sf over a total drainage analysis area of 65,306 sf. Impervious area from the project consists of three residential buildings, driveways, patios, decks, walkways, and pavement on Artwill Avenue. Four raingardens are proposed to treat and mitigate the stormwater runoff from the impact of the new impervious area from the proposed development.

The proposed project maintains or reduces peak rates of runoff compared to existing conditions for all storm events, in accordance with City stormwater regulations. For Channel protection, the State Regulations require analysis between the pre-development to post-development 2-year 24-hour storm event volumes that flow into major water bodies. In post-development condition, there is not an increase in in runoff volume during the 2-year 24-hour storm event, and there are no adverse effects on the abutting properties from the proposed stormwater management system. See Table 2 for storm event flow and volume summary.

Appendices B and D summarizes all 24-hour storm events for pre- and post-development drainage calculations using HydroCAD analysis. Appendices C and E provide a full summary of the 10-year, 24-hour storm for the pre- and post-development drainage calculations using HydroCAD analysis.

Analysis Point ID	2-Year (Flow - cfs)		2-Year (Volume – acre/ft)		10-Year (Flow - cfs)		25-Year (Flow - cfs)		50-Year (Flow - cfs)	
	Pre-Dev.	Post Dev.	Pre-Dev.	Post Dev.	Pre-Dev.	Post Dev.	Pre-Dev.	Post Dev.	Pre-Dev.	Post Dev.
POI-1	1.9	1.2	0.2	0.1	3.6	3.0	5.3	5.1	7.0	6.5

Table 2- Pre and Post Flows

6.0 – REGULATORY COMPLIANCE

The project shall meet the stricter of the stormwater standards identified in the New Hampshire Department of Environmental Services (DES) Env-Wq 1500 Alteration of Terrain Regulations and City stormwater management regulations.

6.1 – ALTERATION OF TERRAIN (AOT) CRITERIA

The following regulatory requirements are provided to show the project conformance to the applicable criteria of the NHDES Env-Wq 1500 Alteration of Terrain Regulations which include and are not limited to the following:

Env-Wq 1507.03(a) Pollutant Discharge Minimization Requirements: Stormwater treatment practices described in Env-Wq 1508.03 through Env-Wq 1508.10 shall be acceptable methods for minimizing pollutant discharges to surface waters.

Stormwater is treated using bioretention systems which are considered a filtration BMP. Specifically, there are a total of four rain gardens throughout the site that provide filtration treatment and have the ability to infiltrate some runoff into the ground. The rain gardens are designed in accordance with the applicable criteria of Env-Wq 1508.06 as follows:

Per 1508.06(e), the volume of the practice shall be large enough to contain the WQV without depending on infiltration. Refer to the corresponding BMP Worksheet in Appendix F for verification.

Per 1508.06(f), the practice completely drains the WQV within 72 hours or less. Refer to the corresponding BMP Worksheet in Appendix F for verification.

Env-Wq 1507.03(c) Pollutant Discharge Minimization Requirements: Stormwater treatment practices shall be designed with infiltration rates in accordance with Env-Wq 1504.14

Per 1508.06(a), the design infiltration rate of underlaying native soil was considered in accordance with Env-Wq 1504.14. The design infiltration rate for each subsurface infiltration basin is the average from each infiltration test in each basin. Refer to the corresponding Infiltration Rate Calculations in Appendix I for verification.

Env-Wq 1507.03(e) Pollutant Discharge Minimization Requirements: Stormwater treatment practices shall be designed for the WQV/WQF, calculated in accordance with Env-Wq 1504.10 and Env-Wq 1504.11.

The regulation is met. Refer to the corresponding BMP Worksheets in Appendix F.

Env-Wq 1507.04(a) Groundwater Recharge Requirements: The proposed development shall reduce to the maximum extent practicable by using groundwater recharge practices as described in Env-Wq 1508.16.

The regulation is met. Refer to the corresponding BMP Worksheet in Appendix F for verification.

Env-Wq 1507.04(c) Groundwater Recharge Requirements: Design Infiltration rates for groundwater recharge practices shall be determined in accordance with Env-Wq 1504.14.

Design infiltration rates were obtained per Ksat testing using a Constant Compact Head Permeameter (Amoozemeter) per Env-Wq 1504.14(d). The design infiltration rate for each subsurface infiltration basin is the average from each infiltration test in each basin. Refer to the corresponding Infiltration Rate Calculations in Appendix I for verification.

Env-Wq 1507.05 Channel Protection Requirements: The 2-year 24-hour post development peak rate shall not exceed the pre-development peak flow rate for all flows leaving the site and the conditions of Env-Wq 1507.05(b), Env-Wq 1507.05(b)(2), or Env-Wq 1507.05(b)(3).

The 2-year, 24-hour post-development peak flow rate generated from the proposed disturbance is equal to or less than the 2-year, 24-hour pre-development peak flow rate and the 2 year, 24-hour post-development storm volume, directed to the nearest water body has not increased over the pre-development volume by more than 0.1 acre-feet.

The regulation is met. Refer to Table 2 for peak discharge rate and 2-year stormwater volume comparisons.

Env-Wq 1507.06 Control Peak Runoff: The 2-year, 10-year and 50-year 24-hour post development peak rate shall not exceed the pre-development peak flow rate for all flows leaving the site.

The regulation is met. Refer to Table 2 for peak discharge rate comparison.

7.0 – BEST MANAGEMENT PRACTICES

Best Management Practices will be developed in accordance with the *New Hampshire Stormwater Manual, Volumes Two and Three, December 2008*[3] to formulate a plan that assures stormwater quality both during and after construction. The intent of the outlined measures is to minimize erosion and sedimentation during construction, stabilize and protect the site from erosion after construction is complete and mitigate any adverse impacts to stormwater quality resulting from development. Best Management Practices for this project include:

- Temporary practices to be implemented during construction.

- Permanent practices to be implemented after construction.

7.1 – TEMPORARY PRACTICES

1. Erosion, sediment, and stormwater detention measures must be installed as directed by the engineer.
2. All disturbed areas, as well as loam stockpiles, shall be seeded and contained by a silt barrier.
3. Silt barriers must be installed prior to any construction commencing. All erosion control devices including silt barriers and storm drain inlet filters shall be inspected

[3] New Hampshire Stormwater Manual: Volume One - Stormwater and Antidegradation, December 2008; Volume Two - Post-Construction Best Management Practices Selection and Design, December 2008; Volume Three - Erosion and Sediment Controls During Construction, December 2008.

at least once per week and following any rainfall. All necessary maintenance shall be completed within twenty-four (24) hours.

4. Any silt barriers found to be failing must be replaced immediately. Sediment is to be removed from behind the silt fence if found to be one-third the height of the silt barrier or greater.
5. Any area of the site, which has been disturbed and where construction activity will not occur for more than twenty-one (21) days, shall be temporarily stabilized by mulching and seeding.
6. No construction materials shall be buried on-site.
7. After all areas have been stabilized, temporary practices are to be removed, and the area they are removed from must be smoothed and revegetated.
8. Areas must be temporarily stabilized within 14 days of disturbance or seeded and mulched within 3 days of final stabilization.
9. After November 15th, incomplete driveways or parking areas must be protected with a minimum of 3" of crushed gravel, meeting the standards of NHDOT item 304.3.
10. An area shall be considered stable if one of the following has occurred:
    a) Base course gravels are installed in areas to be paved.
    b) A minimum of 85% vegetated growth has been established.
    c) A minimum of 3" of non-erosive material such as stone or rip rap has been installed.
    d) Erosion control blankets have been properly installed.

7.2 – PERMANENT PRACTICES

The objectives for developing permanent Best Management Practices for this site include the following:

1. Maintain existing runoff flow characteristics.
    a) Drainage is structured to minimize any offsite increase in runoff.
2. Treatment BMP's are established to ensure the water quality.
3. Maintenance schedules are set to safeguard the long term working of the stormwater BMP's.

A Stormwater Management Operations & Maintenance Manual is provided to ensure the proper functioning of the system over time.

7.3 – BEST MANAGEMENT PRACTICE EFFICIENCIES

Appendix E of Volume 2 of the New Hampshire Stormwater [4] lists the pollutant removal efficiencies of various BMP's. All proposed BMP's meet all state and City requirements for

[4] New Hampshire Stormwater Manual: Volume One - Stormwater and Antidegradation, December 2008; Volume Two - Post-Construction Best Management Practices Selection and Design, December 2008; Volume Three - Erosion and Sediment Controls During Construction, December 2008.

total suspended solids (TSS) and pollutant removal, Total Nitrogen (TN), and Total Phosphorous (TP).

Bioretention Systems (rain gardens) have a 90% TSS removal efficiency, 65% TN removal efficiency, and 65% TP efficiency.

Proposed Rain Gardens #1-4 receive runoff from yards, residential roofs, and potions of residential driveways. Due to the nature of the areas contributing runoff to the rain gardens, no pretreatment is required.

7.3.1 – LID PRACTICES

Bioretention Areas, including rain gardens, are considered to be a Low Impact Design (LID) filtering practice. The goal of LID systems is to mimic a site's precondition hydrology by infiltrating, filtering, storming, evaporating and detaining stormwater but use of natural landscape features. These treatments filter and detain the stormwater. They use natural processes, such as soil filtration, evapotranspiration (from the vegetation in the system) and anaerobic and aerobic treatment of stormwater. They detain the stormwater and release it to mimic the predevelopment storm flows.

The inclusion of rain gardens in the proposed site design allows for stormwater to infiltrate back into the ground. During heavier storm events, a perforated subdrain located below each rain garden's filtration layer has the ability to convey treated flows to other areas on-site to prevent extended ponding periods. Each rain garden is equipped with an outlet control structure that regulates discharge rates during these heavier storms through the implementation of orifices and overflow grates.

8.0 – CONCLUSION

The proposed stormwater management system will treat, infiltrate, and mitigate the runoff generated from the proposed development and provide protection of groundwater and surface waters as required through the Alteration of Terrain Bureau and City stormwater management regulations. Furthermore, the stormwater management for this project has been designed to pose no adverse effects on the surrounding properties.

Respectfully,
TFMoran, Inc.

Justin Macek, EIT
Project Manager

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APPENDIX A – EXTREME PRECIPITATION RATES

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Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.769 degrees West
Latitude	43.058 degrees North
Elevation	0 feet
Date/Time	Fri, 07 Jan 2022 14:42:09 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.66	2.93	**1yr**	2.36	2.82	3.23	3.95	4.56	**1yr**
2yr	0.32	0.50	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.49	3.22	3.58	**2yr**	2.85	3.44	3.94	4.69	5.34	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.43	3.14	4.08	4.59	**5yr**	3.61	4.41	5.05	5.95	6.72	**5yr**
10yr	0.41	0.65	0.82	1.12	1.45	1.89	**10yr**	1.25	1.73	2.23	2.90	3.76	4.88	5.54	**10yr**	4.32	5.33	6.10	7.12	8.00	**10yr**
25yr	0.48	0.76	0.97	1.34	1.77	2.34	**25yr**	1.53	2.14	2.78	3.63	4.75	6.19	7.12	**25yr**	5.47	6.84	7.82	9.05	10.08	**25yr**
50yr	0.54	0.86	1.10	1.54	2.07	2.76	**50yr**	1.79	2.53	3.29	4.33	5.67	7.41	8.60	**50yr**	6.56	8.27	9.45	10.84	12.01	**50yr**
100yr	0.60	0.97	1.25	1.77	2.42	3.26	**100yr**	2.09	2.98	3.91	5.16	6.78	8.88	10.40	**100yr**	7.85	10.00	11.42	13.00	14.31	**100yr**
200yr	0.67	1.10	1.43	2.05	2.83	3.84	**200yr**	2.44	3.52	4.62	6.14	8.10	10.64	12.58	**200yr**	9.41	12.10	13.80	15.59	17.07	**200yr**
500yr	0.80	1.31	1.71	2.49	3.48	4.77	**500yr**	3.00	4.38	5.77	7.72	10.24	13.52	16.18	**500yr**	11.96	15.56	17.73	19.84	21.56	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.88	**1yr**	0.63	0.86	0.92	1.33	1.68	2.24	2.51	**1yr**	1.98	2.42	2.87	3.18	3.90	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.34	3.06	3.46	**2yr**	2.71	3.33	3.83	4.56	5.09	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.12	2.73	3.80	4.21	**5yr**	3.36	4.05	4.73	5.55	6.26	**5yr**
10yr	0.39	0.59	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.81	2.39	3.06	4.39	4.88	**10yr**	3.88	4.70	5.47	6.44	7.22	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.90	**25yr**	1.35	1.86	2.10	2.76	3.54	4.73	5.93	**25yr**	4.19	5.70	6.69	7.84	8.72	**25yr**
50yr	0.48	0.73	0.91	1.31	1.77	2.17	**50yr**	1.53	2.12	2.35	3.07	3.93	5.35	6.85	**50yr**	4.73	6.58	7.78	9.10	10.07	**50yr**
100yr	0.54	0.81	1.02	1.47	2.02	2.47	**100yr**	1.74	2.42	2.63	3.41	4.35	6.01	7.91	**100yr**	5.32	7.61	9.06	10.58	11.63	**100yr**
200yr	0.59	0.89	1.13	1.64	2.29	2.82	**200yr**	1.97	2.75	2.94	3.78	4.79	6.74	9.14	**200yr**	5.97	8.79	10.54	12.32	13.45	**200yr**
500yr	0.69	1.02	1.32	1.92	2.72	3.37	**500yr**	2.35	3.29	3.41	4.31	5.46	7.85	11.06	**500yr**	6.94	10.63	12.87	15.10	16.29	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.72	0.89	1.08	**1yr**	0.77	1.06	1.26	1.74	2.20	2.99	3.16	**1yr**	2.65	3.04	3.59	4.38	5.06	**1yr**
2yr	0.34	0.52	0.64	0.86	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.51	3.43	3.71	**2yr**	3.04	3.56	4.09	4.84	5.64	**2yr**
5yr	0.40	0.62	0.77	1.05	1.34	1.62	**5yr**	1.15	1.58	1.88	2.53	3.25	4.35	4.96	**5yr**	3.85	4.77	5.39	6.38	7.16	**5yr**
10yr	0.47	0.72	0.89	1.25	1.61	1.98	**10yr**	1.39	1.93	2.28	3.10	3.95	5.35	6.20	**10yr**	4.73	5.96	6.81	7.84	8.75	**10yr**
25yr	0.58	0.88	1.09	1.56	2.05	2.57	**25yr**	1.77	2.51	2.95	4.07	5.14	7.80	8.33	**25yr**	6.90	8.01	9.13	10.34	11.41	**25yr**
50yr	0.67	1.02	1.27	1.83	2.46	3.13	**50yr**	2.12	3.06	3.59	5.00	6.31	9.76	10.44	**50yr**	8.64	10.04	11.41	12.72	13.96	**50yr**
100yr	0.79	1.19	1.49	2.16	2.96	3.81	**100yr**	2.55	3.72	4.37	6.15	7.75	12.21	13.07	**100yr**	10.81	12.57	14.25	15.68	17.08	**100yr**
200yr	0.92	1.39	1.76	2.55	3.55	4.65	**200yr**	3.07	4.55	5.33	7.57	9.51	15.32	16.39	**200yr**	13.56	15.76	17.82	19.33	20.90	**200yr**
500yr	1.15	1.70	2.19	3.19	4.53	6.04	**500yr**	3.91	5.90	6.92	10.01	12.52	20.70	22.10	**500yr**	18.32	21.25	23.96	25.47	27.32	**500yr**

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APPENDIX B – PRE-DEVELOPMENT CALCULATIONS

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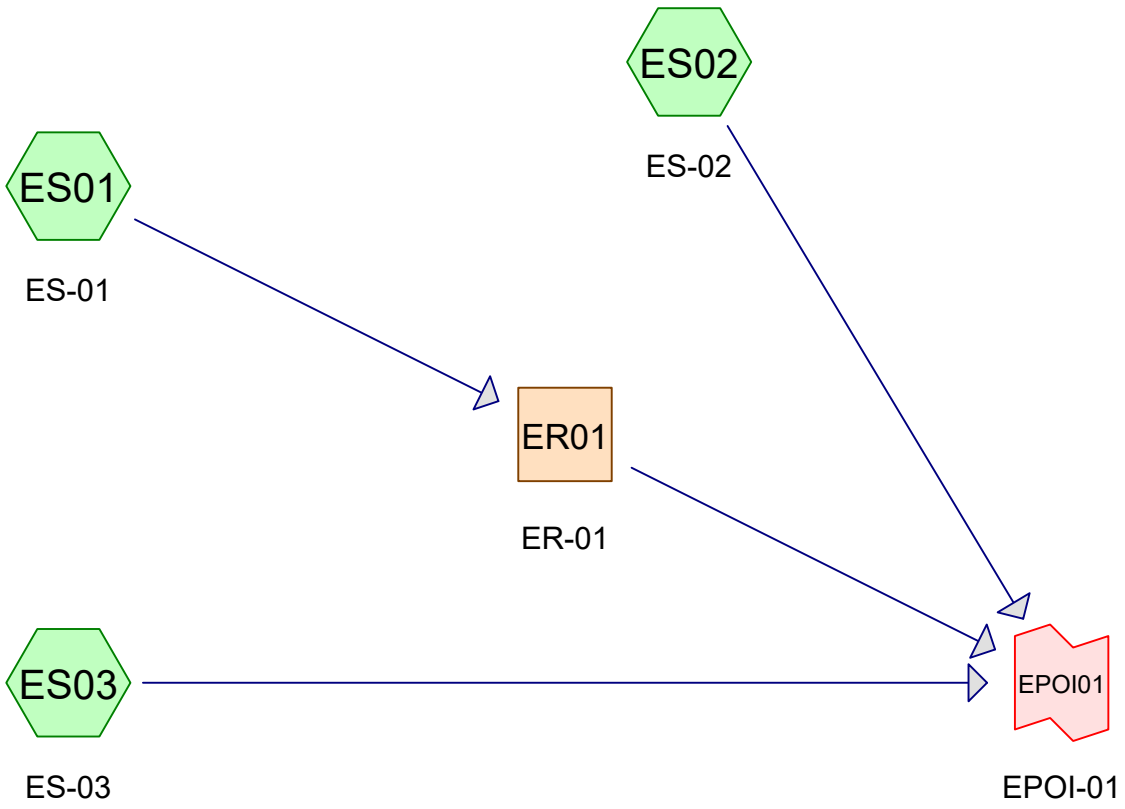
Pre-Development
Drainage



Subcat Reach Pond Link

Routing Diagram for 45407-120_Pre & Post Development
Prepared by TFMoran Inc., Printed 4/18/2022

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45407-120_Pre & Post Development

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.03	68	<50% Grass cover, Poor, HSG A (ES01)
0.04	79	<50% Grass cover, Poor, HSG B (ES02)
0.30	39	>75% Grass cover, Good, HSG A (ES01, ES03)
0.63	61	>75% Grass cover, Good, HSG B (ES02, ES03)
0.12	98	Paved parking, HSG A (ES01)
0.17	98	Paved parking, HSG B (ES02, ES03)
0.08	98	Roofs, HSG A (ES01, ES03)
0.06	98	Roofs, HSG B (ES02)
0.08	60	Woods, Fair, HSG B (ES02, ES03)
1.50	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.53	HSG A	ES01, ES03
0.97	HSG B	ES02, ES03
0.00	HSG C	
0.00	HSG D	
0.00	Other	
1.50		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES01: ES-01 Runoff Area=19,795 sf 29.23% Impervious Runoff Depth>1.10"
Flow Length=165' Tc=6.5 min CN=WQ Runoff=0.5 cfs 0.0 af

Subcatchment ES02: ES-02 Runoff Area=38,970 sf 17.93% Impervious Runoff Depth>1.20"
Flow Length=286' Tc=7.6 min CN=WQ Runoff=1.0 cfs 0.1 af

Subcatchment ES03: ES-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>3.05"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=0.5 cfs 0.0 af

Reach ER01: ER-01 Avg. Flow Depth=0.06' Max Vel=1.36 fps Inflow=0.5 cfs 0.0 af
n=0.023 L=250.0' S=0.0220 '/' Capacity=23.0 cfs Outflow=0.5 cfs 0.0 af

Link EPOI01: EPOI-01 Inflow=1.9 cfs 0.2 af
Primary=1.9 cfs 0.2 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.2 af Average Runoff Depth = 1.36"
71.77% Pervious = 1.08 ac 28.23% Impervious = 0.42 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES01: ES-01 Runoff Area=19,795 sf 29.23% Impervious Runoff Depth>1.95"
Flow Length=165' Tc=6.5 min CN=WQ Runoff=0.8 cfs 0.1 af

Subcatchment ES02: ES-02 Runoff Area=38,970 sf 17.93% Impervious Runoff Depth>2.45"
Flow Length=286' Tc=7.6 min CN=WQ Runoff=2.2 cfs 0.2 af

Subcatchment ES03: ES-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>4.81"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.1 af

Reach ER01: ER-01 Avg. Flow Depth=0.08' Max Vel=1.61 fps Inflow=0.8 cfs 0.1 af
n=0.023 L=250.0' S=0.0220 '/' Capacity=23.0 cfs Outflow=0.7 cfs 0.1 af

Link EPOI01: EPOI-01 Inflow=3.6 cfs 0.3 af
Primary=3.6 cfs 0.3 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.3 af Average Runoff Depth = 2.54"
71.77% Pervious = 1.08 ac 28.23% Impervious = 0.42 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES01: ES-01 Runoff Area=19,795 sf 29.23% Impervious Runoff Depth>2.77"
Flow Length=165' Tc=6.5 min CN=WQ Runoff=1.1 cfs 0.1 af

Subcatchment ES02: ES-02 Runoff Area=38,970 sf 17.93% Impervious Runoff Depth>3.58"
Flow Length=286' Tc=7.6 min CN=WQ Runoff=3.3 cfs 0.3 af

Subcatchment ES03: ES-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>6.22"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=0.9 cfs 0.1 af

Reach ER01: ER-01 Avg. Flow Depth=0.10' Max Vel=1.83 fps Inflow=1.1 cfs 0.1 af
n=0.023 L=250.0' S=0.0220 '/' Capacity=23.0 cfs Outflow=1.1 cfs 0.1 af

Link EPOI01: EPOI-01 Inflow=5.3 cfs 0.4 af
Primary=5.3 cfs 0.4 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.5 af Average Runoff Depth = 3.60"
71.77% Pervious = 1.08 ac 28.23% Impervious = 0.42 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES01: ES-01 Runoff Area=19,795 sf 29.23% Impervious Runoff Depth>3.63"
Flow Length=165' Tc=6.5 min CN=WQ Runoff=1.6 cfs 0.1 af

Subcatchment ES02: ES-02 Runoff Area=38,970 sf 17.93% Impervious Runoff Depth>4.71"
Flow Length=286' Tc=7.6 min CN=WQ Runoff=4.4 cfs 0.4 af

Subcatchment ES03: ES-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>7.55"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=1.1 cfs 0.1 af

Reach ER01: ER-01 Avg. Flow Depth=0.12' Max Vel=2.03 fps Inflow=1.6 cfs 0.1 af
n=0.023 L=250.0' S=0.0220 '/' Capacity=23.0 cfs Outflow=1.5 cfs 0.1 af

Link EPOI01: EPOI-01 Inflow=7.0 cfs 0.6 af
Primary=7.0 cfs 0.6 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.6 af Average Runoff Depth = 4.67"
71.77% Pervious = 1.08 ac 28.23% Impervious = 0.42 ac

APPENDIX C – PRE-DEVELOPMENT CALCULATIONS (10-YEAR STORM EVENT)

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Summary for Subcatchment ES01: ES-01

Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.1 af, Depth> 1.95"
Routed to Reach ER01 : ER-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
12,608	39	>75% Grass cover, Good, HSG A
1,400	68	<50% Grass cover, Poor, HSG A
664	98	Roofs, HSG A
5,123	98	Paved parking, HSG A
19,795		Weighted Average
14,008		70.77% Pervious Area
5,787		29.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0550	0.27		**Sheet Flow, Grass Yard** Grass: Short n= 0.150 P2= 3.70"
0.4	65	0.0230	3.08		**Shallow Concentrated Flow, Grass Yard** Paved Kv= 20.3 fps
6.5	165	Total			

Summary for Subcatchment ES02: ES-02

Runoff = 2.2 cfs @ 12.11 hrs, Volume= 0.2 af, Depth> 2.45"
Routed to Link EPOI01 : EPOI-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
26,796	61	>75% Grass cover, Good, HSG B
1,553	79	<50% Grass cover, Poor, HSG B
3,632	60	Woods, Fair, HSG B
2,444	98	Roofs, HSG B
4,545	98	Paved parking, HSG B
38,970		Weighted Average
31,981		82.07% Pervious Area
6,989		17.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0750	0.31		**Sheet Flow, Grass Yard (East)** Grass: Short n= 0.150 P2= 3.70"
1.7	141	0.0375	1.36		**Shallow Concentrated Flow, Grass Yard (East)** Short Grass Pasture Kv= 7.0 fps
0.5	45	0.0750	1.37		**Shallow Concentrated Flow, Brush** Woodland Kv= 5.0 fps
7.6	286	Total			

Summary for Subcatchment ES03: ES-03

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 0.1 af, Depth> 4.81"
Routed to Link EPOI01 : EPOI-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
525	61	>75% Grass cover, Good, HSG B
0	79	<50% Grass cover, Poor, HSG B
0	98	Roofs, HSG B
2,744	98	Paved parking, HSG B
337	39	>75% Grass cover, Good, HSG A
2,915	98	Roofs, HSG A
20	60	Woods, Fair, HSG B
6,541		Weighted Average
882		13.48% Pervious Area
5,659		86.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0425	2.00		**Sheet Flow, Paved Road** Smooth surfaces n= 0.011 P2= 3.70"
1.0	190	0.0250	3.21		**Shallow Concentrated Flow, Paved Road** Paved Kv= 20.3 fps
1.8	100	0.0170	0.91		**Shallow Concentrated Flow, Grass Shoulder** Short Grass Pasture Kv= 7.0 fps
2.4					**Direct Entry, Min Tc**
6.0	390	Total			

Summary for Reach ER01: ER-01

The Manning's Number used is an average of rough pavement and short grassed area. The reach channel is off the shoulder of the road in grassed area, however as the channel water elevation rises, pavement is introduced to the channel side slopes.

Inflow Area = 0.45 ac, 29.23% Impervious, Inflow Depth > 1.95" for 10-Year event
Inflow = 0.8 cfs @ 12.09 hrs, Volume= 0.1 af
Outflow = 0.7 cfs @ 12.12 hrs, Volume= 0.1 af, Atten= 5%, Lag= 1.7 min
Routed to Link EPOI01 : EPOI-01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.61 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 8.9 min

Peak Storage= 115.1 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 6.59'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 23.0 cfs

5.00' x 0.50' deep channel, n= 0.023 Rough Pavement + Short Grass
Side Slope Z-value= 10.0 '/' Top Width= 15.00'
Length= 250.0' Slope= 0.0220 '/'
Inlet Invert= 31.00', Outlet Invert= 25.50'

‡

Summary for Link EPOI01: EPOI-01

Inflow Area = 1.50 ac, 28.23% Impervious, Inflow Depth > 2.53" for 10-Year event
Inflow = 3.6 cfs @ 12.11 hrs, Volume= 0.3 af
Primary = 3.6 cfs @ 12.11 hrs, Volume= 0.3 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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APPENDIX D – POST-DEVELOPMENT CALCULATIONS

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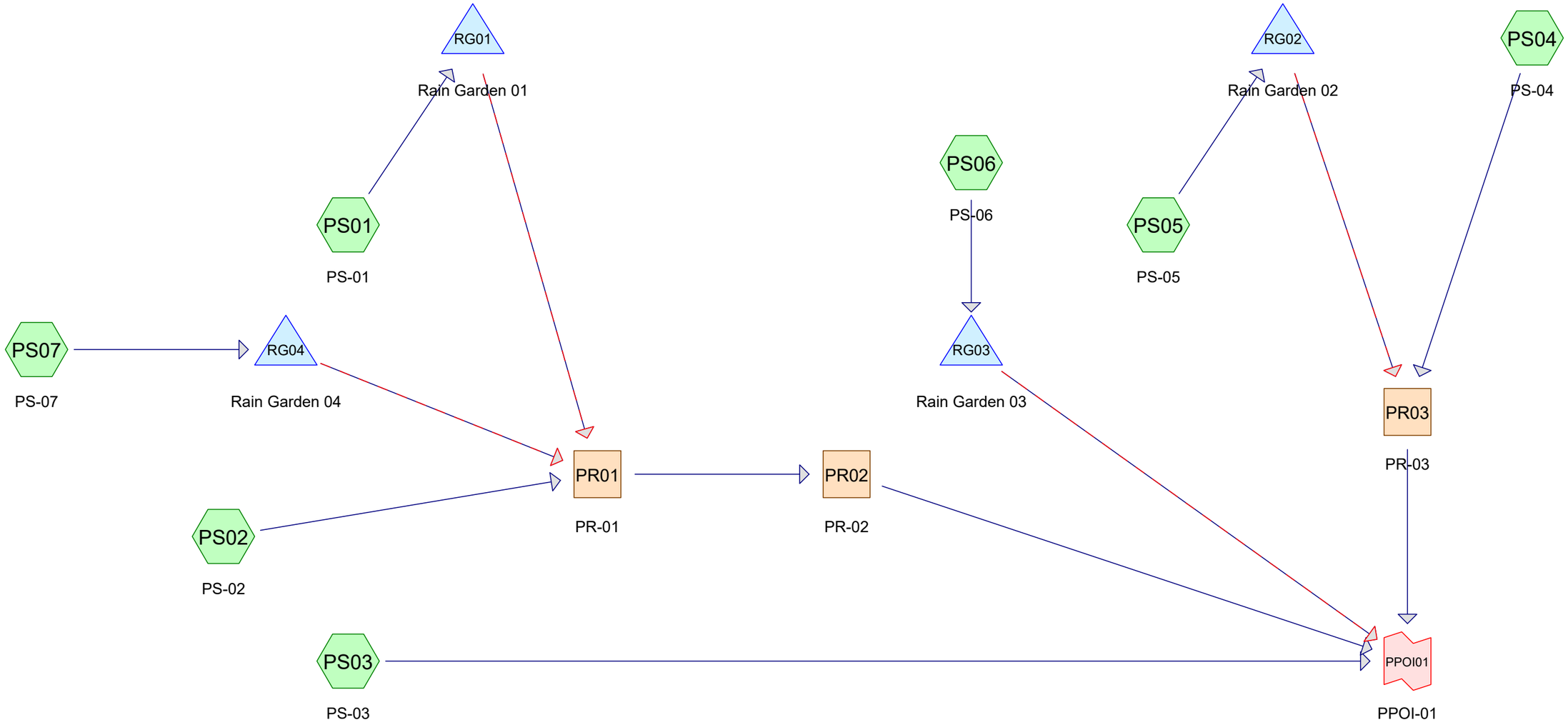
Post-Development
Drainage



Subcat Reach Pond Link

Routing Diagram for 45407-120_Pre & Post Development
Prepared by TFMoran Inc., Printed 4/18/2022
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45407-120_Pre & Post Development

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.04	68	<50% Grass cover, Poor, HSG A (PS01, PS02, PS07)
0.04	79	<50% Grass cover, Poor, HSG B (PS04, PS05, PS06)
0.30	39	>75% Grass cover, Good, HSG A (PS01, PS02, PS03, PS07)
0.54	61	>75% Grass cover, Good, HSG B (PS03, PS04, PS05, PS06)
0.06	98	Paved parking, HSG A (PS01, PS02, PS07)
0.20	98	Paved parking, HSG B (PS03, PS04, PS05, PS06)
0.13	98	Roofs, HSG A (PS01, PS02, PS03, PS07)
0.14	98	Roofs, HSG B (PS04, PS05, PS06)
0.04	60	Woods, Fair, HSG B (PS03, PS04)
1.50	**70**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.53	HSG A	PS01, PS02, PS03, PS07
0.97	HSG B	PS03, PS04, PS05, PS06
0.00	HSG C	
0.00	HSG D	
0.00	Other	
1.50		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS01: PS-01 Runoff Area=11,255 sf 16.98% Impervious Runoff Depth>0.72"
Flow Length=71' Slope=0.0280 '/' Tc=6.1 min CN=WQ Runoff=0.2 cfs 0.0 af

SubcatchmentPS02: PS-02 Runoff Area=6,297 sf 34.43% Impervious Runoff Depth>1.29"
Flow Length=149' Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.0 af

SubcatchmentPS03: PS-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>3.05"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=0.5 cfs 0.0 af

SubcatchmentPS04: PS-04 Runoff Area=17,880 sf 38.38% Impervious Runoff Depth>1.74"
Flow Length=245' Tc=8.1 min CN=WQ Runoff=0.7 cfs 0.1 af

SubcatchmentPS05: PS-05 Runoff Area=15,305 sf 22.05% Impervious Runoff Depth>1.38"
Flow Length=70' Tc=6.2 min CN=WQ Runoff=0.5 cfs 0.0 af

SubcatchmentPS06: PS-06 Runoff Area=5,793 sf 35.75% Impervious Runoff Depth>1.72"
Flow Length=72' Slope=0.0694 '/' Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.0 af

SubcatchmentPS07: PS-07 Runoff Area=2,235 sf 51.59% Impervious Runoff Depth>1.85"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.0 af

Reach PR01: PR-01 Avg. Flow Depth=0.04' Max Vel=0.99 fps Inflow=0.2 cfs 0.0 af
n=0.022 L=25.0' S=0.0200 '/' Capacity=14.6 cfs Outflow=0.2 cfs 0.0 af

Reach PR02: PR-02 Avg. Flow Depth=0.03' Max Vel=1.04 fps Inflow=0.2 cfs 0.0 af
n=0.022 L=210.0' S=0.0262 '/' Capacity=16.7 cfs Outflow=0.2 cfs 0.0 af

Reach PR03: PR-03 Avg. Flow Depth=0.05' Max Vel=0.73 fps Inflow=0.7 cfs 0.1 af
n=0.030 L=60.0' S=0.0117 '/' Capacity=21.9 cfs Outflow=0.6 cfs 0.1 af

Pond RG01: Rain Garden 01 Peak Elev=33.09' Storage=153.1 cf Inflow=0.2 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.0 cfs 0.0 af

Pond RG02: Rain Garden 02 Peak Elev=32.87' Storage=876.7 cf Inflow=0.5 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.1 cfs 0.0 af

Pond RG03: Rain Garden 03 Peak Elev=29.94' Storage=363.6 cf Inflow=0.2 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.1 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.1 cfs 0.0 af

Pond RG04: Rain Garden 04 Peak Elev=31.94' Storage=111.3 cf Inflow=0.1 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.0 cfs 0.0 af

Link PPOI01: PPOI-01 Inflow=1.2 cfs 0.1 af
Primary=1.2 cfs 0.1 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.2 af Average Runoff Depth = 1.57"
64.48% Pervious = 0.97 ac 35.52% Impervious = 0.53 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS01: PS-01 Runoff Area=11,255 sf 16.98% Impervious Runoff Depth>1.42"
Flow Length=71' Slope=0.0280 '/' Tc=6.1 min CN=WQ Runoff=0.3 cfs 0.0 af

SubcatchmentPS02: PS-02 Runoff Area=6,297 sf 34.43% Impervious Runoff Depth>2.23"
Flow Length=149' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.0 af

SubcatchmentPS03: PS-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>4.81"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.1 af

SubcatchmentPS04: PS-04 Runoff Area=17,880 sf 38.38% Impervious Runoff Depth>3.14"
Flow Length=245' Tc=8.1 min CN=WQ Runoff=1.2 cfs 0.1 af

SubcatchmentPS05: PS-05 Runoff Area=15,305 sf 22.05% Impervious Runoff Depth>2.69"
Flow Length=70' Tc=6.2 min CN=WQ Runoff=1.0 cfs 0.1 af

SubcatchmentPS06: PS-06 Runoff Area=5,793 sf 35.75% Impervious Runoff Depth>3.13"
Flow Length=72' Slope=0.0694 '/' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.0 af

SubcatchmentPS07: PS-07 Runoff Area=2,235 sf 51.59% Impervious Runoff Depth>3.04"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.0 af

Reach PR01: PR-01 Avg. Flow Depth=0.05' Max Vel=1.17 fps Inflow=0.3 cfs 0.0 af
n=0.022 L=25.0' S=0.0200 '/' Capacity=14.6 cfs Outflow=0.3 cfs 0.0 af

Reach PR02: PR-02 Avg. Flow Depth=0.04' Max Vel=1.24 fps Inflow=0.3 cfs 0.0 af
n=0.022 L=210.0' S=0.0262 '/' Capacity=16.7 cfs Outflow=0.3 cfs 0.0 af

Reach PR03: PR-03 Avg. Flow Depth=0.10' Max Vel=1.07 fps Inflow=1.9 cfs 0.2 af
n=0.030 L=60.0' S=0.0117 '/' Capacity=21.9 cfs Outflow=1.9 cfs 0.2 af

Pond RG01: Rain Garden 01 Peak Elev=33.85' Storage=383.3 cf Inflow=0.3 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.0 cfs 0.0 af

Pond RG02: Rain Garden 02 Peak Elev=33.00' Storage=1,023.1 cf Inflow=1.0 cfs 0.1 af
Discarded=0.0 cfs 0.0 af Primary=0.6 cfs 0.0 af Secondary=0.2 cfs 0.0 af Outflow=0.8 cfs 0.1 af

Pond RG03: Rain Garden 03 Peak Elev=29.98' Storage=378.3 cf Inflow=0.4 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.2 cfs 0.0 af Secondary=0.2 cfs 0.0 af Outflow=0.4 cfs 0.0 af

Pond RG04: Rain Garden 04 Peak Elev=33.66' Storage=217.1 cf Inflow=0.1 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.0 cfs 0.0 af

Link PPOI01: PPOI-01 Inflow=3.0 cfs 0.3 af
Primary=3.0 cfs 0.3 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.4 af Average Runoff Depth = 2.81"
64.48% Pervious = 0.97 ac 35.52% Impervious = 0.53 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS01: PS-01 Runoff Area=11,255 sf 16.98% Impervious Runoff Depth>2.15"
Flow Length=71' Slope=0.0280 '/' Tc=6.1 min CN=WQ Runoff=0.5 cfs 0.0 af

SubcatchmentPS02: PS-02 Runoff Area=6,297 sf 34.43% Impervious Runoff Depth>3.12"
Flow Length=149' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.0 af

SubcatchmentPS03: PS-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>6.22"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=0.9 cfs 0.1 af

SubcatchmentPS04: PS-04 Runoff Area=17,880 sf 38.38% Impervious Runoff Depth>4.36"
Flow Length=245' Tc=8.1 min CN=WQ Runoff=1.8 cfs 0.1 af

SubcatchmentPS05: PS-05 Runoff Area=15,305 sf 22.05% Impervious Runoff Depth>3.86"
Flow Length=70' Tc=6.2 min CN=WQ Runoff=1.5 cfs 0.1 af

SubcatchmentPS06: PS-06 Runoff Area=5,793 sf 35.75% Impervious Runoff Depth>4.35"
Flow Length=72' Slope=0.0694 '/' Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.0 af

SubcatchmentPS07: PS-07 Runoff Area=2,235 sf 51.59% Impervious Runoff Depth>4.08"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.0 af

Reach PR01: PR-01 Avg. Flow Depth=0.06' Max Vel=1.32 fps Inflow=0.4 cfs 0.0 af
n=0.022 L=25.0' S=0.0200 '/' Capacity=14.6 cfs Outflow=0.4 cfs 0.0 af

Reach PR02: PR-02 Avg. Flow Depth=0.05' Max Vel=1.40 fps Inflow=0.4 cfs 0.0 af
n=0.022 L=210.0' S=0.0262 '/' Capacity=16.7 cfs Outflow=0.4 cfs 0.0 af

Reach PR03: PR-03 Avg. Flow Depth=0.14' Max Vel=1.30 fps Inflow=3.3 cfs 0.2 af
n=0.030 L=60.0' S=0.0117 '/' Capacity=21.9 cfs Outflow=3.2 cfs 0.2 af

Pond RG01: Rain Garden 01 Peak Elev=35.61' Storage=748.8 cf Inflow=0.5 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.0 cfs 0.0 af

Pond RG02: Rain Garden 02 Peak Elev=33.04' Storage=1,028.1 cf Inflow=1.5 cfs 0.1 af
Discarded=0.0 cfs 0.0 af Primary=0.9 cfs 0.1 af Secondary=0.7 cfs 0.0 af Outflow=1.5 cfs 0.1 af

Pond RG03: Rain Garden 03 Peak Elev=29.99' Storage=383.3 cf Inflow=0.6 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.3 cfs 0.0 af Secondary=0.3 cfs 0.0 af Outflow=0.6 cfs 0.0 af

Pond RG04: Rain Garden 04 Peak Elev=33.87' Storage=280.8 cf Inflow=0.2 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.0 cfs 0.0 af

Link PPOI01: PPOI-01 Inflow=5.1 cfs 0.4 af
Primary=5.1 cfs 0.4 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.5 af Average Runoff Depth = 3.92"
64.48% Pervious = 0.97 ac 35.52% Impervious = 0.53 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS01: PS-01 Runoff Area=11,255 sf 16.98% Impervious Runoff Depth>2.93"
Flow Length=71' Slope=0.0280 '/' Tc=6.1 min CN=WQ Runoff=0.7 cfs 0.1 af

SubcatchmentPS02: PS-02 Runoff Area=6,297 sf 34.43% Impervious Runoff Depth>4.02"
Flow Length=149' Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.0 af

SubcatchmentPS03: PS-03 Runoff Area=6,541 sf 86.52% Impervious Runoff Depth>7.55"
Flow Length=390' Tc=6.0 min CN=WQ Runoff=1.1 cfs 0.1 af

SubcatchmentPS04: PS-04 Runoff Area=17,880 sf 38.38% Impervious Runoff Depth>5.55"
Flow Length=245' Tc=8.1 min CN=WQ Runoff=2.3 cfs 0.2 af

SubcatchmentPS05: PS-05 Runoff Area=15,305 sf 22.05% Impervious Runoff Depth>5.02"
Flow Length=70' Tc=6.2 min CN=WQ Runoff=1.9 cfs 0.1 af

SubcatchmentPS06: PS-06 Runoff Area=5,793 sf 35.75% Impervious Runoff Depth>5.54"
Flow Length=72' Slope=0.0694 '/' Tc=6.0 min CN=WQ Runoff=0.8 cfs 0.1 af

SubcatchmentPS07: PS-07 Runoff Area=2,235 sf 51.59% Impervious Runoff Depth>5.11"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.0 af

Reach PR01: PR-01 Avg. Flow Depth=0.07' Max Vel=1.47 fps Inflow=0.6 cfs 0.1 af
n=0.022 L=25.0' S=0.0200 '/' Capacity=14.6 cfs Outflow=0.6 cfs 0.1 af

Reach PR02: PR-02 Avg. Flow Depth=0.06' Max Vel=1.56 fps Inflow=0.6 cfs 0.1 af
n=0.022 L=210.0' S=0.0262 '/' Capacity=16.7 cfs Outflow=0.5 cfs 0.1 af

Reach PR03: PR-03 Avg. Flow Depth=0.16' Max Vel=1.41 fps Inflow=4.0 cfs 0.3 af
n=0.030 L=60.0' S=0.0117 '/' Capacity=21.9 cfs Outflow=4.1 cfs 0.3 af

Pond RG01: Rain Garden 01 Peak Elev=35.87' Storage=1,103.8 cf Inflow=0.7 cfs 0.1 af
Discarded=0.0 cfs 0.0 af Primary=0.0 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.1 cfs 0.1 af

Pond RG02: Rain Garden 02 Peak Elev=33.06' Storage=1,028.1 cf Inflow=1.9 cfs 0.1 af
Discarded=0.0 cfs 0.0 af Primary=1.0 cfs 0.1 af Secondary=0.8 cfs 0.0 af Outflow=1.8 cfs 0.1 af

Pond RG03: Rain Garden 03 Peak Elev=29.99' Storage=387.6 cf Inflow=0.8 cfs 0.1 af
Discarded=0.0 cfs 0.0 af Primary=0.3 cfs 0.0 af Secondary=0.5 cfs 0.0 af Outflow=0.8 cfs 0.1 af

Pond RG04: Rain Garden 04 Peak Elev=33.90' Storage=291.8 cf Inflow=0.3 cfs 0.0 af
Discarded=0.0 cfs 0.0 af Primary=0.1 cfs 0.0 af Secondary=0.0 cfs 0.0 af Outflow=0.1 cfs 0.0 af

Link PPOI01: PPOI-01 Inflow=6.5 cfs 0.5 af
Primary=6.5 cfs 0.5 af

Total Runoff Area = 1.50 ac Runoff Volume = 0.6 af Average Runoff Depth = 5.01"
64.48% Pervious = 0.97 ac 35.52% Impervious = 0.53 ac

APPENDIX E – POST-DEVELOPMENT CALCULATIONS (10-YEAR STORM EVENT)

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Summary for Subcatchment PS01: PS-01

Runoff = 0.3 cfs @ 12.09 hrs, Volume= 0.0 af, Depth> 1.42"
Routed to Pond RG01 : Rain Garden 01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
8,038	39	>75% Grass cover, Good, HSG A
1,306	68	<50% Grass cover, Poor, HSG A
1,624	98	Roofs, HSG A
287	98	Paved parking, HSG A
11,255		Weighted Average
9,344		83.02% Pervious Area
1,911		16.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	71	0.0280	0.20		**Sheet Flow, Grass Yard** Grass: Short n= 0.150 P2= 3.70"

Summary for Subcatchment PS02: PS-02

Runoff = 0.3 cfs @ 12.09 hrs, Volume= 0.0 af, Depth> 2.23"
Routed to Reach PR01 : PR-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
3,621	39	>75% Grass cover, Good, HSG A
508	68	<50% Grass cover, Poor, HSG A
0	36	Woods, Fair, HSG A
157	98	Roofs, HSG A
2,011	98	Paved parking, HSG A
6,297		Weighted Average
4,129		65.57% Pervious Area
2,168		34.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	65	0.0400	0.22		**Sheet Flow, Grass Yard** Grass: Short n= 0.150 P2= 3.70"
0.4	35	0.0250	1.31		**Sheet Flow, Driveway/Road** Smooth surfaces n= 0.011 P2= 3.70"
0.1	27	0.0250	3.21		**Shallow Concentrated Flow, Road** Paved Kv= 20.3 fps
0.1	22	0.0250	2.87	5.75	**Channel Flow, Swale** Area= 2.0 sf Perim= 9.0' r= 0.22' n= 0.030 Short grass
0.5					**Direct Entry, Min Tc**
6.0	149	Total			

Summary for Subcatchment PS03: PS-03

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 0.1 af, Depth> 4.81"
Routed to Link PPOI01 : PPOI-01

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
525	61	>75% Grass cover, Good, HSG B
0	79	<50% Grass cover, Poor, HSG B
0	98	Roofs, HSG B
2,744	98	Paved parking, HSG B
337	39	>75% Grass cover, Good, HSG A
2,915	98	Roofs, HSG A
20	60	Woods, Fair, HSG B
6,541		Weighted Average
882		13.48% Pervious Area
5,659		86.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0425	2.00		**Sheet Flow, Paved Road** Smooth surfaces n= 0.011 P2= 3.70"
1.0	190	0.0250	3.21		**Shallow Concentrated Flow, Paved Road** Paved Kv= 20.3 fps
1.8	100	0.0170	0.91		**Shallow Concentrated Flow, Grass Shoulder** Short Grass Pasture Kv= 7.0 fps
2.4					**Direct Entry, Min Tc**
6.0	390	Total			

Summary for Subcatchment PS04: PS-04

Runoff = 1.2 cfs @ 12.12 hrs, Volume= 0.1 af, Depth> 3.14"
Routed to Reach PR03 : PR-03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
9,038	61	>75% Grass cover, Good, HSG B
154	79	<50% Grass cover, Poor, HSG B
1,352	98	Roofs, HSG B
5,502	98	Paved parking, HSG B
1,826	60	Woods, Fair, HSG B
8	98	Paved parking, HSG B
17,880		Weighted Average
11,018		61.62% Pervious Area
6,862		38.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0500	0.26		**Sheet Flow, Grass Yard** Grass: Short n= 0.150 P2= 3.70"
0.9	80	0.0450	1.48		**Shallow Concentrated Flow, Side Yard (East Property Line)** Short Grass Pasture Kv= 7.0 fps
0.4	30	0.0600	1.22		**Shallow Concentrated Flow, Woods Side Yard** Woodland Kv= 5.0 fps
0.5	35	0.0140	1.20	4.57	**Channel Flow, Wooded Swale** Area= 3.8 sf Perim= 19.0' r= 0.20' n= 0.050 Scattered brush, heavy weeds
8.1	245	Total			

Summary for Subcatchment PS05: PS-05

Runoff = 1.0 cfs @ 12.10 hrs, Volume= 0.1 af, Depth> 2.69"
Routed to Pond RG02 : Rain Garden 02

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
10,534	61	>75% Grass cover, Good, HSG B
1,397	79	<50% Grass cover, Poor, HSG B
3,141	98	Roofs, HSG B
233	98	Paved parking, HSG B
0	60	Woods, Fair, HSG B
15,305		Weighted Average
11,931		77.95% Pervious Area
3,374		22.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	20	0.0250	0.10		**Sheet Flow, Landscape** Grass: Dense n= 0.240 P2= 3.70"
2.9	50	0.0900	0.29		**Sheet Flow, Back Yard** Grass: Short n= 0.150 P2= 3.70"
6.2	70	Total			

Summary for Subcatchment PS06: PS-06

Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.0 af, Depth> 3.13"
Routed to Pond RG03 : Rain Garden 03

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
3,415	61	>75% Grass cover, Good, HSG B
307	79	<50% Grass cover, Poor, HSG B
1,803	98	Roofs, HSG B
268	98	Paved parking, HSG B
0	60	Woods, Fair, HSG B
5,793		Weighted Average
3,722		64.25% Pervious Area
2,071		35.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	72	0.0694	0.28		**Sheet Flow, Grass Yard** Grass: Short n= 0.150 P2= 3.70"
1.7					**Direct Entry, Min Tc**
6.0	72	Total			

Summary for Subcatchment PS07: PS-07

Explanation for "Tc to Account for Porous Pavers"
Per HydroCAD.net - When modeling porous pavement, a Tc value of 790 minutes has produced good predictions for final discharge from porous pavement with a 41" base (this approach has been studied by UNH Stormwater Center). It is believed that a proportional Tc can be used for smaller base thicknesses, as long as the layers remain proportional and in accordance with the UNH Specifications.

Since the proposed porous paver thickness is 20" (4" paver, 2" bedding course, 6" base course, 8" sub-base course), a proportional Tc value of 385 min would be consistent with the aforementioned information from HydroCAD.net. As a result, a direct value of 380.5 minutes is being entered to create a total Tc value of 385 minutes for the subcatchment.

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.0 af, Depth> 3.04"
Routed to Pond RG04 : Rain Garden 04

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.61"

Area (sf)	CN	Description
962	39	>75% Grass cover, Good, HSG A
120	68	<50% Grass cover, Poor, HSG A
898	98	Roofs, HSG A
255	98	Paved parking, HSG A
2,235		Weighted Average
1,082		48.41% Pervious Area
1,153		51.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc**

Summary for Reach PR01: PR-01

Inflow Area = 0.45 ac, 26.44% Impervious, Inflow Depth > 0.71" for 10-Year event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.0 af
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 0.0 af, Atten= 0%, Lag= 0.3 min
Routed to Reach PR02 : PR-02

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.17 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.32 fps, Avg. Travel Time= 1.3 min

Peak Storage= 6.4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 5.93'
Bank-Full Depth= 0.40' Flow Area= 3.6 sf, Capacity= 14.6 cfs

5.00' x 0.40' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 10.0 '/' Top Width= 13.00'
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 31.50', Outlet Invert= 31.00'

‡

Summary for Reach PR02: PR-02

[61] Hint: Exceeded Reach PR01 outlet invert by 0.04' @ 12.10 hrs

Inflow Area = 0.45 ac, 26.44% Impervious, Inflow Depth > 0.71" for 10-Year event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.0 af
Outflow = 0.3 cfs @ 12.12 hrs, Volume= 0.0 af, Atten= 6%, Lag= 1.7 min
Routed to Link PPOI01 : PPOI-01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.24 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 9.8 min

Peak Storage= 47.3 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.04' , Surface Width= 5.83'
Bank-Full Depth= 0.40' Flow Area= 3.6 sf, Capacity= 16.7 cfs

5.00' x 0.40' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 10.0 '/' Top Width= 13.00'
Length= 210.0' Slope= 0.0262 '/'
Inlet Invert= 31.00', Outlet Invert= 25.50'

‡

Summary for Reach PR03: PR-03

Inflow Area = 0.76 ac, 30.85% Impervious, Inflow Depth > 2.48" for 10-Year event
Inflow = 1.9 cfs @ 12.16 hrs, Volume= 0.2 af
Outflow = 1.9 cfs @ 12.17 hrs, Volume= 0.2 af, Atten= 2%, Lag= 0.8 min
Routed to Link PPOI01 : PPOI-01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.07 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.27 fps, Avg. Travel Time= 3.7 min

Peak Storage= 103.5 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 19.05'
Bank-Full Depth= 0.40' Flow Area= 9.2 sf, Capacity= 21.9 cfs

15.00' x 0.40' deep channel, n= 0.030 Short grass
Side Slope Z-value= 20.0 '/' Top Width= 31.00'
Length= 60.0' Slope= 0.0117 '/'
Inlet Invert= 26.00', Outlet Invert= 25.30'

‡

Summary for Pond RG01: Rain Garden 01

Inflow Area = 0.26 ac, 16.98% Impervious, Inflow Depth > 1.42" for 10-Year event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.0 af
Outflow = 0.0 cfs @ 11.75 hrs, Volume= 0.0 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.75 hrs, Volume= 0.0 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.0 af
Routed to Reach PR01 : PR-01
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.0 af
Routed to Reach PR01 : PR-01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 33.85' @ 13.06 hrs Surf.Area= 753 sf Storage= 383.3 cf

Plug-Flow detention time= 75.7 min calculated for 0.0 af (100% of inflow)
Center-of-Mass det. time= 75.4 min (879.1 - 803.7)

Volume	Invert	Avail.Storage	Storage Description
#1	35.50'	720.0 cf	**Pond Area (Irregular)** Listed below (Recalc) -Impervious
#2	34.00'	225.9 cf	**Filter Media (Irregular)** Listed below (Recalc) -Impervious 1,129.5 cf Overall x 20.0% Voids
#3	32.58'	427.7 cf	**Gravel & Pea Gravel (Irregular)** Listed below (Recalc) 1,069.3 cf Overall x 40.0% Voids
		1,373.6 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.50	753	309.0	0.0	0.0	753
36.00	2,262	329.0	720.0	720.0	1,781

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	753	309.0	0.0	0.0	753
35.50	753	309.0	1,129.5	1,129.5	1,217

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
32.58	753	309.0	0.0	0.0	753
34.00	753	309.0	1,069.3	1,069.3	1,192

Device	Routing	Invert	Outlet Devices
#1	Primary	32.83'	**8.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 32.83' / 32.00' S= 0.0151 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	32.58'	**2.150 in/hr Exfiltration over Horizontal area** Phase-In= 0.01'
#3	Secondary	35.95'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68

2.72 2.81 2.92 2.97 3.07 3.32

#4	Device 1	35.85'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	35.75'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.75 hrs HW=32.62' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=32.58' TW=31.50' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.0 cfs)
  ├**4=Grate** (Controls 0.0 cfs)
  └**5=Orifice** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=32.58' TW=31.50' (Dynamic Tailwater)
└**3=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond RG02: Rain Garden 02

Inflow Area = 0.35 ac, 22.05% Impervious, Inflow Depth > 2.69" for 10-Year event
Inflow = 1.0 cfs @ 12.10 hrs, Volume= 0.1 af
Outflow = 0.8 cfs @ 12.17 hrs, Volume= 0.1 af, Atten= 20%, Lag= 4.7 min
Discarded = 0.0 cfs @ 6.85 hrs, Volume= 0.0 af
Primary = 0.6 cfs @ 12.17 hrs, Volume= 0.0 af
  Routed to Reach PR03 : PR-03
Secondary = 0.2 cfs @ 12.17 hrs, Volume= 0.0 af
  Routed to Reach PR03 : PR-03

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 33.00' @ 12.17 hrs Surf.Area= 637 sf Storage= 1,023.1 cf

Plug-Flow detention time= 140.5 min calculated for 0.1 af (75% of inflow)
Center-of-Mass det. time= 48.4 min (855.3 - 806.9)

Volume	Invert	Avail.Storage	Storage Description
#1	32.50'	475.2 cf	**Pond Area (Irregular)** Listed below (Recalc) -Impervious
#2	31.00'	191.1 cf	**Filter Media (Irregular)** Listed below (Recalc) -Impervious 955.5 cf Overall x 20.0% Voids
#3	29.58'	361.8 cf	**Gravel & Pea Gravel (Irregular)** Listed below (Recalc) 904.5 cf Overall x 40.0% Voids
		1,028.1 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
32.50	637	202.0	0.0	0.0	637
33.00	1,303	324.0	475.2	475.2	5,745

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
31.00	637	202.0	0.0	0.0	637
32.50	637	202.0	955.5	955.5	940

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
29.58	637	202.0	0.0	0.0	637
31.00	637	202.0	904.5	904.5	924

Device	Routing	Invert	Outlet Devices
#1	Primary	29.33'	**8.0" Round Culvert** L= 112.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.33' / 26.00' S= 0.0297 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	29.58'	**0.350 in/hr Exfiltration over Horizontal area** Phase-In= 0.01'
#3	Device 1	32.85'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	32.75'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Secondary	32.95'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.0 cfs @ 6.85 hrs HW=29.62' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.5 cfs @ 12.17 hrs HW=32.99' TW=26.10' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.5 cfs of 2.6 cfs potential flow)
  ├**3=Grate** (Weir Controls 0.5 cfs @ 1.22 fps)
  └**4=Orifice** (Orifice Controls 0.0 cfs @ 2.14 fps)

Secondary OutFlow Max=0.2 cfs @ 12.17 hrs HW=32.99' TW=26.10' (Dynamic Tailwater)
└**5=Broad-Crested Rectangular Weir** (Weir Controls 0.2 cfs @ 0.48 fps)

Summary for Pond RG03: Rain Garden 03

Inflow Area = 0.13 ac, 35.75% Impervious, Inflow Depth > 3.13" for 10-Year event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 0.0 af
Outflow = 0.4 cfs @ 12.10 hrs, Volume= 0.0 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.0 cfs @ 2.95 hrs, Volume= 0.0 af
Primary = 0.2 cfs @ 12.10 hrs, Volume= 0.0 af
Routed to Link PPOI01 : PPOI-01
Secondary = 0.2 cfs @ 12.10 hrs, Volume= 0.0 af
Routed to Link PPOI01 : PPOI-01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 29.98' @ 12.10 hrs Surf.Area= 240 sf Storage= 378.3 cf

Plug-Flow detention time= 144.4 min calculated for 0.0 af (77% of inflow)
Center-of-Mass det. time= 57.5 min (846.3 - 788.8)

Volume	Invert	Avail.Storage	Storage Description
#1	29.50'	182.2 cf	**Pond Area (Irregular)** Listed below (Recalc) -Impervious
#2	28.00'	72.0 cf	**Filter Media (Irregular)** Listed below (Recalc) -Impervious 360.0 cf Overall x 20.0% Voids
#3	26.58'	136.3 cf	**Gravel & Pea Gravel (Irregular)** Listed below (Recalc) 340.8 cf Overall x 40.0% Voids
		390.5 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
29.50	240	125.0	0.0	0.0	240
30.00	505	140.0	182.2	182.2	563

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
28.00	240	125.0	0.0	0.0	240
29.50	240	125.0	360.0	360.0	428

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
26.58	240	125.0	0.0	0.0	240
28.00	240	125.0	340.8	340.8	418

Device	Routing	Invert	Outlet Devices
#1	Primary	28.00'	**6.0" Round Culvert** L= 13.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.00' / 27.70' S= 0.0231 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	26.58'	**0.150 in/hr Exfiltration over Horizontal area** Phase-In= 0.01'
#3	Device 1	29.90'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	29.83'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Secondary	29.95'	**20.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.0 cfs @ 2.95 hrs HW=26.61' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.2 cfs @ 12.10 hrs HW=29.98' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.2 cfs of 1.2 cfs potential flow)
  ├**3=Grate** (Weir Controls 0.2 cfs @ 0.90 fps)
  └**4=Orifice** (Orifice Controls 0.0 cfs @ 1.55 fps)

Secondary OutFlow Max=0.2 cfs @ 12.10 hrs HW=29.98' TW=0.00' (Dynamic Tailwater)
└**5=Broad-Crested Rectangular Weir** (Weir Controls 0.2 cfs @ 0.40 fps)

Summary for Pond RG04: Rain Garden 04

Inflow Area = 0.05 ac, 51.59% Impervious, Inflow Depth > 3.04" for 10-Year event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 0.0 af
Outflow = 0.0 cfs @ 11.35 hrs, Volume= 0.0 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.35 hrs, Volume= 0.0 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.0 af
Routed to Reach PR01 : PR-01
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.0 af
Routed to Reach PR01 : PR-01

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 33.66' @ 13.75 hrs Surf.Area= 205 sf Storage= 217.1 cf

Plug-Flow detention time= 167.2 min calculated for 0.0 af (100% of inflow)
Center-of-Mass det. time= 167.0 min (927.8 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.50'	156.7 cf	**Pond Area (Irregular)** Listed below (Recalc) -Impervious
#2	32.00'	61.5 cf	**Filter Media (Irregular)** Listed below (Recalc) -Impervious 307.5 cf Overall x 20.0% Voids
#3	30.58'	116.4 cf	**Gravel & Pea Gravel (Irregular)** Listed below (Recalc) 291.1 cf Overall x 40.0% Voids
		334.6 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
33.50	205	108.0	0.0	0.0	205
34.00	436	121.0	156.7	156.7	449

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
32.00	205	108.0	0.0	0.0	205
33.50	205	108.0	307.5	307.5	367

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
30.58	205	108.0	0.0	0.0	205
32.00	205	108.0	291.1	291.1	358

Device	Routing	Invert	Outlet Devices
#1	Primary	31.50'	**6.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.40' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	30.58'	**2.150 in/hr Exfiltration over Horizontal area** Phase-In= 0.01'
#3	Secondary	33.95'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88

2.85 3.07 3.20 3.32

#4	Device 1	33.85'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	33.75'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.35 hrs HW=30.62' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=30.58' TW=31.50' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.0 cfs)
  ├**4=Grate** (Controls 0.0 cfs)
  └**5=Orifice** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=30.58' TW=31.50' (Dynamic Tailwater)
└**3=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Link PPOI01: PPOI-01

Inflow Area = 1.50 ac, 35.52% Impervious, Inflow Depth > 2.16" for 10-Year event
Inflow = 3.0 cfs @ 12.15 hrs, Volume= 0.3 af
Primary = 3.0 cfs @ 12.15 hrs, Volume= 0.3 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

APPENDIX F – BMP WORKSHEETS

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FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Rain Garden 01 (RG-01)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.26	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.17	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.20	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
191	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
48	cf	25% x WQV (check calc for sediment forebay volume)	
143	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
753	sf	A_{SA} = Surface area of the practice	
2.15	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
1.4	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
34.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
30.40	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
26.64	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
34.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
7.36	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
3.60	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
35.87	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
36.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
501	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-11	Note what sheet in the plan set contains the filter course specification	
4.0	:1	Pond side slopes	**≥ 3:1**
Sheet	C-06	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes: The rain garden is equipped with an underdrain to promote pond drainage during heavier storm events. The pond drains via infiltration alone in less than 72 hours.

Stage-Area-Storage for Pond RG01: Rain Garden 01

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)
32.58	**753**	0.0
32.63	753	15.1
32.68	753	30.1
32.73	753	45.2
32.78	753	60.2
32.83	753	75.3
32.88	753	90.4
32.93	753	105.4
32.98	753	120.5
33.03	753	135.5
33.08	753	150.6
33.13	753	165.7
33.18	753	180.7
33.23	753	195.8
33.28	753	210.8
33.33	753	225.9
33.38	753	241.0
33.43	753	256.0
33.48	753	271.1
33.53	753	286.1
33.58	753	301.2
33.63	753	316.3
33.68	753	331.3
33.73	753	346.4
33.78	753	361.4
33.83	753	376.5
33.88	753	391.6
33.93	753	406.6
33.98	753	421.7
34.03	753	432.2
34.08	753	439.8
34.13	753	447.3
34.18	753	454.8
34.23	753	462.3
34.28	753	469.9
34.33	753	477.4
34.38	753	484.9
34.43	753	492.5
34.48	753	500.0
34.53	753	507.5
34.58	753	515.1
34.63	753	522.6
34.68	753	530.1
34.73	753	537.6
34.78	753	545.2
34.83	753	552.7
34.88	753	560.2
34.93	753	567.8
34.98	753	575.3
35.03	753	582.8
35.08	753	590.4
35.13	753	597.9

Bottom Filter Elev

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)
35.18	753	605.4
35.23	753	612.9
35.28	753	620.5
35.33	753	628.0
35.38	753	635.5
35.43	753	643.1
35.48	753	650.6
35.53	753	677.2
35.58	753	721.2
35.63	753	771.3
35.68	753	828.1
35.73	753	891.8
35.78	753	962.9
35.83	753	1,041.7
35.88	753	1,128.8
35.93	753	1,224.5
35.98	753	**1,329.1**

1" Orifice Elevation

Volume of Storage
927 cf - 426 cf = 501 cf
(See BMP Worksheet)

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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden 02 (RG-02)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.35	ac	A = Area draining to the practice	
0.08	ac	A_I = Impervious area draining to the practice	
0.22	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.25	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.09	ac-in	WQV= 1" x Rv x A	
315	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
79	cf	25% x WQV (check calc for sediment forebay volume)	
236	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
637	sf	A_{SA} = Surface area of the practice	
0.35	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
17.0	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
31.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
30.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
28.03	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
31.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
2.97	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
1.00	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
33.06	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
33.00	ft	Elevation of the top of the practice	
NO		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
494	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-11	Note what sheet in the plan set contains the filter course specification	
4.0	:1	Pond side slopes	**≥ 3:1**
Sheet	C-06	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes: The rain garden is equipped with an underdrain to promote pond drainage during heavier storm events. The pond drains via infiltration alone in less than 72 hours.

Stage-Area-Storage for Pond RG02: Rain Garden 02

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)
29.58	**637**	0.0
29.63	637	12.7
29.68	637	25.5
29.73	637	38.2
29.78	637	51.0
29.83	637	63.7
29.88	637	76.4
29.93	637	89.2
29.98	637	101.9
30.03	637	114.7
30.08	637	127.4
30.13	637	140.1
30.18	637	152.9
30.23	637	165.6
30.28	637	178.4
30.33	637	191.1
30.38	637	203.8
30.43	637	216.6
30.48	637	229.3
30.53	637	242.1
30.58	637	254.8
30.63	637	267.5
30.68	637	280.3
30.73	637	293.0
30.78	637	305.8
30.83	637	318.5
30.88	637	331.2
30.93	637	344.0
30.98	637	356.7
31.03	637	365.6
31.08	637	372.0
31.13	637	378.4
31.18	637	384.7
31.23	637	391.1
31.28	637	397.5
31.33	637	403.9
31.38	637	410.2
31.43	637	416.6
31.48	637	423.0
31.53	637	429.3
31.58	637	435.7
31.63	637	442.1
31.68	637	448.4
31.73	637	454.8
31.78	637	461.2
31.83	637	467.6
31.88	637	473.9
31.93	637	480.3
31.98	637	486.7
32.03	637	493.0
32.08	637	499.4
32.13	637	505.8
32.18	637	512.1
32.23	637	518.5
32.28	637	524.9
32.33	637	531.3
32.38	637	537.6
32.43	637	544.0
32.48	637	550.4
32.53	637	572.5
32.58	637	607.5
32.63	637	645.3
32.68	637	686.3
32.73	637	730.3
32.78	637	777.7
32.83	637	828.5
32.88	637	882.7
32.93	637	940.7
32.98	637	**1,002.3**
33.03	637	**1,028.1**
33.08	637	1,028.1
33.13	637	1,028.1

Bottom Filter Elev

1" Orifice Elevation

Volume of Storage
855 cf - 361 cf = 494 cf
(See BMP Worksheet)

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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden 03 (RG-03)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.13	ac	A = Area draining to the practice	
0.05	ac	A_I = Impervious area draining to the practice	
0.36	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.38	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
177	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
44	cf	25% x WQV (check calc for sediment forebay volume)	
133	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
240	sf	A_{SA} = Surface area of the practice	
0.15	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
59.0	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
28.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
26.75	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
23.08	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
28.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
4.92	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
1.25	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
29.99	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
30.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
178	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-11	Note what sheet in the plan set contains the filter course specification	
4.0	:1	Pond side slopes	**≥ 3:1**
Sheet	C-06	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes: The rain garden is equipped with an underdrain to promote pond drainage during heavier storm events. The pond drains via infiltration alone in less than 72 hours.

Stage-Area-Storage for Pond RG03: Rain Garden 03

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)
26.58	**240**	0.0
26.63	240	4.8
26.68	240	9.6
26.73	240	14.4
26.78	240	19.2
26.83	240	24.0
26.88	240	28.8
26.93	240	33.6
26.98	240	38.4
27.03	240	43.2
27.08	240	48.0
27.13	240	52.8
27.18	240	57.6
27.23	240	62.4
27.28	240	67.2
27.33	240	72.0
27.38	240	76.8
27.43	240	81.6
27.48	240	86.4
27.53	240	91.2
27.58	240	96.0
27.63	240	100.8
27.68	240	105.6
27.73	240	110.4
27.78	240	115.2
27.83	240	120.0
27.88	240	124.8
27.93	240	129.6
27.98	240	134.4
28.03	240	137.8
28.08	240	140.2
28.13	240	142.6
28.18	240	145.0
28.23	240	147.4
28.28	240	149.8
28.33	240	152.2
28.38	240	154.6
28.43	240	157.0
28.48	240	159.4
28.53	240	161.8
28.58	240	164.2
28.63	240	166.6
28.68	240	169.0
28.73	240	171.4
28.78	240	173.8
28.83	240	176.2
28.88	240	178.6
28.93	240	181.0
28.98	240	183.4
29.03	240	185.8
29.08	240	188.2
29.13	240	190.6

Bottom Filter Elev

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)
29.18	240	193.0
29.23	240	195.4
29.28	240	197.8
29.33	240	200.2
29.38	240	202.6
29.43	240	205.0
29.48	240	207.4
29.53	240	215.7
29.58	240	228.9
29.63	240	243.3
29.68	240	258.9
29.73	240	275.8
29.78	240	293.9
29.83	240	313.4
29.88	240	334.3
29.93	240	356.7
29.98	240	**380.5**
30.03	240	**390.5**

1" Orifice Elevation

Volume of Storage
313 cf - 135 cf = 178 cf
(See BMP Worksheet)

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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden 04 (RG-04)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.05	ac	A = Area draining to the practice	
0.03	ac	A_I = Impervious area draining to the practice	
0.51	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.51	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.03	ac-in	WQV= 1" x Rv x A	
94	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
24	cf	25% x WQV (check calc for sediment forebay volume)	
71	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
205	sf	A_{SA} = Surface area of the practice	
1.20	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
4.6	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
32.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
30.15	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
27.97	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
32.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
4.03	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.85	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
33.90	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
34.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
129	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-11	Note what sheet in the plan set contains the filter course specification	
4.0	:1	Pond side slopes	**≥ 3:1**
Sheet	C-06	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes: The rain garden is equipped with an underdrain to promote pond drainage during heavier storm events. The pond drains via infiltration alone in less than 72 hours.

Stage-Area-Storage for Pond RG04: Rain Garden 04

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)	
30.58	**205**	0.0	
30.63	205	4.1	
30.68	205	8.2	
30.73	205	12.3	
30.78	205	16.4	
30.83	205	20.5	
30.88	205	24.6	
30.93	205	28.7	
30.98	205	32.8	
31.03	205	36.9	
31.08	205	41.0	
31.13	205	45.1	
31.18	205	49.2	
31.23	205	53.3	
31.28	205	57.4	
31.33	205	61.5	
31.38	205	65.6	
31.43	205	69.7	
31.48	205	73.8	
31.53	205	77.9	
31.58	205	82.0	
31.63	205	86.1	
31.68	205	90.2	
31.73	205	94.3	
31.78	205	98.4	
31.83	205	102.5	
31.88	205	106.6	
31.93	205	110.7	
31.98	205	114.8	Bottom Filter Elev
32.03	205	117.7	
32.08	205	119.7	
32.13	205	121.8	
32.18	205	123.8	
32.23	205	125.9	
32.28	205	127.9	
32.33	205	130.0	
32.38	205	132.0	
32.43	205	134.1	
32.48	205	136.1	
32.53	205	138.2	
32.58	205	140.2	
32.63	205	142.3	
32.68	205	144.3	
32.73	205	146.4	
32.78	205	148.4	
32.83	205	150.5	
32.88	205	152.5	
32.93	205	154.6	
32.98	205	156.6	
33.03	205	158.7	
33.08	205	160.7	
33.13	205	162.8	

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)	
33.18	205	164.8	
33.23	205	166.9	
33.28	205	168.9	
33.33	205	171.0	
33.38	205	173.0	
33.43	205	175.1	
33.48	205	177.1	
33.53	205	184.3	
33.58	205	195.6	
33.63	205	207.9	
33.68	205	221.3	
33.73	205	235.7	1" Orifice Elevation
33.78	205	251.3	
33.83	205	268.1	
33.88	205	286.1	
33.93	205	305.4	
33.98	205	**326.0**	

Volume of Storage
244 cf - 115 cf = 129 cf
(See BMP Worksheet)

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APPENDIX G – RIPRAP CALCULATIONS

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Proposed 3 Lot Subdivision
437 Lafayette Road
4/19/2022

RIPRAP OUTLET PROTECTION

Location: FES-01

Design Flow =	Q =	0.01	cfs
Tailwater =	Tw =	0.446667	feet
Pipe Dia.=	Do =	0.67	feet

TW>=1/2Do -> La = Length = 3.0Q/Do^(3/2) + 7Do = **0.0** feet

Implementing a 2ft x 2ft pad

W_1 = Width = 3Do+(0.4)(La)= **2.0** feet **(or Width of Channel)**

W_2 = Width = 3Do= **2.0** feet

D = Depth = (1.5)(d50)= **9** inches **(or Min. 9")**

d_{50} = (0.02/Tw)(Q/Do)$^{\wedge(4/3)}$= **6.00** inches **(or Min. 6")**

Rock Riprap Gradation

% by weight passing given the D_{50} Size		Size of stone (inches)		
100		9.00	-	12.00
85		7.80	-	10.80
50		6.00	-	9.00
15		1.80	-	3.00

(See Last Page of Calculations for 25-Year Flows)

Proposed 3 Lot Subdivision
437 Lafayette Road
4/19/2022

RIPRAP OUTLET PROTECTION

Location: FES-02

Design Flow =	Q =	0.87	cfs
Tailwater =	Tw =	0.446667	feet
Pipe Dia.=	Do =	0.67	feet

TW>=1/2Do -> La = Length = 3.0Q/Do^(3/2) + 7Do = **3.0** feet

W_1 = Width = 3Do+(0.4)(La)= **3.0** feet **(or Width of Channel)**

W_2 = Width = 3Do= **2.0** feet

D = Depth = (1.5)(d50)= **9** inches **(or Min. 9")**

d_{50} = (0.02/Tw)(Q/Do)^(4/3)= **6.00** inches **(or Min. 6")**

Rock Riprap Gradation

% by weight passing given the D_{50} Size		Size of stone (inches)		
100		9.00	-	12.00
85		7.80	-	10.80
50		6.00	-	9.00
15		1.80	-	3.00

(See Last Page of Calculations for 25-Year Flows)

Proposed 3 Lot Subdivision
437 Lafayette Road
4/19/2022

RIPRAP OUTLET PROTECTION

Location: FES-03

Design Flow =	Q =	0.27	cfs
Tailwater =	Tw =	0.333333	feet
Pipe Dia.=	Do =	0.5	feet

TW>=1/2Do -> La = Length = 3.0Q/Do^(3/2) + 7Do = **1.0** feet

Implementing a 2ft x 2ft pad

W_1 = Width = 3Do+(0.4)(La)= **2.0** feet **(or Width of Channel)**

W_2 = Width = 3Do= **1.5** feet

D = Depth = (1.5)(d50)= **9** inches **(or Min. 9")**

d_{50} = (0.02/Tw)(Q/Do)$^{\wedge(4/3)}$= **6.00** inches **(or Min. 6")**

Rock Riprap Gradation

% by weight passing given the D_{50} Size		Size of stone (inches)		
100		9.00	-	12.00
85		7.80	-	10.80
50		6.00	-	9.00
15		1.80	-	3.00

(See Last Page of Calculations for 25-Year Flows)

Proposed 3 Lot Subdivision
437 Lafayette Road
4/19/2022

RIPRAP OUTLET PROTECTION

Location: FES-04

Design Flow =	Q =	0.03	cfs
Tailwater =	Tw =	0.333333	feet
Pipe Dia.=	Do =	0.5	feet

TW>=1/2Do -> La = Length = 3.0Q/Do^(3/2) + 7Do = **0.0** feet

Implementing a 2ft x 2ft pad

W_1 = Width = 3Do+(0.4)(La)= **1.5** feet **(or Width of Channel)**

W_2 = Width = 3Do= **1.5** feet

D = Depth = (1.5)(d50)= **9** inches **(or Min. 9")**

d_{50} = (0.02/Tw)(Q/Do)$^{\wedge(4/3)}$= **6.00** inches **(or Min. 6")**

Rock Riprap Gradation

% by weight passing given the D_{50} Size		Size of stone (inches)		
100		9.00	-	12.00
85		7.80	-	10.80
50		6.00	-	9.00
15		1.80	-	3.00

(See Last Page of Calculations for 25-Year Flows)

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond RG01: Rain Garden 01 Peak Elev=35.61' Storage=748.8 cf Inflow=0.49 cfs 0.0 af
Discarded=0.04 cfs 0.0 af Primary=0.00 cfs 0.0 af Secondary=0.00 cfs 0.0 af Outflow=0.04 cfs 0.0 af

Pond RG02: Rain Garden 02 Peak Elev=33.04' Storage=1,028.1 cf Inflow=1.45 cfs 0.1 af
Discarded=0.01 cfs 0.0 af Primary=0.87 cfs 0.1 af Secondary=0.67 cfs 0.0 af Outflow=1.54 cfs 0.1 af

Pond RG03: Rain Garden 03 Peak Elev=29.99' Storage=383.3 cf Inflow=0.61 cfs 0.0 af
Discarded=0.00 cfs 0.0 af Primary=0.27 cfs 0.0 af Secondary=0.34 cfs 0.0 af Outflow=0.61 cfs 0.0 af

Pond RG04: Rain Garden 04 Peak Elev=33.87' Storage=280.8 cf Inflow=0.20 cfs 0.0 af
Discarded=0.01 cfs 0.0 af Primary=0.03 cfs 0.0 af Secondary=0.00 cfs 0.0 af Outflow=0.04 cfs 0.0 af

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APPENDIX H - NRCS WEB SOIL SURVEY

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United States Department of Agriculture

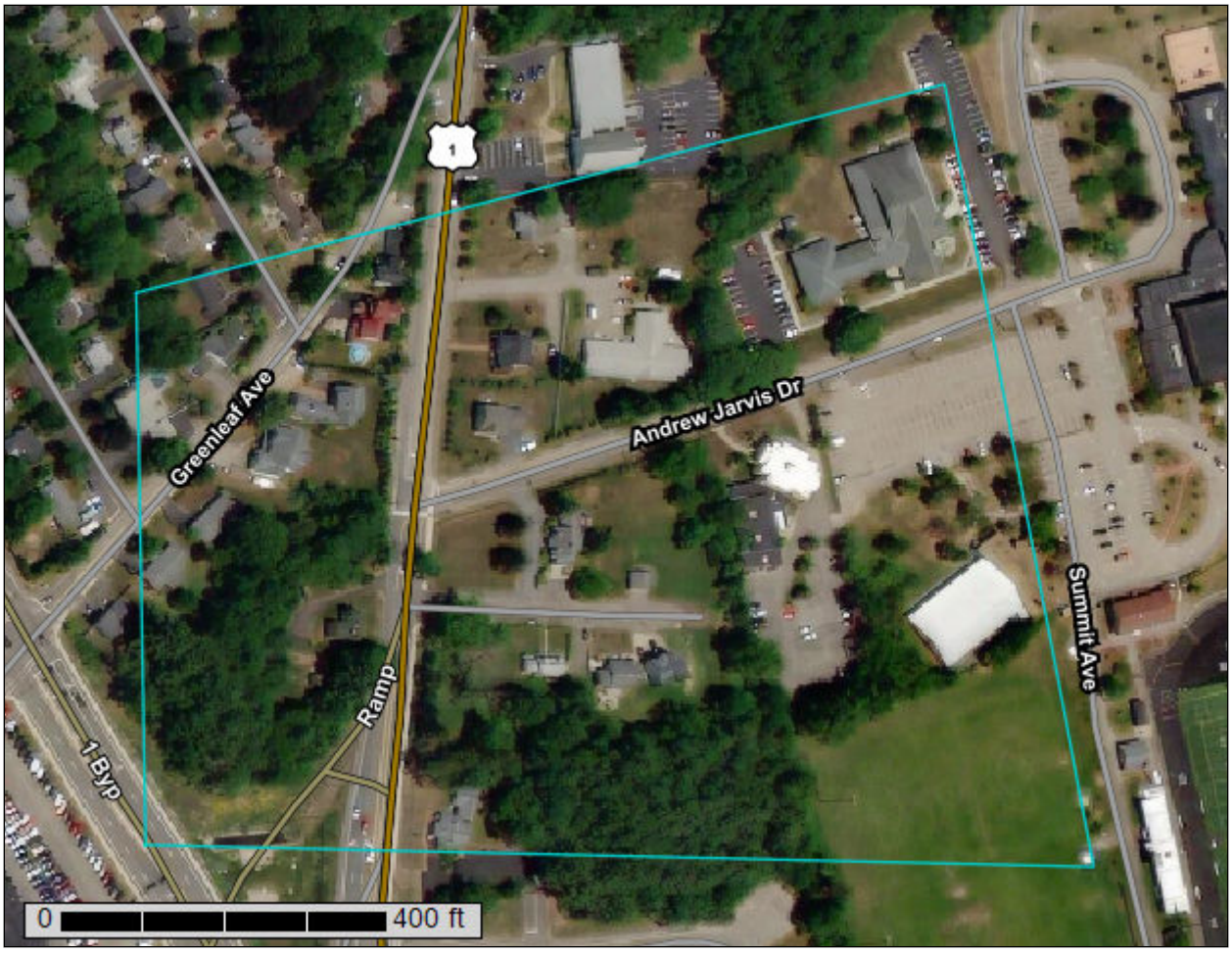
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Rockingham County, New Hampshire

437 Lafayette Road



January 7, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,470 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 24, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Jun 14, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
299	Udorthents, smoothed	2.6	12.8%
799	Urban land-Canton complex, 3 to 15 percent slopes	17.9	87.2%
Totals for Area of Interest		**20.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rockingham County, New Hampshire

299—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9cmt
Elevation: 0 to 840 feet
Mean annual precipitation: 44 to 49 inches
Mean annual air temperature: 48 degrees F
Frost-free period: 155 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Properties and qualities

Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

799—Urban land-Canton complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9cq0
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Canton and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Parent material: Till

Typical profile

H1 - 0 to 5 inches: gravelly fine sandy loam
H2 - 5 to 21 inches: gravelly fine sandy loam
H3 - 21 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 5 percent
Hydric soil rating: No

Squamscott and scitico

Percent of map unit: 4 percent
Landform: Marine terraces
Hydric soil rating: Yes

Walpole

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

Chatfield

Percent of map unit: 4 percent
Hydric soil rating: No

Scituate and newfields

Percent of map unit: 4 percent
Hydric soil rating: No

Boxford and eldridge

Percent of map unit: 4 percent
Hydric soil rating: No

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United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX I - TEST PIT LOGS & INFILTRATION CALCULATIONS

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Test Pit Report

For

Smith Field Construction

437 Lafayette Road,

Portsmouth, NH

Prepared For

437 Lafayette Road Subdivision

45407.120

PREPARED BY

TFMoran, Inc.

48 Constitution Drive

Bedford, NH 03110

January 25th & February 1st, 2022

Test Pit 1 January 25th, 2022

0-13” 10YR 5/3 Brown, Loam, Massive, Friable, Anthropogenic Fill (Asphalt, Brick)

13-20” AB 10YR 7/6 Yellow, Loam, Blocky, Friable, Gravely <5% Rock (Iron Stone)

20-55” B1 Gley 1 7N Gray, Sandy Loam, massive, pliable

55- 65” B2 10YR 5/1 Gray, Coarse Sand, Friable, Massive, > 15% Angular Rock Fragment (Iron Stone)

REDOX @ 20” 10YR 7/8 Common Distinct >15%

Soil Series: Walpole

EST Wet: 20” Below Grade

OBS WT: 39” Below Grade (Apparent →)

Ledge: > 65” Below Grade

Test Pit 2 January 25th, 2022

0-15” A 10YR 4/3 Brown, Loam, Massive

15-17” 10YR 7/6 Yellow, Sandy Loam, friable, granular

17-27” Gley 1 7/N light gray, Sandy Loam, friable, granular

27-52” 10YR 6/6 Brownish Yellow, Loam, friable, massive

52-77” 10YR 5/1 Gray, Course Sand, Friable, Gravely, granular

REDOX @ 26” 10YR 7/8 Common Distinct

Soil Series: Walpole

EST Wet: 26” Below Grade

OBS WT: 51” Below Grade (Apparent ↑)

Ledge: 77” Below Grade

Test Pit 3 January 25th, 2022

0-16” 10YR 4/3 Brown, Loam, aggregated, friable

16-27” 10YR 6/6 Brownish Yellow, Loam, aggregated, friable, Gravely >5%

27-52” 10YR 7/2 Light Gray, Loamy Sand, aggregated, Friable Gravely >15%

52-84” 10YR 8/1 White, Sandy Clay Loam, Platey, indurate

REDOX @: 41” 10YR 7/8 Common Distinct >15%

Soil Series: Canton - Chatfield Complex

EST Wet: 41” Below Grade

OBS WT: 84” Below Grade (Apparent ↘)

Ledge: 84” Below Grade

Test Pit 4 January 25th, 2022

0-18” 10YR 5/4 Yellowish Brown, Loam, Friable, Aggregate

18-27” 10YR 6/6 Brownish Yellow, Sandy Loam, Gravely >5%, Friable, Aggregate

27-37” 10YR 6/2 Light Brownish Grey, Loamy Sand, > 15% Angular Rock Fragment (Iron Stone)

37-65” 10YR 7/8 Yellow, Decaying Bedrock, Angular Cobble, Iron Stone

REDOX @: 5R 3/8 Common Distinct >15%

Soil Series: Chatfield

EST Wet: 37” Below Grade

OBS WT: 56” Below Grade (Apparent ↑)

Ledge: 65” Below Grade

Test Pit 5 January 25th, 2022

0-10” 10YR 4/3 Brown, Loamy Sand, aggregate, friable, gravely >5%

10-31” 10YR 5/4 Yellowish Brown, Course Sand, Granular, Friable, gravely >15%

31-57” Gley 1 5/N Gray, Clay, Decayed Bedrock, Boulders >5%, Massive

REDOX @: 31” 5R 3/8 Common Distinct >15%

Soil Series: Chatfield – Maybid Complex

EST Wet: 31” Below Grade

OBS WT: > 57”

Ledge: 57” Below Grade

Test Pit 6 January 25th, 2022

0-12” 10YR 4/3 Brown, Sandy Loam, Aggregate, Friable

12-16” 10YR 7/2 Light Gray, Sand, granular, friable, gravely >5%

16-28” 10YR 7/1 Light Gray, Fine Sand, Granular, Friable

28-42” 10YR 7/3 Very Pale Brown, Sandy Loam, Aggregate, friable, heterogeneous

42-47” Gley 1 5/5G-1 Greenish Gray, Sandy Clay Loam, Platey, Indurate

47-96” Gley 2 8/5BG Light Greenish Gray, Clay, Massive, Indurate, homogeneous

REDOX @42” 5R 3/8 Common Distinct >15%

Soil Series: Canton Complex (Anthropogenic)

EST Wet: 42” Below Grade

OBS WT: 79” Below Grade (Apparent →)

Ledge: > 96”

Test Pit 7 January 25th, 2022

0-18” 10YR 4/2 Dark Grayish Brown, Sandy Loam, Friable, blocky

18-42” 10YR 7/4 Very pale Brown, Fine Sand, granular, friable

42-54” 10YR 6/6 Brownish Yellow, Course Sand, granular, friable

54-65” 10YR 5/8 Yellowish Brown, Sandy Loam, heterogeneous, friable

65-72” Gley 2 4/10B Dark Blueish Gray, Sandy Clay Loam, Platey, Indurate

72-102” Gley 2 7/10B Light Blueish Gray, Clay, Massive, Indurate

REDOX @ 57” 5R 3/8 Common Distinct >15%

Soil Series: Canton Complex (Anthropogenic)

EST Wet: 57” Below Grade

OBS WT: 93” Below Grade (Apparent ↑)

Ledge: >102”

Test Pit 8 January 25th, 2022

0-14” 10YR 4/2 Dark Grayish Brown, Loamy Sand, friable, blocky

14-42” 10YR 7/4 Very pale Brown, Fine Sand, aggregate, friable, > 15% Cobble River Stone

42-50” Gley 1 5/5G_/1 Greenish Gray, Sandy Clay Loam, Aquatard present (Iron Stone), Massive, Indurate

50-55” 10YR 6/4 Light Yellowish Brown, Sandy Clay Loam, Inclusion, heterogeneous, Massive, Indurate

55-103” Gley 2 8/5BG Light Greenish Gray, Clay, Indurate, massive

REDOX @ 42 5R 3/8 Common Distinct >15% (Aquatard (Potentially Anthropogenic))

Soil Series: Canton Complex (Anthropogenic)

EST Wet: 42” Below Grade

Test Pit 8 January 25th, 2022 (Cont'd)

OBS WT: 101" Below Grade (Apparent ↑)

Ledge: > 103"

Test Pit 9 January 25th, 2022

0-9" 10YR 4/3 Brown, Loam, blocky, friable, gravely >5%

9-23" 10YR 5/6 Yellowish Brown, Loamy Sand, granular, , > 15% Angular Rock Fragment (Iron Stone)

23-54" 10YR 7/2 light Grey, Sandy Loam, Indurate, massive, heterogeneous, > 15% Angular Rock Fragment (Iron Stone)

REDOX @ 5R 4/6 Common Distinct >15%

Soil Series: Walpole

EST Wet: 30" Below Grade

OBS WT: > 54"

Ledge: 54" Below Grade

Test Pit 10 February 1st, 2022

0-12" 10YR 4/4 Dark Yellowish Brown, Loamy Sand, Blocky, Friable, Cobble >15%, Homogeneous Soil

12-23" 10YR 6/3 Pale Brown, Sandy Loam, aggregate, friable, Cobble >15%, Homogeneous soil

23-36" 10YR 6/2 Light Brownish Grey, Course Sand, granular, Heterogeneous, Cobble >15%, Very Course particles <5%

36-66" 10YR 5/4 Yellowish Brown, Loamy Sand, massive, Indurate > 25% Angular Rock Fragment (Iron Stone)

Test Pit 10 February 1st, 2022 (Cont'd)

66-76" 10YR 5/4 Yellowish Brown, Sandy Loam, massive, Indurate, decaying ledge, > 55% Angular Rock Fragment (Iron Stone)

REDOX @ 52 – 58 10YR 5/6 Common Distinct >15%

Soil Series: Canton – Walpole Complex

EST Wet: 52" Below Grade

OBS WT: >76"

Ledge: 76" Below Grade

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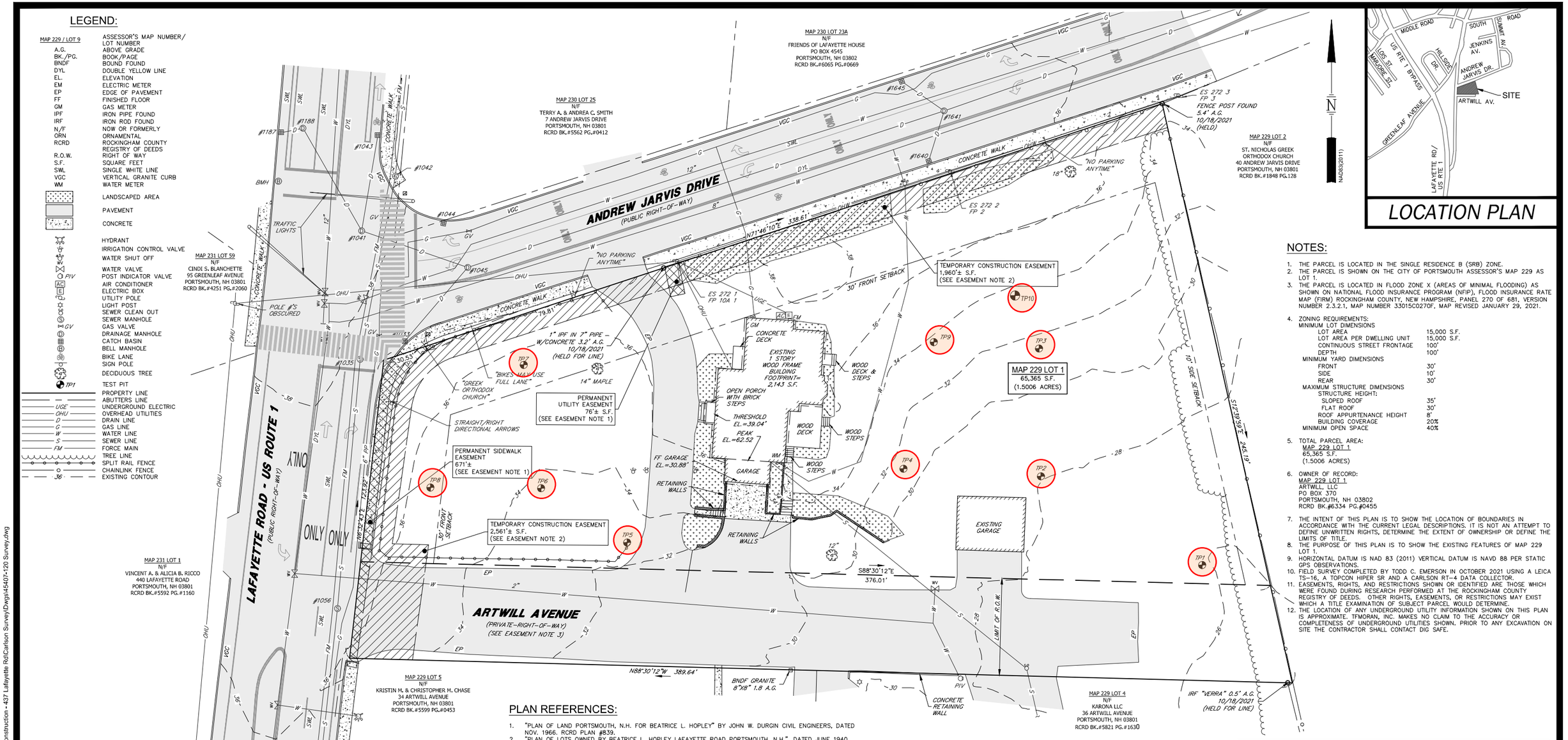
LEGEND:

MAP 229 / LOT 9	ASSESSOR'S MAP NUMBER/ LOT NUMBER
A.G.	ABOVE GRADE
BK./PG.	BOOK/PAGE
BNDF	BOUND FOUND
DYL	DOUBLE YELLOW LINE
EL.	ELEVATION
EM	ELECTRIC METER
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
GM	GAS METER
IPF	IRON PIPE FOUND
IRF	IRON ROD FOUND
N/F	NOW OR FORMERLY
ORN	ORNAMENTAL
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
R.O.W.	RIGHT OF WAY
S.F.	SQUARE FEET
SWL	SINGLE WHITE LINE
VGC	VERTICAL GRANITE CURB
WM	WATER METER
	LANDSCAPED AREA
	PAVEMENT
	CONCRETE
	HYDRANT
	IRRIGATION CONTROL VALVE
	WATER SHUT OFF
	WATER VALVE
PIV	POST INDICATOR VALVE
AC	AIR CONDITIONER
E	ELECTRIC BOX
	UTILITY POLE
	LIGHT POST
	SEWER CLEAN OUT
S	SEWER MANHOLE
GV	GAS VALVE
D	DRAINAGE MANHOLE
	CATCH BASIN
T	BELL MANHOLE
	BIKE LANE
	SIGN POLE
	DECIDUOUS TREE
TP1	TEST PIT
	PROPERTY LINE
	ABUTTERS LINE
UGE	UNDERGROUND ELECTRIC
OHU	OVERHEAD UTILITIES
D	DRAIN LINE
G	GAS LINE
W	WATER LINE
S	SEWER LINE
FM	FORCE MAIN
	TREE LINE
	SPLIT RAIL FENCE
	CHAINLINK FENCE
36	EXISTING CONTOUR



LOCATION PLAN

NOTES:

1. THE PARCEL IS LOCATED IN THE SINGLE RESIDENCE B (SRB) ZONE.
2. THE PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 229 AS LOT 1.
3. THE PARCEL IS LOCATED IN FLOOD ZONE X (AREAS OF MINIMAL FLOODING) AS SHOWN ON NATIONAL FLOOD INSURANCE PROGRAM (NFIP), FLOOD INSURANCE RATE MAP (FIRM) ROCKINGHAM COUNTY, NEW HAMPSHIRE, PANEL 270 OF 681, VERSION NUMBER 2.3.2.1, MAP NUMBER 33015C0270F, MAP REVISED JANUARY 29, 2021.
4. ZONING REQUIREMENTS:

MINIMUM LOT DIMENSIONS	
LOT AREA	15,000 S.F.
LOT AREA PER DWELLING UNIT	15,000 S.F.
CONTINUOUS STREET FRONTAGE	100'
DEPTH	100'
MINIMUM YARD DIMENSIONS	
FRONT	30'
SIDE	10'
REAR	30'
MAXIMUM STRUCTURE DIMENSIONS	
STRUCTURE HEIGHT:	
SLOPED ROOF	35'
FLAT ROOF	30'
ROOF APPURTENANCE HEIGHT	8'
BUILDING COVERAGE	20%
MINIMUM OPEN SPACE	40%

5. TOTAL PARCEL AREA:
   MAP 229 LOT 1
   65,365 S.F.
   (1.5006 ACRES)
6. OWNER OF RECORD:
   MAP 229 LOT 1
   ARTWILL, LLC
   PO BOX 370
   PORTSMOUTH, NH 03802
   RCRD BK.#6334 PG.#0455
7. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH THE CURRENT LEGAL DESCRIPTIONS. IT IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP OR DEFINE THE LIMITS OF TITLE.
8. THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING FEATURES OF MAP 229 LOT 1.
9. HORIZONTAL DATUM IS NAD 83 (2011) VERTICAL DATUM IS NAVD 88 PER STATIC GPS OBSERVATIONS.
10. FIELD SURVEY COMPLETED BY TODD C. EMERSON IN OCTOBER 2021 USING A LEICA TS-16, A TOPCON HIPER SR AND A CARLSON RT-4 DATA COLLECTOR.
11. EASEMENTS, RIGHTS, AND RESTRICTIONS SHOWN OR IDENTIFIED ARE THOSE WHICH WERE FOUND DURING RESEARCH PERFORMED AT THE ROCKINGHAM COUNTY REGISTRY OF DEEDS. OTHER RIGHTS, EASEMENTS, OR RESTRICTIONS MAY EXIST WHICH A TITLE EXAMINATION OF SUBJECT PARCEL WOULD DETERMINE.
12. THE LOCATION OF ANY UNDERGROUND UTILITY INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE. TFMORAN, INC. MAKES NO CLAIM TO THE ACCURACY OR COMPLETENESS OF UNDERGROUND UTILITIES SHOWN. PRIOR TO ANY EXCAVATION ON SITE THE CONTRACTOR SHALL CONTACT DIG SAFE.

PLAN REFERENCES:

1. "PLAN OF LAND PORTSMOUTH, N.H. FOR BEATRICE L. HOPLEY" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED NOV. 1966. RCRD PLAN #839.
2. "PLAN OF LOTS OWNED BY BEATRICE L. HOPLEY LAFAYETTE ROAD PORTSMOUTH, N.H.", DATED JUNE 1940, REVISED FROM ORIGINAL PLAN BY JOHN W. DURGIN, REVISED MAY, 1946, REVISED FEB. 1957. RCRD PLAN #2637.
3. "STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION CONSTRUCTION PLANS FEDERAL AID PROJECT OF PROPOSED BRIDGE REMOVAL BRIDGE NO. 173/071 & RECONFIGURATION OF US ROUTE 1 BYPASS AND US ROUTE 1 (LAFAYETTE ROAD) FEDERAL PROJECT X-A000(994) NH PROJECT NO. 13455-A, CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM", APPROVED 6/27/12. RCRD PLAN #13455.
4. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO-R37-A, CITY OF PORTSMOUTH ROCKINGHAM COUNTY". PLAN #50031.
5. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO. 37 LAFAYETTE ROAD". PLAN #50147.
6. "CORRECTIVE SEWER EASEMENT PLAN OVER LAND OF KARONA, LLC 36 ARTWILL AVENUE PORTSMOUTH, NEW HAMPSHIRE ASSESSOR'S PARCEL 229-4 FOR KARONA, LLC" BY JAMES VERRA AND ASSOCIATES, INC., DATED 1/19/2021. RCRD PLAN #C-42611.
7. "SUBDIVISION PLAN OF LAND OF J. PHILIP MCCAFFERY FOR GREAT BAY SCHOOL AND TRAINING CENTER LAFAYETTE RD. COUNTY OF ROCKINGHAM PORTSMOUTH NH", BY RICHARD P. MILLETTE AND ASSOCIATES, DATED DEC. 1981, WITH REV.1 FROM 1/7/82. RCRD PLAN #D-10590.
8. "SUBDIVISION PLAN TAX MAP 230 - LOT 23 OWNER: GREAT BAY SCHOOL AND TRAINING CENTER FOR LEMIEUX BUILDERS, INC." 417 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED SEPTEMBER 2013, WITH REVISION 2 DATED 12/23/13. RCRD PLAN #D-38079.
9. "EASEMENT PLAN TAX MAP 230 - LOT 25 D.R. LEMIEUX BUILDERS, INC. TO THE CITY OF PORTSMOUTH 7 ANDREW JARVIS DRIVE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED JUNE 2014, WITH REVISION 2 DATED 7/25/14. RCRD PLAN #D-38417.
10. "EASEMENT PLAN TAX MAP 229 - LOT 1 HARLON P. WILLIS REVOCABLE TRUST AND JEAN P. WILLIS REVOCABLE TRUST TO THE CITY OF PORTSMOUTH 437 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED OCTOBER 26, 2015, WITH REVISION 1 DATED 10/26/2015. RCRD PLAN #D-40626.
11. "EASEMENT PLAN TAX MAP 229 - LOT 5 KRISTEN M. CHASE AND CHRISTOPHER M. CHASE TO THE CITY OF PORTSMOUTH 34 ARTWILL AVENUE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED JANUARY 20, 2016, WITH REVISION 2 DATED 12/2/2016. RCRD PLAN #D-40627.
12. "INTERSECTION IMPROVEMENT PROJECT U.S. ROUTE 1 AT ANDREW JARVIS DRIVE IN THE CITY OF PORTSMOUTH ROCKINGHAM COUNTY STATE OF NEW HAMPSHIRE PREPARED FOR CITY OF PORTSMOUTH DEPT OF PUBLIC WORKS" BY GREENMAN-PEDERSON, INC., DATED 12/22/17.

EASEMENT NOTES:

1. MAP 229 LOT 1 IS SUBJECT TO PERMANENT EASEMENTS FOR THE INSTALLATION & MAINTENANCE OF A PUBLIC SIDEWALK AND FOR THE INSTALLATION & MAINTENANCE OF TRAFFIC SIGNAL EQUIPMENT. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 1 & 3).
2. MAP 229 LOT 1 IS SUBJECT TO TEMPORARY EASEMENTS FOR THE PURPOSE OF INSTALLING AND MAINTAINING A SIDEWALK. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 2 & 4).
3. MAP 229 LOT 1 IS SUBJECT TO RIGHTS OVER A PORTION OF THE PREMISES SHOWN AS "ARTWILL AVENUE" GRANTED TO MAP 229 LOT 2 FOR THE PURPOSES OF INGRESS & EGRESS, CONNECTION TO A 2 INCH WATERLINE AND THE EXTENSION THEREOF, CONNECTION TO THE CITY SEWER ON LAFAYETTE ROAD AND THE RIGHT TO FIRST REFUSAL TO PURCHASE A 50 FOOT STRIP OF LAND. SEE RCRD BK.1848 PG. 128.
4. MAP 229 LOT 1 HAS THE BENEFIT OF A 20' WIDE SEWER EASEMENT FOR REPAIR AND MAINTENANCE ACROSS LAND OF MAP 229 LOT 4. SEE RCRD BK. 6236 PG. 731 AND PLAN REFERENCE 6.

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY THOSE UNDER MY DIRECT SUPERVISION AND ARE THE RESULT OF A FIELD SURVEY CONDUCTED IN OCTOBER, 2021. THIS SURVEY CONFORMS TO THE ACCURACY REQUIREMENTS OF AN URBAN SURVEY OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS.
I FURTHER CERTIFY THAT THIS SURVEY IS CORRECT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, AND THE FIELD TRAVERSE SURVEY EXCEEDS A PRECISION OF 1:15,000.

DIG SAFE
811 IT'S THE LAW
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

20 10 0 20
Graphic Scale in Feet

LICENSED LAND SURVEYOR _____ DATE _____

REV.	DATE	DESCRIPTION	DR	CK

TAX MAP 229 LOT 1
EXISTING CONDITIONS PLAN
SMITHFIELD CONSTRUCTION
437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
COUNTY OF ROCKINGHAM
OWNED BY
ARTWILL, LLC

SCALE: 1" = 20' (22x34)
1" = 40' (11x17)
MARCH 1, 2022

Seacoast Division
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
170 Commerce Way, Suite 102
Portsmouth, NH 03801
Phone (603) 431-2222
Fax (603) 431-0910
www.tfmoran.com

FILE	DR	FB	
45407-120	CK	CADFILE	S-1

Mar 01, 2022 - 2:30pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Carlson Survey\Dwgs\45407-120 Survey.dwg

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TEST PIT LOG

SITE: 437 LAFAYETTE ROAD, PORTSMOUTH, NH
LOGGED BY: PAUL O'HANLON, TFM, INC.
DATE: 1/25/2022

Test Pit #1:

0–13" 10YR 5/3 BROWN, LOAM, MASSIVE, FRIABLE, ANTHROPOGENIC FILL (ASPHALT, BRICK)
13–20" AB 10YR 7/6 YELLOW, LOAM, BLOCKY, FRIABLE, GRAVELY <5% ROCK (IRON STONE)
20–55" B1 GLEY 1 7N GRAY, SANDY LOAM, MASSIVE, PLIABLE
55– 65" B2 10YR 5/1 GRAY, COARSE SAND, FRIABLE, MASSIVE, > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
REDOX @ 20" 10YR 7/8 COMMON DISTINCT >15%
SOIL SERIES: WALPOLE
EST WET: 20" BELOW GRADE
OBS WT: 39" BELOW GRADE (APPARENT →)
LEDGE: > 65" BELOW GRADE

Test Pit #2:

0–15"A 10YR 4/3 BROWN, LOAM, MASSIVE
15–17" 10YR 7/6 YELLOW, SANDY LOAM, FRIABLE, GRANULAR
17–27" GLEY 1 7/N LIGHT GRAY, SANDY LOAM, FRIABLE, GRANULAR
27–52" 10YR 6/8 BROWNISH YELLOW, LOAM, FRIABLE, MASSIVE
52–77" 10YR 5/1 GRAY, COURSE SAND, FRIABLE, GRAVELY, GRANULAR
REDOX @ 26" 10YR 7/8 COMMON DISTINCT
SOIL SERIES: WALPOLE
EST WET: 26" BELOW GRADE
OBS WT: 51" BELOW GRADE (APPARENT ↑)
LEDGE: 77" BELOW GRADE

Test Pit #3:

0–16" 10YR 4/3 BROWN, LOAM, AGGREGATED, FRIABLE
16–27" 10YR 6/6 BROWNISH YELLOW, LOAM, AGGREGATED, FRIABLE, GRAVELY >5%
27–52" 10YR 7/2 LIGHT GRAY, LOAMY SAND, AGGREGATED, FRIABLE GRAVELY >15%
52–84" 10YR 8/1 WHITE, SANDY CLAY LOAM, PLATEY, INDURATE
REDOX @: 41" 10YR 7/8 COMMON DISTINCT >15%
SOIL SERIES: CANTON – CHATFIELD COMPLEX
EST WET: 41" BELOW GRADE
OBS WT: 84" BELOW GRADE (APPARENT ↘)
LEDGE: 84" BELOW GRADE

Test Pit #4:

0–18" 10YR 5/4 YELLOWISH BROWN, LOAM, FRIABLE, AGGREGATE
18–27" 10YR 6/6 BROWNISH YELLOW, SANDY LOAM, GRAVELY >5%, FRIABLE, AGGREGATE
27–37" 10YR 6/2 LIGHT BROWNISH GREY, LOAMY SAND, > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
37–65" 10YR 7/8 YELLOW, DECAYING BEDROCK, ANGULAR COBBLE, IRON STONE
REDOX @: 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CHATFIELD
EST WET: 37" BELOW GRADE
OBS WT: 56" BELOW GRADE (APPARENT ↑)
LEDGE: 65" BELOW GRADE

Test Pit #5:

0–10" 10YR 4/3 BROWN, LOAMY SAND, AGGREGATE, FRIABLE, GRAVELY >5%
10–31" 10YR 5/4 YELLOWISH BROWN, COURSE SAND, GRANULAR, FRIABLE, GRAVELY >15%
31–57" GLEY 1 5/N GRAY, CLAY, DECAYED BEDROCK, BOULDERS >5%, MASSIVE
REDOX @: 31" 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CHATFIELD – MAYBID COMPLEX
EST WET: 31" BELOW GRADE
OBS WT: > 57"
LEDGE: 57" BELOW GRADE

TEST PIT LOG

SITE: 437 LAFAYETTE ROAD, PORTSMOUTH, NH
LOGGED BY: PAUL O'HANLON, TFM, INC.
DATE: 1/25/2022

Test Pit #6:

0–12" 10YR 4/3 BROWN, SANDY LOAM, AGGREGATE, FRIABLE
12–16" 10YR 7/2 LIGHT GRAY, SAND, GRANULAR, FRIABLE, GRAVELY >5%
16–28" 10YR 7/1 LIGHT GRAY, FINE SAND, GRANULAR, FRIABLE
28–42" 10YR 7/3 VERY PALE BROWN, SANDY LOAM, AGGREGATE, FRIABLE, HETEROGENEOUS
42–47" GLEY 1 5/5G–1 GREENISH GRAY, SANDY CLAY LOAM, PLATEY, INDURATE
47–96" GLEY 2 8/5BG LIGHT GREENISH GRAY, CLAY, MASSIVE, INDURATE, HOMOGENEOUS
REDOX @42" 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CANTON COMPLEX (ANTHROPOGENIC)
EST WET: 42" BELOW GRADE
OBS WT: 79" BELOW GRADE (APPARENT →)
LEDGE: > 96"

Test Pit #7:

0–18" 10YR 4/2 DARK GRAYISH BROWN, SANDY LOAM, FRIABLE, BLOCKY
18–42" 10YR 7/4 VERY PALE BROWN, FINE SAND, GRANULAR, FRIABLE
42–54" 10YR 6/6 BROWNISH YELLOW, COURSE SAND, GRANULAR, FRIABLE
54–65" 10YR 5/8 YELLOWISH BROWN, SANDY LOAM, HETEROGENEOUS, FRIABLE
65–72" GLEY 2 4/10B DARK BLUEISH GRAY, SANDY CLAY LOAM, PLATEY, INDURATE
72–102" GLEY 2 7/10B LIGHT BLUEISH GRAY, CLAY, MASSIVE, INDURATE
REDOX @ 57" 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CANTON COMPLEX (ANTHROPOGENIC)
EST WET: 57" BELOW GRADE
OBS WT: 93" BELOW GRADE (APPARENT ↑)
LEDGE: >102"

Test Pit #8:

0–14" 10YR 4/2 DARK GRAYISH BROWN, LOAMY SAND, FRIABLE, BLOCKY
14–42" 10YR 7/4 VERY PALE BROWN, FINE SAND, AGGREGATE, FRIABLE, > 15% COBBLE RIVER STONE
42–50" GLEY 1 5/5G_/1 GREENISH GRAY, SANDY CLAY LOAM, AQUATARD PRESENT (IRON STONE), MASSIVE, INDURATE
50–55" 10YR 6/4 LIGHT YELLOWISH BROWN, SANDY CLAY LOAM, INCLUSION, HETEROGENEOUS, MASSIVE, INDURATE
55–103" GLEY 2 8/5BG LIGHT GREENISH GRAY, CLAY, INDURATE, MASSIVE
REDOX @ 42 5R 3/8 COMMON DISTINCT >15% (AQUATARD (POTENTIALLY ANTHROPOGENIC))
SOIL SERIES: CANTON COMPLEX (ANTHROPOGENIC)
EST WET: 42" BELOW GRADE
OBS WT: 101" BELOW GRADE (APPARENT ↑)
LEDGE: > 103"

Test Pit #9:

0–9"10YR 4/3 BROWN, LOAM, BLOCKY, FRIABLE, GRAVELY >5%
9–23" 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, , > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
23–54" 10YR 7/2 LIGHT GREY, SANDY LOAM, INDURATE, MASSIVE, HETEROGENEOUS, > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
REDOX @ 5R 4/6 COMMON DISTINCT >15%
SOIL SERIES: WALPOLE
EST WET: 30" BELOW GRADE
OBS WT: > 54"
LEDGE: 54" BELOW GRADE

TEST PIT LOG

SITE: 437 LAFAYETTE ROAD, PORTSMOUTH, NH
LOGGED BY: PAUL O'HANLON, TFM, INC.
DATE: 2/1/2022

Test Pit #10:

0–12" 10YR 4/4 DARK YELLOWISH BROWN, LOAMY SAND, BLOCKY, FRIABLE, COBBLE >15%, HOMOGENEOUS SOIL
12–23" 10YR 6/3 PALE BROWN, SANDY LOAM, AGGREGATE, FRIABLE, COBBLE >15%, HOMOGENEOUS SOIL
23–36" 10YR 6/2 LIGHT BROWNISH GREY, COURSE SAND, GRANULAR, HETEROGENEOUS, COBBLE >15%, VERY COURSE PARTICLES <5%
36–66" 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, MASSIVE, INDURATE > 25% ANGULAR ROCK FRAGMENT (IRON STONE)
66–76" 10YR 5/4 YELLOWISH BROWN, SANDY LOAM, MASSIVE, INDURATE, DECAYING LEDGE, > 55% ANGULAR ROCK FRAGMENT (IRON STONE)
REDOX @ 52 – 58 10YR 5/6 COMMON DISTINCT >15%
SOIL SERIES: CANTON – WALPOLE COMPLEX
EST WET: 52" BELOW GRADE
OBS WT: >76"
LEDGE: 76" BELOW GRADE

REV.	DATE	DESCRIPTION	DR	CK

TAX MAP 229 LOT 1

TEST PITS LOGS

SMITHFIELD CONSTRUCTION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

OWNED BY

ARTWILL, LLC

SCALE: N.T.S.

MARCH 1, 2022

Seacoast Division

TFM

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

170 Commerce Way, Suite 102
Portsmouth, NH 03801
Phone (603) 431-2222
Fax (603) 431-0910
www.tfmoran.com

FILE	45407-120	DR		FB		S-2
		CK		CADFILE		

Mar 01, 2022 - 2:31pm
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Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-3 - Back Yard of Lot 3 - Hole #1

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 45.0 cm
Depth to Impervious Layer or ESHWT = 104.1 cm 41 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	26.5	-	-		-	-	-	-	-	-	-	-			
2	0.5	20	0.000753	25.5	1.0	0.008	1	20	2400	1.8072	0.711	59.1	0.000753	0.0006	1.808	0.712	1.337	0.526
3	1	20	0.000753	24.9	0.6	0.008	1	20	1440	1.08432	0.427	59.1	0.000753	0.0006	1.085	0.427	0.802	0.316
4	1.5	20	0.000753	24.2	0.7	0.008	1	20	1680	1.26504	0.498	59.1	0.000753	0.0006	1.266	0.498	0.936	0.368
5	2	20	0.000753	23.5	0.7	0.008	1	20	1680	1.26504	0.498	59.1	0.000753	0.0006	1.266	0.498	0.936	0.368
6	2.5	20	0.000753	22.8	0.7	0.008	1	20	1680	1.26504	0.498	59.1	0.000753	0.0006	1.266	0.498	0.936	0.368
7	3	20	0.000753	22.2	0.6	0.008	1	20	1440	1.08432	0.427	59.1	0.000753	0.0006	1.085	0.427	0.802	0.316
8	3.5	20	0.000753	21.7	0.5	0.008	1	20	1200	0.9036	0.356	59.1	0.000753	0.0006	0.904	0.356	0.668	0.263
Average Ksat based on readings 2-7											0.470					0.470		0.347

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-3 - Back Yard of Lot 3 - Hole #2

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 52.0 cm
Depth to Impervious Layer or ESHWT = 104.1 cm 41 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	27	-	-		-	-	-	-	-	-	-	-			
2	0.5	16	0.001057	25.4	1.6	0.008	1	20	3840	4.05888	1.5980	52.1	0.001057	0.0007	4.058	1.5974	2.794	1.100
3	1	16	0.001057	24.5	0.9	0.008	1	20	2160	2.28312	0.8989	52.1	0.001057	0.0007	2.282	0.899	1.571	0.619
4	1.5	16	0.001057	23.4	1.1	0.008	1	20	2640	2.79048	1.0986	52.1	0.001057	0.0007	2.790	1.0982	1.921	0.756
5	2	16	0.001057	22.5	0.9	0.008	1	20	2160	2.28312	0.8989	52.1	0.001057	0.0007	2.282	0.899	1.571	0.619
6	2.5	16	0.001057	21.6	0.9	0.008	1	20	2160	2.28312	0.8989	52.1	0.001057	0.0007	2.282	0.899	1.571	0.619
7	3	16	0.001057	20.7	0.9	0.008	1	20	2160	2.28312	0.8989	52.1	0.001057	0.0007	2.282	0.899	1.571	0.619
8	3.5	16	0.001057	19.9	0.8	0.008	1	20	1920	2.02944	0.7990	52.1	0.001057	0.0007	2.029	0.799	1.397	0.550
Average Ksat based on readings 2,4-8											0.8789					0.879		0.605

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-3 - Back Yard of Lot 3 - Hole #3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 46.0 cm
Impervious Layer or ESHWT = 104.1 cm 41 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	42.0	-	-		-	-	-	-	-	-	-	-			
2	0.5	19	0.000815	40.8	1.2	0.008	1	20	2880	2.3472	0.924	58.1	0.000815	0.0006	2.347	0.924	1.694	0.667
3	1	19	0.000815	39.9	0.9	0.008	1	20	2160	1.7604	0.693	58.1	0.000815	0.0006	1.760	0.693	1.271	0.500
4	1.5	19	0.000815	39.0	0.9	0.008	1	20	2160	1.7604	0.693	58.1	0.000815	0.0006	1.760	0.693	1.271	0.500
5	2	19	0.000815	38.0	1.0	0.008	1	20	2400	1.956	0.770	58.1	0.000815	0.0006	1.956	0.770	1.412	0.556
6	2.5	19	0.000815	37.2	0.8	0.008	1	20	1920	1.5648	0.616	58.1	0.000815	0.0006	1.565	0.616	1.129	0.445
7	3	19	0.000815	36.4	0.8	0.008	1	20	1920	1.5648	0.616	58.1	0.000815	0.0006	1.565	0.616	1.129	0.445
8	3.5	19	0.000815	35.6	0.8	0.008	1	20	1920	1.5648	0.616	58.1	0.000815	0.0006	1.565	0.616	1.129	0.445
											0.724					0.724		0.522

* NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read
H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Hole #1	0.5
Hole #2	0.9
Hole #3	0.7
Average	**0.7**

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 4/25/2024
Location: TP-4 Between Lots 2 and 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 46.0 cm
Depth to Impervious Layer or ESHWT = 94.0 cm 37 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	33.0	-	-		-	-	-	-	-	-	-	-			
2	1	14	0.001288	32.4	0.6	0.017	1	20	720	0.92736	0.3651	48.0	0.001288	0.0009	0.928	0.365	0.613	0.241
3	2	14	0.001288	31.8	0.6	0.017	1	20	720	0.92736	0.3651	48.0	0.001288	0.0009	0.928	0.365	0.613	0.241
4	3	14	0.001288	31.3	0.5	0.017	1	20	600	0.7728	0.3043	48.0	0.001288	0.0009	0.773	0.304	0.511	0.201
5	4	14	0.001288	30.8	0.5	0.017	1	20	600	0.7728	0.3043	48.0	0.001288	0.0009	0.773	0.304	0.511	0.201
6	5	14	0.001288	30.4	0.4	0.017	1	20	480	0.61824	0.2434	48.0	0.001288	0.0009	0.618	0.243	0.409	0.161
7	6	14	0.001288	22.2	8.2	0.017	1	20	9840	12.67392	4.9897	48.0	0.001288	0.0009	12.677	4.991	8.381	3.300
Average Ksat based on readings 1-6											0.3164					0.316		0.724

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-4 Between Lots 2 and 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 38.0 cm
Depth to Impervious Layer or ESHWT = 94.0 cm 37 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s*	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	27.2	-	-		-	-	-	-	-	-	-	-			
2	2	15	0.001163	26.5	0.7	0.033	1	20	420	0.48846	0.1923	56.0	0.001163	0.0007	0.489	0.192	0.305	0.120
3	4	15	0.001163	26	0.5	0.033	1	20	300	0.3489	0.1374	56.0	0.001163	0.0007	0.349	0.137	0.218	0.086
4	6	15	0.001163	25.9	0.1	0.033	1	20	60	0.06978	0.0275	56.0	0.001163	0.0007	0.070	0.027	0.044	0.017
5	8	15	0.001163	25.4	0.5	0.033	1	20	300	0.3489	0.1374	56.0	0.001163	0.0007	0.349	0.137	0.218	0.086
Average Ksat based on readings 1-3											0.1648					0.165		0.103

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer (ESHW - Depth of Auger Hole in cm)

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 4/25/2024
Location: TP-4 Between Lots 2 and 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 43.0 cm
Impervious Layer or ESHWT = 94.0 cm 37 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	37.0	-	-		-	-	-	-	-	-	-	-			
2	1	15	0.001163	36.0	1.0	0.017	1	20	1200	1.3956	0.549	51.0	0.001163	0.0008	1.396	0.550	0.931	0.367
3	2	15	0.001163	35.5	0.5	0.017	1	20	600	0.6978	0.275	51.0	0.001163	0.0008	0.698	0.275	0.466	0.183
4	3	15	0.001163	35.0	0.5	0.017	1	20	600	0.6978	0.275	51.0	0.001163	0.0008	0.698	0.275	0.466	0.183
5	4	15	0.001163	34.5	0.5	0.017	1	20	600	0.6978	0.275	51.0	0.001163	0.0008	0.698	0.275	0.466	0.183
6	5	15	0.001163	34.0	0.5	0.017	1	20	600	0.6978	0.275	51.0	0.001163	0.0008	0.698	0.275	0.466	0.183
Average Ksat based on readings 3-6											0.275					0.275		0.183

* NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read
H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Hole #1	0.3
Hole #2	0.2
Hole #3	0.3
Average	**0.3**

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP 5 - SE Corner of Lot 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 32.0 cm
Depth to Impervious Layer or ESHWT = 78.7 cm 31 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s*	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	46.8	-	-		-	-	-	-	-	-	-	-			
2	2	11	0.00182817	44.5	2.3	0.033	2	105	7245	13.24512	5.2146	46.7	0.001827	0.0010	13.238	5.212	7.368	2.901
3	3	11	0.00182817	43.8	0.7	0.017	2	105	4410	8.062249	3.1741	46.7	0.001827	0.0010	8.058	3.173	4.485	1.766
4	4	11	0.00182817	43.3	0.5	0.017	2	105	3150	5.75875	2.2672	46.7	0.001827	0.0010	5.756	2.266	3.203	1.261
5	5	11	0.00182817	42.8	0.5	0.017	2	105	3150	5.75875	2.2672	46.7	0.001827	0.0010	5.756	2.266	3.203	1.261
6	6	11	0.00182817	42.2	0.6	0.017	2	105	3780	6.910499	2.7207	46.7	0.001827	0.0010	6.907	2.719	3.844	1.513
Average Ksat based on readings 3-6											2.6073					2.606		1.450

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer (ESHW - Depth of Auger Hole in cm)

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP 5 - SE Corner of Lot 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 37.0 cm
Depth to Impervious Layer or ESHWT = 78.7 cm 31 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	32.7	-	-		-	-	-	-	-	-	-	-			
2	1	16	0.001057	31.8	0.9	0.017	2	105	5670	5.99319	2.360	41.7	0.001057	0.0008	5.991	2.359	4.778	1.881
3	2	16	0.001057	31.1	0.7	0.017	2	105	4410	4.66137	1.835	41.7	0.001057	0.0008	4.660	1.835	3.716	1.463
4	3	16	0.001057	30.2	0.9	0.017	2	105	5670	5.99319	2.360	41.7	0.001057	0.0008	5.991	2.359	4.778	1.881
5	4	16	0.001057	29.4	0.8	0.017	2	105	5040	5.32728	2.097	41.7	0.001057	0.0008	5.325	2.097	4.247	1.672
6	5	16	0.001057	28.7	0.7	0.017	2	105	4410	4.66137	1.835	41.7	0.001057	0.0008	4.660	1.835	3.716	1.463
7	6	16	0.001057	28	0.7	0.017	2	105	4410	4.66137	1.835	41.7	0.001057	0.0008	4.660	1.835	3.716	1.463
Average Ksat based on readings											2.054					2.053		1.637

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Hole #1	2.6
Hole #2	2.1
Average	**2.4**

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-7 Back of Lot 1

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 28.0 cm
Depth to Impervious Layer or ESHWT = 236.2 cm 93 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	26.0	-	-		-	-	-	-	-	-	-	-			
2	1	12	0.0016137	24.8	1.2	0.017	2	105	7560	12.19959	4.8030	208.2	0.001613	0.0003	12.193	4.801	2.086	0.821
3	2	12	0.0016137	24.1	0.7	0.017	2	105	4410	7.11643	2.8017	208.2	0.001613	0.0003	7.113	2.800	1.217	0.479
4	3	12	0.0016137	23.3	0.8	0.017	2	105	5040	8.133062	3.2020	208.2	0.001613	0.0003	8.129	3.200	1.391	0.547
5	4	12	0.0016137	22.5	0.8	0.017	2	105	5040	8.133062	3.2020	208.2	0.001613	0.0003	8.129	3.200	1.391	0.547
6	5	12	0.0016137	21.8	0.7	0.017	2	105	4410	7.11643	2.8017	208.2	0.001613	0.0003	7.113	2.800	1.217	0.479
7	6	12	0.0016137	20.9	0.9	0.017	2	105	5670	9.149695	3.6022	208.2	0.001613	0.0003	9.145	3.600	1.564	0.616
Average Ksat based on readings 3-7											3.1219					3.120		0.534

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-7 Back of Lot 1

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 36.0 cm
Depth to Impervious Layer or ESHWT = 236.2 cm 93 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s*	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	15.5	-	-		-	-	-	-	-	-	-	-			
2	1	8	0.00284801	14.5	1.0	0.017	2	105	6300	17.94247	7.0640	200.2	0.002847	0.0003	17.933	7.060	2.061	0.811
3	2	8	0.00284801	13.7	0.8	0.017	2	105	5040	14.35398	5.6512	200.2	0.002847	0.0003	14.347	5.648	1.649	0.649
4	3	8	0.00284801	12.8	0.9	0.017	2	105	5670	16.14822	6.3576	200.2	0.002847	0.0003	16.140	6.354	1.855	0.730
5	4	8	0.00284801	12.2	0.6	0.017	2	105	3780	10.76548	4.2384	200.2	0.002847	0.0003	10.760	4.236	1.236	0.487
6	5	8	0.00284801	11.5	0.7	0.017	2	105	4410	12.55973	4.9448	200.2	0.002847	0.0003	12.553	4.942	1.443	0.568
7	6	8	0.00284801	10.8	0.7	0.017	2	105	4410	12.55973	4.9448	200.2	0.002847	0.0003	12.553	4.942	1.443	0.568
Average Ksat based on readings 3-7											5.2273					5.225		0.600

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer (ESHW - Depth of Auger Hole in cm)

Project No: 45407.12 Date: 1/25/2022

Project Name: 437 Lafatette Road - Portsmouth, NH Location: TP-7 Back of Lot 1

For 5 cm Auger

A of Auger Hole = 19.6 cm^2

Radius of Hole = 2.5 cm

Depth of Auger Hole = 34 cm

Impervious Layer or ESHWT = 236.2 cm 93 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	38.5	-	-		-	-	-	-	-	-	-	-			
2	1	8.5	0.00262191	37.9	0.6	0.017	2	105	3780	9.910837	3.902	202.2	0.002621	0.0003	9.906	3.900	1.209	0.476
3	2	8.5	0.00262191	37.1	0.8	0.017	2	105	5040	13.21445	5.203	202.2	0.002621	0.0003	13.208	5.200	1.612	0.635
4	3	8.5	0.00262191	36.4	0.7	0.017	2	105	4410	11.56264	4.552	202.2	0.002621	0.0003	11.557	4.550	1.410	0.555
5	4	8.5	0.00262191	35.7	0.7	0.017	2	105	4410	11.56264	4.552	202.2	0.002621	0.0003	11.557	4.550	1.410	0.555
6	6	8.5	0.00262191	34.5	1.2	0.033	2	105	3780	9.910837	3.902	202.2	0.002621	0.0003	9.906	3.900	1.209	0.476
Average Ksat based on readings 3-6											4.552					4.550		0.555

* NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water

A Coefficient A from CCHP Manual - Approximate for Glover Solution

d Distinance from top of water to outflow of CCHP (D-H)

A1 Calculated Coefficient A for Glover Solution (H>2s)

B1 Calculated Coefficient A for Glover Solution (H<2s)

s Distance from bottom of auger hole to impereable layer

Hole #1	3.1
Hole #2	5.2
Hole #3	4.6
Average	**4.3**

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-10 Back of Lot 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 34.0 cm
Depth to Impervious Layer or ESHWT = 159.0 cm 63 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	34.5	-	-		-	-	-	-	-	-	-	-			
2	1	20	0.00075386	33.3	1.2	0.017	1	20	1440	1.085555	0.4274	125.0	0.000753	0.0003	1.085	0.427	0.461	0.182
3	2	20	0.00075386	31.5	1.8	0.017	1	20	2160	1.628332	0.6411	125.0	0.000753	0.0003	1.628	0.641	0.692	0.272
4	3	20	0.00075386	30.0	1.5	0.017	1	20	1800	1.356944	0.5342	125.0	0.000753	0.0003	1.356	0.534	0.576	0.227
5	4	20	0.00075386	28.5	1.5	0.017	1	20	1800	1.356944	0.5342	125.0	0.000753	0.0003	1.356	0.534	0.576	0.227
5	5	20	0.00075386	27.0	1.5	0.017	1	20	1800	1.356944	0.5342	125.0	0.000753	0.0003	1.356	0.534	0.576	0.227
Average Ksat based on readings 3-7											0.5609					0.561		0.238

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-10 Back of Lot 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 46.0 cm
Depth to Impervious Layer or ESHWT = 159.0 cm 63 in (From Ground Surface

										Approximate Glover Solution		Glover Solution						
															if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow	Saturated Hydraulic Conductivity (K_{sat})		s*	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr	cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	42	-	-		-	-	-	-	-	-	-	-			
2	0.5	26	0.00050145	37.9	4.1	0.008	1	20	9840	4.934274	1.9426	113.0	0.000501	0.0003	4.932	1.942	2.783	1.096
3	1	26	0.00050145	34.4	3.5	0.008	1	20	8400	4.212185	1.6583	113.0	0.000501	0.0003	4.210	1.657	2.376	0.935
4	1.5	26	0.00050145	31.8	2.6	0.008	1	20	6240	3.129052	1.2319	113.0	0.000501	0.0003	3.127	1.231	1.765	0.695
5	2	26	0.00050145	29.8	2.0	0.008	1	20	4800	2.406963	0.9476	113.0	0.000501	0.0003	2.406	0.947	1.358	0.535
6	2.5	26	0.00050145	28.2	1.6	0.008	1	20	3840	1.92557	0.7581	113.0	0.000501	0.0003	1.925	0.758	1.086	0.428
7	3	26	0.00050145	26.6	1.6	0.008	1	20	3840	1.92557	0.7581	113.0	0.000501	0.0003	1.925	0.758	1.086	0.428
8	3.5	26	0.00050145	25.4	1.2	0.008	1	20	2880	1.444178	0.5686	113.0	0.000501	0.0003	1.443	0.568	0.815	0.321
9	4	26	0.00050145	24.2	1.2	0.008	1	20	2880	1.444178	0.5686	113.0	0.000501	0.0003	1.443	0.568	0.815	0.321
10	4.5	26	0.00050145	23	1.2	0.008	1	20	2880	1.444178	0.5686	113.0	0.000501	0.0003	1.443	0.568	0.815	0.321
Average Ksat based on readings 3-7											0.6444					0.644		0.363

NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read

H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer (ESHW - Depth of Auger Hole in cm)

Project No: 45407.12
Project Name: 437 Lafatette Road - Portsmouth, NH

Date: 1/25/2022
Location: TP-10 Back of Lot 3

For 5 cm Auger

A of Auger Hole = 19.6 cm^2
Radius of Hole = 2.5 cm
Depth of Auger Hole = 32 cm
Impervious Layer or ESHWT = 159.0 cm 63 in (From Ground Surface

											Approximate Glover Solution		Glover Solution						
																if s>2H		if s<2H	
Reading #	Time Interval	H	Coefficient A	Reading	Δ	Elapsed Time	# On Azm	Conv. Factor (Area)	Outflow		Saturated Hydraulic Conductivity (K_{sat})		s	A1	B1	Saturated Hydraulic Conductivity (K_{sat})		Saturated Hydraulic Conductivity (K_{sat})	
	min	cm	l/cm	cm	cm	hrs	cm	cm^3	cm^3/hr		cm/hr	in/hr	cm			cm/hr	in/hr	cm/hr	in/hr
1	0	-	-	35.0	-	-		-	-		-	-	-	-	-	-			
2	0.5	14	0.001288	33.4	1.6	0.008	1	20	3840		4.94592	1.947	127.0	0.001288	0.0004	4.947	1.948	1.524	0.600
3	1	14	0.001288	32.6	0.8	0.008	1	20	1920		2.47296	0.974	127.0	0.001288	0.0004	2.474	0.974	0.762	0.300
4	1.5	14	0.001288	31.8	0.8	0.008	1	20	1920		2.47296	0.974	127.0	0.001288	0.0004	2.474	0.974	0.762	0.300
5	2	14	0.001288	31.1	0.7	0.008	1	20	1680		2.16384	0.852	127.0	0.001288	0.0004	2.164	0.852	0.667	0.263
6	2.5	14	0.001288	30.4	0.7	0.008	1	20	1680		2.16384	0.852	127.0	0.001288	0.0004	2.164	0.852	0.667	0.263
7	3	14	0.001288	29.6	0.8	0.008	1	20	1920		2.47296	0.974	127.0	0.001288	0.0004	2.474	0.974	0.762	0.300
8	3.5	14	0.001288	28.9	0.7	0.008	1	20	1680		2.16384	0.852	127.0	0.001288	0.0004	2.164	0.852	0.667	0.263
Average Ksat based on readings 3-6												0.913					0.913		0.281

* NOTE: Could not keep a steady H reading in the Hole - Infiltrating beyond equipment ability to read
H Steady Head (amount of water in auger hole from bottom of the hole to the surface of the water
A Coefficient A from CCHP Manual - Approximate for Glover Solution
d Distinance from top of water to outflow of CCHP (D-H)
A1 Calculated Coefficient A for Glover Solution (H>2s)
B1 Calculated Coefficient A for Glover Solution (H<2s)
s Distance from bottom of auger hole to impereable layer

Hole #1	0.6
Hole #2	0.6
Hole #3	0.9
Average	**0.7**

APPENDIX J – NHDES ONE STOP DATAMAPPER

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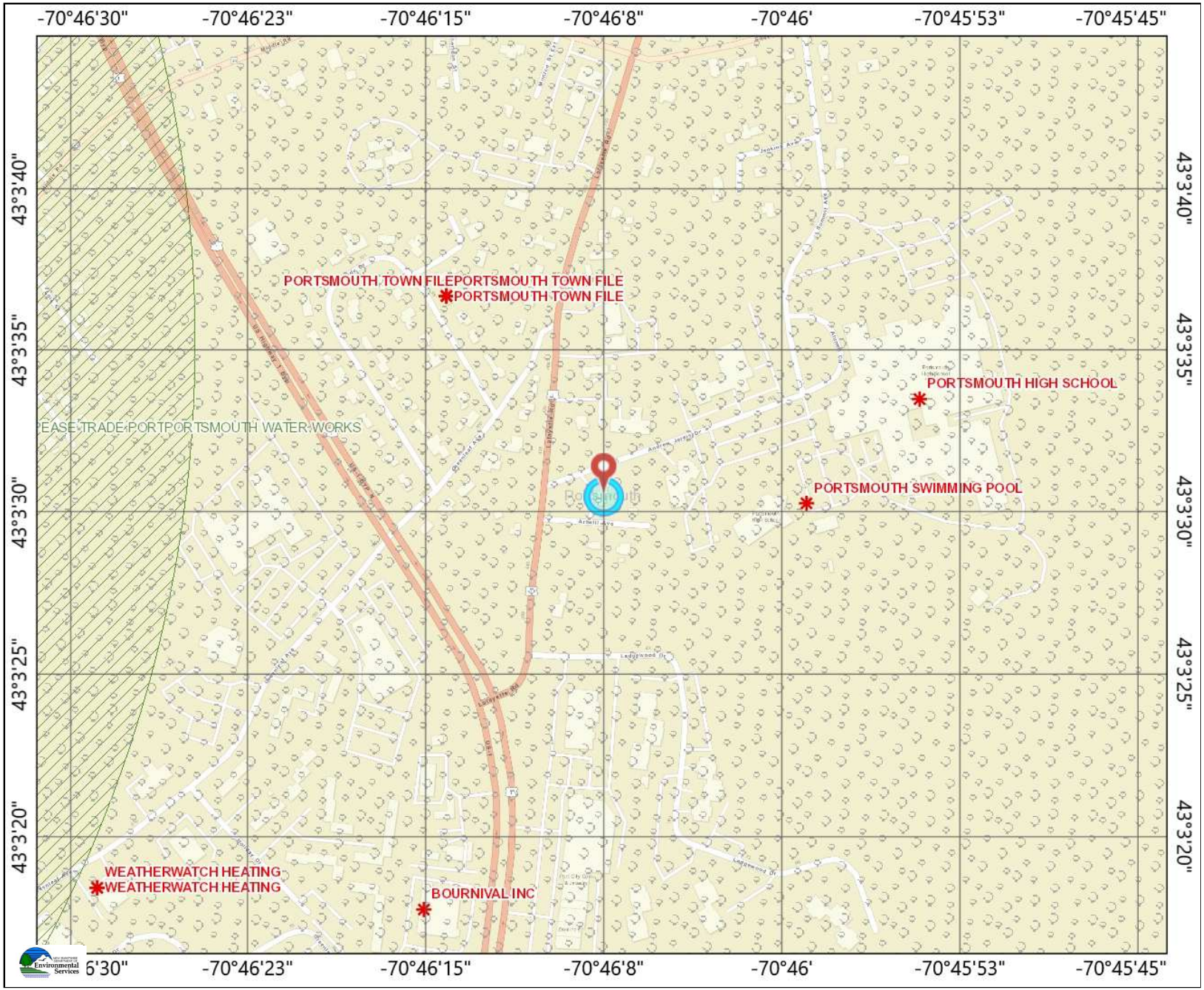
437 Lafayette Road - AoT Screening Layers



Legend

- Remediation Sites
- Coastal and Great Bay Regi Communities
- Designated Rivers Quarterm Buffer
- Public Water Supply Wells
- Groundwater Classification / GA1
- Groundwater Classification / GA2
- Water Supply Intake Protect Areas
- Wellhead Protection Areas
- Class A Lakes with a Quarte Buffer
- Class A - All Features
- All Lakes, with a Quarter Mil Buffer
- Outstanding Resource Wate Watersheds
- Surface Waters with Impairn 2016 with Quarter Mile Buffe
- Watersheds with Chloride Impairments 2016

Map Scale

1: 5,000

Map Generated: 1/25/2022

Notes

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APPENDIX K - PRE AND POST-DEVELOPMENT DRAINAGE PLANS

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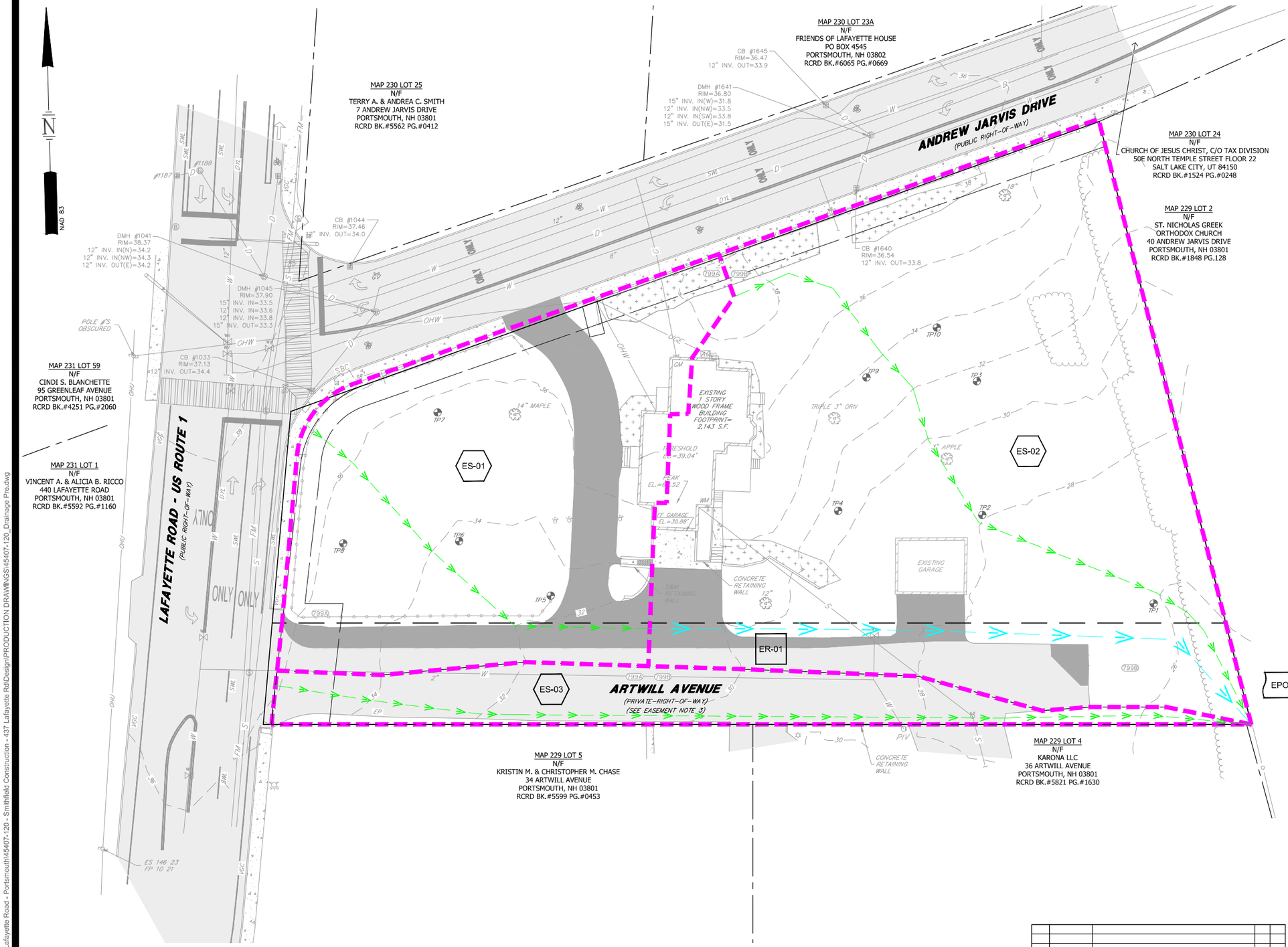

LEGEND

- PROPERTY LINE
- LIMITS OF DRAINAGE SUBCATCHMENT
- XXX — SOIL GROUP BREAKLINE
- FLOW PATH (Tc LINE)
- REACH
- EPOI-01 — EXISTING POINT OF INTEREST
- ES-1 — EXISTING SUBCATCHMENT AREA
- ER-1 — EXISTING REACH

SOIL LEGEND (PER SITE SPECIFIC SOIL SURVEY)

SYMBOL	DESCRIPTION	HYDROLOGIC SOIL GROUP
799*	UBRAN LAND-CANTON COMPLEX 3% - 15% SLOPES	A (BASED ON FIELD INFILTRATION RATES)
799*	UBRAN LAND-CANTON COMPLEX 3% - 15% SLOPES	B (BASED ON FIELD INFILTRATION RATES)

*ENTIRE PROPERTY IDENTIFIED AS URBAN LAND-CANTON COMPLEX.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

PRE-DEVELOPMENT DRAINAGE MAP

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR
ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34")

APRIL 19, 2022

REV	DATE	DESCRIPTION	DR	CK

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB		D-01
		CK	JCC	CADFILE	45407-120_DRAINAGE PRE	

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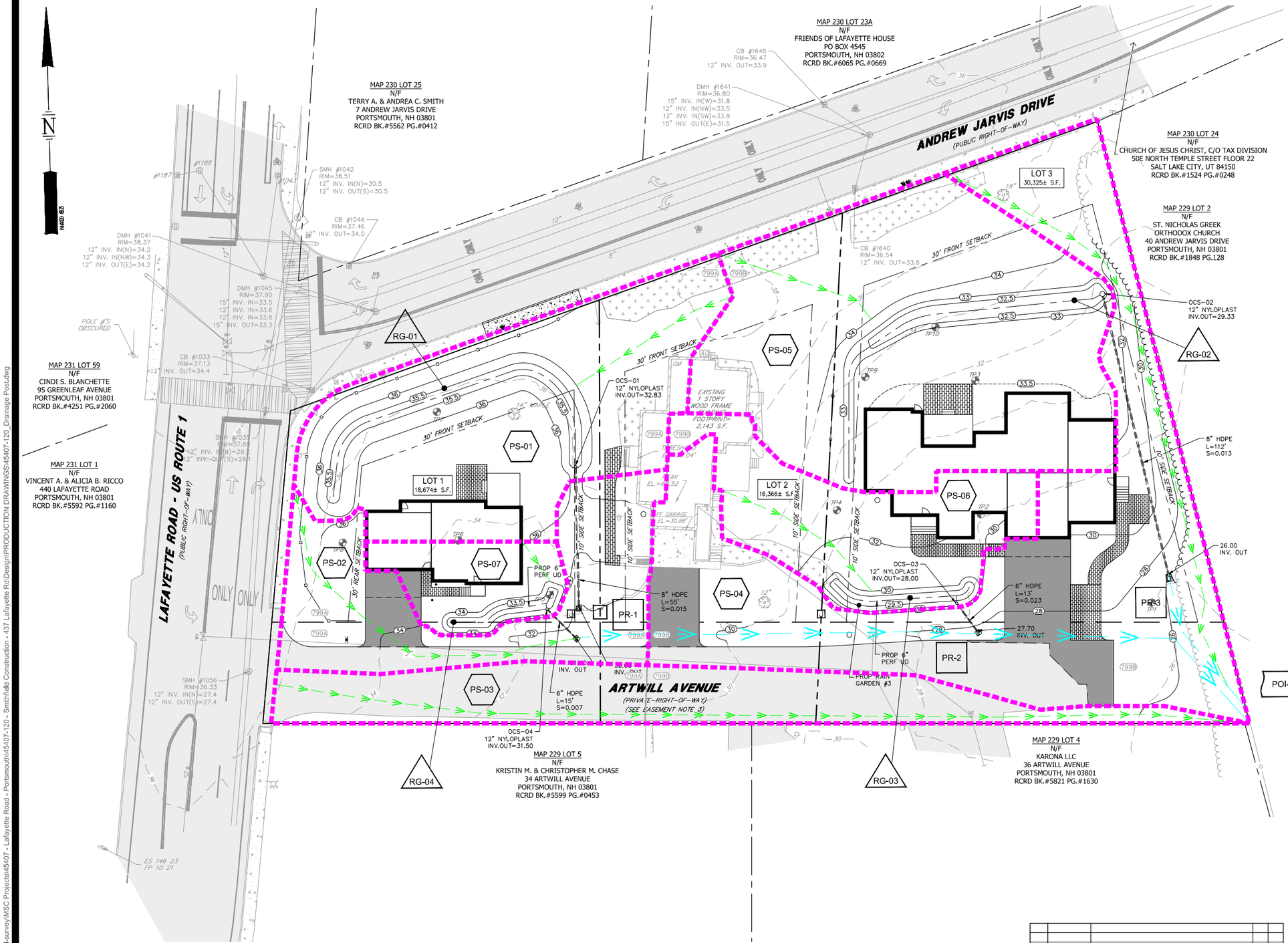

LEGEND

- PROPERTY LINE
- LIMITS OF DRAINAGE SUBCATCHMENT
- XXX — SOIL GROUP BREAKLINE
- FLOW PATH (Tc LINE)
- REACH
- POI-1 — POINT OF INTEREST
- PS-1 — PROPOSED SUBCATCHMENT AREA
- PS-1 — PROPOSED POND
- PR-01 — PROPOSED REACH

SOIL LEGEND (PER SITE SPECIFIC SOIL SURVEY)

SYMBOL	DESCRIPTION	HYDROLOGIC SOIL GROUP
799*	UBRAN LAND-CANTON COMPLEX 3% - 15% SLOPES	A (BASED ON FIELD INFILTRATION RATES)
799*	UBRAN LAND-CANTON COMPLEX 3% - 15% SLOPES	B (BASED ON FIELD INFILTRATION RATES)

*ENTIRE PROPERTY IDENTIFIED AS URBAN LAND-CANTON COMPLEX.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

POST-DEVELOPMENT DRAINAGE MAP

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR
ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34")
APRIL 19, 2022

HORIZONTAL SCALE 1"=20'
20 10 0 20

REV	DATE	DESCRIPTION	DR	CK

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB		D-02
		CK	JCC	CADFILE	45407-120_DRAINAGE POST	

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APPENDIX L – OPERATION AND MAINTENANCE MANUAL

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Project #45407.120

STORMWATER MANAGEMENT SYSTEM OPERATION & MAINENANCE MANUAL

F O R

Proposed 3 Lot Subdivision

437 Lafayette Road
Portsmouth, New Hampshire
Rockingham County

Tax Map 229, Lot 1

April 19, 2022

Prepared By:

TFM Since 1968

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

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Table of Contents

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Maintenance of Property

TFMoran, Inc., has prepared the following Stormwater Management System Operation & Maintenance Plan for Artwill, LLC at 437 Lafayette Road, Portsmouth, New Hampshire. The intent of this plan is to provide the owner (Artwill, LLC), and future property managers/owners of the site with a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this development. This includes all temporary and permanent stormwater and erosion control measures during construction.

Plans

Refer to the Site Development Plans prepared by TFMoran, Inc. for Tax Map 229 Lot 1, Proposed 3 Lot Subdivision, 437 Lafayette Road, Portsmouth, New Hampshire, dated April 19, 2022. See Appendix A in this manual for the "Stormwater Operation and Maintenance Plan" identifying locations of stormwater practices described hereon.

Owner Responsibility

The current owners, and their successors of the property, are required to submit a copy of the Operations and Maintenance Report completed on a yearly basis to the City of Portsmouth Planning Department and Public Works Department by December 31st. The future successor includes but is not limited to the individual lot owners. This report should be prepared by a qualified inspector with working knowledge of the site. The owner shall be responsible for the following inspection and maintenance program which is necessary in order to keep the Stormwater Management System functioning properly. These measures will help reduce potential environmental impacts. By following the enclosed procedures, Artwill, LLC and its successors will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site-generated stormwater runoff.

The owner and future owners are the responsible party for the following record keeping activities further identified in this Operation & Maintenance Manual:

- Conduct reporting, inspection, and maintenance activities in accordance with the "Inspection and Maintenance Checklist Requirements" and if applicable "Regular Inspection and Maintenance Guidance" provided by University of New Hampshire Stormwater Center (UNHSC);
- Document each inspection and maintenance activity with the "Inspection and Maintenance Log" and if applicable "Checklist for Inspection" provided by University of New Hampshire Stormwater Center (UNHSC);
- Photograph each practice that is subject to the "Inspection and Maintenance Checklist Requirements" at each inspection of that stormwater practice;
- Document actions taken if invasive species begin to grow in the stormwater management system; and
- Document each application of deicing material applied to the site with the "Deicing Log"

All record keeping required by the Operation & Maintenance Manual shall be maintained by the responsible party and be made available to the applicable regulatory agencies (i.e. NHDES AoT Bureau, City of Portsmouth, etc.) upon request. Logs and reports required by this Operation & Maintenance Manual should be prepared by a qualified inspector with working knowledge of the site. This manual and associated records shall be transferred to any future owners. All current and future owners must comply with RSA 485-A:17, Env-Wq 1500, the permit, and all conditions contained in the permit.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. These measures will greatly help to reduce potential environmental impacts. By following the enclosed procedures, Artwill, LLC and its successors will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site-generated stormwater runoff.

General Inspection and Maintenance Requirements

Temporary stormwater, sediment and erosion control measures that require maintenance on the site during construction include, but are not limited to, the following:

- Stabilized construction entrance;
- Silt sock barriers;
- Inlet protection; and
- Construction dumpster area, if used.

Permanent stormwater, sediment and erosion control measures that require maintenance on the site include, but are not limited, to the following:

- Litter/trash removal;
- Dumpster area maintenance;
- Pavement sweeping;
- Surface maintenance related to deicing/plowing;
- Rip-rap protection;
- Bioretention systems;
- Outlet control structures;
- Emergency spillway;
- Catch basins;
- Drip line stone trench; and
- Culvert pipes.

Inspection and Maintenance Checklist Requirements

By implementing the following procedures, current owners will be able to maintain the functional design of the Stormwater Management System and maximize the systems ability to remove sediment and other contaminants from site-generated stormwater runoff. The owner shall conduct inspection and maintenance activities in accordance with the following checklist:

	Frequency	***Inspect***	***Action***
Temporary Controls			
Stabilized Construction Entrance	Weekly	• Inspect adjacent roadway for sediment tracking • Inspect stone for sediment accumulation	• Sweep adjacent roadways as soon as sediment is tracked • Top dress with additional stone when necessary to prevent tracking
Litter/Trash Removal	Routinely	• Inspect site especially construction areas	• Remove debris and clean areas as necessary
Construction Dumpster Area Maintenance (if used)	Routinely	• Dumpster Areas	• Remove any accumulated debris and dispose of properly
Silt Sock Barrier	Weekly	• Inspect accumulated sediment level, rips and tears	• Repair or replace damaged lengths • Remove and dispose accumulated sediment once level reaches 1/3 of barrier
Gravel	Spring and Fall	• Inspect gravel for ruts and depth	• Replace gravel as necessary, regrade as necessary to maintain design grades, remove any accumulated gravel washed from roadway

	Frequency	***Inspect***	***Action***
Permanent Controls			
Rip Rap Outlet Protection	Spring and Fall and after rainstorms exceeding 2.5 inches in 24 hrs	• Inspect for damage or displaced stones • Inspect for torn or visible fabric	• Repair and replace stone and / or fabric immediately • Remove accumulated sediment, trash and blocking materials

	Frequency	***Inspect***	***Action***
Permanent Controls			
Infiltration Basin	Spring and Fall and after rainstorms exceeding 2.5 inches in 24 hrs	• Inspect level of accumulated sediment	• Remove accumulated sediment
		• Inspect for debris	• Remove debris from inlet and outlets
		• Inspect outlet structures	• Repair as necessary
		• Inspect vegetative cover	• Mow embankments and removed woody vegetation
		• Inspect embankments and spillways	• Repair embankments and spillways as necessary
		• Inspect infiltration function within 72-hrs following a rainfall event	• Restore infiltration by removing accumulated sediments and reconstruction of the infiltration basin if deemed necessary
Landscape (not including Bioretention Systems)	Spring	• Mulch: Inspect mulch areas for trash and debris and thickness of mulch	• Remove weeds and debris. Top dress with new mulch when necessary
	Spring	• Trees and Shrubs: Inspect for broken, weak or diseased branches and debris	• Prune to maintain shape to avoid splitting, remove broken, weak or diseased branches, replace as necessary
	As necessary	• Lawn	• Mow as required
	Spring and Fall	• Inspect landscaped areas for debris and litter	• Remove debris and litter as necessary
Bioretention System	1st few months when rainfall exceeds 2.5” in a 24 hr period	• Inspect drawdown time: required to drawdown in 72 hrs or the standing water covers more than 15% of the surface after 48 hrs	• Remove the top few inches of discolored material and rake or till the remaining material as needed

	Frequency	***Inspect***	***Action***
Permanent Controls			
	4 times for 1st yr, then Spring and Fall	• Inspect for animal burrows and short circuits in the system	• Repair soil erosion from and fill holes and lightly compact
		• Inspect inlet and outlet for debris and leaves	• Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface
		• Inspect the filter bed	• Remove sediment as necessary. If more than 2" of filter material is removed, replace with the design filter media specified
		• Inspect vegetation for distress during extended periods without rain	• Water as necessary
	Spring and Fall	• Inspect Drawdown time: required to drawdown in 72 hrs or the standing water covers more than 15% of the surface after 48 hrs	• Remove the top few inches of discolored material and rake or till the remaining material as needed
	Annually	• Inspect inlet and outlet for erosion	• Repair or replace as necessary
		• Inspect vegetative cover	• Reinforcement plantings should be performed if 50% cover is not established in 2 yrs.
	Additionally, refer to the most currently available documents from UNHSC (attached for reference): "Regular Inspection Maintenance Guidance" and "Checklist for Inspection". If there are discrepancies between the UNHSC documents and this Manual's checklist requirements, the stricter requirements shall override.		
Conventional Pavement	Spring and Fall	• Inspect pavement for debris	• Sweeping as required

	Frequency	***Inspect***	***Action***
Permanent Controls			
Drainage (Catch Basins / Drop Inlets)	Spring and Fall	• Inspect for sediment • Inspect for hydrocarbons • Inspect Hoods	• If sump is more than half full of sediment, remove sediment as necessary • Remove and dispose of properly • Repair and replace as necessary
Drip Line Stone Trench	Spring and Fall	• Inspect for debris and vegetation	• Clean and remove debris and vegetation as necessary
Drain Manholes and Yard Drains	Spring and Fall	• Inspect for accumulated sediment and debris	• Clean any material upon inspection and deposit of properly
Inlet Protection (temporary during construction)	During construction and after measurable rainfall	• Inspect for accumulated sediment	• Empty sediment bag if more than ½ filled with sediment or debris. Replace bag if torn or punctured to ½" diameter or greater on the lower half of the bag
Culvert Pipe	Spring and Fall	• Inspect for obstructions	• Remove and dispose of debris properly, Remove upstream debris to prevent future clogging • Repair/replace if pipe becomes crushed or deteriorated
Emergency Spillway	Spring and Fall	• Inspect for erosion, sediment accumulation, stone loss, and presence of invasive species	• Remove debris and accumulated sediment (sediment accumulation should not exceed 3") • Repair eroded areas • Remove invasive species and vegetation • Replace stone as necessary

	Frequency	*Inspect*	*Action*
Permanent Controls			
Outlet Control Structure	Annually	• Inspection for debris or sediment buildup • Inspect structure	• Remove sediment and debris as necessary • Remove debris covering orifice or v-notch • Repair as necessary

Landscaping

Maintenance of landscaping to follow the NOFA Standards for Organic Land Care, 6th Edition, Practices for the Design and Maintenance of Ecological Landscapes. ("NOFA Standards for Organic Land Care." NOFA Standards for Organic Land Care 6th Edition Practices for the Design and Maintenance of Ecological Landscapes, Northeast Organic Farming Association of Connecticut, Inc, 2017, http://www.organiclandcare.net/sites/default/files/nofa_organic_land_care_standards_6thedition_2017_opt.pdf.)

Inspection and Maintenance Records and Annual Report

A detailed, written record of all logs, reports, photographs required by this Operation & Maintenance Manual must be kept by the owner and future property owners or assigns and/or condominium association of the property. The property owner shall submit records to the City of Portsmouth Department of Public Works and Planning Department yearly. Addresses listed below:

Planning Director
Portsmouth Planning Department
1 Junkins Avenue
Portsmouth, NH 03801

Director of Public Works
Department of Public Works
680 Peverly Hill Road
Portsmouth, NH 03801

The attached forms are provided to assist the property manager with the inspection and maintenance of the Stormwater Management System. The "Inspection and Maintenance Log" (Attachment 1) and "Deicing Log" (Attachment 2) on the following pages are blank copies to aid in record keeping required by this Operation & Maintenance Manual.

Supplement the "Inspection and Maintenance Log" with the most currently available "Checklist for Inspections" from UNHSC (attached to this Manual for reference). Each inspection or maintenance activity shall include photographs of each practice that is subject to the "Inspection and Maintenance Checklist Requirements" at each inspection of that stormwater practice. Log actions taken if invasive species begin to grow in the stormwater management system as required per the attached "Control of Invasive Plants".

For all surface maintenance related activities related to deicing/plowing, complete the “Deicing Log” to track the amount and type of deicing materials applied to the site. Snow shall be stored in designated snow storage areas which have been designed to drain on-site and receive treatment via the stormwater management system prior to infiltration or discharge.

Owner's Certification

Contact Information

Owner:	Artwill, LLC
Contact Person	Joe Caldarola
	PO Box 370
	Portsmouth, NH 03801
	(603) 674-5204
	joe@smithfieldconstruction.com

I have reviewed this document and understand the responsibilities contained. I agree to perform the required maintenance on the stormwater management system.

Owner's Signature (future owner's and successors, if applicable)

Print Name

Title

Date

Any inquiries in regard to the design, function, and/or maintenance of any one of the above mentioned facilities or tasks shall be directed to the project engineer:

TFMoran, Inc., Seacoast Division
170 Commerce Way, Suite 102
Portsmouth, NH 03801
(603) 431-2222

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ATTACHMENT 1

Inspection and Maintenance Log

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Attachment 1

Inspection and Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed (list items/comments)	Date of Cleaning/Repair	Performed By

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ATTACHMENT 2

Deicing Log

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Attachment 2

Deicing Log

Deicing Material Used	Amount of Deicing Material Applied	Date of Application	Logged By

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APPENDIX A

Stormwater Operation & Maintenance Plan

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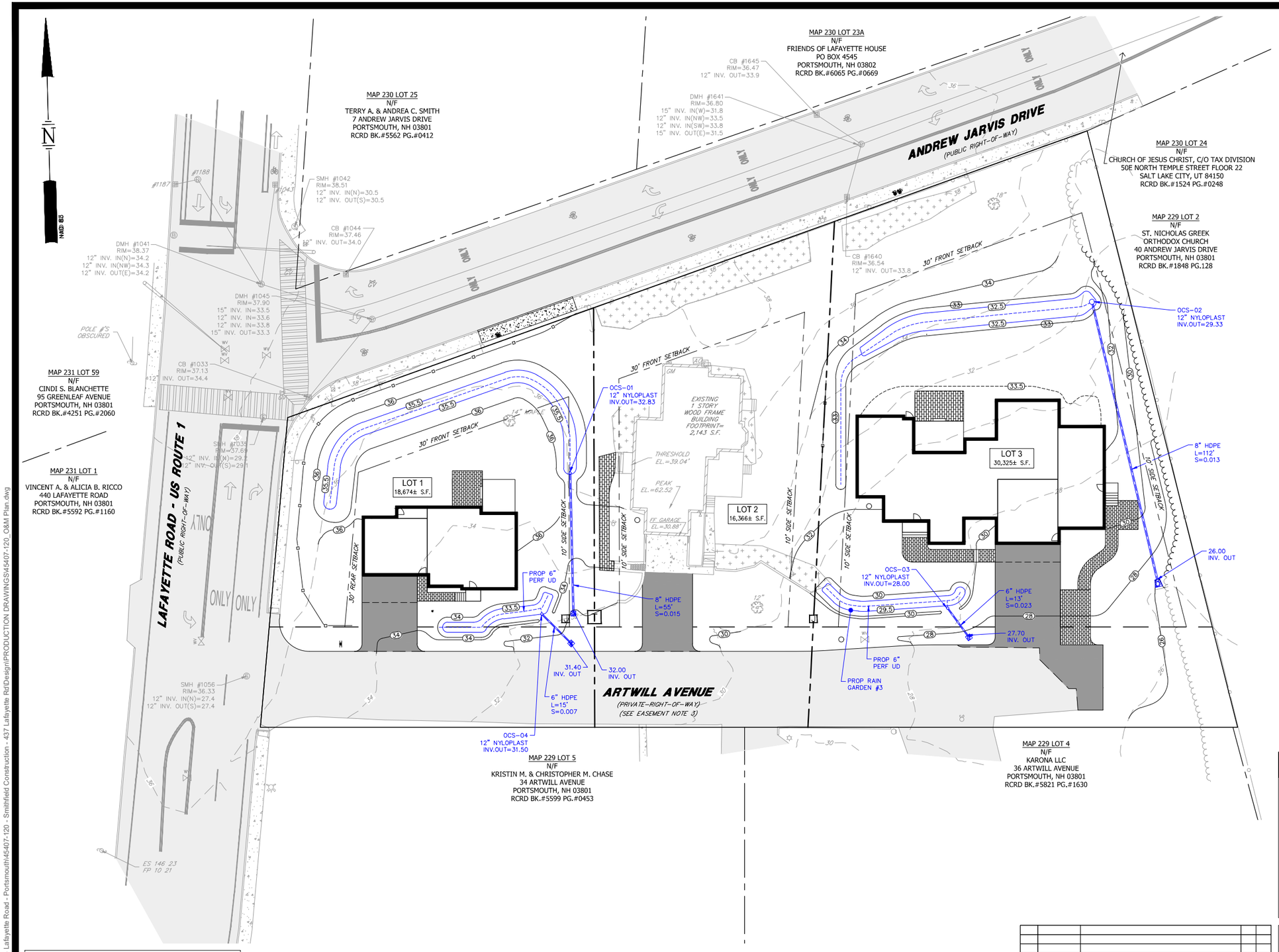

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

STORMWATER OPERATION & MAINTENANCE PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR
ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	DR	JSM	FB		
45407-120	CK	JCC	CADFILE	45407-120_O&M PLAN	O&M-01

May 09, 2022 - 2:39pm
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APPENDIX B

UNHSC Regular Inspection and Maintenance Guidelines
for Bioretention Systems

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Regular Inspection and Maintenance Guidance for Bioretention Systems / Tree Filters

Maintenance of bioretention systems and tree filters can typically be performed as part of standard landscaping. Regular inspection and maintenance is critical to the effective operation of bioretention systems and tree filters to insure they remain clear of leaves and debris and free draining. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less frequent maintenance needs depending on a variety of factors including but not limited to: the occurrence of large storm events, overly wet or dry periods, regional hydrologic conditions, and the upstream land use.

ACTIVITIES

The most common maintenance activity is the removal of sediment and organic debris from the system and bypass structures. Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system, including infiltration rate and nutrient uptake. Vegetation care is important to system productivity and health.

ACTIVITY	FREQUENCY
CLOGGING AND SYSTEM PERFORMANCE	
A record should be kept of the time to drain for the system completely after a storm event. The system should drain completely within 72 hours.	After every major storm in the first few months, then annually at minimum.
Check to insure the filter surface remains well draining after storm events. **Remedy**: If filter bed is clogged, draining poorly, or standing water covers more than 50% of the surface 48 hours after a precipitation event, then remove top few inches of discolored material. Till, or rake remaining material as needed.	
Check inlets and outlets for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet and overflow if obstructed.	Quarterly initially, annually as a minimum thereafter.
Check for animal burrows and short-circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets, outlets, sidewalls.	
VEGETATION	
Check for robust vegetation coverage throughout the system and dead or dying plants. **Remedy:** Vegetation should cover > 75% of the system and should be cared for as needed.	Annually or as needed

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APPENDIX C

UNHSC Checklist for Inspection of Bioretention System

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CHECKLIST FOR INSPECTION OF BIORETENTION SYSTEM / TREE FILTERS

Location:
Inspector:
Date:
Time:
Site Conditions:
Days Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Initial Inspection After Planting		
Plants are stable, roots not exposed	**S** **U**	
Surface is at design level, no evidence of preferential flow/shoving	**S** **U**	
Inlet and outlet/bypass are functional	**S** **U**	
2. Debris Cleanup (1 time/year minimum, Spring/Fall)		
Litter, leaves, and dead vegetation removed from the system	**S** **U**	
Prune/mow vegetation	**S** **U**	
3. Standing Water (1 time/year and/or after large storm events)		
No evidence of standing water after 24-48 hours since rainfall	**S** **U**	
4. Vegetation Condition and Coverage		
Vegetation condition good with good coverage (typically > 75%)	**S** **U**	
5. Other Issues		
Note any additional issues not previously covered.	**S** **U**	

Corrective Action Needed	Due Date
1.	
2.	
3.	
Inspector Signature	**Date**

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APPENDIX D

Control of Invasive Plants

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CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Background:

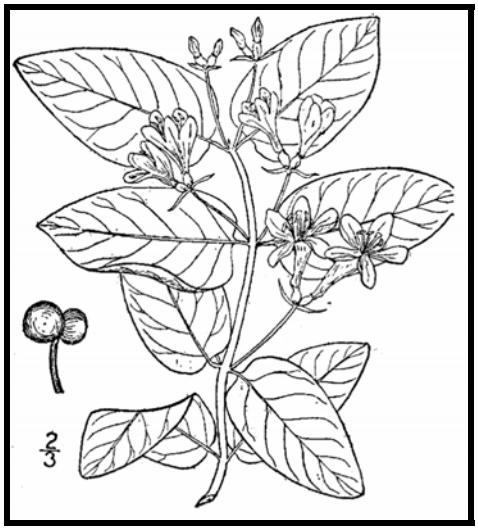
Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

University of New Hampshire Cooperative Extension

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

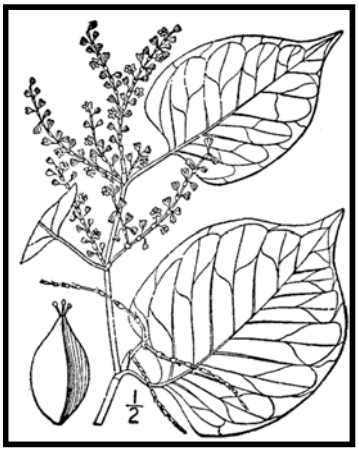
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame’s rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">Fruits and Seeds
  </td><td>Prior to flowering
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>During and following flowering
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(Phragmites australis)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>Fruits, Seeds, Plant Fragments
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn’t materially influence disposal activities.</td><td>Small infestation
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

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PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

APRIL 19, 2022
LAST REVISED: MAY 25, 2022

GENERAL INFORMATION

OWNER
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802

APPLICANT
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802

PREPARED FOR
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802

RESOURCE LIST

PLANNING/ZONING DEPARTMENT
1 JUNKINS AVE
PORTSMOUTH, NH 03801
603-610-7216

BUILDING DEPARTMENT
1 JUNKINS AVE
PORTSMOUTH, NH 03801
603-610-7243
ROBERT MARSILIA,
CHIEF BUILDING INSPECTOR

PUBLIC WORKS
600 PEVERLY HILL RD
PORTSMOUTH, NH 03801
603-472-1530
PETER RICE, PUBLIC WORKS DIRECTOR

POLICE DEPARTMENT
3 JUNKINS AVE
PORTSMOUTH, NH 03801
603-427-1510
MARK NEWPORT, CHIEF

FIRE DEPARTMENT
170 COURT ST
PORTSMOUTH, NH 03801
603-427-1515
PATRICK HOWE, CHIEF

ASSOCIATED PROFESSIONALS
ARCHITECT
SMITHFIELD CONSTRUCTION, INC.
PO BOX 370
PORTSMOUTH, NH 03802
603-674-5204

VICINITY PLAN

INDEX OF SHEETS

SHEET	SHEET TITLE
C-00	COVER
C-01	NOTES & LEGEND
S-01	EXISTING CONDITIONS PLAN
S-02	SUBDIVISION PLAN
C-02	SITE PREPARATION & DEMOLITION PLAN
C-03	SITE LAYOUT PLAN
C-04	GRADING & DRAINAGE PLAN
C-05	UTILITY PLAN
C-06	LANDSCAPE PLAN
C-07	EROSION CONTROL PLAN
C-08	EROSION CONTROL NOTES
C-09	TRUCK TURNING PLAN
C-10 - C-15	DETAILS
REFERENCE PLANS BY ASSOCIATED PROFESSIONALS	
-	ARCHITECTURAL ELEVATION PLAN

PERMITS/APPROVALS

	NUMBER	APPROVED	EXPIRES
CITY PLANNING BOARD SITE PLAN REVIEW	-	-	-
CITY PLANNING BOARD SUBDIVISION REVIEW	-	-	-
CITY PLANNING BOARD CONDITIONAL USE PERMIT FOR AADU	-	-	-
NHDES SEWER CONNECTION PERMIT	-	-	-

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1
COVER
PROPOSED 3 LOT SUBDIVISION
437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
OWNED BY & PREPARE FOR
ARTWILL, LLC

SCALE: AS SHOWN **APRIL 19, 2022**

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE
No. 14950
LICENSED
PROFESSIONAL ENGINEER

DIG SAFE
CALL BEFORE YOU DIG
811 OR 1-888-DIG-SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

THESE PLANS ARE PERMIT DRAWINGS ONLY AND HAVE NOT BEEN DETAILED FOR CONSTRUCTION OR BIDDING.

REV	DATE	DESCRIPTION	DR	CK
1	5/23/2022	UPDATE LAST REVISED DATE.	JSM	JJM

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
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www.tfmoran.com

FILE	45407-120	DR	JSM	FB	-	C-00
PRT		CK	JCC	CADFILE	45407-120_COVER	

LEGEND

PROPOSED

- PROPERTY LINE
- ZONING LINE
- EASEMENT
- BASELINE
- FLOODPLAIN
- EDGE OF WATERBODY
- EDGE OF WETLAND
- SETBACK (WETLAND)
- SETBACK (STRUCTURE)
- SETBACK (PARKING)
- SETBACK (LANDSCAPE)
- GRAVEL ROAD
- EOP — EDGE OF PAVEMENT
- VGC — VERTICAL GRANITE CURB
- SGC — SLOPED GRANITE CURB
- CC — CONCRETE CURB
- ICC — INTEGRATED CONCRETE CURB
- BIT — BITUMINOUS ASPHALT CURB
- CCB — CAPE COD BERM
- SAWCUT
- BUILDING
- BUILDING ROOF OVERHANG
- BUILDING FOUNDATION
- BUILDING ENTRANCE
- OVERHEAD DOOR
- TREE LINE
- FENCE (CHAIN LINK)
- FENCE (WIRE)
- FENCE (STOCKADE)
- GUARDRAIL
- STONE WALL
- RETAINING WALL
- SILT FENCE
- SS — SILT SOCK
- SOIL BOUNDARY
- LIMIT OF GRADING
- XX — CONTOUR
- 100.50 TC / 100.00 BC OR 100.00 FG — PROPOSED SPOT GRADE
- (100.50) FG — EXISTING SPOT GRADE
- ## — PARKING COUNT
- DSLY — YELLOW DOUBLE SOLID LINE
- SSLY — YELLOW SINGLE SOLID LINE
- SSLW — WHITE SINGLE SOLID LINE
- SBLW — WHITE SINGLE BROKEN LINE
- STOP BAR
- CROSSWALK
- ACCESSIBLE PARKING SYMBOL
- PAVEMENT ARROW
- TRAFFIC FLOW ARROW (NOT PAINTED)
- SIGN (SINGLE POST)
- SIGN (DOUBLE POST)
- SIGN (PYLON)
- SIGN (MONUMENT)
- BOLLARD
- D — DUMPSTER PAD

PROPOSED

- CONCRETE
- GRAVEL
- HEAVY DUTY PAVEMENT
- CONSTRUCTION ENTRANCE
- SNOW STORAGE
- RIPRAP
- INLET PROTECTION
- FLOW ARROW
- DRAIN LINE
- DRAINAGE SWALE
- STORMWATER BMP
- S — SEWER LINE
- FM — SEWER FORCE MAIN LINE
- W — WATER LINE
- G — GAS LINE
- OHE — OVERHEAD UTILITY LINE
- UGE — UNDERGROUND UTILITY LINE
- CATCH BASIN
- DRAIN INLET
- OUTLET CONTROL STRUCTURE
- ROOF DRAIN
- DRAIN CLEANOUT
- DRAIN MANHOLE
- FARED END SECTION
- SEWER CLEAN OUT
- SEWER MANHOLE
- SEWER VENT
- DRAIN/SEWER/WATER PLUG OR CAP
- HYDRANT
- FIRE DEPARTMENT CONNECTION
- WATER GATE VALVE
- WATER SHUTOFF
- THRUST BLOCK
- WATER METER
- WATER MANHOLE
- WELL
- GAS GATE VALVE
- GAS SHUT OFF
- GAS METER
- TELEPHONE MANHOLE
- ELECTRIC MANHOLE
- TRAFFIC CONTROL CABINET
- ELECTRIC HANDHOLE
- ELECTRIC PULL BOX
- ELECTRIC METER
- FLOOD LIGHT
- LIGHT POLE
- UTILITY POLE
- GUY POLE
- T — TRANSFORMER PAD
- B-# — BORING LOCATION
- TP-# — TEST PIT LOCATION
- IT-# — INFILTRATION TEST LOCATION
- MW-# — MONITORING WELL

ABBREVIATIONS

GENERAL

ABAN	ABANDON
AC	ACRES
ADJ	ADJUST
APPROX	APPROXIMATE
BC	BOTTOM OF CURB
BIT	BITUMINOUS
BK/PG	BOOK & PAGE
BLDG	BUILDING
BMP	BEST MANAGEMENT PRACTICE
BS	BOTTOM OF SLOPE
BW	BOTTOM OF WALL
CONC	CONCRETE
COORD	COORDINATE
DIA	DIAMETER
ELEV	ELEVATION
EP	EDGE OF PAVEMENT
EXIST	EXISTING
FFE	FINISHED FLOOR ELEVATION
FND	FOUNDATION
HP	HIGH POINT
INV	INVERT ELEVATION
IT	INFILTRATION TEST
L	LENGTH
LF	LINEAR FEET
LSA	LANDSCAPE AREA
MAX	MAXIMUM
MIN	MINIMUM
N/F	NOW OR FORMERLY
NHFG	NEW HAMPSHIRE FISH & GAME
NTS	NOT TO SCALE
OC	ON CENTER
PAVE	PAVEMENT
PERF	PERFORATED
PROP	PROPOSED
R	RADIUS
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
REM	REMOVE
RET	RETAIN
RIM	RIM ELEVATION
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SW	SIDEWALK
TBM	TEMPORARY BENCHMARK
TC	TOP OF CURB
TP	TEST PIT
TW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
WCR	ACCESSIBLE WHEELCHAIR RAMP
W/	WITH

UTILITIES

CB	CATCH BASIN
CIP	CAST IRON PIPE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
COND	CONDUIT
DCB	DOUBLE CATCH BASIN
DIP	DUCTILE IRON PIPE
DMH	DRAIN MANHOLE
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FES	FLARED END SECTION
GT	GREASE TRAP
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HH	HANDHOLE
HW	HEADWALL
HYD	HYDRANT
LP	LIGHT POLE
OCS	OUTLET CONTROL STRUCTURE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
SMH	SEWER MANHOLE
SOS	SEDIMENT OIL SEPARATOR
TSV	TAPPING SLEEVE, VALVE, AND BOX
UP	UTILITY POLE

DIG SAFE — CALL 811 OR 1-888-DIG-SAFE — CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

GENERAL NOTES

1. THESE PLANS ARE PERMIT DRAWINGS ONLY AND HAVE NOT BEEN DETAILED FOR CONSTRUCTION OR BIDDING.
2. THESE PLANS WERE PREPARED UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER. TFMORAN, INC. ASSUMES NO LIABILITY AS A RESULT OF ANY CHANGES OR NON-CONFORMANCE WITH THESE PLANS EXCEPT UPON THE WRITTEN APPROVAL OF THE ENGINEER OF RECORD.
3. THE SUBDIVISION PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
4. ALL IMPROVEMENTS SHOWN ON THE SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE CITY PLANNING BOARD.
5. ALL WORK SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS OF THE CITY OF PORTSMOUTH, AND SHALL BE BUILT IN A WORKMANLIKE MANNER IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL WORK TO CONFORM TO CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS. ALL WORK WITHIN THE RIGHT-OF-WAY OF THE CITY AND/OR STATE SHALL COMPLY WITH APPLICABLE STANDARDS. COORDINATE ALL WORK WITHIN THE RIGHT-OF-WAY WITH APPROPRIATE CITY, COUNTY, AND/OR STATE AGENCY.
6. THE SITE CONTRACTOR SHALL ENSURE THAT ALL WORK IS PERFORMED IN ACCORDANCE WITH APPLICABLE SECTIONS OF ENV-WQ 1500. THE SITE CONTRACTOR SHALL NOTIFY THE ENGINEER IN ADVANCE OF CONSTRUCTION OF EACH STORMWATER FACILITY TO COORDINATE REQUIRED INSPECTIONS. THE CONTRACTOR SHALL TAKE PROGRESS PHOTOS DURING CONSTRUCTION OF ALL STORMWATER DRAINAGE COMPONENTS AND SEND TO THE ENGINEER.
7. SEE EXISTING CONDITIONS PLAN FOR THE HORIZONTAL AND VERTICAL DATUM.
8. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION. VERIFY TBM ELEVATIONS PRIOR TO CONSTRUCTION.
9. CONTACT EASEMENT OWNERS PRIOR TO COMMENCING ANY WORK WITHIN THE EASEMENTS.
10. PRIOR TO COMMENCING ANY SITE WORK, ALL LIMITS OF WORK SHALL BE CLEARLY MARKED IN THE FIELD.
11. SITE WORK SHALL BE CONSTRUCTED FROM A COMPLETE SET OF PLANS, NOT ALL FEATURES ARE DETAILED ON EVERY PLAN. THE ENGINEER IS TO BE NOTIFIED OF ANY CONFLICT WITHIN THIS PLAN SET.
12. TFMORAN, INC. ASSUMES NO LIABILITY FOR WORK PERFORMED WITHOUT AN ACCEPTABLE PROGRAM OF TESTING AND INSPECTION AS APPROVED BY THE ENGINEER OF RECORD.
13. TEMPORARY FENCING SHALL BE PROVIDED AND COVERED WITH A FABRIC MATERIAL TO CONTROL DUST MITIGATION.
14. ALL DEMOLITION SHALL INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKWAYS, AND ANY OTHER ADJACENT OPERATING FACILITIES. PRIOR WRITTEN PERMISSION FROM THE OWNER/DEVELOPER AND LOCAL PERMITTING AUTHORITY IS REQUIRED IF CLOSURE/OBSTRUCTIONS TO ROADS, STREET, WALKWAYS, AND OTHERS IS DEEMED NECESSARY. CONTRACTOR TO PROVIDE ALTERNATE ROUTES AROUND CLOSURES/OBSTRUCTIONS PER LOCAL/STATE/FEDERAL REGULATIONS.
15. REFER TO ARCHITECTURAL PLANS FOR LAYOUT OF BUILDING FOUNDATIONS AND CONCRETE ELEMENTS WHICH ABUT THE BUILDING SUCH AS STAIRS, SIDEWALKS, LOADING DOCK RAMPS, PADS, AND COMPACTOR PADS. DO NOT USE SITE PLANS FOR LAYOUT OF FOUNDATIONS.
16. IN THE EVENT OF A CONFLICT BETWEEN PLANS, SPECIFICATIONS, AND DETAILS, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY FOR CLARIFICATION.
17. IF CONDITIONS AT THE SITE ARE DIFFERENT THAN SHOWN ON THE PLANS, THE ENGINEER SHALL BE NOTIFIED PRIOR TO PROCEEDING WITH THE AFFECTED WORK.
18. CONTRACTOR'S GENERAL RESPONSIBILITIES:
    A. BID AND PERFORM THE WORK IN ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL CODES, SPECIFICATIONS, REGULATIONS, AND STANDARDS AND CONDITIONS OF ALL PROJECT-SPECIFIC PERMITS AND APPROVALS AS LISTED ON THE COVER SHEET TO THESE PLANS OR OTHERWISE REQUIRED.
    B. NOTIFY ENGINEER IN WRITING OF ANY DISCREPANCIES OF PROPOSED LAYOUT AND/OR EXISTING FEATURES.
    C. EMPLOY A LICENSED SURVEYOR TO DETERMINE ALL LINES AND GRADES AND LAYOUT OF SITE ELEMENTS AND BUILDINGS.
    D. THE CONTRACTOR SHALL BE RESPONSIBLE TO BECOME FAMILIAR WITH THE SITE AND ALL SURROUNDING CONDITIONS. THE CONTRACTOR SHALL ADVISE THE APPROPRIATE AUTHORITY OF INTENTIONS AT LEAST 48 HOURS IN ADVANCE.
    E. TAKE APPROPRIATE MEASURES TO REDUCE, TO THE FULLEST EXTENT POSSIBLE, NOISE, DUST, AND UNSIGHTLY DEBRIS. CONSTRUCTION ACTIVITIES SHALL BE CARRIED OUT BETWEEN THE HOURS OF 7:00 AM AND 9:00 PM, MONDAY THROUGH FRIDAY IN ACCORDANCE WITH THE APPLICABLE MUNICIPAL ORDINANCES AND REGULATIONS OF THE CITY OF PORTSMOUTH, NEW HAMPSHIRE.
    F. MAINTAIN EMERGENCY ACCESS TO ALL AREAS AFFECTED BY WORK AT ALL TIMES.
    G. IN ACCORDANCE WITH RSA 430:53 AND AGR 3800, THE CONTRACTOR SHALL NOT TRANSPORT INVASIVE SPECIES OFF THE PROPERTY, AND SHALL DISPOSE OF INVASIVE SPECIES ON-SITE IN A LEGAL MANNER.
    H. COORDINATE WITH ALL UTILITY COMPANIES AND CONTACT DIGSAFE (811 OR 888-344-7233) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION.
    I. PROTECT NEW AND EXISTING BURIED UTILITIES DURING INSTALLATION OF ALL SITE ELEMENTS. DAMAGED UTILITIES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
    J. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS AT THE SITE. THESE PLANS, PREPARED BY TFMORAN, INC., DO NOT EXTEND TO OR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THEIR EMPLOYEES, AGENTS, OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE SURVEYOR OR ENGINEER HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEMS WHICH MAY BE REQUIRED BY THE US OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND/OR LOCAL REGULATIONS.
    K. WRITTEN DIMENSIONS HAVE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN CASE OF CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWING AND/OR SPECIFICATION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY FOR CLARIFICATIONS.
    L. VERIFY LAYOUT OF PROPOSED BUILDING FOUNDATIONS WITH ARCHITECT AND THAT PROPOSED FOUNDATION MEETS PROPERTY LINE AND/OR WETLAND SETBACKS PRIOR TO COMMENCING ANY FOUNDATION CONSTRUCTION.
    M. PROVIDE AN AS-BUILT PLAN AT THE COMPLETION OF THE PROJECT TO THE PLANNING DIRECTOR AND PER CITY REGULATIONS.
    N. IF ANY DEVIATIONS FROM THE APPROVED PLANS AND SPECIFICATIONS HAVE BEEN MADE, THE SITE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS STAMPED BY A LICENSED SURVEYOR OR QUALIFIED ENGINEER ALONG WITH A LETTER STAMPED BY A QUALIFIED ENGINEER DESCRIBING ALL SUCH DEVIATIONS, AND BEAR ALL COSTS FOR PREPARING AND FILING ANY NEW PERMITS OR PERMIT AMENDMENTS THAT MAY BE REQUIRED.
    O. AT COMPLETION OF CONSTRUCTION, THE SITE CONTRACTOR SHALL PROVIDE A LETTER CERTIFYING THAT THE PROJECT WAS COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS, AND A LETTER STAMPED BY A QUALIFIED ENGINEER THAT THEY HAVE OBSERVED ALL UNDERGROUND DETENTION SYSTEMS, INFILTRATION SYSTEMS, OR FILTERING SYSTEMS PRIOR TO BACKFILL AND THAT SUCH SYSTEMS CONFORM TO THE APPROVED PLANS AND SPECIFICATIONS.

GRADING & DRAINAGE NOTES

1. THE CONTRACTOR SHALL PREPARE, MAINTAIN, AND EXECUTE A S.W.P.P.P. IN ACCORDANCE WITH EPA REGULATIONS AND THE CONSTRUCTION GENERAL PERMIT.
2. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER TO SUBMIT AN eNOI AT LEAST 14 DAYS IN ADVANCE OF ANY EARTHWORK ACTIVITIES AT THE SITE.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK THE ACCURACY OF THE TOPOGRAPHY AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY EARTHWORK BEING PERFORMED ON THE SITE. NO CLAIM FOR EXTRA WORK WILL BE CONSIDERED FOR PAYMENT AFTER EARTHWORK HAS COMMENCED.
4. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT FOR INFORMATION ABOUT SOIL AND GROUNDWATER CONDITIONS. THE CONTRACTOR SHALL FOLLOW THE GEOTECHNICAL ENGINEER'S RECOMMENDED METHODS TO ADDRESS ANY SOIL AND GROUNDWATER ISSUES THAT ARE FOUND ON SITE, INCLUDING AND NOT LIMITED TO DEWATERING METHODS, PERIMETER DRAINS AND TIE INTO STORMWATER MANAGEMENT SYSTEM, ETC.
5. COORDINATE WITH GEOTECHNICAL/STRUCTURAL PLANS FOR SITE PREPARATION AND OTHER BUILDING INFORMATION.
6. COORDINATE WITH ARCHITECTURAL PLANS FOR DETAILED GRADING AT BUILDING, AND SIZE AND LOCATION OF ALL BUILDING SERVICES.
7. COORDINATE WITH MECHANICAL AND PLUMBING PLANS FOR ROOF DRAIN INFORMATION.
8. LIMITS OF WORK ARE SHOWN AS APPROXIMATE. THE CONTRACTOR SHALL COORDINATE ALL WORK TO PROVIDE SMOOTH TRANSITIONS. THIS INCLUDES GRADING, PAVEMENT, CURBING, SIDEWALKS, AND ALIGNMENTS.
9. THE CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE, RAMPS, AND LOADING AREAS.
10. THE SITE SHALL BE GRADED SO ALL FINISHED PAVEMENT HAS POSITIVE DRAINAGE AND SHALL NOT POND WATER DEEPER THAN 1/4" FOR A PERIOD OF MORE THAN 15 MINUTES AFTER FLOODING.
11. ALL ELEVATIONS SHOWN AT CURB ARE TO THE BOTTOM OF CURB UNLESS OTHERWISE NOTED. CURBS HAVE A 6" REVEAL UNLESS OTHERWISE NOTED.
12. ALL SIDEWALK AND OTHER CURB REVEALS SHALL BE 6" WITH A TOLERANCE OF PLUS OR MINUS 3/8". WHERE SIDEWALK IS TO BE FLUSH, THE PAVEMENT REVEAL SHALL BE 1/4" WITH A TOLERANCE OF 1/8".
13. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE PRIOR TO INSTALLATION OF FINISHED PAVEMENT.
14. ROAD AND DRAINAGE CONSTRUCTION SHALL CONFORM TO THE DETAILS SHOWN ON THE PLANS AND SHALL MEET LOCAL STANDARDS AND THE REQUIREMENTS OF THE LATEST NHDOT STANDARD SPECIFICATIONS FOR ROADS AND BRIDGE CONSTRUCTION AND THE NHDOT STANDARD STRUCTURE DRAWINGS UNLESS OTHERWISE NOTED.
15. STORMWATER DRAINAGE SYSTEM SHALL BE CONSTRUCTED TO LINE AND GRADE AS SHOWN ON THE PLANS. CONSTRUCTION METHODS SHALL CONFORM TO NHDOT STANDARD SPECIFICATIONS, SECTION 603. CATCH BASINS AND DRAIN MANHOLES SHALL CONFORM TO SECTION 604. ALL CATCH BASIN GRATES SHALL BE TYPE B AND CONFORM TO NHDOT STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED.
16. NO FILL SHALL BE PLACED IN ANY WETLAND AREA.
17. ALL EXCAVATIONS SHALL BE THOROUGHLY SECURED ON A DAILY BASIS BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION OPERATIONS IN THE IMMEDIATE AREA.
18. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER, AND MULCH.
19. DENSITY REQUIREMENTS:

MINIMUM DENSITY*	LOCATION
95%	BELOW PAVED OR CONCRETE AREAS
95%	TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL
90%	BELOW LOAM AND SEED AREAS

*ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C. FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM D-6938.

UTILITY NOTES

1. LENGTH OF PIPE IS FOR CONVENIENCE ONLY. ACTUAL PIPE LENGTH SHALL BE DETERMINED IN THE FIELD.
2. ALL PROPOSED UTILITY WORK, INCLUDING MATERIAL, INSTALLATION, TERMINATION, EXCAVATION, BEDDING, BACKFILL, COMPACTION, TESTING, CONNECTIONS, AND CONSTRUCTION SHALL BE COORDINATED WITH AND COMPLETED IN ACCORDANCE WITH THE APPROPRIATE REQUIREMENTS, CODES, AND STANDARDS OF ALL CORRESPONDING UTILITY ENTITIES AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES, SHOWN OR NOT SHOWN ON THESE PLANS, PRIOR TO THE START OF ANY CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION BE AGREED TO BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT "DIGSAFE" (811) AT LEAST 72 HOURS BEFORE DIGGING.
4. COORDINATE ALL WORK ADJACENT TO PROPOSED BUILDINGS WITH ARCHITECTURAL BUILDING DRAWINGS. CONFIRM UTILITY PENETRATIONS AND INVERT ELEVATIONS ARE COORDINATED PRIOR TO INSTALLATION.
5. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES OWNING UTILITIES, EITHER OVERHEAD OR UNDERGROUND, WITHIN THE CONSTRUCTION AREA AND SHALL COORDINATE AS NECESSARY WITH THE UTILITY COMPANIES OF SAID UTILITIES. THE PROTECTION OR RELOCATION OF UTILITIES IS ULTIMATELY THE RESPONSIBILITY OF THE CONTRACTOR.
6. THE EXACT LOCATION OF NEW UTILITY CONNECTIONS SHALL BE DETERMINED BY THE CONTRACTOR IN COORDINATION WITH UTILITY COMPANY, COUNTY AGENCY, AND/OR PRIVATE UTILITY COMPANY.
7. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER THE UTILITY INSTALLATION COMPLETE AND OPERATIONAL.
8. ALL UTILITY COMPANIES REQUIRE INDIVIDUAL CONDUITS. CONTRACTOR TO COORDINATE WITH TELEPHONE, CABLE, AND ELECTRIC COMPANIES REGARDING NUMBER, SIZE, AND TYPE OF CONDUITS REQUIRED PRIOR TO INSTALLATION OF ANY CONDUIT.
9. SANITARY SEWER SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATIONS AS SHOWN ON THESE PLANS. ALL SEWER MAINS AND FITTINGS SHALL BE PVC AND SHALL CONFORM TO ASTM F 679 (SDR 35 MINIMUM). FORCE MAINS AND FITTINGS SHALL CONFORM TO NH CODE OF ADMINISTRATIVE RULES ENV-WQ 700. ALL SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH NH CODE OF ADMINISTRATIVE RULES ENV-WQ 700. SANITARY MANHOLES SHALL CONFORM TO NHDES WATER DIVISION WASTEWATER ENGINEERING BUREAU STANDARDS AND SPECIFICATIONS SHOWN HEREON.
10. ON-SITE WATER DISTRIBUTION SHALL BE TO CITY OF PORTSMOUTH STANDARDS AND SPECIFICATIONS. WATER MAINS SHALL HAVE A MINIMUM OF 5.5' COVER. WHERE WATER PIPES CROSS SEWER LINES A MINIMUM OF 18" VERTICAL SEPARATION BETWEEN THE TWO OUTSIDE PIPE WALLS SHALL BE OBSERVED. HORIZONTAL SEPARATION BETWEEN WATER AND SEWER SHALL BE 10' MINIMUM. WHERE A SANITARY LINE CROSSES A WATER LINE, SEWER LINE MUST BE CONSTRUCTED OF FORCE MAIN MATERIALS (PER ENV-WQ 704.08) FROM BUILDING OR MANHOLE TO MANHOLE, OR SUBSTITUTE RUBBER-GASKETED PRESSURE PIPE FOR THE SAME DISTANCE. WHEN SANITARY LINES PASS BELOW WATER LINES, LAY PIPE SO THAT NO JOINT IN THE SANITARY LINE WILL BE CLOSER THAN 6' HORIZONTALLY TO THE WATER LINE.
11. THRUST BLOCKS SHALL BE PROVIDED AT ALL LOCATIONS WHERE WATER LINE CHANGES DIRECTIONS OR CONNECTS TO ANOTHER WATER LINE.
12. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR CONDUIT AND WIRING TO ALL SIGNS AND LIGHTS. CONDUIT TO BE A MINIMUM OF 24" BELOW FINISH GRADE.
13. ALL PROPOSED UTILITIES SHALL BE UNDERGROUND. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES.
14. THE CONTRACTOR SHALL ARRANGE AND PAY FOR ALL INSPECTIONS, TESTING, AND RELATED SERVICES AND SUBMIT COPIES OF ACCEPTANCE TO THE OWNER, UNLESS OTHERWISE INDICATED.
15. PROVIDE PERMANENT PAVEMENT REPAIR FOR ALL UTILITY TRENCHES IN EXISTING ROAD OR PAVEMENT TO REMAIN. SAW CUT TRENCH, PAVEMENT, AND GRANULAR BASE THICKNESS TO MATCH EXISTING PAVEMENT. OBTAIN ALL PERMITS REQUIRED FOR TRENCHING.
16. UNLESS OTHERWISE SPECIFIED, ALL UNDERGROUND STRUCTURES, PIPES, CHAMBERS, ETC. SHALL BE COVERED WITH A MINIMUM OF 18" OF COMPACTED SOIL BEFORE EXPOSURE TO VEHICLE LOADS.
17. THE PROPERTY WILL BE SERVICED BY THE FOLLOWING:

DRAINAGE	PRIVATE
SEWER	MUNICIPAL
WATER	MUNICIPAL
GAS	UNITIL
ELECTRIC	EVERSOURCE
TELEPHONE	CONSOLIDATED COMMUNICATIONS FKA FAIRPOINT COMMUNICATIONS
CABLE	COMCAST

STATE OF NEW HAMPSHIRE — JOHN J. McTIGUE No. 14950 LICENSED PROFESSIONAL ENGINEER

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

NOTES & LEGEND

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: NTS **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

TFM — Civil Engineers, Structural Engineers, Traffic Engineers, Land Surveyors, Landscape Architects, Scientists
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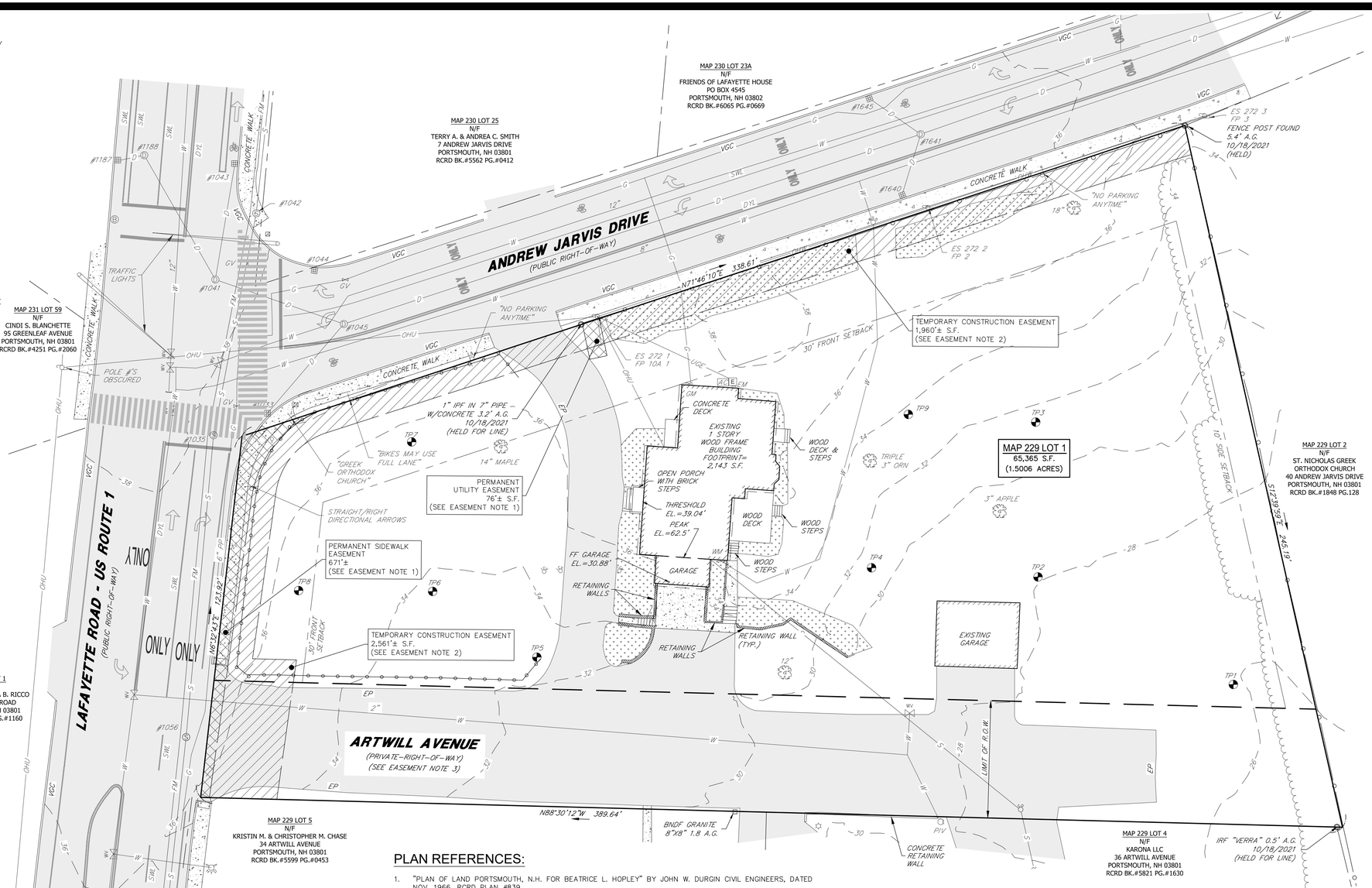
www.tfmoran.com

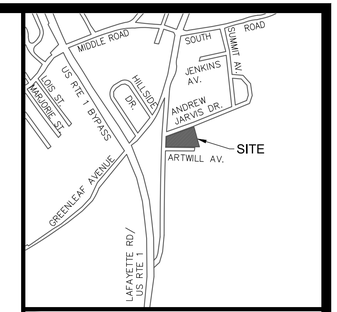
FILE	45407-120	DR	JSM	FB	–	C-01
		CK	JCC	CADFILE	45407-120_NOTES	

May 23, 2022 - 4:05pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Design\PRODUCTION DRAWINGS\45407-120_Notes.dwg

LEGEND:

MAP 229 / LOT 9	ASSESSOR'S MAP NUMBER / LOT NUMBER
A.G.	ABOVE GRADE
BK./PG.	BOOK/PAGE
BNDF	BOUND FOUND
DYL	DOUBLE YELLOW LINE
EL.	ELEVATION
EM	ELECTRIC METER
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
GM	GAS METER
IPF	IRON PIPE FOUND
IRF	IRON ROD FOUND
N/F	NOW OR FORMERLY
ORN	ORNAMENTAL
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
R.O.W.	RIGHT OF WAY
S.F.	SQUARE FEET
SWL	SINGLE WHITE LINE
VGC	VERTICAL GRANITE CURB
WM	WATER METER
	LANDSCAPED AREA
	PAVEMENT
	CONCRETE
	HYDRANT
	IRRIGATION CONTROL VALVE
	WATER SHUT OFF
	WATER VALVE
PIV	POST INDICATOR VALVE
AC	AIR CONDITIONER
E	ELECTRIC BOX
	UTILITY POLE
	LIGHT POST
	SEWER CLEAN OUT
S	SEWER MANHOLE
GV	GAS VALVE
D	DRAINAGE MANHOLE
CB	CATCH BASIN
B	BELL MANHOLE
	BIKE LANE
	SIGN POLE
	DECIDUOUS TREE
TP1	TEST PIT
	PROPERTY LINE
	ABUTTERS LINE
UGE	UNDERGROUND ELECTRIC
OHU	OVERHEAD UTILITIES
D	DRAIN LINE
G	GAS LINE
W	WATER LINE
S	SEWER LINE
FM	FORCE MAIN
	TREE LINE
	SPLIT RAIL FENCE
	CHAINLINK FENCE
36	EXISTING CONTOUR





LOCATION PLAN

NOTES:

1. THE PARCEL IS LOCATED IN THE SINGLE RESIDENCE B (SRB) ZONE.
2. THE PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 229 AS LOT 1.
3. THE PARCEL IS LOCATED IN FLOOD ZONE X (AREAS OF MINIMAL FLOODING) AS SHOWN ON NATIONAL FLOOD INSURANCE PROGRAM (NFIP), FLOOD INSURANCE RATE MAP (FIRM) ROCKINGHAM COUNTY, NEW HAMPSHIRE, PANEL 270 OF 681, VERSION NUMBER 2.3.2.1, MAP NUMBER 33015C0270F, MAP REVISED JANUARY 29, 2021.
4. ZONING REQUIREMENTS:

MINIMUM LOT DIMENSIONS	
LOT AREA	15,000 S.F.
LOT AREA PER DWELLING UNIT	15,000 S.F.
CONTINUOUS STREET FRONTAGE	100'
DEPTH	100'
MINIMUM YARD DIMENSIONS	
FRONT	30'
SIDE	10'
REAR	30'
MAXIMUM STRUCTURE DIMENSIONS	
STRUCTURE HEIGHT:	
SLOPED ROOF	35'
FLAT ROOF	30'
ROOF APPURTENANCE HEIGHT	8'
BUILDING COVERAGE	20%
MINIMUM OPEN SPACE	40%

5. TOTAL PARCEL AREA:
   MAP 229 LOT 1
   65,365 S.F.
   (1.5006 ACRES)
6. OWNER OF RECORD:
   MAP 229 LOT 1
   ARTWILL, LLC
   PO BOX 370
   PORTSMOUTH, NH 03802
   RCRD BK.#6334 PG.#0455
7. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH THE CURRENT LEGAL DESCRIPTIONS. IT IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP OR DEFINE THE LIMITS OF TITLE.
8. THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING FEATURES OF MAP 229 LOT 1.
9. HORIZONTAL DATUM IS NAD 83 (2011) VERTICAL DATUM IS NAVD 88 PER STATIC GPS OBSERVATIONS.
10. FIELD SURVEY COMPLETED BY TODD C. EMERSON IN OCTOBER 2021 USING A LEICA TS-16, A TOPCON HIPER SR AND A CARLSON RT-4 DATA COLLECTOR.
11. EASEMENTS, RIGHTS, AND RESTRICTIONS SHOWN OR IDENTIFIED ARE THOSE WHICH WERE FOUND DURING RESEARCH PERFORMED AT THE ROCKINGHAM COUNTY REGISTRY OF DEEDS. OTHER RIGHTS, EASEMENTS, OR RESTRICTIONS MAY EXIST WHICH A TITLE EXAMINATION OF SUBJECT PARCEL WOULD DETERMINE.
12. THE LOCATION OF ANY UNDERGROUND UTILITY INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE. TFMORAN, INC. MAKES NO CLAIM TO THE ACCURACY OR COMPLETENESS OF UNDERGROUND UTILITIES SHOWN. PRIOR TO ANY EXCAVATION ON SITE THE CONTRACTOR SHALL CONTACT DIG SAFE.

PLAN REFERENCES:

1. "PLAN OF LAND PORTSMOUTH, N.H. FOR BEATRICE L. HOPLEY" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED NOV. 1966. RCRD PLAN #839.
2. "PLAN OF LOTS OWNED BY BEATRICE L. HOPLEY LAFAYETTE ROAD PORTSMOUTH, N.H.", DATED JUNE 1940, REVISED FROM ORIGINAL PLAN BY JOHN W. DURGIN, REVISED MAY, 1946, REVISED FEB. 1957. RCRD PLAN #2637.
3. "STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION CONSTRUCTION PLANS FEDERAL AID PROJECT OF PROPOSED BRIDGE REMOVAL BRIDGE NO. 173/071 & RECONFIGURATION OF US ROUTE 1 BYPASS AND US ROUTE 1 (LAFAYETTE ROAD) FEDERAL PROJECT X-A000(994) NH PROJECT NO. 13455-A, CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM", APPROVED 6/27/12. RCRD PLAN #13455.
4. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO-R37-A, CITY OF PORTSMOUTH ROCKINGHAM COUNTY". PLAN #50031.
5. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO. 37 LAFAYETTE ROAD". PLAN #50147.
6. "CORRECTIVE SEWER EASEMENT PLAN OVER LAND OF KARONA, LLC 36 ARTWILL AVENUE PORTSMOUTH, NEW HAMPSHIRE ASSESSOR'S PARCEL 229-4 FOR KARONA, LLC" BY JAMES VERRA AND ASSOCIATES, INC., DATED 1/19/2021. RCRD PLAN #C-42611.
7. "SUBDIVISION PLAN OF LAND OF J. PHILIP MCCAFFERY FOR GREAT BAY SCHOOL AND TRAINING CENTER LAFAYETTE RD. COUNTY OF ROCKINGHAM PORTSMOUTH NH", BY RICHARD P. MILLETTE AND ASSOCIATES, DATED DEC. 1981, WITH REV.1 FROM 1/7/82. RCRD PLAN #D-10590.
8. "SUBDIVISION PLAN TAX MAP 230 – LOT 23 OWNER: GREAT BAY SCHOOL AND TRAINING CENTER FOR LEMIEUX BUILDERS, INC." 417 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED SEPTEMBER 2013, WITH REVISION 2 DATED 12/23/13. RCRD PLAN #D-38079.
9. "EASEMENT PLAN TAX MAP 230 – LOT 25 D.R. LEMIEUX BUILDERS, INC. TO THE CITY OF PORTSMOUTH 7 ANDREW JARVIS DRIVE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED JUNE 2014, WITH REVISION 2 DATED 7/25/14. RCRD PLAN #D-38417.
10. "EASEMENT PLAN TAX MAP 229 – LOT 1 HARLON P. WILLIS REVOCABLE TRUST AND JEAN P. WILLIS REVOCABLE TRUST TO THE CITY OF PORTSMOUTH 437 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED OCTOBER 26, 2015, WITH REVISION 1 DATED 10/26/2015. RCRD PLAN #D-40626.
11. "EASEMENT PLAN TAX MAP 229 – LOT 5 KRISTEN M. CHASE AND CHRISTOPHER M. CHASE TO THE CITY OF PORTSMOUTH 34 ARTWILL AVENUE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED JANUARY 20, 2016, WITH REVISION 2 DATED 12/2/2016. RCRD PLAN #D-40627.
12. "INTERSECTION IMPROVEMENT PROJECT U.S. ROUTE 1 AT ANDREW JARVIS DRIVE IN THE CITY OF PORTSMOUTH ROCKINGHAM COUNTY STATE OF NEW HAMPSHIRE PREPARED FOR CITY OF PORTSMOUTH DEPT OF PUBLIC WORKS" BY GREENMAN-PEDERSON, INC., DATED 12/22/17.

EASEMENT NOTES:

1. MAP 229 LOT 1 IS SUBJECT TO PERMANENT EASEMENTS FOR THE INSTALLATION & MAINTENANCE OF A PUBLIC SIDEWALK AND FOR THE INSTALLATION & MAINTENANCE OF TRAFFIC SIGNAL EQUIPMENT. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 1 & 3).
2. MAP 229 LOT 1 IS SUBJECT TO TEMPORARY EASEMENTS FOR THE PURPOSE OF INSTALLING AND MAINTAINING A SIDEWALK. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 2 & 4).
3. MAP 229 LOT 1 IS SUBJECT TO RIGHTS OVER A PORTION OF THE PREMISES SHOWN AS "ARTWILL AVENUE" GRANTED TO MAP 229 LOT 2 FOR THE PURPOSES OF INGRESS & EGRESS, CONNECTION TO A 2 INCH WATERLINE AND THE EXTENSION THEREOF, CONNECTION TO THE CITY SEWER ON LAFAYETTE ROAD AND THE RIGHT TO FIRST REFUSAL TO PURCHASE A 50 FOOT STRIP OF LAND. SEE RCRD BK.1848 PG. 128.
4. MAP 229 LOT 1 HAS THE BENEFIT OF A 20' WIDE SEWER EASEMENT FOR REPAIR AND MAINTENANCE ACROSS LAND OF MAP 229 LOT 4. SEE RCRD BK. 6236 PG. 731 AND PLAN REFERENCE 6.

DIG SAFE
ME NH RI VT
811 TOLL FREE
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

20 10 0 20
Graphic Scale in Feet

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY THOSE UNDER MY DIRECT SUPERVISION AND ARE THE RESULT OF A FIELD SURVEY CONDUCTED IN OCTOBER, 2021. THIS SURVEY CONFORMS TO THE ACCURACY REQUIREMENTS OF AN URBAN SURVEY OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS.
I FURTHER CERTIFY THAT THIS SURVEY IS CORRECT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, AND THE FIELD TRAVERSE SURVEY EXCEEDS A PRECISION OF 1:15,000.

STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — No. 844 — J. COREY COLWELL — SIGNATURE

LICENSED LAND SURVEYOR

2022-05-25
DATE

REV.	DATE	DESCRIPTION	DR	CK
1	5/25/2022	NO REVISIONS THIS SHEET	BMK	JCC

TAX MAP 229 LOT 1
EXISTING CONDITIONS PLAN
SMITHFIELD CONSTRUCTION
437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
COUNTY OF ROCKINGHAM
OWNED BY
ARTWILL, LLC

SCALE: 1" = 20' (22x34)
1" = 40' (11x17)
APRIL 19, 2022

Seacoast Division
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
170 Commerce Way, Suite 102
Portsmouth, NH 03801
Phone (603) 431-2222
Fax (603) 431-0910
www.tfmoran.com

FILE	DR	ID	FB		
45407-120	CK	JCC	CADFILE	583	S-01

May 24, 2022 - 2:54pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Carlson Survey\Dwgs\45407-120 Survey.dwg

TEST PIT LOG

SITE: 437 LAFAYETTE ROAD, PORTSMOUTH, NH
LOGGED BY: PAUL O'HANLON, TFM, INC.
DATE: 1/25/2022

Test Pit #1:

0–13" 10YR 5/3 BROWN, LOAM, MASSIVE, FRIABLE, ANTHROPOGENIC FILL (ASPHALT, BRICK)
13–20" AB 10YR 7/6 YELLOW, LOAM, BLOCKY, FRIABLE, GRAVELY <5% ROCK (IRON STONE)
20–55" B1 GLEY 1 7N GRAY, SANDY LOAM, MASSIVE, PLIABLE
55– 65" B2 10YR 5/1 GRAY, COARSE SAND, FRIABLE, MASSIVE, > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
REDOX @ 20" 10YR 7/8 COMMON DISTINCT >15%
SOIL SERIES: WALPOLE
EST WET: 20" BELOW GRADE
OBS WT: 39" BELOW GRADE (APPARENT →)
LEDGE: > 65" BELOW GRADE

Test Pit #2:

0–15"A 10YR 4/3 BROWN, LOAM, MASSIVE
15–17" 10YR 7/6 YELLOW, SANDY LOAM, FRIABLE, GRANULAR
17–27" GLEY 1 7/N LIGHT GRAY, SANDY LOAM, FRIABLE, GRANULAR
27–52" 10YR 6/6 BROWNISH YELLOW, LOAM, FRIABLE, MASSIVE
52–77" 10YR 5/1 GRAY, COURSE SAND, FRIABLE, GRAVELY, GRANULAR
REDOX @ 26" 10YR 7/8 COMMON DISTINCT
SOIL SERIES: WALPOLE
EST WET: 26" BELOW GRADE
OBS WT: 51" BELOW GRADE (APPARENT ↑)
LEDGE: 77" BELOW GRADE

Test Pit #3:

0–16" 10YR 4/3 BROWN, LOAM, AGGREGATED, FRIABLE
16–27" 10YR 6/6 BROWNISH YELLOW, LOAM, AGGREGATED, FRIABLE, GRAVELY >5%
27–52" 10YR 7/2 LIGHT GRAY, LOAMY SAND, AGGREGATED, FRIABLE GRAVELY >15%
52–84" 10YR 8/1 WHITE, SANDY CLAY LOAM, PLATEY, INDURATE
REDOX @: 41" 10YR 7/8 COMMON DISTINCT >15%
SOIL SERIES: CANTON – CHATFIELD COMPLEX
EST WET: 41" BELOW GRADE
OBS WT: 84" BELOW GRADE (APPARENT ↘)
LEDGE: 84" BELOW GRADE

Test Pit #4:

0–18" 10YR 5/4 YELLOWISH BROWN, LOAM, FRIABLE, AGGREGATE
18–27" 10YR 6/6 BROWNISH YELLOW, SANDY LOAM, GRAVELY >5%, FRIABLE, AGGREGATE
27–37" 10YR 6/2 LIGHT BROWNISH GREY, LOAMY SAND, > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
37–65" 10YR 7/8 YELLOW, DECAYING BEDROCK, ANGULAR COBBLE, IRON STONE
REDOX @: 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CHATFIELD
EST WET: 37" BELOW GRADE
OBS WT: 56" BELOW GRADE (APPARENT ↑)
LEDGE: 65" BELOW GRADE

Test Pit #5:

0–10" 10YR 4/3 BROWN, LOAMY SAND, AGGREGATE, FRIABLE, GRAVELY >5%
10–31" 10YR 5/4 YELLOWISH BROWN, COURSE SAND, GRANULAR, FRIABLE, GRAVELY >15%
31–57" GLEY 1 5/N GRAY, CLAY, DECAYED BEDROCK, BOULDERS >5%, MASSIVE
REDOX @: 31" 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CHATFIELD – MAYBID COMPLEX
EST WET: 31" BELOW GRADE
OBS WT: > 57"
LEDGE: 57" BELOW GRADE

TEST PIT LOG

SITE: 437 LAFAYETTE ROAD, PORTSMOUTH, NH
LOGGED BY: PAUL O'HANLON, TFM, INC.
DATE: 1/25/2022

Test Pit #6:

0–12" 10YR 4/3 BROWN, SANDY LOAM, AGGREGATE, FRIABLE
12–16" 10YR 7/2 LIGHT GRAY, SAND, GRANULAR, FRIABLE, GRAVELY >5%
16–28" 10YR 7/1 LIGHT GRAY, FINE SAND, GRANULAR, FRIABLE
28–42" 10YR 7/3 VERY PALE BROWN, SANDY LOAM, AGGREGATE, FRIABLE, HETEROGENEOUS
42–47" GLEY 1 5/5G–1 GREENISH GRAY, SANDY CLAY LOAM, PLATEY, INDURATE
47–96" GLEY 2 8/5BG LIGHT GREENISH GRAY, CLAY, MASSIVE, INDURATE, HOMOGENEOUS
REDOX @42" 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CANTON COMPLEX (ANTHROPOGENIC)
EST WET: 42" BELOW GRADE
OBS WT: 79" BELOW GRADE (APPARENT →)
LEDGE: > 96"

Test Pit #7:

0–18" 10YR 4/2 DARK GRAYISH BROWN, SANDY LOAM, FRIABLE, BLOCKY
18–42" 10YR 7/4 VERY PALE BROWN, FINE SAND, GRANULAR, FRIABLE
42–54" 10YR 6/6 BROWNISH YELLOW, COURSE SAND, GRANULAR, FRIABLE
54–65" 10YR 5/8 YELLOWISH BROWN, SANDY LOAM, HETEROGENEOUS, FRIABLE
65–72" GLEY 2 4/10B DARK BLUEISH GRAY, SANDY CLAY LOAM, PLATEY, INDURATE
72–102" GLEY 2 7/10B LIGHT BLUEISH GRAY, CLAY, MASSIVE, INDURATE
REDOX @ 57" 5R 3/8 COMMON DISTINCT >15%
SOIL SERIES: CANTON COMPLEX (ANTHROPOGENIC)
EST WET: 57" BELOW GRADE
OBS WT: 93" BELOW GRADE (APPARENT ↑)
LEDGE: >102"

Test Pit #8:

0–14" 10YR 4/2 DARK GRAYISH BROWN, LOAMY SAND, FRIABLE, BLOCKY
14–42" 10YR 7/4 VERY PALE BROWN, FINE SAND, AGGREGATE, FRIABLE, > 15% COBBLE RIVER STONE
42–50" GLEY 1 5/5G_/1 GREENISH GRAY, SANDY CLAY LOAM, AQUATARD PRESENT (IRON STONE), MASSIVE, INDURATE
50–55" 10YR 6/4 LIGHT YELLOWISH BROWN, SANDY CLAY LOAM, INCLUSION, HETEROGENEOUS, MASSIVE, INDURATE
55–103" GLEY 2 8/5BG LIGHT GREENISH GRAY, CLAY, INDURATE, MASSIVE
REDOX @ 42 5R 3/8 COMMON DISTINCT >15% (AQUATARD (POTENTIALLY ANTHROPOGENIC))
SOIL SERIES: CANTON COMPLEX (ANTHROPOGENIC)
EST WET: 42" BELOW GRADE
OBS WT: 101" BELOW GRADE (APPARENT ↑)
LEDGE: > 103"

Test Pit #9:

0–9"10YR 4/3 BROWN, LOAM, BLOCKY, FRIABLE, GRAVELY >5%
9–23" 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, , > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
23–54" 10YR 7/2 LIGHT GREY, SANDY LOAM, INDURATE, MASSIVE, HETEROGENEOUS, > 15% ANGULAR ROCK FRAGMENT (IRON STONE)
REDOX @ 5R 4/6 COMMON DISTINCT >15%
SOIL SERIES: WALPOLE
EST WET: 30" BELOW GRADE
OBS WT: > 54"
LEDGE: 54" BELOW GRADE

TEST PIT LOG

SITE: 437 LAFAYETTE ROAD, PORTSMOUTH, NH
LOGGED BY: PAUL O'HANLON, TFM, INC.
DATE: 2/1/2022

Test Pit #10:

0–12" 10YR 4/4 DARK YELLOWISH BROWN, LOAMY SAND, BLOCKY, FRIABLE, COBBLE >15%, HOMOGENEOUS SOIL
12–23" 10YR 6/3 PALE BROWN, SANDY LOAM, AGGREGATE, FRIABLE, COBBLE >15%, HOMOGENEOUS SOIL
23–36" 10YR 6/2 LIGHT BROWNISH GREY, COURSE SAND, GRANULAR, HETEROGENEOUS, COBBLE >15%, VERY COURSE PARTICLES <5%
36–66" 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, MASSIVE, INDURATE > 25% ANGULAR ROCK FRAGMENT (IRON STONE)
66–76" 10YR 5/4 YELLOWISH BROWN, SANDY LOAM, MASSIVE, INDURATE, DECAYING LEDGE, > 55% ANGULAR ROCK FRAGMENT (IRON STONE)
REDOX @ 52 – 58 10YR 5/6 COMMON DISTINCT >15%
SOIL SERIES: CANTON – WALPOLE COMPLEX
EST WET: 52" BELOW GRADE
OBS WT: >76"
LEDGE: 76" BELOW GRADE

REV.	DATE	DESCRIPTION	DR	CK
1	5/25/2022	NO REVISIONS THIS SHEET	BMK	JCC

TAX MAP 229 LOT 1

TEST PITS LOGS

SMITHFIELD CONSTRUCTION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

OWNED BY

ARTWILL, LLC

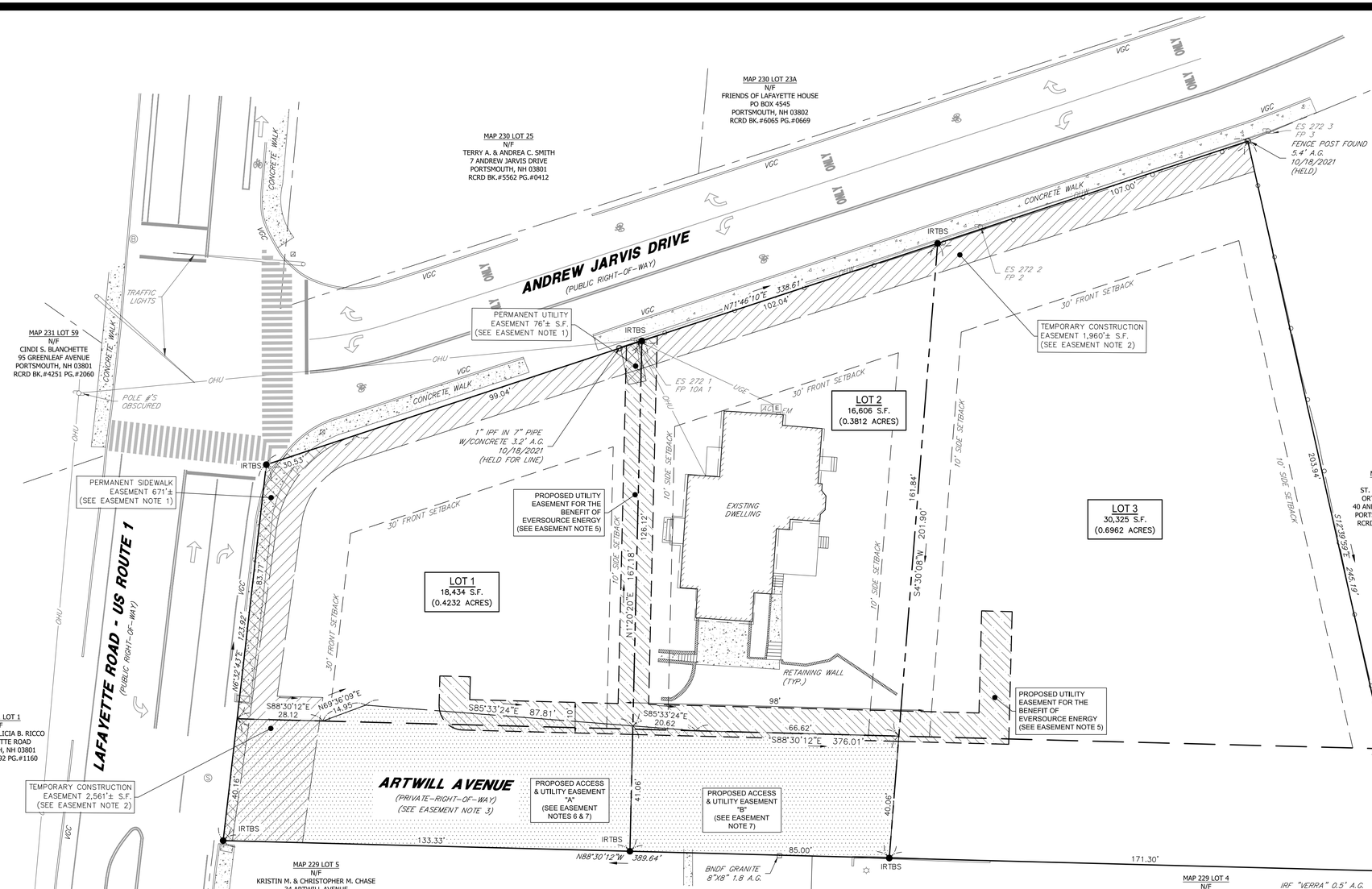
SCALE: N.T.S.

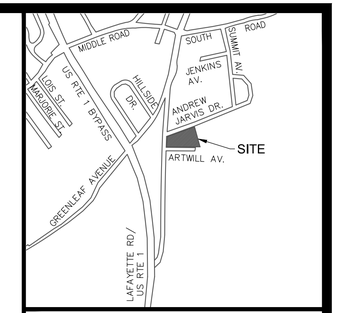
APRIL 19, 2022

Seacoast Division
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
170 Commerce Way, Suite 102
Portsmouth, NH 03801
Phone (603) 431–2222
Fax (603) 431–0910
www.tfmoran.com

FILE	45407-120	DR		FB		S-02
		CK		CADFILE		

May 24, 2022 - 2:55pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Carlson Survey\Dwgs\45407-120 Survey.dwg





LOCATION PLAN

NOTES:

1. THE PARCEL IS LOCATED IN THE SINGLE RESIDENCE B (SRB) ZONE.
2. THE PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 229 AS LOT 1.
3. THE PARCEL IS LOCATED IN FLOOD ZONE X (AREAS OF MINIMAL FLOODING) AS SHOWN ON NATIONAL FLOOD INSURANCE PROGRAM (NFIP), FLOOD INSURANCE RATE MAP (FIRM) ROCKINGHAM COUNTY, NEW HAMPSHIRE, PANEL 270 OF 681, VERSION NUMBER 2.3.2.1, MAP NUMBER 33015C0270F, MAP REVISED JANUARY 29, 2021.
4. ZONING REQUIREMENTS:

	SRB
MINIMUM LOT DIMENSIONS:	
LOT AREA	15,000 S.F.
LOT AREA PER DWELLING UNIT	15,000 S.F.
CONTINUOUS STREET FRONTAGE	100'
DEPTH	100'
MINIMUM YARD DIMENSIONS	
FRONT	30'
SIDE	10'
REAR	30'
MAXIMUM STRUCTURE DIMENSIONS	
STRUCTURE HEIGHT:	
SLOPED ROOF	35'
FLAT ROOF	30'
ROOF APPURTENANCE HEIGHT	8'
BUILDING COVERAGE	20%
MINIMUM OPEN SPACE	40%

5. TOTAL PARCEL AREA:

MAP 229 LOT 1	PROPOSED LOT 1	PROPOSED LOT 2	PROPOSED LOT 3
65,365 S.F.	18,434 S.F.	16,606 S.F.	30,325 S.F.
(1.5006 ACRES)	(0.4232 ACRES)	(0.3812 ACRES)	(0.6962 ACRES)

6. OWNER OF RECORD:
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802
RCRD BK.#6334 PG.#455
7. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH THE CURRENT LEGAL DESCRIPTIONS. IT IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP OR DEFINE THE LIMITS OF TITLE.
8. THE PURPOSE OF THIS PLAN IS TO SUBDIVIDE MAP 229 LOT 1 INTO 3 RESIDENTIAL LOTS.
9. HORIZONTAL DATUM IS NAD 83 (2011) VERTICAL DATUM IS NAVD 88 PER STATIC GPS OBSERVATIONS.
10. FIELD SURVEY COMPLETED BY TODD C. EMERSON IN OCTOBER 2021 USING A LEICA TS-16, A TOPCON HIPER SR AND A CARLSON RT-4 DATA COLLECTOR.
11. EASEMENTS, RIGHTS, AND RESTRICTIONS SHOWN OR IDENTIFIED ARE THOSE WHICH WERE FOUND DURING RESEARCH PERFORMED AT THE ROCKINGHAM COUNTY REGISTRY OF DEEDS. OTHER RIGHTS, EASEMENTS, OR RESTRICTIONS MAY EXIST WHICH A TITLE EXAMINATION OF SUBJECT PARCEL WOULD DETERMINE.
12. THE LOCATION OF ANY UNDERGROUND UTILITY INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE. TFMORAN, INC. MAKES NO CLAIM TO THE ACCURACY OR COMPLETENESS OF UNDERGROUND UTILITIES SHOWN. PRIOR TO ANY EXCAVATION ON SITE, THE CONTRACTOR SHALL CONTACT DIG SAFE.

EASEMENT NOTES:

1. MAP 229 LOT 1 IS SUBJECT TO PERMANENT EASEMENTS FOR THE INSTALLATION & MAINTENANCE OF A PUBLIC SIDEWALK AND FOR THE INSTALLATION & MAINTENANCE OF TRAFFIC SIGNAL EQUIPMENT. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 1 & 3).
2. MAP 229 LOT 1 IS SUBJECT TO TEMPORARY EASEMENTS FOR THE PURPOSE OF INSTALLING AND MAINTAINING A SIDEWALK. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 2 & 4).
3. MAP 229 LOT 1 IS SUBJECT TO RIGHTS OVER A PORTION OF THE PREMISES SHOWN AS "ARTWILL AVENUE" GRANTED TO MAP 229 LOT 2 FOR THE PURPOSES OF INGRESS & EGRESS, CONNECTION TO A 2 INCH WATERLINE AND THE EXTENSION THEREOF, CONNECTION TO THE CITY SEWER ON LAFAYETTE ROAD AND THE RIGHT TO FIRST REFUSAL TO PURCHASE A 50 FOOT STRIP OF LAND. SEE RCRD BK.1848 PG. 128.
4. MAP 229 LOT 1 HAS THE BENEFIT OF A 20' WIDE SEWER EASEMENT FOR REPAIR AND MAINTENANCE ACROSS LAND OF MAP 229 LOT 4. SEE RCRD BK. 6236 PG. 731 AND PLAN REFERENCE 6.
5. LOTS 1, 2 & 3 ARE SUBJECT TO A PROPOSED UTILITY EASEMENT FOR THE BENEFIT OF EVERSOURCE ENERGY. SAID EASEMENT SHALL BE LOCATED 5 FEET EACH SIDE OF THE AS-BUILT LOCATION OF THE UNDERGROUND UTILITY LINES SERVICING THE BUILDINGS.
6. LOT 1 IS SUBJECT TO PROPOSED ACCESS & UTILITY EASEMENT "A" FOR THE BENEFIT OF LOT 2. SAID EASEMENT IS TO INCLUDE A PORTION OF ARTWILL AVENUE AND 5 FEET EACH SIDE OF THE AS-BUILT LOCATION OF THE PROPOSED SEWER FORCE MAIN.
7. LOTS 1 & 2 ARE SUBJECT TO PROPOSED ACCESS & UTILITY EASEMENTS "A" & "B" FOR THE BENEFIT OF LOT 3. SAID EASEMENT IS TO INCLUDE A PORTION OF ARTWILL AVENUE AND 5 FEET EACH SIDE OF THE AS-BUILT LOCATION OF THE PROPOSED SEWER FORCE MAIN.

LEGEND:

MAP 137 LOT 11	ASSESSORS MAP AND LOT NUMBER
A.G.	ABOVE GRADE
BK. PG.	BOOK / PAGE
BNDF	BOUND FOUND
EM	ELECTRIC METER
EP	EDGE OF PAVEMENT
IPF	IRON PIPE FOUND
IRF	IRON ROD FOUND
IRTBS	IRON ROD TO BE SET
N/F	NOW OR FORMERLY
PEP	PROPOSED EDGE OF PAVEMENT
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
S.F.	SQUARE FEET
TYP.	TYPICAL
VGC	VERTICAL GRANITE CURB
	DRILL HOLE FOUND/SET
	IRON PIPE/ROD FOUND
	BOUND FOUND
	UTILITY POLE
T	PROPOSED TRANSFORMER
J	PROPOSED JUNCTION
S	SEWER MANHOLE
	SIGNAL MAST
OHU	OVERHEAD UTILITIES
	CHAINLINK FENCE
	SPLIT RAIL FENCE
	BOUNDARY LINE
	PROPOSED LOT LINE
	YARD SETBACK
UGU	PROPOSED UNDERGROUND UTILITY LINE
S	PROPOSED SEWER LINE
FM	PROPOSED SEWER FORCE MAIN
	CONCRETE
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	PROPOSED UTILITY EASEMENT
	PROPOSED ACCESS & UTILITY EASEMENT

PLAN REFERENCES:

1. "PLAN OF LAND PORTSMOUTH, N.H. FOR BEATRICE L. HOPLEY" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED NOV. 1966. RCRD PLAN #839.
2. "PLAN OF LOTS OWNED BY BEATRICE L. HOPLEY LAFAYETTE ROAD PORTSMOUTH, N.H.", DATED JUNE 1940, REVISED FROM ORIGINAL PLAN BY JOHN W. DURGIN, REVISED MAY, 1946, REVISED FEB. 1957. RCRD PLAN #2637.
3. "STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION CONSTRUCTION PLANS FEDERAL AID PROJECT OF PROPOSED BRIDGE REMOVAL BRIDGE NO. 173/071 & RECONFIGURATION OF US ROUTE 1 BYPASS AND US ROUTE 1 (LAFAYETTE ROAD) FEDERAL PROJECT X-A000(994) NH PROJECT NO. 13455-A, CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM", APPROVED 6/27/12. RCRD PLAN #13455.
4. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO-R37-A, CITY OF PORTSMOUTH ROCKINGHAM COUNTY". PLAN #50031.
5. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO. 37 LAFAYETTE ROAD". PLAN #50147.
6. "CORRECTIVE SEWER EASEMENT PLAN OVER LAND OF KARONA, LLC 36 ARTWILL AVENUE PORTSMOUTH, NEW HAMPSHIRE ASSESSOR'S PARCEL 229-4 FOR KARONA, LLC" BY JAMES VERRA AND ASSOCIATES, INC., DATED 1/19/2021. RCRD PLAN #C-42611.
7. "SUBDIVISION PLAN OF LAND OF J. PHILIP MCCAFFERY FOR GREAT BAY SCHOOL AND TRAINING CENTER LAFAYETTE RD. COUNTY OF ROCKINGHAM PORTSMOUTH NH", BY RICHARD P. MILLETTE AND ASSOCIATES, DATED DEC. 1981, WITH REV.1 FROM 1/7/82. RCRD PLAN #D-10590.
8. "SUBDIVISION PLAN TAX MAP 230 - LOT 23 OWNER: GREAT BAY SCHOOL AND TRAINING CENTER FOR LEMIEUX BUILDERS, INC." 417 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED SEPTEMBER 2013, WITH REVISION 2 DATED 12/23/13. RCRD PLAN #D-38079.
9. "EASEMENT PLAN TAX MAP 230 - LOT 25 D.R. LEMIEUX BUILDERS, INC. TO THE CITY OF PORTSMOUTH 7 ANDREW JARVIS DRIVE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED JUNE 2014, WITH REVISION 2 DATED 7/25/14. RCRD PLAN #D-38417.
10. "EASEMENT PLAN TAX MAP 229 - LOT 1 HARLON P. WILLIS REVOCABLE TRUST AND JEAN P. WILLIS REVOCABLE TRUST TO THE CITY OF PORTSMOUTH 437 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED OCTOBER 26, 2015, WITH REVISION 1 DATED 10/26/2015. RCRD PLAN #D-40626.
11. "EASEMENT PLAN TAX MAP 229 - LOT 5 KRISTEN M. CHASE AND CHRISTOPHER M. CHASE TO THE CITY OF PORTSMOUTH 34 ARTWILL AVENUE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED JANUARY 20, 2016, WITH REVISION 2 DATED 12/2/2016. RCRD PLAN #D-40627.

Graphic Scale in Feet
20 10 0 20

DIG SAFE
MA ME NH RI VT
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM
CALL 811 TOLL FREE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

REV.	DATE	DESCRIPTION	DR	CK
1	5/25/2022	REVISED UTILITY EASEMENT	BMK	JCC

PURSUANT TO NEW HAMPSHIRE REVISED STATUTES ANNOTATED 676:18, II, III AND IV AND 672:14:

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY THOSE UNDER MY DIRECT SUPERVISION AND ARE THE RESULT OF A FIELD SURVEY CONDUCTED IN OCTOBER 2021. THIS SURVEY CONFORMS TO THE ACCURACY REQUIREMENTS OF AN URBAN SURVEY OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS.
I FURTHER CERTIFY THAT THIS SURVEY IS CORRECT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, AND THE FIELD TRAVERSE SURVEY EXCEEDS A PRECISION OF 1:15,000.

STATE OF NEW HAMPSHIRE
No. 844
J. COREY COLWELL
LICENSED LAND SURVEYOR
SIGNATURE

LICENSED LAND SURVEYOR

2022-05-25
DATE

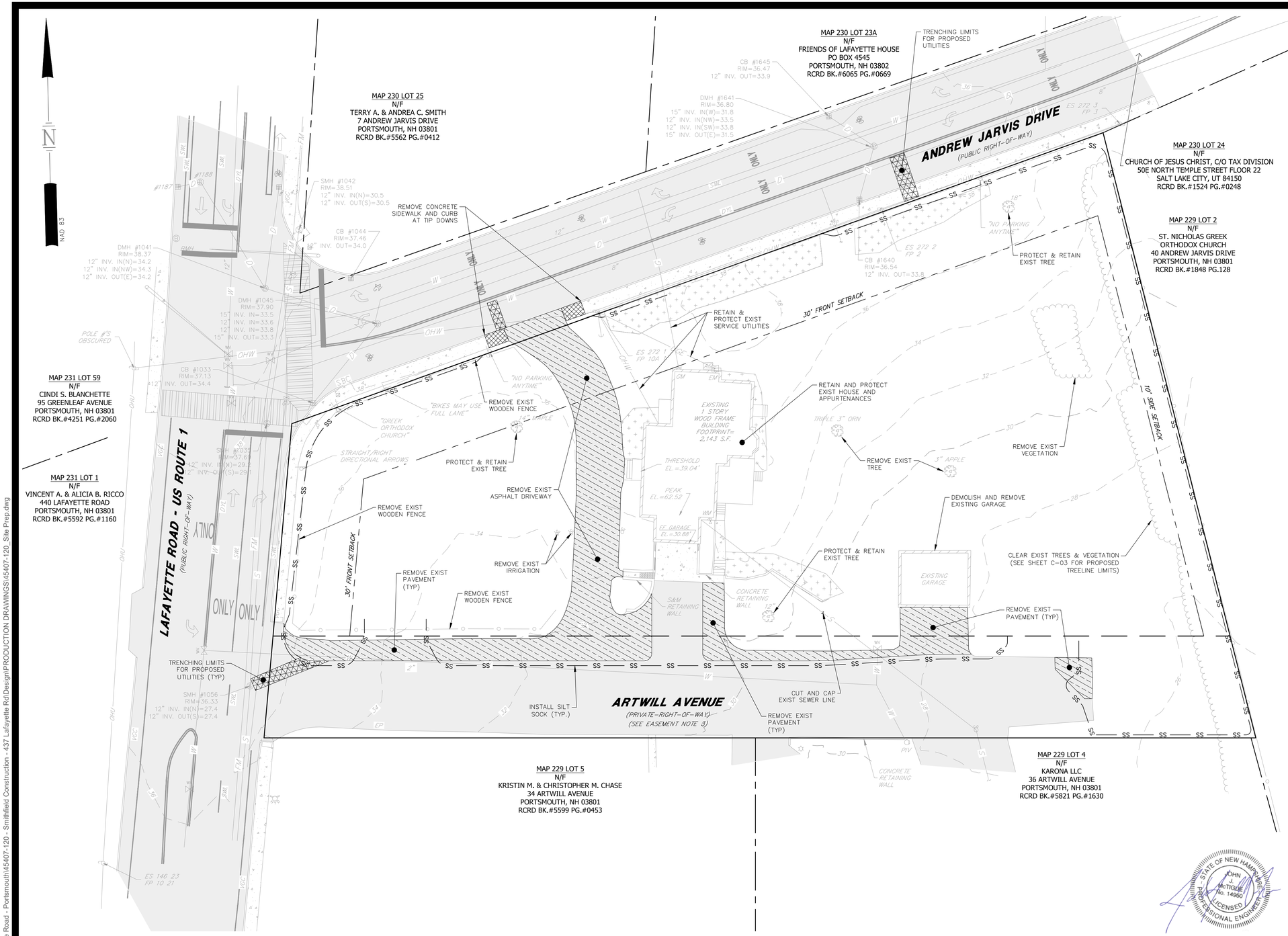
TAX MAP 229 LOT 1
SUBDIVISION PLAN
PROPOSED 3-LOT SUBDIVISION
437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
COUNTY OF ROCKINGHAM
OWNED BY
ARTWILL, LLC

SCALE: 1" = 20' (22x34)
1" = 40' (11x17)
APRIL 19, 2022

Seacoast Division
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
170 Commerce Way, Suite 102
Portsmouth, NH 03801
Phone (603) 431-2222
Fax (603) 431-0910
www.tfmoran.com

FILE	DR	MVP	FB		
45407-120	CK	JCC	CAD/FILE	583	S-03

May 24, 2022 - 3:24pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Carlson Survey\Dwgs\45407-120 Survey.dwg



NOTES

1. SEE NOTES ON SHEET C-01.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATIONS, SIZE, AND ELEVATIONS OF ALL EXISTING UTILITIES, SHOWN OR NOT SHOWN ON THESE PLANS PRIOR TO THE START OF ANY DEMOLITION. THE LOCATIONS SHOWN ON THESE PLANS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED DEMOLITION TO DETERMINE APPROPRIATE ACTION TO BE TAKEN BEFORE PROCEEDING WITH THE WORK. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO ANTICIPATE CONFLICTS AND REPAIR EXISTING UTILITIES AS NECESSARY TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO ALL AREAS AFFECTED BY WORK AT ALL TIMES.
4. THE CONTRACTOR SHALL VERIFY ALL SURVEY INFORMATION IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
5. EXISTING UTILITY SERVICES TO BE DISCONTINUED ARE TO BE CAPPED AS REQUIRED BY THE RESPECTIVE UTILITY COMPANIES.
6. CONSTRUCTION DEBRIS AND INVASIVE SPECIES SHALL BE REMOVED FROM SITE AND DISPOSED OF IN A LEGAL MANNER.
7. PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL PLACE ORANGE CONSTRUCTION FENCING AROUND EACH TREE TO BE RETAINED THROUGHOUT CONSTRUCTION. NO STOCKPILES OF MATERIAL ARE PERMITTED WITHIN THE DRIP LINE OF THE TREES TO BE SAVED.
8. CONTACT THE LANDSCAPE ARCHITECT IMMEDIATELY IF ANY TREES ARE DAMAGED DURING CONSTRUCTION.

CONSTRUCTION SEQUENCE NOTES

TO MINIMIZE EROSION AND SEDIMENTATION DUE TO CONSTRUCTION, CONSTRUCTION SHALL FOLLOW THIS GENERAL CONSTRUCTION SEQUENCE.

MODIFICATIONS TO THE SEQUENCE NECESSARY DUE TO THE CONTRACTOR'S SCHEDULE SHALL INCLUDE APPROPRIATE TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONTROL MEASURES.

THE CONTRACTOR SHALL SCHEDULE WORK SUCH THAT ANY CONSTRUCTION AREA IS STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE EXCEPT AS NOTED BELOW. NO MORE THAN 5 ACRES OF DISTURBED LAND SHALL BE UNSTABILIZED AT ANY ONE TIME.

THE PROJECT SHALL BE MANAGED SO THAT IT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER ARC 3800 RELATIVE TO INVASIVE SPECIES.

DO NOT TRAFFIC EXPOSED SOIL SURFACE OF INFILTRATION SYSTEMS WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO STORMWATER BMP'S. STORMWATER RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMP'S ARE STABILIZED.

DO NOT PLACE STORMWATER BMP'S INTO SERVICE UNTIL THE CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.

AFTER THE INFILTRATION SYSTEM IS EXCAVATED TO THE FINAL DESIGN ELEVATION, THE FLOOR SHOULD BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW TO RESTORE THE INFILTRATION RATES, FOLLOWED BY A PASS WITH A LEVELING DRAG.

1. NOTIFY EASEMENT OWNERS PRIOR TO COMMENCEMENT OF WORK.
2. INSTALL ALL PERIMETER EROSION PROTECTION MEASURES AS INDICATED ON THE PLANS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. STORMWATER TREATMENT PONDS AND SWALES SHALL BE INSTALLED BEFORE ROUGH GRADING THE SITE.
4. DURING CONSTRUCTION EVERY EFFORT SHALL BE MADE TO MANAGE SURFACE RUNOFF QUALITY.
5. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, SILT BARRIERS, SEDIMENT TRAPS, ETC. MULCH AND SEED AS REQUIRED. (TEMPORARY SEED MIXTURE OF WINTER RYE APPLIED AT A RATE OF 2.5 LBS/1000 SF SHALL BE USED).
6. CONDUCT MAJOR EARTHWORK, INCLUDING CLEARING AND GRUBBING, WITHIN THE LIMITS OF WORK. ALL CUT AND FILL SLOPES SHALL BE SEEDED WITHIN 72 HOURS AFTER GRADING.
7. ALL STRIPPED TOPSOIL AND OTHER EARTH MATERIALS SHALL BE STOCKPILED OUTSIDE THE IMMEDIATE WORK AND WETLAND AREAS. A SILT BARRIER SHALL BE CONSTRUCTED AROUND THESE PILES IN A MANNER TO PROVIDE ACCESS AND AVOID SEDIMENT OUTSIDE OF THE WORK AREA.
8. CONSTRUCT BUILDING PAD AND COMMENCE NEW BUILDING CONSTRUCTION.
9. CONSTRUCT TEMPORARY CULVERTS AND DIVERSIONS AS REQUIRED.
10. BEGIN PERMANENT AND TEMPORARY INSTALLATION OF SEED AND MULCH.
11. PERFORM EARTHWORK NECESSARY TO ESTABLISH ROUGH GRADING AROUND PARKING FIELDS AND ACCESS DRIVES. MANAGE EXPOSED SOIL SURFACES TO AVOID TRANSPORTING SEDIMENTS INTO WETLANDS. PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
12. INSTALL SUBSURFACE UTILITIES (WATER, SEWER, GAS, ELECTRIC, COMMUNICATIONS, DRAINAGE, DRAINAGE FACILITIES, ETC.).
13. CONSTRUCT PROPOSED ROADWAY, RAIN GARDENS, GRAVEL WETLANDS AND DRAINAGE SWALES. ALL DITCHES, SWALES, AND GRAVEL WETLANDS SHALL BE FULLY STABILIZED PRIOR TO DIRECTING FLOW TO THEM.
14. COMPLETE BUILDING AND ALL OFF-SITE IMPROVEMENTS.
15. COMPLETE SEEDING AND MULCHING. SEED TO BE APPLIED WITH BROADCAST SPREADER OR BY HYDRO-SEEDING, THEN ROLLED, RAKED, OR DRAGGED TO ASSURE SEED/SOIL CONTACT.
16. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDED AREAS HAVE BECOME FIRMLY ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE.
17. DURING THE COURSE OF THE WORK AND UPON COMPLETION, THE CONTRACTOR SHALL REMOVE ALL SEDIMENT DEPOSITS, EITHER ON OR OFF SITE, INCLUDING CATCH BASINS, AND SUMPS, DRAIN PIPES AND DITCHES, CURB LINES, ALONG SILT BARRIERS, ETC. RESULTING FROM SOIL AND/OR CONSTRUCTION OPERATIONS.
18. SEE WINTER CONSTRUCTION SEQUENCE FOR WORK CONDUCTED AFTER OCTOBER 15TH.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

SITE PREPARATION & DEMOLITION PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") **APRIL 19, 2022**

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE No. 14960
LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DR	CK
1	5/23/2022	REVISE UTILITY TRENCHING LIMITS.	JSM	JJM

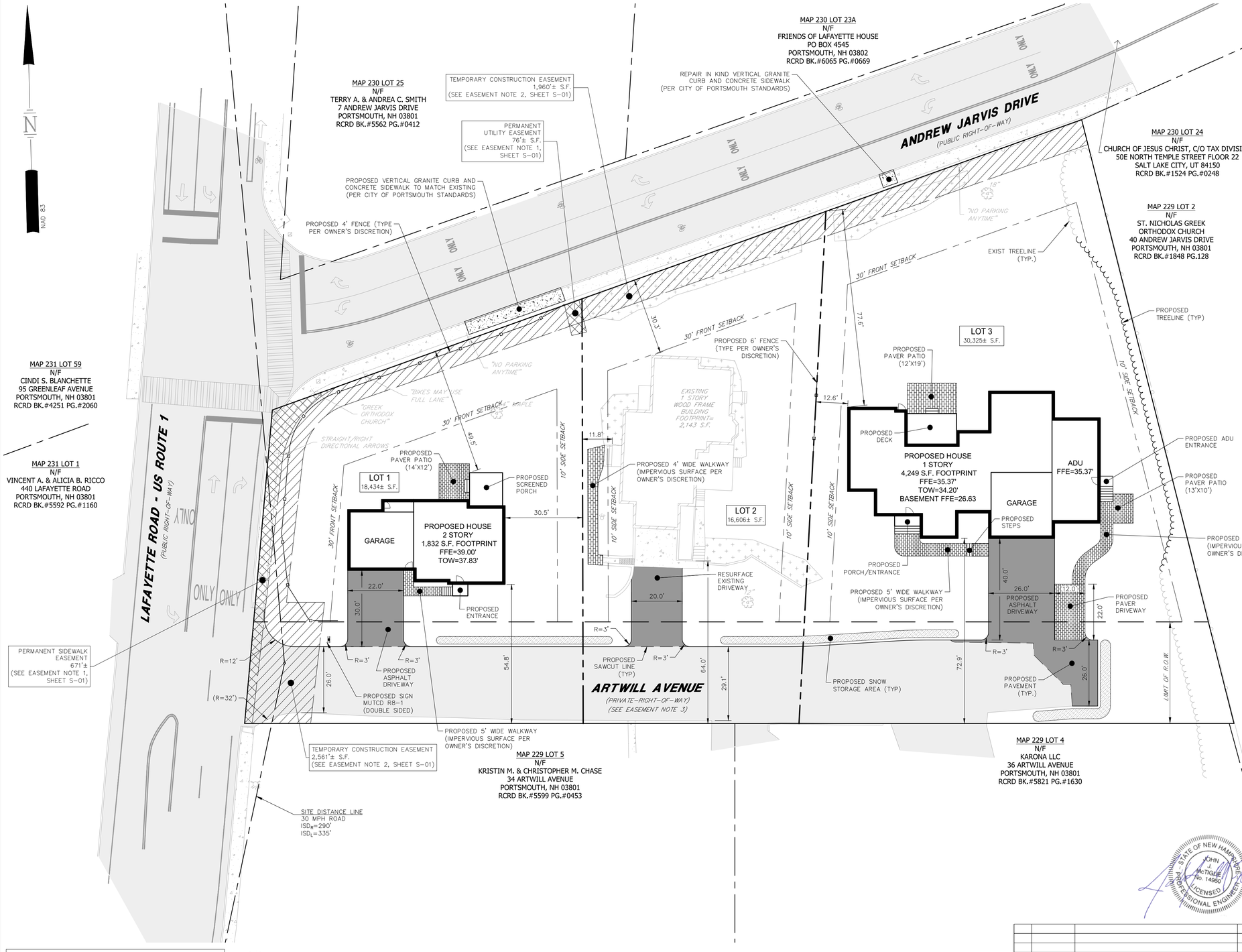
DIG SAFE
CONTACT DIG SAFE - 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	DR	CK			
45407-120	JSM	JCC	FB	CADFILE	45407-120_SITE PREP

C-02

May 23, 2022 - 4:05pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Design\PRODUCTION DRAWINGS\45407-120_Site Prep.dwg



SITE DATA

OWNER OF RECORD OF MAP 229 LOT 1:
HARLON P. WILLIS REVOCABLE TRUST & JEAN P. WILLIS REVOCABLE TRUST
437 LAFAYETTE ROAD, PORTSMOUTH, NH 03801

DEED REFERENCE TO PARCEL IS BK.#3537 PG.#1327

AREA OF PARCEL = 65,365± S.F. OR 1.5006± ACRES

ZONED: SINGLE RESIDENCE B (SRB)
EXISTING USE: 1 LOT, SINGLE FAMILY DWELLING UNIT
PROPOSED USE: 3 LOTS, 3 SINGLE FAMILY DWELLING UNITS

THE PURPOSE OF THIS PLAN IS TO DEPICT TWO PROPOSED SINGLE FAMILY DWELLING UNIT WITH ACCESS ALONG ARTWELL AVENUE. ASSOCIATED IMPROVEMENTS NOT SHOWN ON THIS PLAN INCLUDE AND ARE NOT LIMITED TO GRADING, STORMWATER MANAGEMENT SYSTEMS, UTILITIES, LIGHTING, AND LANDSCAPING.

DIMENSIONAL REQUIREMENTS (CURRENT ZONING)

	REQUIRED:	PROVIDED: LOT 1:	LOT 2:	LOT 3:
MINIMUM LOT DIMENSIONS:				
LOT AREA	15,000 S.F.	18,434 S.F.	16,606 S.F.	30,325 S.F.
LOT FRONTAGE	30 FT	129.6 FT	102.0 FT	107.0 FT
DEPTH	100 FT	105.6 FT	142.4 FT	179.7 FT
MINIMUM YARD DIMENSIONS:				
FRONT	30 FT	49.5 FT	30.3 FT	77.6 FT
SIDE	10 FT	30.5 FT	11.8 FT	12.6 FT
REAR	30 FT	54.8 FT	64.0 FT	72.9 FT
MAXIMUM STRUCTURE DIMENSIONS:				
SLOPED ROOF	35 FT	35 FT	27.5± FT	35 FT
ROOF APPURTENANCE HEIGHT	8 FT	>8 FT	>8 FT	>8 FT
BUILDING LOT COVERAGE	20% (MAX)	11.2%	14.9%	15.1%
MINIMUM SETBACKS/BUFFER:				
BUILDING FRONT	30 FT	30 FT	30 FT	30 FT
BUILDING SIDE	10 FT	10 FT	10 FT	10 FT
BUILDING REAR	30 FT	30 FT	30 FT	30 FT
MINIMUM OPEN SPACE	40%	61.4%	60.6%	66.5%

PARKING REQUIREMENTS

PARKING SPACES	1.3 SPACES/UNIT	2 SPACES*	2 SPACES	2 SPACES	3 SPACES

*LOT 3 CONTAINS (2) UNITS AND REQUIRES 3 SPACES

NOTES

1. SEE NOTES ON SHEET C-01.
2. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS NOTED OTHERWISE.
3. LIGHTING, SIGNAGE, LANDSCAPING, AND SCREENING SHALL MEET THE REQUIREMENTS OF THE CITY ZONING ORDINANCE AND SITE PLAN REGULATIONS.
4. SNOW SHALL NOT BE STOCKPILED IN STORMWATER BMP'S, WETLAND BUFFERS, OR WETLANDS. SEE SNOW STORAGE LOCATIONS. IN THE EVENT THAT THE SNOW STORAGE AREAS PROVIDED ON THE SITE ARE COMPLETELY UTILIZED, EXCESS SNOW SHALL BE TRANSPORTED OFF SITE FOR DISPOSAL IN ACCORDANCE WITH NHDES REGULATION. IF SNOW IS STORED WITHIN PARKING AREA, KEEP CATCH BASINS CLEAR.
5. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
6. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
7. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

SIGN LEGEND

ID	SIGN	SIZE (INCHES) WIDTH	SIZE (INCHES) HEIGHT	DESIGN (COLORING, TEXT SIZE, SPACING, SHAPE, RETROFLECTIVITY, ETC.)	NO. OF SIGNS
R8-1	NO PARKING ON PAVEMENT	18	24	REFER TO THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS	2

NOTE:
1. HANDICAP PARKING SIGNS SHALL BE IN ACCORDANCE WITH CITY OF PORTSMOUTH STANDARDS AND ADA REGULATIONS.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

SITE LAYOUT PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") **APRIL 19, 2022**

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE
No. 14950
LICENSED PROFESSIONAL ENGINEER

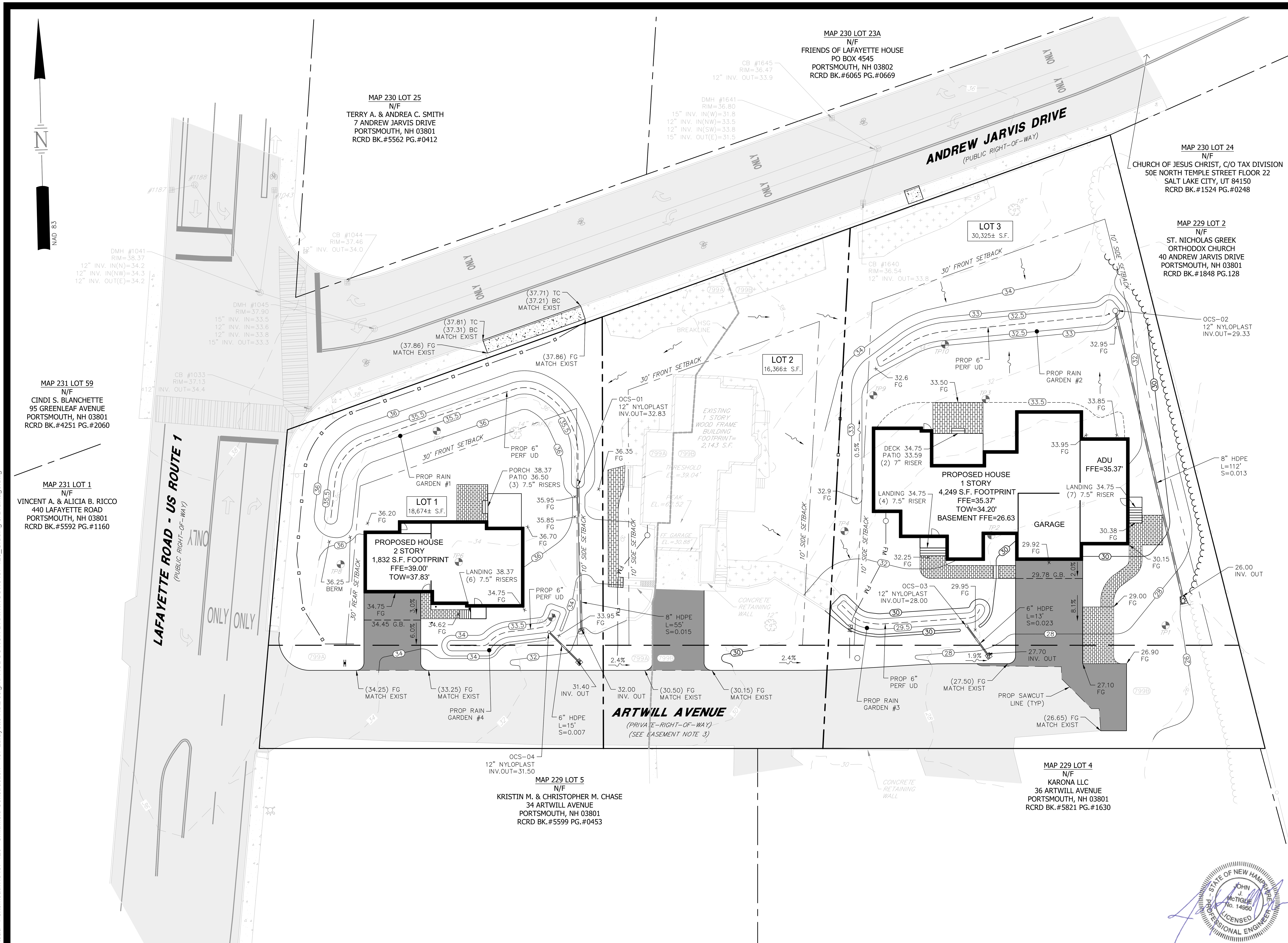
HORIZONTAL SCALE 1"=20'
20 10 0 20

REV	DATE	DESCRIPTION	DR	CK

DIG SAFE
811 OR 1-888-DIG-SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

PROJ. #	45407-120	DR	JSM	FB		C-03
		CK	JCC	CADFILE	45407-120_SITE LAYOUT	



NOTES

1. SEE NOTES ON SHEET C-01.
2. SEE SHEET C-11 FOR RAIN GARDEN DETAILS.
3. ALL DOORS AND GARAGE ENTRANCES SHALL BE AT FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED.
4. PROPOSED SPOT GRADES ARE PROVIDED TO THE NEAREST 0.05. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE FINISHED GRADES MEET ADA STANDARDS FOR WHEEL CHAIR RAMPS, HANDICAP SPACES AND ACCESS AISLES, CROSSWALKS, SIDEWALKS, ETC.
5. ALL ELEVATIONS SHOWN AT CURB ARE TO THE BOTTOM OF CURB UNLESS OTHERWISE NOTED. CURBS HAVE A 6" REVEAL UNLESS OTHERWISE NOTED.
6. LENGTH OF PIPE IS FOR CONVENIENCE ONLY. ACTUAL PIPE LENGTH SHALL BE DETERMINED IN THE FIELD.
7. ALL PROPOSED DRAINAGE PIPES SHALL BE 12" AND HDPE, UNLESS OTHERWISE NOTED ON THE PLAN.
8. DRAINAGE PIPES WITH LESS THAN 3' COVER SHALL BE INSULATED (SEE UTILITY TRENCH DETAIL) AND DRAINAGE CATCH BASINS WITH LESS THAN 3.5' OF COVER OVER INVERTS SHALL USE SLAB TOP CATCH BASIN (SEE DETAILS).
9. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT AND ARCHITECTURAL PLANS FOR SUBDRAINAGE SYSTEMS FOR THE BUILDING FOUNDATION. SUBDRAINAGE MUST DAYLIGHT OR TIE INTO THE STORMWATER MANAGEMENT SYSTEM. COORDINATE SUBDRAINAGE SYSMTEM DESIGN WITH THE ENGINEER OF RECORD.

SOIL LEGEND
(PER SITE SPECIFIC SOIL SURVEY)

SYMBOL	DESCRIPTION	HYDROLOGIC SOIL GROUP
799*	UBRAN LAND-CANTON COMPLEX 3% - 15% SLOPES	A (BASED ON FIELD INFILTRATION RATES)
799*	UBRAN LAND-CANTON COMPLEX 3% - 15% SLOPES	B (BASED ON FIELD INFILTRATION RATES)

*ENTIRE PROPERTY IDENTIFIED AS URBAN LAND-CANTON COMPLEX.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

GRADING & DRAINAGE PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR
ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") APRIL 19, 2022

STATE OF NEW HAMPSHIRE — JOHN J. McTIGUE No. 14956 LICENSED PROFESSIONAL ENGINEER

HORIZONTAL SCALE 1"=20'
20 10 0 20

REV	DATE	DESCRIPTION	DR	CK
1	5/18/2022	REVISE FFE OF HOUSE ON LOT #3.	JSM	JCC

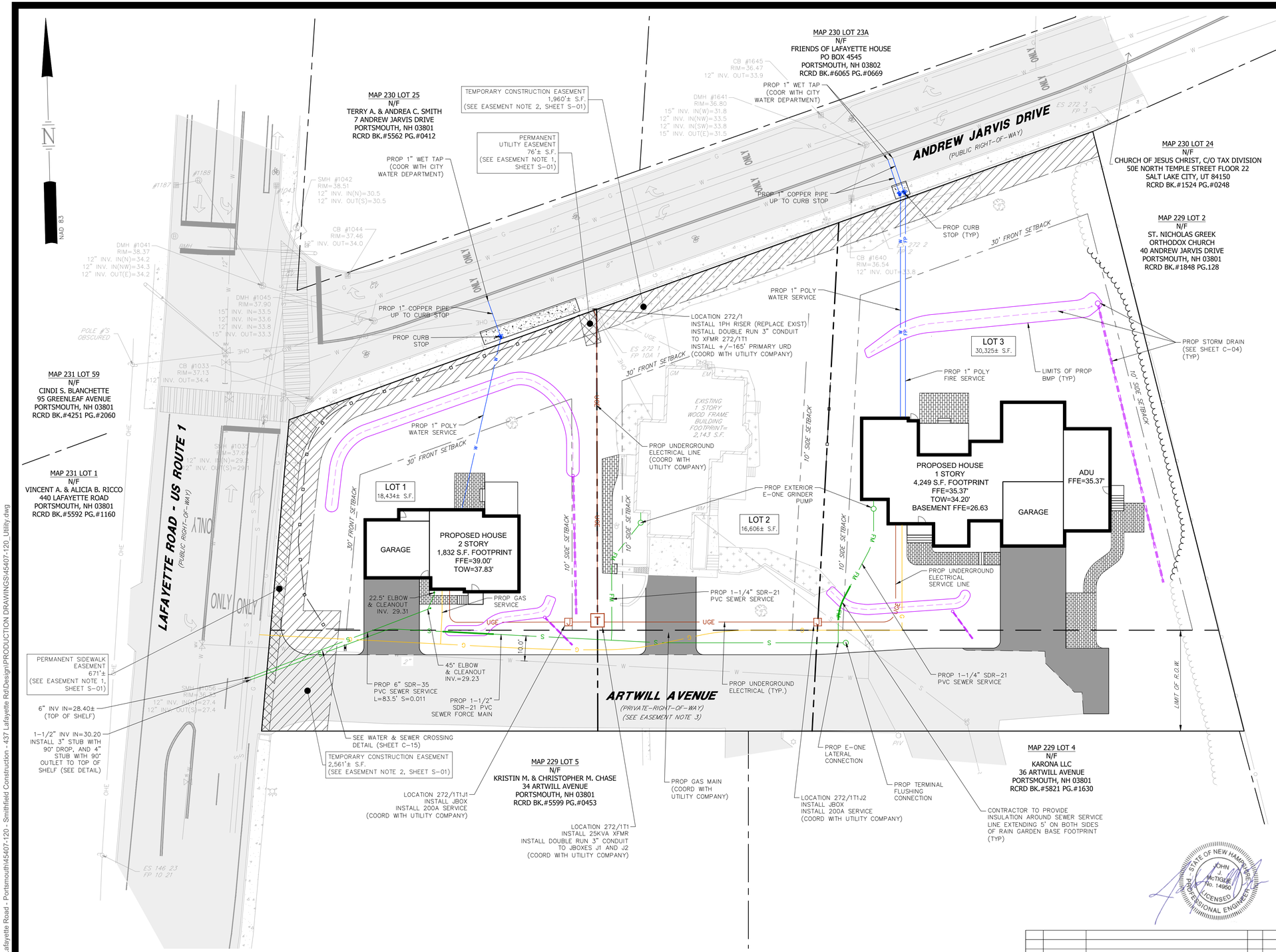
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

F.B.	45407-120	DR JSM	FB		C-04
		CK JCC	CADFILE	45407-120_GRADING & DRAINAGE	

DIG SAFE — CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

NOTES

1. SEE UTILITY NOTES ON SHEET C-01.
2. CONTRACTOR SHALL COORDINATE WITH CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTING SEWER MANHOLE CONNECTION.



SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

UTILITY PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34")

APRIL 19, 2022

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE No. 14060 LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DR	CK
1	5/13/2022	ADD GAS MAIN AND CHANGE FIRE SERVICE TO 1"	JSM	JCC

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
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May 23, 2022 - 4:06pm
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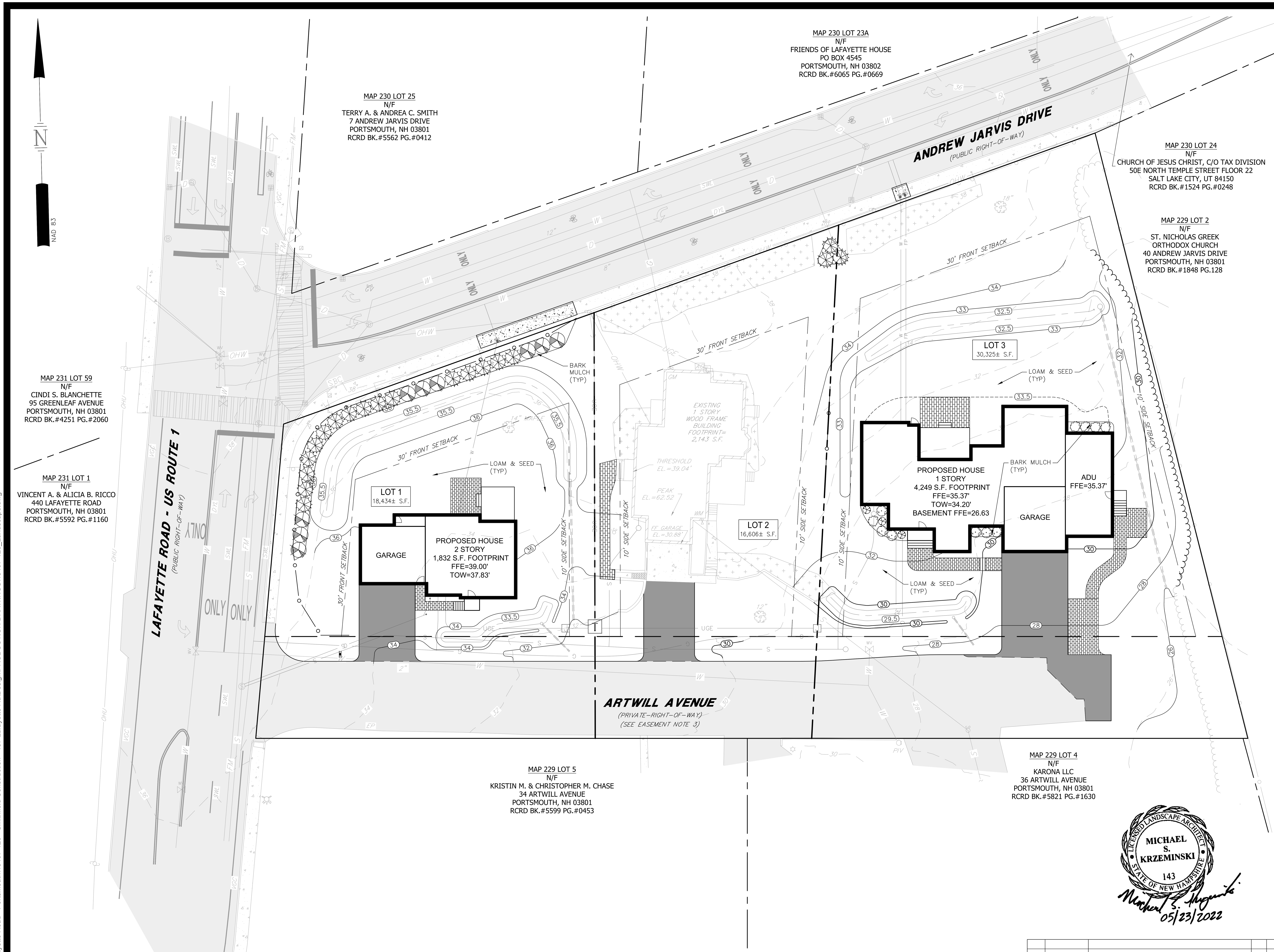

LANDSCAPE LEGEND

SYMBOL	QTY	BOTANICAL NAME COMMON NAME	SIZE	REMARKS
	3	CLETHRA ALNIFOLIA 'HUMMINGBIRD' HUMMINGBIRD SUMMERSWEET	2 GAL.	CONT.
	9	FORSYTHIA 'LYNWOOD GOLD' LYNWOOD GOLD FORSYTHIA	5' TO 6'	B&B
	4	HYDRANGEA ARBORESCENS 'INCREDIBALL' INCREDIBALL SMOOTH HYDRANGEA	3 GAL.	CONT.
	5	JUNIPERUS VIRGINIANA 'GREY OWL' GREY OWL EASTERN RED CEDAR	3 GAL.	CONT.
	19	THUJA O. 'TECHNY' MISSION ARBORVITAE	5' TO 6'	B&B

LANDSCAPE NOTES

1. CONTRACTOR WILL LOCATE, VERIFY AND MARK ALL EXISTING AND NEWLY INSTALLED UNDERGROUND UTILITIES PRIOR TO ANY LAWNWORK OR PLANTING. ANY CONFLICTS WHICH MIGHT OCCUR BETWEEN PLANTING AND UTILITIES WILL IMMEDIATELY BE REPORTED TO THE LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE, SO THAT ALTERNATE PLANTING LOCATIONS CAN BE DETERMINED.
2. CONTRACTOR WILL FURNISH AND PLANT ALL PLANTS IN QUANTITIES AS SHOWN ON THIS PLAN. IN CASES OF DISCREPANCY BETWEEN PLAN AND LIST CLARIFY WITH LANDSCAPE ARCHITECT PRIOR TO PLACING PURCHASE ORDER AND AGAIN PRIOR TO PLANTING.
3. SEE PLANTING DETAILS AND IF INCLUDED, SPECIFICATIONS FOR ADDITIONAL INFORMATION.
4. NO SUBSTITUTION OF PLANT MATERIALS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE THE APPROPRIATE ARRANGEMENTS TO PROVIDE ALL PLANTS AND MATERIALS TO ACCOMMODATE PLANTING WITHIN THE TIME ALLOWED BY THE CONSTRUCTION SCHEDULE.
6. PLANTING SHALL BE COMPLETED FROM APRIL 15TH THROUGH OCTOBER 15TH UNLESS OTHERWISE NOTED IN SPECIFICATIONS. THERE WILL BE NO PLANTING DURING JULY AND AUGUST UNLESS SPECIAL PROVISIONS ARE MADE FOR DROUGHT BY PROVIDING ADDITIONAL WATERING.
7. ALL PLANTS WILL BE NURSERY GROWN.
8. PLANTS WILL BE IN ACCORDANCE, AT A MINIMUM, WITH CURRENT EDITION OF "AMERICAN STANDARDS FOR NURSERY STOCK" AS PUBLISHED BY THE AMERICAN HORTICULTURE INDUSTRY ASSOCIATION.
9. TREES WILL BE PRUNED IN ACCORDANCE WITH THE LATEST EDITION OF ANSI A300 PART 1, "TREE, SHRUB AND OTHER WOODY PLANT MAINTENANCE STANDARD PRACTICES".
10. PLANTS MATERIAL IS SUBJECT TO APPROVAL / REJECTION BY THE LANDSCAPE ARCHITECT AT THE SITE AND AT THE NURSERY.
11. ALL PLANTS WILL BE MOVED WITH ROOT SYSTEMS AS SOLID UNITS AND WITH BALLS OF EARTH FIRMLY WRAPPED WITH BURLAP. NO PLANT WILL BE ACCEPTED WHEN BALL OF EARTH SURROUNDING ITS ROOTS HAS BEEN BADLY CRACKED OR BROKEN BEFORE PLANTING. ALL PLANTS THAT CANNOT BE PLANTED AT ONCE WILL BE HEELED-IN BY SETTING IN THE GROUND AND COVERING THE BALLS WITH SOIL AND THEN WATERING. DURING TRANSPORT, ALL PLANT MATERIALS WILL BE WRAPPED WITH WIND PROOF COVERING.
12. NEWLY PLANTED MATERIAL WILL BEAR THE SAME RELATIONSHIP TO FINISHED GRADE AS TO THE ORIGINAL GRADE OF THE PLANT PRIOR TO DIGGING.
13. PROPOSED TREES OVERHANGING SIDEWALKS, ROADS OR PARKING WILL BEGIN BRANCHING NATURALLY (NOT PRUNED) AT 6' HEIGHT.
14. MULCH FOR PLANTED AREAS (NOT INCLUDING RAIN GARDENS) WILL BE AGED SHREDDED PINE BARK, PARTIALLY DECOMPOSED, DARK BROWN IN COLOR AND FREE OF WOOD CHIPS UNLESS OTHERWISE SHOWN.
15. PLANT MATERIAL WILL BE LOCATED OUTSIDE BUILDING DRIPLINES AND ROOF VALLEY POINTS OF CONCENTRATION TO PREVENT DAMAGE TO PLANTS. CLARIFY DISCREPANCIES WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
16. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED, WILL RECEIVE SIX (6) INCH LOAM AND SEED AT THE DIRECTION OF THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE.
17. TREE STAKES AND WRAP WILL REMAIN IN PLACE FOR NO LESS THAN 6 MONTHS AND NO MORE THAN 1 YEAR. CONTRACTOR WILL REMOVE.
18. ALL PLANT GROUPINGS WILL BE IN MULCH BEDS UNLESS OTHERWISE SPECIFIED OR NOTED ON PLANS. WHERE MULCHED PLANT BED ABUTS LAWN, PROVIDE TURF CUT EDGE.
19. ALL PLANT BEDS WILL INTERSECT WITH PAVEMENT AT 90 DEGREES UNLESS OTHERWISE NOTED ON PLANS.
20. ALL PLANT BED EDGES WILL BE SMOOTH AND CONSISTENT IN LAYOUT OF RADII AND TANGENTS. IRREGULAR, WAVY EDGES WILL NOT BE ACCEPTED.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

LANDSCAPE PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34")

APRIL 19, 2022

HORIZONTAL SCALE 1"=20'

20 10 0 20

REV	DATE	DESCRIPTION	DR	CK
1	5/20/2022	MINOR GRADING AND LANDSCAPING REVISIONS.	JSM	MK

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Civil Engineers
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Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

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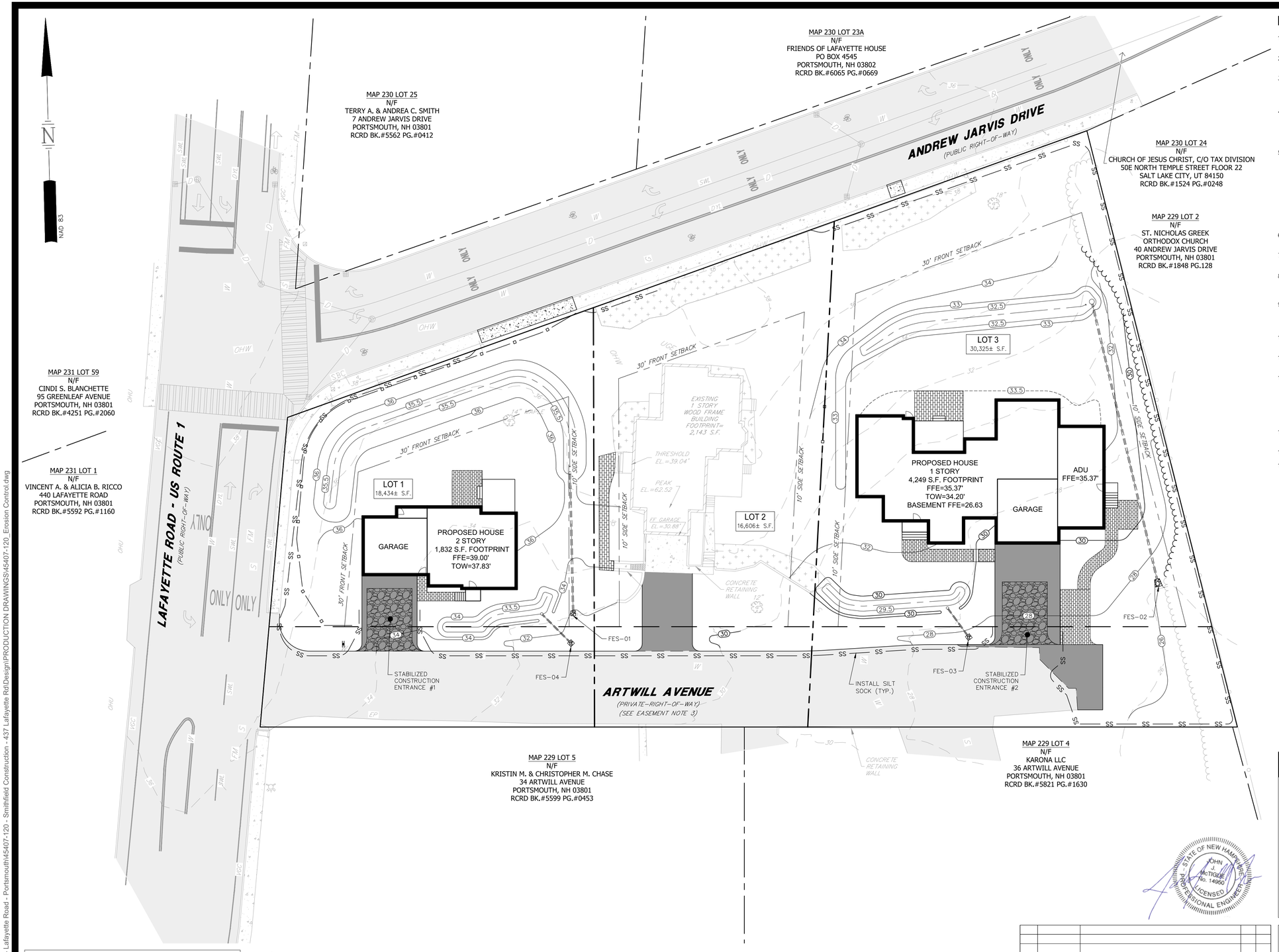

NOTES

1. SEE NOTES ON SHEET C-01, EROSION CONTROL NOTES ON SHEET C-08, EROSION CONTROL DETAILS ON SHEET C-10, AND THE APPROVED SWPPP, AS APPLICABLE.
2. INSTALL SILT BARRIER ALONG THE PERIMETER OF THE AREA TO BE DISTURBED AS FIRST ORDER OF WORK.
3. PROVIDE INLET PROTECTION BARRIERS AROUND ALL EXISTING AND PROPOSED STORM DRAINAGE INLETS WITHIN THE WORK LIMITS AND MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED. INLET PROTECTION BARRIERS SHALL BE IN PLACE AT ALL CATCH BASINS PRIOR TO THE DISTURBANCE OF SOIL.
4. DUST CONTROL SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. IT SHALL BE ACCOMPLISHED BY THE UNIFORM APPLICATION OF CALCIUM CHLORIDE AT THE RATE OF 1-1/2 POUNDS PER SQUARE YARD BY MEANS OF A LIME SPREADER OR OTHER APPROVED METHOD. WATER MAY ALSO BE USED FOR DUST CONTROL, AND APPLIED BY SPRINKLING WITH WATER TRUCK DISTRIBUTORS, AS REQUIRED.
5. THE SITE WILL REQUIRE A USEPA NPDES PERMIT FOR STORMWATER DISCHARGE FOR THE SITE CONSTRUCTION IF THE DISTURBANCE EXCEEDS ONE ACRE. THE CONSTRUCTION SITE OPERATOR SHALL DEVELOP AND IMPLEMENT A CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH EPA REGULATIONS AND THE CONSTRUCTION GENERAL PERMIT WHICH SHALL REMAIN ON SITE AND MADE ACCESSIBLE TO THE PUBLIC. THE SITE CONTRACTOR SHALL COORDINATE WITH THE OWNER TO SUBMIT AN eNOI AT LEAST 14 DAYS IN ADVANCE OF ANY EARTHWORK ACTIVITIES AT THE SITE. A COMPLETED NOTICE OF TERMINATION (NOT) SHALL BE SUBMITTED TO NPDES PERMITTING AUTHORITY WITHIN 30 DAYS AFTER EITHER OF THE FOLLOWING CONDITIONS HAVE BEEN MET: FINAL STABILIZATION HAS BEEN ACHIEVED ON ALL PORTIONS OF THE SITE FOR WHICH THE PERMITTEE IS RESPONSIBLE FOR, OR ANOTHER OPERATOR/PERMITTEE HAS ASSUMED CONTROL OVER ALL AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
6. SILT PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS CONTAINED IN THIS PLAN SET.
7. CONSTRUCT JUTE MATTING ON ALL SLOPES STEEPER THAN 3:1, DISTURBED AREAS SLOPING TOWARDS WETLANDS AND ALL LOCATIONS SHOWN ON PLAN.
8. INSPECT EROSION CONTROL MEASURES WEEKLY AND AFTER EACH RAIN STORM OF 0.10" OR GREATER. REPAIR/MODIFY SILT BARRIER AS NECESSARY TO MAXIMIZE FILTER EFFICIENCY. REMOVE SEDIMENT WHEN SEDIMENT IS 1/3 THE STRUCTURE HEIGHT.
9. PROVIDE SILT BARRIERS AT THE BASE OF CUT AND FILL SLOPES UNTIL COMPLETION OF THE PROJECT OR UNTIL VEGETATION BECOMES ESTABLISHED ON SLOPES. EROSION PROTECTION BELOW FILL SLOPES SHALL BE PLACED IMMEDIATELY AFTER CLEARING, PRIOR TO EMBANKMENT CONSTRUCTION.
10. ALL DISTURBED AREAS SHALL BE REVEGETATED AS QUICKLY AS POSSIBLE. ALL CUT AND FILL SLOPES SHALL BE SEEDED WITHIN 72 HOURS AFTER GRADING.
11. ALL WORK AREAS TO BE STABILIZED AT THE END OF EACH WORK DAY AND PRIOR TO ANY PREDICTED SIGNIFICANT RAIN EVENT.
12. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    - A. BASE COURSE GRAVELS, WHICH MEET THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2, ARE INSTALLED IN AREAS TO BE PAVED
    - B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
    - C. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP RAP HAS BEEN INSTALLED
    - D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED
13. ALL CATCH BASINS, MANHOLES, AND DRAIN LINES SHALL BE THOROUGHLY CLEANED OF ALL SEDIMENT AND DEBRIS AFTER ALL AREAS HAVE BEEN STABILIZED.
14. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING SLOPE STABILITY DURING CONSTRUCTION.
15. THE EROSION CONTROL PRACTICES SHOWN ON THESE PLANS ARE ILLUSTRATIVE ONLY AND SHALL BE SUPPLEMENTED BY THE SITE CONTRACTOR AS NEEDED.

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

EROSION CONTROL PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") **APRIL 19, 2022**

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE
No. 14950
LICENSED
PROFESSIONAL ENGINEER

HORIZONTAL SCALE 1"=20'
20 10 0 20

REV	DATE	DESCRIPTION	DR	CK
1	5/23/2022	REVISED GRADING.	JSM	JJM

DIG SAFE
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		CK	JCC	CADFILE	45407-120_EROSION CONTROL	

SOIL CHARACTERISTICS

THE SOIL IN THE VICINITY OF THE SITE CONSIST OF URBAN LAND–CANTON COMPLEX, THE MAJORITY OF THE SOIL IS HSG TYPE A AND TYPE B.

DISTURBED AREA

THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 46,875 SQUARE FEET (1.076 ACRES). CONSTRUCTION SHALL BE PHASED TO LIMIT DISTURBED AREAS TO LESS THAN 5 ACRES.

CRITICAL NOTE: THIS DRAWING IS PROVIDED FOR GENERAL GUIDANCE. ALL SPECIAL EROSION CONTROL MEASURES MUST BE EXECUTED IN ACCORDANCE WITH APPLICABLE CURRENT STATE AND LOCAL REGULATIONS, APPROVED SWPPP, AND PERMIT REQUIREMENTS.

SEQUENCE OF MAJOR ACTIVITIES

1. INSTALL PERIMETER CONTROLS, STABILIZED CONSTRUCTION ENTRANCE, AND TEMPORARY EROSION CONTROL MEASURES PER APPROVED SITE DEVELOPMENT PLANS, PERMITS, OR SWPPP IF REQUIRED, PRIOR TO EARTH MOVING OPERATIONS.
2. DEMOLISH EXISTING SITE WORK DESIGNATED FOR REMOVAL.
3. INSTALL STORMWATER TREATMENT PONDS AND SWALES BEFORE ROUGH GRADING THE SITE.
4. COMPLETE MAJOR GRADING OF SITE.
5. CONSTRUCT BUILDING PAD, STORMWATER SYSTEM, AND SITE UTILITIES.
6. CONSTRUCT PARKING LOT.
7. WHEN ALL CONSTRUCTION ACTIVITY IS COMPLETE AND SITE IS STABILIZED, REMOVE ALL INLET PROTECTION, SILT BARRIERS, AND SEDIMENT THAT HAS BEEN TRAPPED BY THESE DEVICES.
8. CONSULT APPLICABLE REGULATIONS, PERMITS, CONDITIONS, AND APPROVED SWPPP FOR CONDITIONS RELATED TO NOTICE OF TERMINATION, IF REQUIRED.

EROSION AND SEDIMENT CONTROLS AND STABILIZATION PRACTICES

STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES AND DISTURBED AREAS WHERE CONSTRUCTION ACTIVITY WILL NOT OCCUR FOR MORE THAN TWENTY ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:

1. BASE COURSE GRAVELS, WHICH MEET THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2, HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
2. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
3. A MINIMUM OF 3" OF NON–EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
4. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.

DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT BARRIERS. ALL STORM DRAIN INLETS SHALL BE PROVIDED WITH BARRIER FILTERS. STONE RIPRAP SHALL BE PROVIDED AT THE OUTLETS OF DRAINAGE PIPES WHERE EROSIVE VELOCITIES ARE ENCOUNTERED.

OFF SITE VEHICLE TRACKING

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED.

INSTALLATION, MAINTENANCE, AND INSPECTION OF EROSION AND SEDIMENT CONTROLS

A. GENERAL

THESE ARE THE GENERAL INSPECTION AND MAINTENANCE PRACTICES THAT WILL BE USED TO IMPLEMENT THE PLAN.

1. STABILIZATION OF ALL SWALES, DITCHES, AND PONDS IS REQUIRED PRIOR TO DIRECTING FLOW TO THEM.
2. THE SMALLEST PRACTICAL PORTION OF THE SITE WILL BE DENUDED AT ONE TIME. (5 AC MAX)
3. ALL CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH APPLICABLE REGULATIONS, PERMITS, AND CONDITIONS AND[a] FOR PROJECTS REQUIRING A NPDES EPA CGP AND DISCHARGING TO A NON–SENSITIVE WATERBODY, AT LEAST EVERY 7 DAYS OR EVERY 14 DAYS AND AFTER A 0.25 INCHES RAIN EVENT OR GREATER.
4. ALL MEASURES WILL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT WILL BE INITIATED WITHIN 24 HOURS OF REPORT.
5. BUILT UP SEDIMENT WILL BE REMOVED FROM SILT BARRIER WHEN IT HAS REACHED ONE THIRD THE HEIGHT OF THE BARRIER.
6. ALL DIVERSION DIKES WILL BE INSPECTED AND ANY BREACHES PROMPTLY REPAIRED.
7. TEMPORARY SEEDING AND PLANTING WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND UNHEALTHY GROWTH.
8. A MAINTENANCE INSPECTION REPORT WILL BE MADE AFTER EACH INSPECTION.
9. IF INSPECTIONS ARE REQUIRED OR THE PROJECT IS SUBJECT TO A NPDES EPA CGP, THE CONTRACTOR'S SITE SUPERINTENDENT WILL BE RESPONSIBLE FOR INSPECTIONS, MAINTENANCE, AND REPAIR ACTIVITIES, AND FILLING OUT THE INSPECTION AND MAINTENANCE REPORT.

B. FILTERS / BARRIERS

1. SILT SOCKS

   A. KNOTTED MESH NETTING MATERIAL SHALL BE DELIVERED TO SITE IN A 5 MIL CONTINUOUS, TUBULAR, HDPE 3/8" MATERIAL, FILLED WITH COMPOST CONFORMING TO THE FOLLOWING REQUIREMENTS:

PHYSICAL PROPERTY	TEST	REQUIREMENTS
PH	TMECC 04.11–A	5.0 TO 8.0
PARTICLE SIZE	TMECC 02.02–B	2" SIEVE AND MIN. 60% GREATER THAN THE 3/8" SIEVE
MOISTURE CONTENT		STND TESTING < 60%

   MATERIAL SHALL BE RELATIVELY FREE OF INERT OR FOREIGN MAN–MADE MATERIALS

   MATERIAL SHALL BE WEED FREE AND DERIVED FROM A WELL–DECOMPOSED SOURCE OF ORGANIC MATTER, FREE FROM ANY REFUSE, CONTAMINANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH.

   B. SEDIMENT COLLECTED AT THE BASE OF THE SILT SOCK SHALL BE REMOVED ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE SILT SOCK.

   C. SILT BARRIER SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREAS HAS BEEN PERMANENTLY STABILIZED.

2. SEQUENCE OF INSTALLATION

   SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM.

3. MAINTENANCE

   A. SILT BARRIERS SHALL BE INSPECTED WEEKLY AND IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. THEY SHALL BE REPAIRED IF THERE ARE ANY SIGNS OF EROSION OR SEDIMENTATION BELOW THEM. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. IF THERE ARE SIGNS OF UNDERCUTTING AT THE CENTER OR THE EDGES, OR IMPOUNDING OF LARGE VOLUMES OF WATER BEHIND THEM, SEDIMENT BARRIERS SHALL BE REPLACED WITH A TEMPORARY CHECK DAM.

   B. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.

   C. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE THIRD (1/3) THE HEIGHT OF THE BARRIER.

   D. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFIRM WITH THE EXISTING GRADE, PREPARED AND SEEDED.

C. MULCHING

1. TIMING

   IN ORDER FOR MULCH TO BE EFFECTIVE, IT MUST BE IN PLACE PRIOR TO MAJOR STORM EVENTS. THERE ARE TWO (2) TYPES OF STANDARDS WHICH SHALL BE USED TO ASSURE THIS:

   A. APPLY MULCH PRIOR TO ANY STORM EVENT.

   THIS IS APPLICABLE WHEN WORKING WITHIN 100' OF WETLANDS. IT WILL BE NECESSARY TO CLOSELY MONITOR WEATHER PREDICTIONS, USUALLY BY CONTACTING THE NATIONAL WEATHER SERVICE, TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.

   B. REQUIRED MULCHING WITHIN A SPECIFIED TIME PERIOD.

   THE TIME PERIOD CAN RANGE FROM 14 TO 21 DAYS OF INACTIVITY ON AN AREA, WHERE THE LENGTH OF TIME VARIES WITH SITE CONDITIONS. PROFESSIONAL JUDGMENT SHALL BE USED TO EVALUATE THE INTERACTION OF SITE CONDITIONS (SOIL ERODIBILITY, SEASON OF YEAR, EXTENT OF DISTURBANCE, PROXIMITY TO SENSITIVE RESOURCES, ETC.) AND THE POTENTIAL IMPACT OF EROSION ON ADJACENT AREAS TO CHOOSE AN APPROPRIATE TIME RESTRICTION.

2. GUIDELINES FOR WINTER MULCH APPLICATION.

   WHEN MULCH IS APPLIED TO PROVIDE PROTECTION OVER WINTER (PAST THE GROWING SEASON) IT SHALL BE AT A RATE OF 6,000 POUNDS OF HAY OR STRAW PER ACRE. A TACKIFIER MAY BE ADDED TO THE MULCH.

3. MAINTENANCE

   ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS, TO CHECK FOR RILL EROSION. IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED.

D. VEGETATIVE PRACTICE

1. AFTER ROUGH GRADING OF THE SUBGRADE HAS BEEN COMPLETED AND APPROVED, THE SUB GRADE SURFACE SHALL BE SCARIFIED TO A DEPTH OF 4". THEN, FURNISH AND INSTALL A LAYER OF LOAM PROVIDING A ROLLED THICKNESS AS SPECIFIED IN THESE PLANS. ANY DEPRESSIONS WHICH MAY OCCUR DURING ROLLING SHALL BE FILLED WITH ADDITIONAL LOAM, REGRADED AND REROLLED UNTIL THE SURFACE IS TRUE TO THE FINISHED LINES AND GRADES. ALL LOAM NECESSARY TO COMPLETE THE WORK UNDER THIS SECTION SHALL BE SUPPLIED BY THE SITE SUBCONTRACTOR.
2. ALL LARGE STIFF CLODS, LUMPS, BRUSH, ROOTS, DEBRIS, GLASS, STUMPS, LITTER, AND OTHER FOREIGN MATERIAL, AS WELL AS STONES OVER 1" IN DIAMETER, SHALL BE REMOVED FROM THE LOAM AND DISPOSED OF OFF SITE. THE LOAM SHALL BE RAKED SMOOTH AND EVEN.
3. THE LOAM SHALL BE PREPARED TO RECEIVE SEED BY REMOVING STONES, FOREIGN OBJECTS AND GRADING TO ELIMINATE WATER POCKETS AND IRREGULARITIES PRIOR TO PLACING SEED. FINISH GRADING SHALL RESULT IN STRAIGHT UNIFORM GRADES AND SMOOTH, EVEN SURFACES WITHOUT IRREGULARITIES TO LOW POINTS.
4. SHAPE THE AREAS TO THE LINES AND GRADES REQUIRED. THE SITE SUBCONTRACTOR'S ATTENTION IS DIRECTED TO THE SCHEDULING OF LOAMING AND SEEDING OF GRADED AREAS TO PERMIT SUFFICIENT TIME FOR THE STABILIZATION OF THESE AREAS. IT SHALL BE THE SITE SUBCONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE AREAS DURING THE CONSTRUCTION PERIOD AND REGRADE, LOAM AND RESEED ANY DAMAGED AREAS.
5. ALL AREAS DISTURBED BY CONSTRUCTION WITHIN THE PROPERTY LINES AND NOT COVERED BY STRUCTURES, PAVEMENT, OR MULCH SHALL BE LOAMED AND SEEDED.
6. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF 2 TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5.
7. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 500 POUNDS PER ACRE OF 10–20–20 FERTILIZER.
8. SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4 1/2 POUNDS AND 5 1/2 POUNDS PER INCH OF WIDTH.
9. SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4" AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH.
10. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AT A RATE OF 1.5 TO 2 TONS PER ACRE. MULCH THAT BLOWS OR WASHES AWAY SHALL BE REPLACED IMMEDIATELY AND ANCHORED USING APPROPRIATE TECHNIQUES FROM THE EROSION AND SEDIMENT CONTROL HANDBOOK.
11. THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED.
12. THE SITE SUBCONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED, INCLUDING CUTTING, AS SPECIFIED HEREIN AFTER UNDER MAINTENANCE AND PROTECTION.
13. UNLESS OTHERWISE APPROVED, SEEDING SHALL BE DONE DURING THE APPROXIMATE PERIODS OF EARLY SPRING TO SEPTEMBER 30, WHEN SOIL CONDITIONS AND WEATHER ARE SUITABLE FOR SUCH WORK. IN NO CASE SHALL THE WEED CONTENT EXCEED 1 PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. FOR TEMPORARY PLANTINGS AFTER SEPTEMBER 30, TO EARLY SPRING AND FOR TEMPORARY PROTECTION OF DISTURBED AREAS:

    A. FOLLOW ABOVE SLOPE, LOAM DEPTH AND GRADING REQUIREMENTS.
    B. FERTILIZER SHALL BE SPREAD AND WORKED INTO THE SURFACE AT A RATE OF 500 POUNDS PER ACRE.

    MULCHING AND SEEDING SHALL BE APPLIED AT THE FOLLOWING RATES:

WINTER RYE (FALL SEEDING)	2.5 LBS/1,000 SF
OATS (SPRING SEEDING)	2.0 LBS/1,000 SF
MULCH	1.5 TONS/ACRE

E. CATCH BASIN INLET PROTECTION

1. INLET BASKET STRUCTURE

   A. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY PRIOR TO DISTURBING PAVEMENT AND SHALL REMAIN IN PLACE AND MAINTAINED UNTIL PAVEMENT BINDER COURSE IS COMPLETE.

   B. MOLD 6X6, 42 LB. WIRE SUPPORT AROUND INLET FRAME AND GRATE AND EXTEND 6" BEYOND SIDES. SECURE FILTER FABRIC TO WIRE SUPPORT.

   C. THE FILTER FABRIC SHALL BE A GEOTEXTILE FABRIC; POLYESTER, POLYPROPYLENE, STABILIZED NYLON, POLYETHYLENE OR POLYVINYLIDENE CHLORIDE MEETING THE FOLLOWING SPECIFICATIONS:

      GRAB STRENGTH: 45 LB. MINIMUM IN ANY PRINCIPAL DIRECTION (ASTM D1682)
      MULLEN BURST STRENGTH: MIN. 60PSI (ASTM D774)

   D. THE FABRIC SHALL HAVE AN OPENING NO GREATER THAN A NUMBER 20 U.S. STANDARD SIEVE AND A MINIMUM PERMEABILITY OF 120 GPM.

   E. THE INLET PROTECTION SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM REACHING THE DRAINAGE SYSTEM AND/OR CAUSING SURFACE FLOODING.

   F. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT, OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED.

F. WINTER CONSTRUCTION SEQUENCE

1. ALL PROPOSED POST–DEVELOPMENT LANDSCAPED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1 AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE PLACEMENT OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENT.
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
3. AFTER OCTOBER 15TH, INCOMPLETE PARKING AREAS WHERE ACTIVE CONSTRUCTION HAS STOPPED FOR THE WINTER ALL TRAVEL SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOWFALL AFTER EACH STORM EVENT.

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES, SILT BARRIERS SHALL BE INSTALLED PRIOR TO COMMENCING ANY CLEARING OR GRADING OF THE SITE. STRUCTURAL CONTROLS SHALL BE INSTALLED CONCURRENTLY WITH THE APPLICABLE ACTIVITY. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN TWENTY ONE (21) DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN FOURTEEN (14) DAYS OF THE LAST DISTURBANCE. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, SILT BARRIERS AND ANY EARTH/DIKES WILL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.

FOR SINGLE/DUPLEX FAMILY SUBDIVISIONS, WHEN LOT DEVELOPMENT IS NOT PART OF THE PERMIT, THEN LOT DISTURBANCE, OTHER THAN THAT SHOWN ON THE APPROVED PLANS, SHALL NOT COMMENCE UNTIL AFTER THE ROADWAY HAS THE BASE COURSE TO DESIGN ELEVATION AND THE ASSOCIATED DRAINAGE IS COMPLETE AND STABLE.

WASTE DISPOSAL

1. WASTE MATERIALS
   ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN A DUMPSTER. NO CONSTRUCTION WASTE MATERIALS WILL BE BURIED ON SITE. ALL PERSONNEL WILL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
2. HAZARDOUS WASTE
   ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
3. SANITARY WASTE
   ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION

1. MATERIAL MANAGEMENT PRACTICES
   THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:

   GOOD HOUSEKEEPING:
   THE FOLLOWING GOOD HOUSEKEEPING PRACTICES WILL BE FOLLOWED ON SITE DURING THE CONSTRUCTION PROJECT:

   A. AN EFFORT WILL BE MADE TO STORE ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB.

   B. ALL MATERIALS STORED ON SITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE.

   C. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.

   D. THE SITE SUPERINTENDENT WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS.

   E. SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.

   F. WHENEVER POSSIBLE ALL OF A PRODUCT WILL BE USED UP BEFORE DISPOSING OF THE CONTAINER.

   HAZARDOUS PRODUCTS:
   THE FOLLOWING PRACTICES WILL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:

   A. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.

   B. ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION.

   C. SURPLUS PRODUCT THAT MUST BE DISPOSED OF WILL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.

2. PRODUCT SPECIFICATION PRACTICES
   THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ON SITE:

   PETROLEUM PRODUCTS:
   ALL ON SITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

   FERTILIZERS:
   FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS. ONCE APPLIED FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER. STORAGE WILL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.

   PAINTS:
   ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM BUT WILL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.

   CONCRETE TRUCKS:
   CONCRETE TRUCKS WILL DISCHARGE AND WASH OUT SURPLUS CONCRETE OR DRUM WASH WATER IN A CONTAINED AREA DESIGNATED ON SITE.

SPILL CONTROL PRACTICES

IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION THE FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:

A. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.

B. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS WILL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST, AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE.

C. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.

D. THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.

E. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.

F. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM RECURRING AND HOW TO CLEANUP THE SPILL IF IT RECURS. A DESCRIPTION OF THE SPILL, ITS CAUSE, AND THE CLEANUP MEASURES WILL BE INCLUDED.

G. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY–TO–DAY SITE OPERATIONS WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.

DUST CONTROL

THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL METHODS SHALL INCLUDE, BUT NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

DIG SAFE
CALL 811 OR 1-888-DIG-SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE No. 14950
LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DR	CK

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

EROSION CONTROL NOTES

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

48 Constitution Drive
Bedford, NH 03110
Phone (603) 472–4488
Fax (603) 472–9747
www.tfmoran.com

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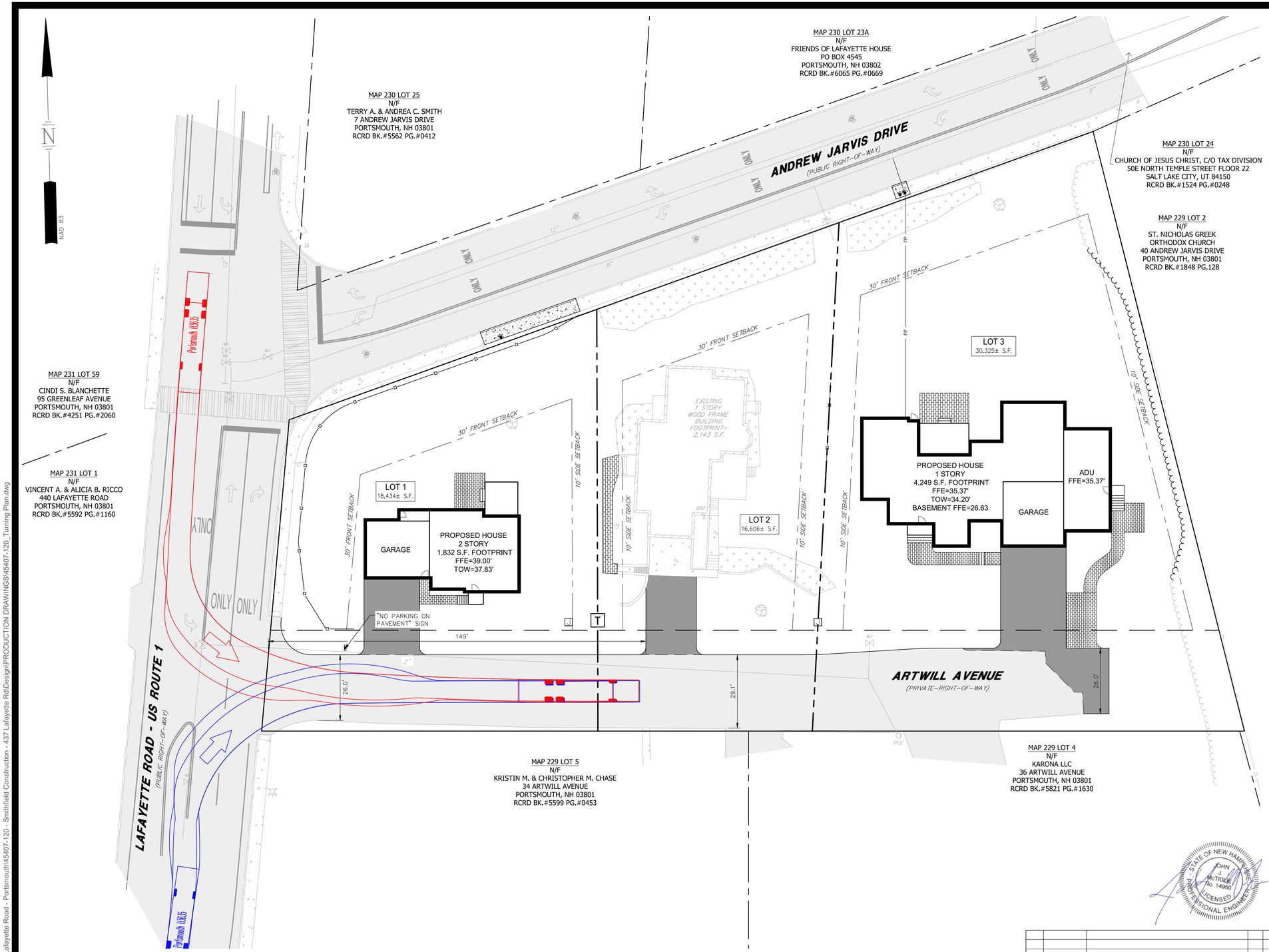

NOTES

1. PROPOSED HOUSE ON LOT #3 SHALL BE EQUIPPED WITH FIRE SPRINKLERS FOR FIRE SUPPRESSION.

HORIZONTAL SCALE 1"=20'
20 10 0 20

REV	DATE	DESCRIPTION	DR	CK

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

TRUCK TURNING PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34") **APRIL 19, 2022**

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE No. 14960 LICENSED PROFESSIONAL ENGINEER

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

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		CK	JCC	CADFILE	45407-120_TURNING PLAN	

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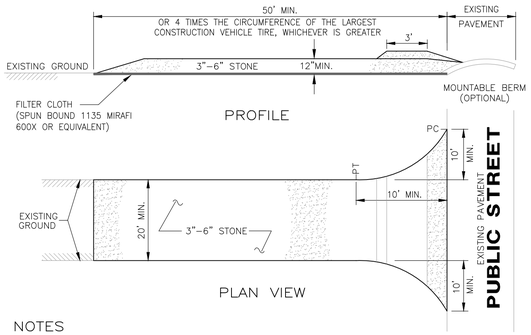
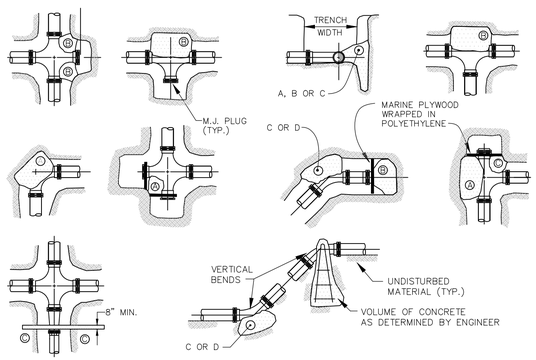


NOTES

1. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE SURFACE.
2. WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
3. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
4. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN STORM EVENT.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



NOTES

1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL, WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO PIPE JOINTS SHALL BE COVERED WITH CONCRETE.
2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
4. WHERE MECHANICAL JOINT PIPE IS USED, MECHANICAL JOINT PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
5. INSTALLATION AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE CITY/TOWN ESTABLISHED RULES AND PROCEDURES.

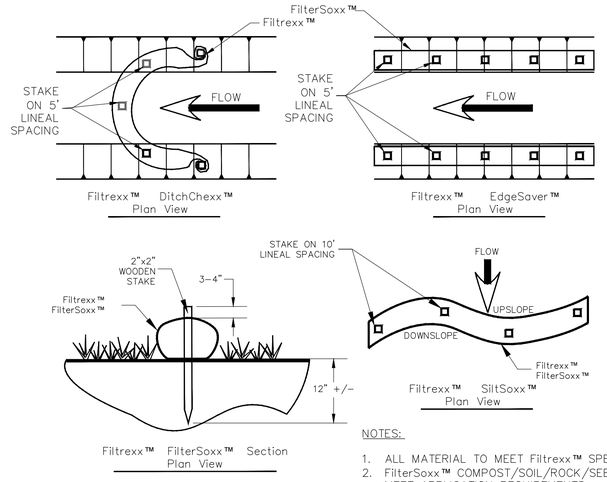
TEST PRESSURE = 200psi

SQUARE FEET OF CONCRETE THRUST BLOCKING BEARING ON UNDISTURBED MATERIAL

REACTION TYPE		PIPE SIZE 4"	6"	8"	10"	12"
A	90°	0.89	2.19	3.82	11.14	17.24
B	180°	0.65	1.55	2.78	8.38	12.00
C	45°	0.48	1.19	2.12	6.02	9.32
D	22-1/2°	0.25	0.60	1.06	3.08	4.74
E	11-1/4°	0.13	0.30	0.54	1.54	2.38

THRUST BLOCKS

NOT TO SCALE

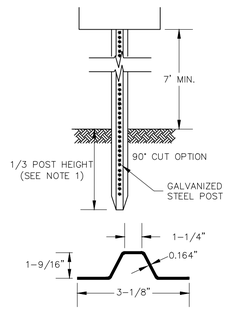


NOTES:

1. ALL MATERIAL TO MEET Filtrexx™ SPECIFICATIONS
2. FilterSoxx™ COMPOST/SOIL/ROCK/SEED FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.
4. SIZE OF SOCK TO BE PER MANUFACTURER'S SPECIFICATIONS

FILTREXX™ FILTERSOXX™ STAKING

NOT TO SCALE

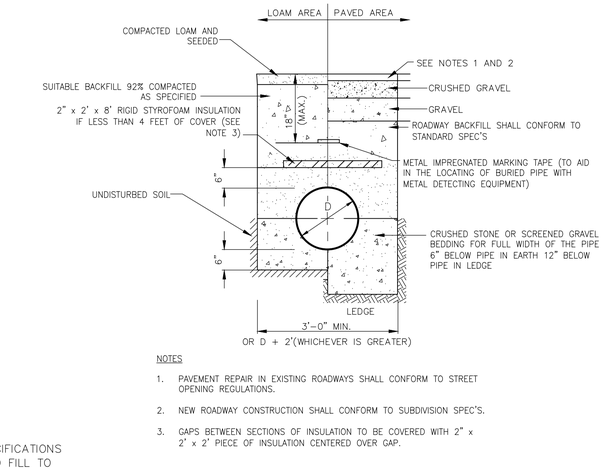


LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 – 1080)
FINISH: SHALL BE PAINTED WITH 2 COATS OF AN APPROVED MEDIUM GREEN BAKED-ON OR AIR-DRIED PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

NOTE:
1. WHERE LEDGE APPLICATION EXISTS, DRILL & GROUT TO A MINIMUM OF 2'.
2. ALL SIGNAGE SHALL FOLLOW THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES STANDARDS AND NHDOT STANDARDS.
3. SIGN, HARDWARE, AND INSTALLATION SHALL CONFORM TO THE LATEST NHDOT STANDARD SPECIFICATIONS.

SIGN POST

NOT TO SCALE

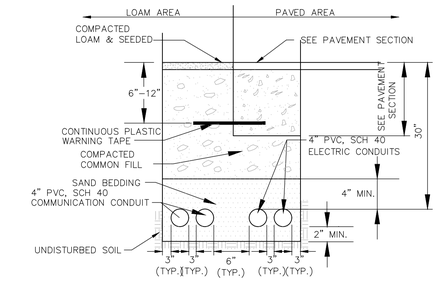


NOTES

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPEC'S.
3. GAPS BETWEEN SECTIONS OF INSULATION TO BE COVERED WITH 2" x 2' x 2' PIECE OF INSULATION CENTERED OVER GAP.

SEWER TRENCH WITH OPTIONAL INSULATION

NOT TO SCALE



NOTES

1. ELECTRIC SERVICE INSTALLATION AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL CODES.
2. COMMUNICATION SERVICE INSTALLATION SHALL MEET ALL CONSTRUCTION REQUIREMENTS.
3. ACTUAL NUMBER OF CONDUITS TO BE DETERMINED BY RESPECTIVE COMPANIES.
4. VERIFY INSTALLATION REQUIREMENTS WITH RESPECTIVE COMPANIES.

ELECTRIC/COMMUNICATIONS CONDUIT

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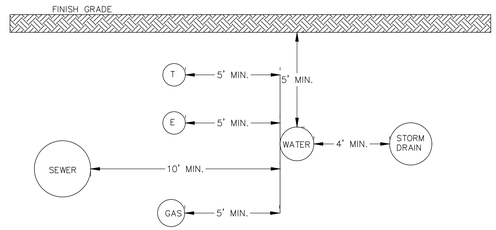

TYPICAL UTILITY SEPARATION DETAIL

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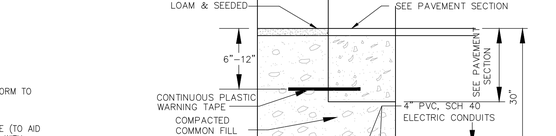

PAVEMENT SAWCUT

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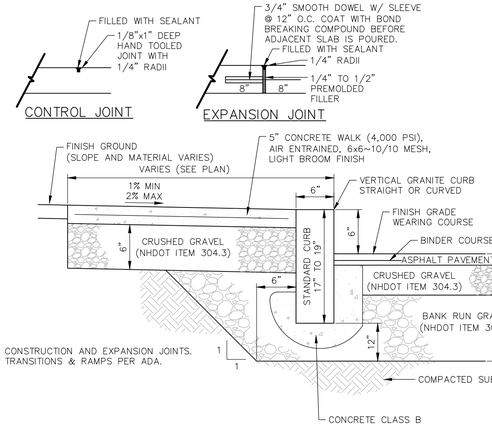
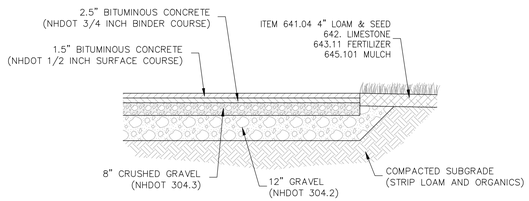


NOTES:
1. PROVIDE CONSTRUCTION AND EXPANSION JOINTS.
2. PROVIDE TRANSITIONS & RAMPS PER ADA.

CONCRETE SIDEWALK WITH VERTICAL GRANITE CURB

NOT TO SCALE



PAVEMENT SECTION/LOAM & SEED DETAIL

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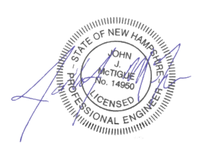

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

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Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
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Bedford, NH 03110
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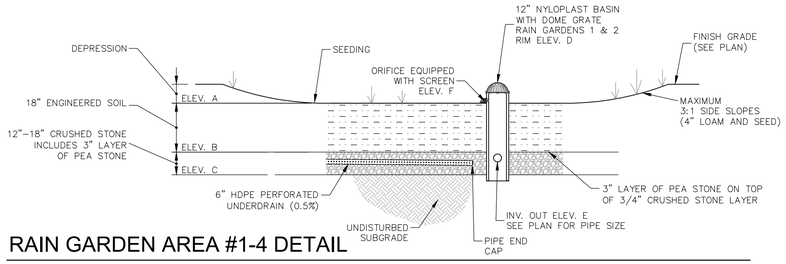
www.tfmoran.com

FILE 45407-120 | DR JSM | CK JCC | FB | CADFILE 45407-120_DETAILS | C-10



RAIN GARDEN AREA #1-4 DETAIL

NOT TO SCALE

SEEDING

1. USE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR MOIST SITES BY NEW ENGLAND WETLAND PLANTS, INC. OR EQUIVALENT.
2. SEED AT A RATE OF 1LB/1250SF. APPLY TO BARE SOIL. LIGHTLY MULCH WITH CLEAN WEED FREE STRAW.

	ELEV.			
	RG #1	RG #2	RG #3	RG #4
A	35.50	32.50	29.50	33.50
B	34.00	31.00	28.00	32.00
C	32.58	29.58	26.58	30.58
D	35.85	32.85	29.90	33.85
E*	32.83	29.33	28.00	31.50
F	35.75 1" ORIFICE	32.75 1" ORIFICE	29.83 1" ORIFICE	33.75 1" ORIFICE

* SEE GRADING AND DRAINAGE PLAN FOR CULVERT SIZES.

RAIN GARDEN CONSTRUCTION

1. CLEAR AND GRUB THE AREA WHERE THE RAIN GARDEN AREAS ARE TO BE LOCATED. STOCKPILE LOAM FOR REUSE ON SLOPES.
2. GRADE RAIN GARDEN AREAS ACCORDING TO PLAN AND DETAILS. SIDE SLOPES SHALL HAVE 4" LOAM AND SEED AND A SLOPE NOT TO EXCEED 3:1. BOTTOM OF RAIN GARDEN AREAS TO BE CONSTRUCTED WITH MANUFACTURED SOIL (SEE RAIN GARDEN CONSTRUCTION DETAIL). SPECIFIC PLANTINGS SHALL BE PLACED IN THE FACILITY ACCORDING TO THE LANDSCAPE PLAN PLANTING DETAIL.
3. RAIN GARDEN SOIL MIXTURE SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES EXCLUDING MULCH. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE RAIN GARDEN AREA THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVIDE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATION.
4. THE USDA TEXTURAL CLASSIFICATION OF THE SANDY SOIL SHALL BE LOAMY SAND OR SANDY LOAM.
5. THE ENGINEERED SOIL – SEE ENGINEERED SOIL MIX NOTES.
   A. SOILS TO BE TESTED AND APPROVED BY THE ENGINEER OF RECORD. ENGINEER SHALL SUBMIT LETTER OF VERIFICATION TO THE CITY.
9. THE CONTRACTOR SHALL TAKE MEASURES TO PREVENT EQUIPMENT & VEHICLE TRAFFIC FROM DRIVING IN THE AREA OF THE PROPOSED RAIN GARDEN AREA DURING CONSTRUCTION.
10. AFTER THE BASIN IS EXCAVATED TO THE FINAL DESIGN ELEVATION, THE FLOOR SHOULD BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW TO RESTORE INFILTRATION RATES. THE BASIN BOTTOM SHOULD BE LEVELED PRIOR TO BACKFILLING WITH CRUSHED STONE AND RAIN GARDEN SOIL MIXTURE.
11. AASHTO #57 STONE CAN BE USED IN PLACE OF 3/4" CRUSHED STONE.

RAIN GARDEN MAINTENANCE

MAINTENANCE SCHEDULE TO BEGIN AFTER CONSTRUCTION IS FINISHED AND BASIN STABILIZATION IS COMPLETE.

1. CONTRACTOR AND LAND OWNERS TO PERFORM SCHEDULED MAINTENANCE ON THE RAIN GARDENS.
2. REGULAR WATERING DURING THE FIRST FEW WEEKS AFTER PLANTING AND DURING HOT, DRY SPELLS, ESPECIALLY IN THE FIRST TWO YEARS AFTER PLANTING. AFTER THE FIRST TWO YEARS AND ONCE PLANTS ARE ESTABLISHED, WATERING SHOULD ONLY BE NECESSARY DURING DROUGHT CONDITIONS.
3. FOR THE FIRST YEAR, FREQUENT AND AGGRESSIVE WEEDING MONTHLY DURING GROWING SEASON. REMOVE ONLY INVASIVE SPECIES.
4. TWICE PER YEAR, INSPECT SPILLWAYS AND REMOVE ANY ACCUMULATED DEBRIS OR SEDIMENT TO ENSURE PROPER FUNCTIONALITY.
5. ONCE A YEAR TRIM AND PRUNE EXCESS VEGETATION. DEAD, DYING, DISEASED, OR HAZARDOUS BRANCHES SHOULD BE TRIMMED AND REMOVED AS THEY OCCUR.
6. ONCE A YEAR INSPECT RAIN GARDEN FOR DEAD OR DYING VEGETATION. REPLACE VEGETATION AS NEEDED. NEW PLANTS SHOULD BE PLACED IN THE SAME LOCATION AS THE OLD PLANT, OR AS NEAR AS POSSIBLE TO THE OLD LOCATION. NEW PLANTS SHOULD BE THE NATIVE AND SAME OR EQUIVALENT VARIETY.
7. DO NOT MOW GARDEN.
8. ONCE A YEAR, INSPECT BOTTOM OF RAIN GARDEN. MAINTAIN A 2–3" LAYER OF MULCH. REPLACE AS REQUIRED.
9. DURING INSPECTIONS, REMOVE ANY TRASH, ACCUMULATED DEBRIS OR SEDIMENT.
10. ONCE A YEAR INSPECT BERM FOR SETTLING. ADD COMPACTED SOIL AND REPLANT AS NEEDED.
11. ONCE A YEAR IN THE FALL THE SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME AFTER A RAINFALL EVENT THAT EXCEEDS 1.0 INCHES IN A 24–HOUR PERIOD. THE SYSTEM SHOULD BE CHECKED TO CONFIRM THAT IT COMPLETELY DRAINS IN 72–HOUR AFTER THE RAINFALL EVENT. IF THE GARDEN DOES NOT DRAIN, A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION OR INFILTRATION FUNCTIONS, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS.
12. ONCE A YEAR TEST PLANTING BED FOR PH. IF THE PH IS BELOW 5.2, LIMESTONE SHOULD BE APPLIED. IF THE PH IS ABOVE 8.0, IRON SULFATE AND SULFUR SHOULD BE APPLIED.

ENGINEERED SOIL MIX

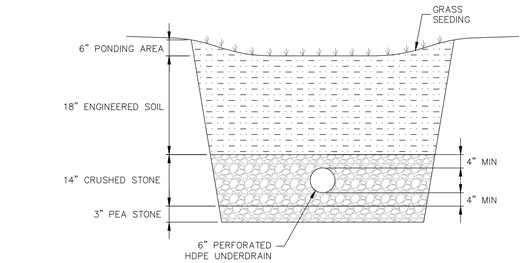
1. THE ENGINEERED SOIL IS MADE OF IS 10% WOOD CHIPS, 35% LOAM, AND 55% SAND.
2. LOAM SHALL MEET THE USDA TEXTURAL CLASSIFICATION OF LOAMY FINE SAND.
3. SAND SHALL BE CONCRETE SAND MEETING ASTM C–33 SPECIFICATION.
4. WOOD CHIPS SHALL BE SHREDDED WOOD, WOOD CHIPS, GROUND BARK, OR WOOD WASTE; OF UNIFORM TEXTURE AND FREE OF STONES, STICKS, SOIL, OR TOXIC MATERIALS
5. SOIL REACTION: PH OF 6 TO 7.
6. CEC OF TOTAL SOIL: MINIMUM 10 MEQ/100 ML AT PH OF 7.0.
7. BASIS–OF–DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS INDICATED ON DRAWINGS
8. BASIC PROPERTIES: MANUFACTURED SOIL SHALL NOT CONTAIN THE FOLLOWING:
   A. UNACCEPTABLE MATERIALS: CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, PLASTER, BUILDING DEBRIS, ASPHALT, BRICKS, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, ACID, SOLID WASTE, AND OTHER EXTRANEOUS MATERIALS THAT ARE HARMFUL TO PLANT GROWTH.
   B. UNSUITABLE MATERIALS: STONES, ROOTS, PLANTS, SOD, CLAY LUMPS, AND POCKETS OF COARSE SAND THAT EXCEED A COMBINED MAXIMUM OF 5 PERCENT BY DRY WEIGHT OF THE MANUFACTURED SOIL.
   C. LARGE MATERIALS: STONES, CLODS, ROOTS, CLAY LUMPS, AND POCKETS OF COARSE SAND EXCEEDING 0.187 INCHES (4.76 MM) IN ANY DIMENSION.

ENGINEERED SOIL MIX PARTICLE SIZE DISTRIBUTION (PSD)			
PSD UPPER LIMIT		PSD LOWER LIMIT	
SIEVE #	% Passing	SIEVE #	% PASSING
4	100	4	100
10	95	10	95
40	40	40	15
200	20	200	15
<200	5	<200	5

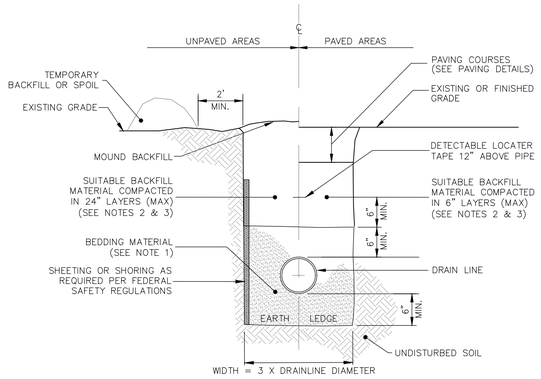
RAIN GARDEN INSPECTION SCHEDULE

1. RAIN GARDEN TO BE INSPECTED BY THE DESIGN ENGINEER FOR EACH STAGE OF CONSTRUCTION.
2. PHASES OF CONSTRUCTION BEING:
   A. EXCAVATION OF THE RAIN GARDEN BASIN, INCLUDING ROTOTILLING.
   B. INSTALLATION OF THE CRUSHED STONE
   C. INSTALLATION OF THE ENGINEERED SOIL
   D. INSTALLATION OF THE OUTLET STRUCTURE AND UNDERDRAIN IN THE OUTLET STONE TRENCHES
3. SAMPLE OF THE INDIVIDUAL COMPONENTS OF THE ENGINEERED SOIL TO BE PROVIDED AND APPROVED PRIOR BEING COMBINED AND INSTALLED. SAMPLE CRUSHED STONE TO BE PROVIDED AND APPROVED PRIOR TO INSTALLATION.
4. ENGINEER TO VERIFY MIX RATIO OF ENGINEERED SOIL MIX.

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION



RAIN GARDEN TYPICAL SECTION



NOTES

1. BEDDING – BEDDING FOR PIPES SHALL CONSIST OF PREPARING THE BOTTOM OF THE TRENCH TO SUPPORT THE ENTIRE LENGTH OF THE PIPE AT A UNIFORM SLOPE AND ALIGNMENT. CRUSHED STONE SHALL BE USED TO BED THE PIPE TO THE ELEVATION SHOWN ON THE DRAWINGS. NORMAL PIPE BEDDING IS CRUSHED STONE TO THE HAUNCH OF THE PIPE AND SAND BEDDING 6" ABOVE THE CROWN. IF THE TOP OF THE PIPE IS LESS THAN 30" FROM FINISH GRADE, BED PIPE COMPLETELY IN STONE UP TO 6" ABOVE PIPE CROWN. UNDERDRAIN TO HAVE 4" MINIMUM OF STONE OVER PIPE OR AS NECESSARY TO BE IN CONTACT WITH GRAVEL LAYER OF SELECTS ABOVE.
2. COMPACTION – ALL BACKFILL SHALL BE COMPACTED AT OR NEAR OPTIMUM MOISTURE CONTENT BY PNEUMATIC TAMPERS, VIBRATORY COMPACTORS OR OTHER APPROVED MEANS. BACKFILL BENEATH PAVED SURFACES SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T99, METHOD C.
3. SUITABLE MATERIAL – IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ROCKS OVER 6" IN LARGEST DIMENSION; FROZEN EARTH AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.
4. BASE COURSE AND PAVEMENT – SHALL MEET THE REQUIREMENT OF THE NHDOT LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DIVISION 300 AND 400 RESPECTIVELY.

TRENCH FOR DRAIN LINE

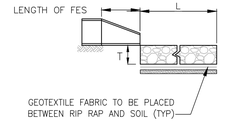
NOT TO SCALE

MAINTENANCE:

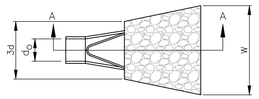
THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIP RAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

CONSTRUCTION SPECIFICATIONS:

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP RAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12".
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. ADD ANIMAL SCREEN TO FLARED END SECTION OUTLET.



SECTION A–A



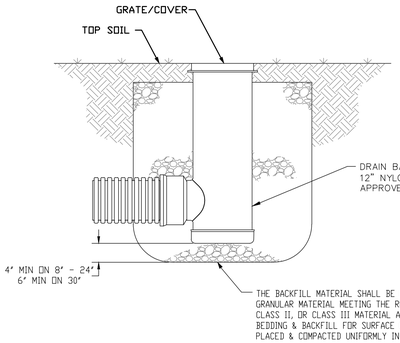
RIPRAP DIMENSIONS				
LOCATION	FES01	FES02	FES03	FES04
d50 STONE SIZE (IN)	6	6	6	6
L– LENGTH OF APRON (FT)	2	3	2	2
W–WIDTH OF APRON (FT)	2	3	2	2
T–DEPTH OF APRON (IN)	9	9	9	9

% OF WEIGHT SMALLER THAN THE GIVEN SIZE | SIZE OF STONE (INCHES)

100	9.00 TO 12.00
85	7.80 TO 10.80
50	6.00 TO 9.00
15	1.80 TO 3.00

RIP RAP AND FLARED END SECTION WITH OUTLET PROTECTION

NOT TO SCALE

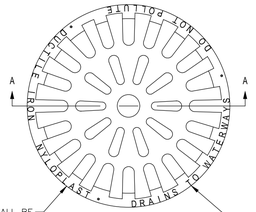


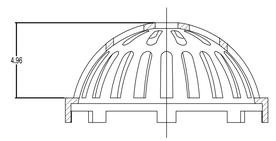
DRAIN BASIN NON-TRAFFIC INSTALLATION

NOT TO SCALE

1299CGD

APPROX. DRAIN AREA = 82.87 SQ IN
APPROX. WEIGHT = 18.50 LBS





SECTION A–A

DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70–50–05
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST

12" DOME GRATE

NOT TO SCALE

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

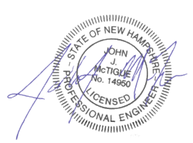
PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**



REV	DATE	DESCRIPTION	DR	CK

TFM
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Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
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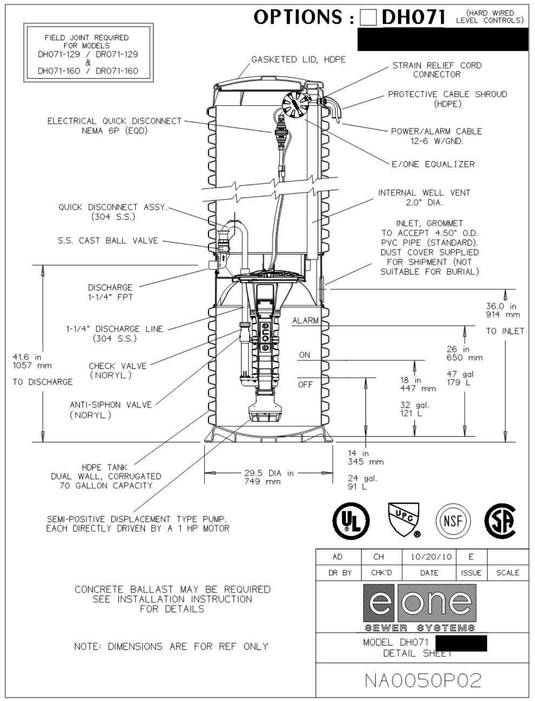
FILE	45407–120	DR	JSM	FB		C–11
		CK	JCC	CADFILE	45407–120_DETAILS	



AD	CH	10/20/10	E	
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

MODEL DH071 [redacted]
DETAIL SHEET

NA0050P02

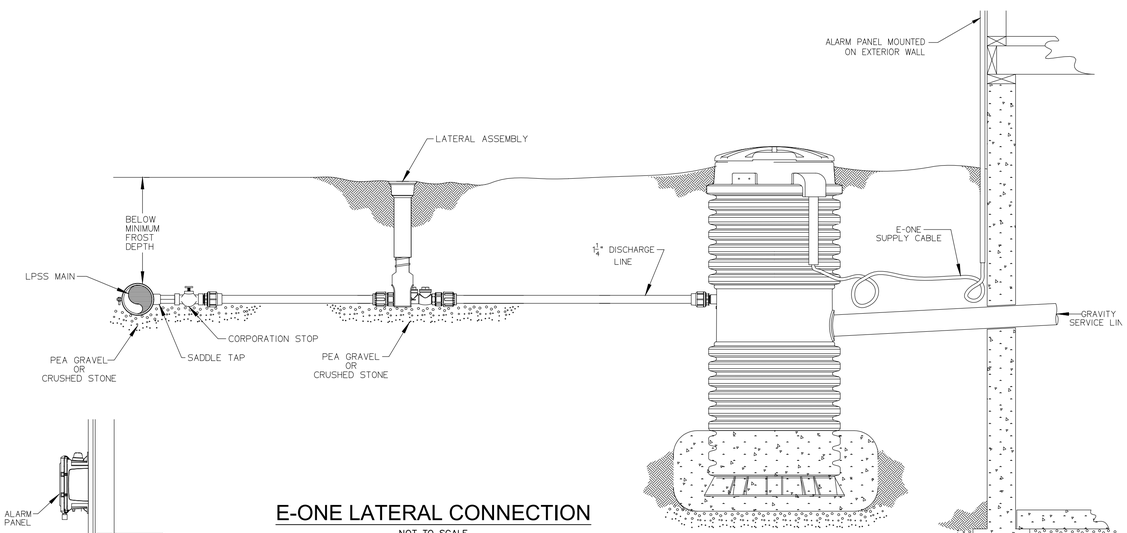
PRESSURE SEWER TESTING NOTES

1. PIPE AND JOINT MATERIALS:
   A. PRESSURE SEWERS SHALL BE CONSTRUCTED OF DUCTILE IRON (DI), HIGH DENSITY POLYETHYLENE (HDPE), OR PVC MATERIAL.
   B. PRESSURE SEWERS SHALL BE TREATED AS GRAVITY SEWERS FOR PURPOSES OF FOUNDATION BEDDING AND BACKFILL REQUIREMENTS.
   C. PVC PIPE USED PRESSURE SEWERS SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D2241 OR ASTM D1785 STANDARDS IN EFFECT WHEN THE PIPE IS MANUFACTURED.
   D. HDPE PIPE USED FOR PRESSURE SEWERS SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D3035 STANDARD IN EFFECT WHEN THE PIPE IS MANUFACTURED.
   E. IF DI PIPE IS USED IN AN ENVIRONMENT THAT COULD CAUSE CORROSION OR OTHER DETERIORATION OF OR DAMAGE TO AN IRON PIPE, OR OTHERWISE REDUCE THE TYPICAL LIFE EXPECTANCY OF THE PIPE, SUCH AS MAY OCCUR WITH CERTAIN SOIL TYPES, LOW PH LEVELS, OR WATER CONDITIONS, THE PIPE SHALL BE PROTECTED AGAINST CORROSION, SUCH AS WITH CATHODIC PROTECTION.
2. TESTING: THE COMPLETED SEWER SERVICE SHALL BE SUBJECTED TO A THIRD PARTY LEAKAGE TEST ANY OF THE FOLLOWING MANNERS: (PRIOR TO BACKFILLING) PRESSURE SEWERS SHALL BE TESTED IN ACCORDANCE WITH SECTION 5 OF THE AWWA C600, "INSTALLATION OF CAST IRON WATER MAINS AND THEIR APPURTENANCES"STANDARD IN EFFECT WHEN THE TEST IS CONDUCTED AT A PRESSURE EQUAL TO THE GREATER OF 150 PERCENT OF THE DESIGN OPERATING TOTAL DYNAMIC HEAD OR AT LEAST 100 PSI.
3. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.
4. JOINTS SHALL BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATER-TIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AS AT THE STREET SEWER WYE OR AT THE FOUNDATION WALL, APPROPRIATE MANUFACTURED ADAPTERS SHALL BE USED.
5. SEWER SERVICE INSTALLATION: THE PIPE SHALL BE HANDLED, PLACED AND JOINTED IN ACCORDANCE WITH INSTALLATION GUIDES OF THE APPROPRIATE MANUFACTURER. IT SHALL BE CAREFULLY BEDDED ON A 6 INCH LAYER OF CRUSHED STONE AND/OR GRAVEL AS SPECIFIED IN NOTE 11. BEDDING AND RE-FILL FOR DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED BY HAND OR WITH APPROPRIATE MECHANICAL DEVICES.
6. PIPE JOINTS MUST BE MADE UNDER DRY CONDITIONS. IF WATER IS PRESENT, ALL NECESSARY STEPS SHALL BE TAKEN TO DEWATER THE TRENCH.
7. THE CENTERLINE OF ALL BUILDING CONNECTIONS SHALL ENTER THE TOP HALF OF THE SEWER.
8. ILLEGAL CONNECTIONS: NOTHING BUT SANITARY WASTE FLOW FROM TOILETS, SINKS, LAUNDRY ETC. SHALL BE PERMITTED. ROOF LEADERS, FOOTING DRAINS, SUMP PUMPS OR OTHER SIMILAR CONNECTIONS CARRYING RAIN WATER, DRAINAGE OR GROUND WATER SHALL NOT BE PERMITTED.
9. PRESSURE SEWERAGE SHALL HAVE AN ISOLATION VALVE OR CURB STOP VALVE INSTALLED AT THE PROPERTY LINE / LIMITED COMMON AREA. IF A CHECK VALVE IS USED AT THE PROPERTY LINE, THE VALVE SHALL BE INSTALLED WITHIN A VAULT TO FACILITATE MAINTENANCE.
10. WATER SERVICE SHALL NOT BE LAID IN SAME TRENCH AS SEWER SERVICE.
11. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATERIAL AND MEETING ASTM C33/C33M STONE SIZE 67 AND FREE FROM CLAY, LOAM AND ORGANNIC MATTER. THE EXCAVATION SHALL BE PROPERLY DEWATERED WHILE PLACING BEDDING MATERIAL AND SETTING OF THE BASE OR POURING CONCRETE.

100% PASSING	1 INCH SCREEN
90%-100% PASSING	3/4 INCH SCREEN
20%-55% PASSING	3/8 INCH SCREEN
0%-10% PASSING	#4 SIEVE
0%-5% PASSING	#8 SIEVE

WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, SCREENED GRAVEL OR CRUSHED STONE 1/2 INCH TO 1 1/2 INCH SHALL BE USED.

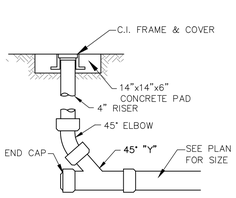
12. LOCATION: THE LOCATION OF THE TEE OR WYE SHALL BE RECORDED AND FILED IN THE MUNICIPAL RECORDS.
13. INTERNAL STEPS IN MANHOLES ARE PROHIBITED PER PORTSMOUTH DPW STANDARDS.



E-ONE LATERAL CONNECTION

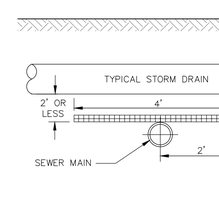
NOT TO SCALE

environment one CORPORATION

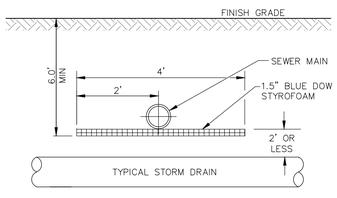


SEWER CLEAN OUT

NOT TO SCALE



CONDITION I

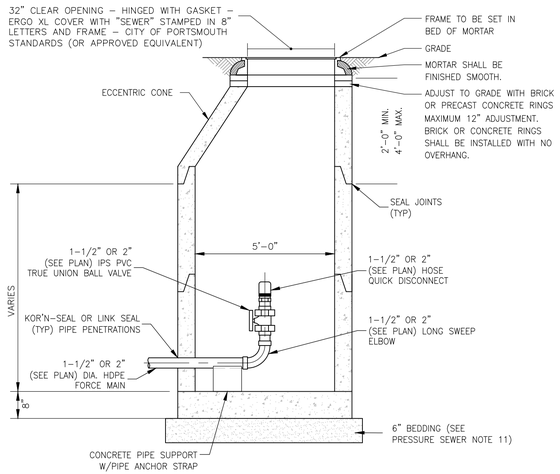


CONDITION II

NOTES:
1. THE LENGTH OR WIDTH OF INSULATION SHALL EXTEND 1 STORM DRAIN PIPE DIAMETER BEYOND THE EDGE OF STORM DRAIN PIPE IN EACH DIRECTION OR A MINIMUM OF 2' BEYOND THE CENTERLINE OF THE STORM DRAIN PIPE, WHICHEVER IS GREATER.
2. ALL BUTT JOINT SEAMS TO BE OVERLAPPED WITH A 1' PIECE OF INSULATION CENTERED OVER SEAM.
3. 18" VERTICAL CLEARANCE SHALL BE PROVIDED BETWEEN WATER MAIN/SERVICES AND SEWER MAIN/SERVICES, WATER OVER SEWER.

INSULATION AT STORM DRAIN & SEWER MAIN CROSSINGS

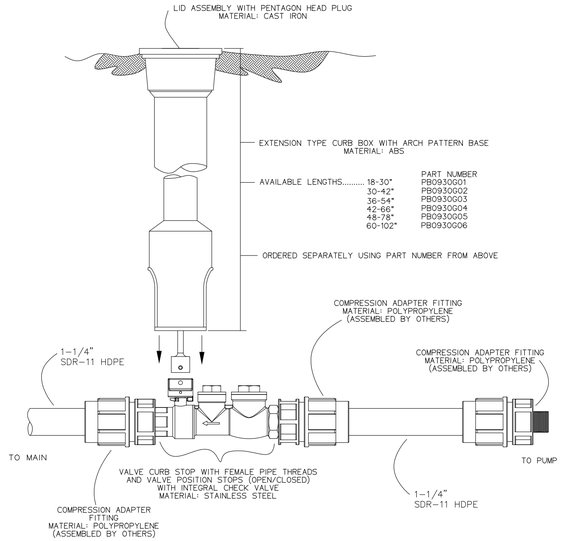
NOT TO SCALE



E-ONE TERMINAL FLUSHING MANHOLE

NOT TO SCALE

NOTES:
1. MANHOLE FRAME & GRATE SHALL BE NEENAH R-3589-A OR APPROVED EQUAL.
2. ALL COMPONENTS SHALL BE DESIGNED FOR HS-20 LOADING.
3. REINFORCING SHALL CONFORM TO ASTM 185 OR ASTM 1497 & ASTM A615, GRADE 60.
4. ALL CONCRETE SHALL BE NHDOT CLASS A.
5. LARGER DIAMETER STRUCTURES SHALL BE USED AS REQUIRED DUE TO NUMBER, ORIENTATION OR SIZE OF PIPES AT THE STRUCTURE.
6. "CL" USED AT ALL LOCATIONS WITHOUT CURB AND "C" TO BE USED AT ALL TO NUMBER, SIZE OR ORIENTATION OF PIPES AT THE BASIN.
7. ALL CASTINGS SHALL BE MADE IN THE USA.
8. INSTALL PIPE SUPPORTS ON THE SWEEP ELBOW.
9. ALL PIPE FITTINGS ARE TO BE RESTRAINED JOINT STYLE.
   A. HDPE TO BE FUSION, ELECTROFUSION OR MECHANICAL JOINT.
   B. PVC WOULD BE SOLVENT GLUE.
   C. ALL JOINTS TO BE THREADED AND PRESSURE RATED TO 200 PSI
10. MANHOLE STRUCTURES SHALL MEET THE DESIGN REQUIREMENTS OF ENV-WQ 704.12 THROUGH ENV-WQ 704.17.
11. A.R.I. D-025 STAINLESS STEEL AIR RELEASE VALVE OR EQUIVALENT.



NOTES:
1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS
   *FOR SS FITTING INTO SS THREAD, USE EITHER PIPE DOPE OR TEFLON TAPE, NOT BOTH
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC0193G02
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

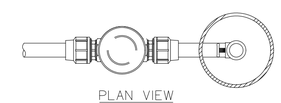
KIT PARTS ARE NOT ASSEMBLED

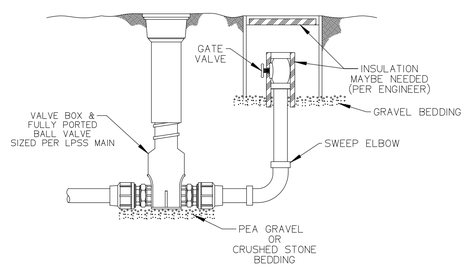
SGS	DN	11/02/11	B	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

STAINLESS STEEL LATERAL KIT
1-1/2" SDR 11 HDPE PIPE

NA0330P03





E-ONE TERMINAL FLUSHING CONNECTION

NOT TO SCALE

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: AS SHOWN **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK
1	5/23/2022	ADDED PRESSURE SEWER TESTING NOTES.	JSM	JJM

TFM © Civil Engineers, Structural Engineers, Traffic Engineers, Land Surveyors, Landscape Architects, Scientists
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FILE	45407-120	DR	JSM	FB		C-12
		CK	JCC	CADFILE	45407-120_DETAILS	

DIG SAFE — CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

May 23, 2022 - 4:07pm
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SEWER SERVICE NOTES

1. MINIMUM SIZE PIPE FOR SEWER SERVICE SHALL BE FOUR INCHES.

2. PIPE AND JOINT MATERIALS:
   A. PLASTIC SEWER PIPE
      1. PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:

ASTM STANDARDS	GENERIC PIPE MATERIAL	SIZES APPROVED
D3034	*PVC (SOLID WALL)	8" THROUGH 15" (SDR 35)
F679	PVC (SOLID WALL)	18" THROUGH 27" (T-1 & T-2)
F789	PVC (SOLID WALL)	4" THROUGH 18" (T-1 TO T-3)
F794	PVC (RIBBED WALL)	8" THROUGH 36"
D2680	*ABS (COMPOSITES WALL)	8" THROUGH 15"

*PVC: POLY VINYL CHLORIDE
*ABS: ACRYLONITRILE-BUTADIENE-STYRENE

      2. JOINTS SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D-3212 AND SHALL BE PUSH-ON, BELL AND SPIGOT TYPE.

         ABS TRUSS PIPE AND FITTINGS SHALL CONFORM TO ASTM D-2680, POLYMER COMPOUNDING SHALL BE TO ASTM D-1788 (CLASS 322).

         JOINTS FOR ABS TRUSS PIPE SHALL BE CHEMICAL WELDED COUPLINGS TYPE SC IN ACCORDANCE WITH ASTM D-2680, FORMING A CHEMICAL WELDED JOINT.

   B. DUCTILE-IRON PIPE, FITTINGS AND JOINTS.

      1. DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE UNITED STATES OF AMERICA STANDARDS INSTITUTE:
         A21.50 THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A-536 DUCTILE IRON CASTINGS.
         A21.51 DUCTILE IRON PIPE, CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS FOR WATER OR OTHER LIQUIDS.
      2. JOINTS SHALL BE OF THE MECHANICAL OR PUSH-ON TYPE. JOINTS AND GASKETS SHALL CONFORM TO:
         A21.11 RUBBER GASKETS JOINTS FOR CAST IRON PRESSURE PIPE & FITTINGS

3. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.

4. JOINTS SHALL BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATER-TIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AS AT THE STREET SEWER WYE OR AT THE FOUNDATION WALL, APPROPRIATE MANUFACTURED ADAPTERS SHALL BE USED.

5. TEES AND WYES: WHERE A TEE OR WYE IS NOT AVAILABLE IN THE EXISTING STREET SEWER, AN APPROPRIATE CONNECTION SHALL BE MADE, FOLLOWING MANUFACTURERS' INSTRUCTIONS USING A BOLTED, CLAMPED OR EPOXY-CEMENTED SADDLE TAPPED INTO A SMOOTHLY DRILLED OR SAWN OPENING IN THE SEWER. THE PRACTICE OF BREAKING AN OPENING WITH A SLEDGE HAMMER, STUFFING CLOTH OR OTHER SUCH MATERIAL AROUND THE JOINT, OR APPLYING MORTAR TO HOLD THE CONNECTION, AND ANY OTHER SIMILAR CRUDE PRACTICES OR INEPT OR HASTY IMPROVISATIONS WILL NOT BE PERMITTED. THE CONNECTION SHALL BE CONCRETE ENCASED AS SHOWN IN THE DETAIL UP TO AND INCLUDING 15" DIAMETER.

6. SEWER SERVICE INSTALLATION: THE PIPE SHALL BE HANDLED, PLACED AND JOINTED IN ACCORDANCE WITH INSTALLATION GUIDES OF THE APPROPRIATE MANUFACTURER. IT SHALL BE CAREFULLY BEDDED ON A 6 INCH LAYER OF CRUSHED STONE AND/OR GRAVEL AS SPECIFIED IN NOTE 10. BEDDING AND RE-FILL FOR DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED BY HAND OR WITH APPROPRIATE MECHANICAL DEVICES.

   THE PIPE SHALL BE LAID AT A CONTINUOUS AND CONSTANT GRADE FROM THE STREET SEWER CONNECTION TO THE FOUNDATION AT A GRADE OF NOT LESS THAN 1/4" INCH PER FOOT. PIPE JOINTS MUST BE MADE UNDER DRY CONDITIONS. IF WATER IS PRESENT, ALL NECESSARY STEPS SHALL BE TAKEN TO DEWATER THE TRENCH.

7. TESTING: THE COMPLETED SEWER SERVICE SHALL BE SUBJECTED TO A THIRD PARTY LEAKAGE TEST IN ANY OF THE FOLLOWING MANNERS: (PRIOR TO BACKFILLING)

   A. AN OBSERVATION TEE SHALL BE INSTALLED AS SHOWN AND WHEN READY FOR TESTING, AN INFLATABLE BLADDER OR PLUG SHALL BE INSERTED JUST UPSTREAM FROM THE OPENING IN THE TEE. AFTER INFLATION, WATER SHALL BE INTRODUCED INTO THE SYSTEM ABOVE THE PLUG TO A HEIGHT OF 5 FEET ABOVE THE LEVEL OF THE PLUG.

   B. THE PIPE SHALL BE LEFT EXPOSED AND LIBERALLY HOSED WITH WATER, TO SIMULATE, AS NEARLY AS POSSIBLE, WET TRENCH CONDITIONS OR, IF TRENCH IS WET, THE GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. INSPECTIONS FOR LEAKS SHALL BE MADE THROUGH THE CLEANOUT WITH A FLASHLIGHT.

   C. DRY FLUORESCENE DYE SHALL BE SPRINKLED INTO THE TRENCH OVER THE PIPE. IF THE TRENCH IS DRY, THE PIPE SHALL BE LIBERALLY HOSED WITH WATER, OR IF THE TRENCH IS WET, GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. OBSERVATION FOR LEAKS SHALL BE MADE IN THE FIRST DOWN-STREAM MANHOLE.

   LEAKAGE OBSERVED IN ANY ONE OF THE ABOVE ALTERNATE TESTS SHALL BE CAUSE FOR NON-ACCEPTANCE AND THE PIPE SHALL BE DUG-UP IF NECESSARY AND RE-LAID SO AS TO ASSURE WATER TIGHTNESS.

8. ILLEGAL CONNECTIONS: NOTHING BUT SANITARY WASTE FLOW FROM TOILETS, SINKS, LAUNDRY ETC. SHALL BE PERMITTED. ROOF LEADERS, FOOTING DRAINS, SUMP PUMPS OR OTHER SIMILAR CONNECTIONS CARRYING RAIN WATER, DRAINAGE OR GROUND WATER SHALL NOT BE PERMITTED.

9. WATER SERVICE SHALL NOT BE LAID IN SAME TRENCH AS SEWER SERVICE.

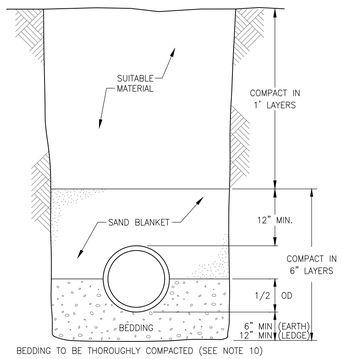
10. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATERIAL AND MEETING ASTM C33-67.

100% PASSING	1 INCH SCREEN
90%-100% PASSING	3/4 INCH SCREEN
20%-55% PASSING	3/8 INCH SCREEN
0%-10% PASSING	#4 SIEVE
0%-5% PASSING	#8 SIEVE

   WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, SCREENED GRAVEL OR CRUSHED STONE 1/2 INCH TO 1 1/2 INCH SHALL BE USED.

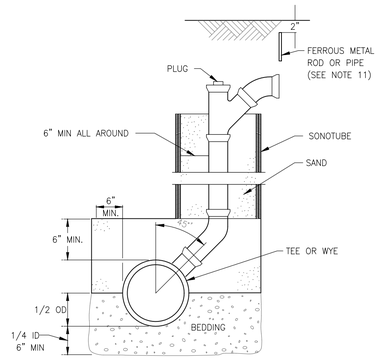
11. LOCATION: THE LOCATION OF THE TEE OR WYE SHALL BE RECORDED AND FILED IN THE MUNICIPAL RECORDS. IN ADDITION, A FERROUS METAL ROD OR PIPE SHALL BE PLACED OVER THE TEE OR WYE AS DESCRIBED IN THE TYPICAL "CHIMNEY" DETAIL, TO AID IN LOCATING THE BURIED PIPE WITH A DIP NEEDLE OR PIPEFINDER.

12. CHIMNEYS: IF VERTICAL DROP INTO SEWER IS GREATER THAN 4 FEET, A CHIMNEY SHALL BE CONSTRUCTED FOR THE SEWER CONNECTION. CHIMNEY INSTALLATION AS RECOMMENDED BY THE PIPE MANUFACTURER MAY BE USED IF APPROVED BY THE ENGINEER.



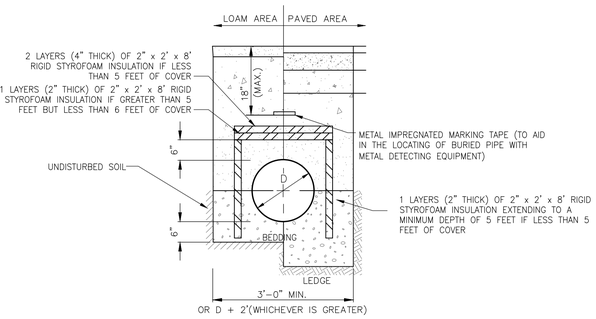
BEDDING TO BE THOROUGHLY COMPACTED (SEE NOTE 10)

TRENCH CROSS-SECTION
NOT TO SCALE



BACKFILLING TO BE BROUGHT UP EVENLY ON ALL SIDES.

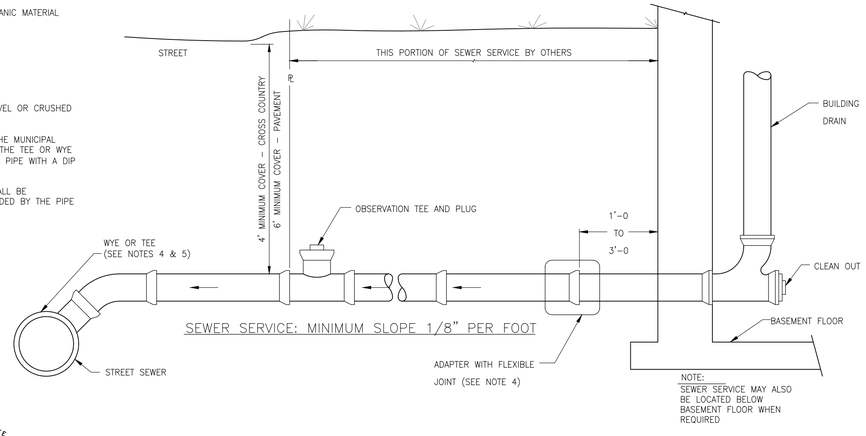
CHIMNEY (SEE NOTE 12)
NOT TO SCALE



NOTES

1. GAPS BETWEEN SECTIONS OF INSULATION TO BE COVERED WITH 2" x 2' x 2' PIECE OF INSULATION CENTERED OVER GAP.

SEWER TRENCH WITH INSULATION
NOT TO SCALE



NOTE:
SEWER SERVICE MAY ALSO BE LOCATED BELOW BASEMENT FLOOR WHEN REQUIRED

SEWER SERVICE DETAILS
NOT TO SCALE

GRAVITY SEWER NOTES

1. MINIMUM SIZE PIPE FOR GRAVITY SEWER SHALL BE 8-INCHES.

2. PIPE AND JOINT MATERIALS FOR PLASTIC SEWER PIPE SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:

ASTM STANDARDS	GENERIC PIPE MATERIAL	SIZES APPROVED
D3034-04a	* PVC (SOLID WALL)	8" THROUGH 15" (SDR 35)
F679-03	PVC (SOLID WALL)	18" THROUGH 27" (T-1 & T-2)
F794-03	PVC (RIBBED WALL)	8" THROUGH 36"
F1760-01(2005)e1	PVC, RECYCLED	ALL DIAMETERS

*PVC: POLY VINYL CHLORIDE

3. PLASTIC SEWER PIPE SHALL HAVE A PIPE STIFFNESS RATING OF AT LEAST 46 POUNDS PER SQUARE INCH AT 5 PERCENT PIPE DIAMETER DEFLECTION, AS MEASURED IN ACCORDANCE WITH ASTM D2412-02 DURING MANUFACTURE.

4. JOINTS SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D-3212-96(a)(2003)e1 AND SHALL BE PUSH-ON, BELL AND SPIGOT TYPE.

5. DUCTILE-IRON PIPE, FITTINGS AND JOINTS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE AMERICAN WATER WORKS ASSOCIATION (AWWA).

   AWWA C151/A21.51-02 THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A-536-84 (2004) DUCTILE IRON CASTINGS.

   AWWA C151/A21.51-02 DUCTILE IRON PIPE, CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS FOR WATER OR OTHER LIQUIDS.

   JOINTS SHALL BE OF THE MECHANICAL OR PUSH-ON TYPE. JOINTS AND GASKETS SHALL CONFORM TO AWWA C151/A21.11 RUBBER GASKETS JOINTS FOR CAST IRON PRESSURE PIPE & FITTINGS.

6. CONCRETE PIPE SHALL CONFORM TO AWWA C302-04.

7. PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS SHALL CONFORM TO AWWA C301-99.

   JOINTS SEALS FOR CONCRETE CYLINDER PIPE SHALL BE OIL RESISTANT ELASTOMERIC MATERIAL CONFORMING TO ASWWA C301-99 SPECIFICATIONS.

8. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.

9. GRAVITY SEWER PIPE TESTING SHALL BE AS FOLLOWS:

   ALL NEW GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.

   LOW PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH:

   ASTM F1417-92(2005) "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW PRESSURE AIR".

   UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, "LOW PRESSURE AIR TESTING OF INSTALLED SEWER PIPE".

10. ALL NEW GRAVITY SEWERS SHALL BE CLEANED AND VISUALLY INSPECTED AND SHALL BE TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE AND VISUALLY INSPECT USING LAMP TEST.

11. ALL PLASTIC SEWER PIPE SHALL BE DEFLECTION TESTED NOT LESS THAN 30 DAYS AND NO MORE THAN 90 DAYS FOLLOWING INSTALLATION.

12. THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5 PERCENT OF THE AVERAGE INSIDE DIAMETER.

13. TRENCH CONSTUCTION SHALL CONFORM TO THE FOLLOWING:

    SEWERS SHALL BE BURIED TO A MINIMUM DEPTH OF 6' BELOW GRADE IN ALL ROADWAY LOCATIONS AND TO A MINIMUM DEPTH OF 4 FEET BELOW GRADE IN ALL CROSS COUNTRY LOCATIONS.

    WHERE SEWER LINES CROSS WATER PIPES, A MINIMUM OF 18" VERTICAL SEPARATION BETWEEN THE TWO OUTSIDE PIPE WALLS SHALL BE OBSERVED. AT SEWER/WATER INTERSECTIONS, A MINIMUM OF 6 FEET SHALL BE PROVIDED FROM THE WATER LINE TO THE SEWER PIPE JOINT. 12" SEPARATION BETWEEN THE TWO OUTSIDE PIPE WALLS SHALL BE REQUIRED BETWEEN SEWER LINES AND ALL OTHER PIPES.

    TRENCH DIMENSIONS FOR SEWER PIPE LESS THAN 15 INCHES IN DIAMETER, THE ALLOWABLE TRENCH WIDTH AT A PLANE 12 INCHES ABOVE THE PIPE SHALL BE NO MORE THAN 36 INCHES AND FOR PIPE 15 INCHES AND LARGER, THE ALLOWABLE WIDTH SHALL BE EQUAL TO THE PIPES OUTSIDE DIAMETER PLUS 24 INCHES.

    PIPE TRENCH BEDDING MATERIAL AND FILL MATERIAL FOR EXCAVATION BELOW GRADE SHALL BE SCREENED GRAVEL OR CRUSHED STONE TO ASTM C33-03 STONE SIZE NO. 67. THE PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND FREE FROM ANY ORGANIC MATERIALS, GRADED SUCH THAT 100 PERCENT PASSED THE 1/2-INCH SIEVE AND A MAXIMUM OF 15 PERCENT PASSES A #200 SIEVE. IN LIEU OF A SAND BLANKET, A STONE ENVELOPE 6 INCHES THICK COMPLETELY AROUND THE PIPE USING 3/4-INCH STONE MAY BE USED.

    PIPE BEDDING MATERIAL SHALL EXTEND FROM A HORIZONTAL PLANE THROUGH THE PIPE AXIS TO 6-INCHES BELOW THE BOTTOM OF THE OUTSIDE SURFACE OF THE PIPE.

    PIPE SAND BLANKET MATERIAL SHALL COVER THE PIPE A MINIMUM OF 12 INCHES ABOVE THE CROWN OF THE OUTSIDE SURFACE.

    COMPACTION SHALL BE IN 12-INCH LAYERS FOR BEDDING AND BLANKET MATERIALS.

    BACKFILL MATERIAL SHALL BE IN 3-FOOT LAYERS TO THE GROUND SURFACE EXCEPT FOR ROAD CONSTRUCTION WHERE THE FINAL 3-FEET SHALL BE COMPACTED IN 12-INCH LAYERS TO THE ROAD BASE SURFACE.

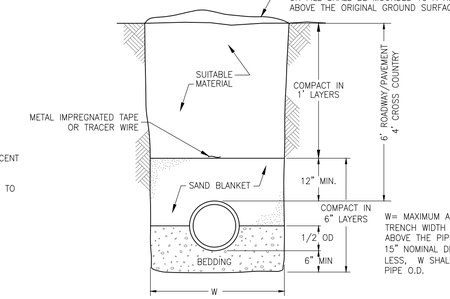
    TRENCH BACKFILL MATERIAL IN ROADWAY LOCATIONS SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION, EXCLUDING DEBRIS, PAVEMENT PIECES, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT, CLAY, EXCAVATED LEDGE, ROCKS OVER 6 INCHES IN THE LARGEST DIMENSION, OR ANY OTHER UNSUITABLE MATERIAL NOT APPROVED BY THE ENGINEER.

    TRENCH BACKFILL AT CROSS-COUNTRY LOCATIONS SHALL BE AS DESCRIBED ABOVE EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLE RECONSTRUCTION, WHEN NECESSARY WILL BE PRESERVED. BACKFILL SHALL BE MOUNDED 6-INCHES ABOVE ORIGINAL GROUND.

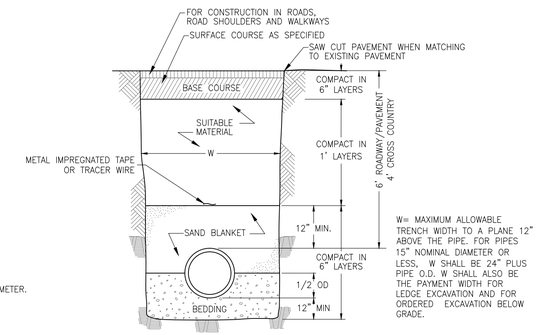
    BASE COURSE MATERIALS FOR TRENCH REPAIRS SHALL MEET THE REQUIREMENTS OF DIVISION 300 OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION.

    WHERE SHEETING IS PLACED ALONG SIDE OF THE PIPE AND EXTENDS BELOW MID-DIAMETER, THE SHEETING SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION NOT LESS THAN ONE FOOT ABOVE THE TOP OF THE PIPE AND AT LEAST 3 FEET BELOW FINISH GRADE.

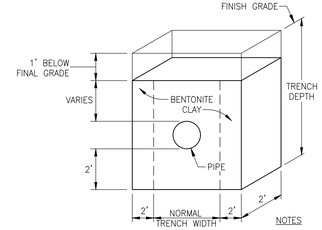
    TRENCHES FOR SEWER PIPES WITH SLOPES OVER 0.08 FEET PER FOOT AND TRENCHES FOR SEWER PIPES BELOW THE SEASONAL HIGH GROUND WATER LEVEL SHALL HAVE IMPERVIOUS TRENCH DAMS CONSTRUCTED EVERY 300 FEET TO PREVENT POTENTIAL DISTURBANCE TO PIPE BEDDING AND BLANKET MATERIALS.



EARTH CONSTRUCTION
NOT TO SCALE



LEDGE CONSTRUCTION
NOT TO SCALE



INSTALL AT CENTER OF EACH GRAVITY PIPE RUN

NOTES

1. DAM SHALL BE LOCATED EVERY 300' OF SEWER PIPE RUN.
2. NO FITTING SHALL BE LOCATED WITHIN 4' OF DAM.

SEWER TRENCH DAM
NOT TO SCALE

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

JOHN J. MCTIGUE No. 14950 — STATE OF NEW HAMPSHIRE — LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DR	CK

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

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PRT		DR	JSM	FB		
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DIG SAFE — CALL 811 OR 1-800-344-7233 — CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

GENERAL NOTES

1. IT IS THE INTENTION THAT THE MANHOLE, INCLUDING ALL COMPONENT PARTS, HAVE ADEQUATE SPACE, STRENGTH AND LEAKPROOF QUALITIES CONSIDERED NECESSARY FOR THE INTENDED SERVICE. SPACE REQUIREMENTS AND CONFIGURATIONS, SHALL BE AS SHOWN ON THE DRAWING. MANHOLES SHALL BE AN ASSEMBLY OF PRECAST SECTIONS, WITH STEEL REINFORCEMENT, WITH ADEQUATE JOINTING, OR CONCRETE CAST MONOLITHICALLY IN PLACE WITH REINFORCEMENT. IN ANY APPROVED MANHOLE, THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND LOADS OF 8 TONS (H-20 LOADING) WITHOUT FAILURE AND PREVENT LEAKAGE IN EXCESS OF ONE GALLON PER DAY PER VERTICAL FOOT OF MANHOLE, CONTINUOUSLY FOR THE LIFE OF THE STRUCTURE. A PERIOD GENERALLY IN EXCESS OF 25 YEARS IS TO BE UNDERSTOOD IN BOTH CASES.

2. BARRELS, CONE SECTIONS AND CONCRETE GRADE RINGS SHALL BE PRECAST REINFORCED CONCRETE AND SHALL CONFORM ENV-WQ 704.12 & 704.13.

3. PRECAST CONCRETE BARREL SECTIONS, CONES AND BASES SHALL CONFORM TO ASTM C478-06.

4. BASE SECTIONS SHALL BE OF MONOLITHIC CONSTRUCTION TO A POINT AT LEAST 6 INCHES ABOVE THE CROWN OF THE INCOMING PIPE.

5. MANHOLE CONE SECTIONS SHALL BE ECCENTRIC IN SHAPE.

6. ALL PRECAST SECTIONS AND BASES SHALL HAVE THE DATE OF MANUFACTURE AND THE NAME OR TRADEMARK OF THE MANUFACTURER IMPRESSED OR INDELIBLY MARKED ON THE INSIDE WALL.

7. ALL PRECAST SECTIONS AND BASES SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP-PROOFING COATING.

8. SHALLOW MANHOLE: IN LIEU OF A CONE SECTION, WHEN MANHOLE DEPTH IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER MAY BE USED HAVING AN ECCENTRIC ENTRANCE OPENING AND CAPABLE OF SUPPORTING H-20 LOADS.

9. HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF AN OVERLAPPING TYPE, SEALED FOR WATERTIGHTNESS USING A DOUBLE ROW OF AN ELASTOMERIC OR MASTIC-LIKE SEALANT. APPROVED ELASTOMERIC SEALANTS ARE:
   - SIKAFLEX-12-SL
   - SONNEBORN BUILING PRODUCTS-SONOLASTIC SL-1

10. THE MINIMUM INTERNAL DIAMETER OF MANHOLES SHALL BE 48 INCHES. FOR SEWERS LARGER THAN 24-INCH DIAMETER. MANHOLE DIAMETERS SHALL BE INCREASED SO AS TO PROVIDE AT LEAST 12-INCHES OF SHELF ON EACH SIDE OF THE SEWER.

11. LEAKAGE TEST SHALL BE PERFORMED IN ACCORDANCE TO ENV-WQ 704.17.

    (a) ALL MANHOLES SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST IN ACCORDANCE WITH THE ASTM C1244 STARNDARD IN EFFECT WHEN THE TESTING IS PERFORMED.

    (b) THE MANHOLE VACUUM TEST SHALL CONFORM TO THE FOLLOWING:

        1. THE INITIAL VACUUM GUAGE TEST PRESSURE SHALL BE 10 INCHES Hg.

        2. THE MINIMUM ACCEPTABLE TEST HOLD TIME FOR 1-INCH Hg PRESSURE DROP TO 9 INCHES SHALL BE:

            A. NOT LESS THAN 2 MINUTES FOR MANHOLES LESS THAN 10 FEET DEEP.

            B. NOT LESS THAN 2.5 MINUTES FOR MANHOLES 10 TO 15 FEET DEEP.

            C. NOT LESS THAN 3 MINUTES FOR MANHOLES MORE THAN 15 FEET DEEP.

    (c) THE MANHOLE SHALL BE REPAIRED AND RETESTED IF THE TEST HOLD TIMES FAIL TO ACHIEVE THE ACCEPTANCE LIMITS SPECIFIED IN (b) ABOVE.

    (d) INVERTS AND SHELVES SHALL NOT BE INSTALLED UNTIL AFTER SUCCESSFUL TESTING IS COMPLETE.

    (e) FOLLOWING COMPLETION OF THE LEAKAGE TEST, THE FRAME AND COVER SHALL BE PLACED ON TOP OF THE MANHOLE OR SOME OTHER MEANS USED TO PREVENT ACCIDENTAL ENTRY BY UNAUTHORIZED PERSONS, CHILDREN OR ANIMALS, UNTIL THE CONTRACTOR IS READY TO MAKE FINAL ADJUSTMENT TO GRADE.

12. BRICK MASONRY FOR SHELF, INVERT AND GRADE ADJUSTMENT SHALL COMPLY WITH ASTM C32-05, CLAY OR SHALE, FOR GRADE SS HARD BRICK.

13. MORTAR SHALL BE COMPOSED OF PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE:
    (a) 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
    (b) 4.5 PARTS SAND, 1 PART CEMENT AND 0.5 PART HYDRATED LIME

    CEMENT SHALL BE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C150-05. HYDRATED LIME SHALL BE TYPE S CONFORMING TO ASTM C207-06 "STANDARD SPECIFICATIONS FOR HYDRATED LIME FOR MASONRY PURPOSES". SAND SHALL CONSIST OF INERT NATURAL SAND CONFORMING TO ASTM C33-03 "STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES".

14. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED OR PRECAST CONCRETE SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF THE PIPE AND FLOW. AT CHANGES IN DIRECTIONS, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPE TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.

15. FRAMES AND COVERS: FRAMES AND COVERS: SEWER MANHOLE FRAMES AND COVERS SHALL BE CITY OF PORTSMOUTH STANDARD, AND SHALL BE PURCHASED AND PICKED UP AT PORTSMOUTH DEPARTMENT OF PUBLIC WORKS WATER DEPARTMENT. THEY SHALL BE OF HEAVY DUTY DESIGN, CLASS 30, CONFORMING TO ASTM A48/48M AND PROVIDE A 30-INCH CLEAR OPENING. THE CASTING SHALL BE OF EVEN GRAINED CAST IRON, SMOOTH, AND FREE FROM SCALE, LUMPS, BLISTERS, SAND HOLES AND DEFECTS. CONTACT SURFACES OF COVERS AND FRAMES SHALL BE MACHINED AT THE FOUNDRY TO PREVENT ROCKING OF COVERS IN ANY ORIENTATION.

16. BEDDING: PRECAST BASES SHALL BE PLACED ON A 6-INCH LAYER OF COMPACTED BEDDING MATERIAL THAT CONFORMS TO ASTM C33-03 NO. 67 STONE AND FREE FROM CLAY, LOAM AND ORGANNIC MATTER. THE EXCAVATION SHALL BE PROPERLY DEWATERED WHILE PLACING BEDDING MATERIAL AND SETTING OF THE BASE OR POURING CONCRETE. WATER-STOPS SHALL BE USED AT THE HORIZONTAL JOINT OF THE CAST-IN-PLACE MANHOLES.

100% PASSING	1" SCREEN
90-100% PASSING	3/4" SCREEN
20-55% PASSING	3/8" SCREEN
0-10% PASSING	#4 SIEVE
0-5% PASSING	#8 SIEVE

17. FLEXIBLE JOINT: A FLEXIBLE JOINT SHALL BE PROVIDED WIbHIN THE FOLLOWING DISTANCES FROM ANY MANHOLE CONNECTION: (a) WITHIN 48 INCHES FOR REINFORCED CONCRETE PIPE (RCP). (b) WITHIN 60 INCHES FOR PVC PIPE LARGER THAN 15" DIAMETER.

18. NO FLEXIBLE JOINT SHALL BE REQUIRED FOR DUCTILE IRON PIPE OR PVC PIPE UP THROUGH 15-INCH DIAMETER.

19. INTERNAL STEPS ARE PROHIBITED PER CITY OF PORTSMOUTH DPW STANDARDS.

20. REFERENCE NHDES ENV-WQ 700 IN PLACE OF ASTM STANDARDS.

21. PIPE TO MANHOLE JOINTS SHALL BE ONLY AS FOLLOWS:

    A. ELASTOMERIC, RUBBER SLEEVE WITH WATERTIGHT JOINTS AT THE MANHOLE OPENING AND PIPE SURFACES.

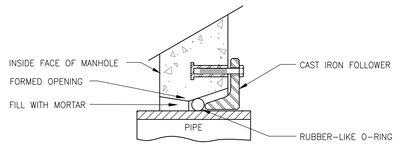
    B. CAST INTO WALL OR SECUREED WITH STAINLESS STEEL CLAMPS.

    C. ELASTOMERIC SEALING RING CAST IN THE MANHOLE OPENING WITH THE SEAL FORMED ON THE SURFACE OF THE PIPE BY COMPRESSION OF THE RING.

    D. NON-SHRINK GROUTED JOINTS WHERE WATERTIGHT BONDING TO THE MANHOLE AND PIPE CAN BE OBTAINED.

22. THE INVERT OF THE INCOMING PIPE SHALL BE NO MORE THAN 6 INCHES ABOVE THE OUTGOING PIPE UNLESS A DROP ENTRY IS USED.

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION



RES-SEAL
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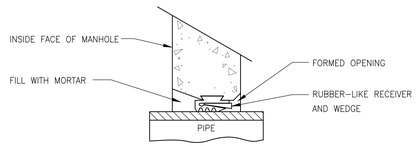

PRESS-WEDGE II
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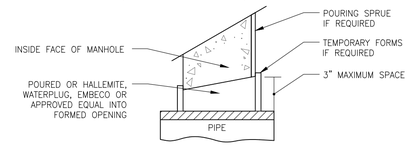

MORTARED JOINT
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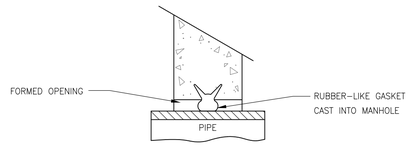
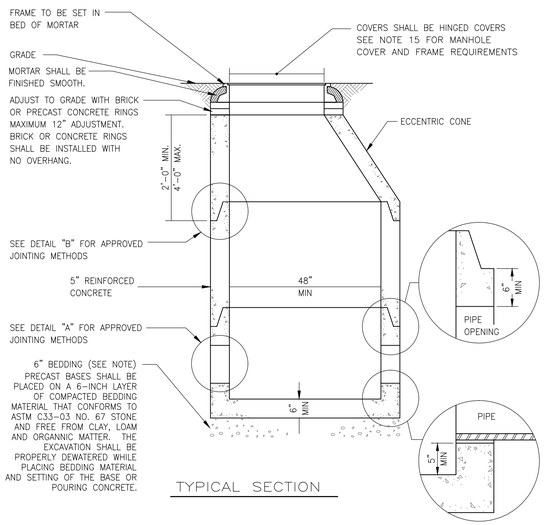


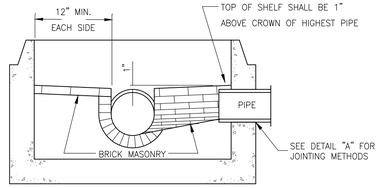
A-LOK
(OR ACCEPTABLE SUBSTITUTE)



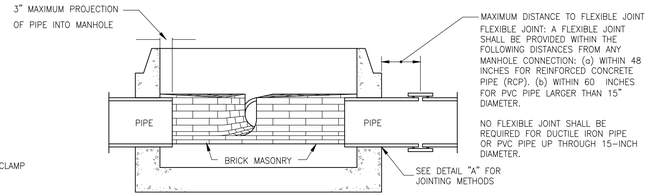
TYPICAL SECTION

NOTES:

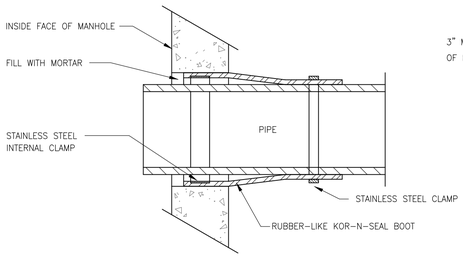
1. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST.
2. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT. INVERT BRICKS SHALL BE LAID ON EDGE.
3. BASE SECTION TO BE FULL WALL THICKNESS AND MONOLITHIC TO A POINT 6" ABOVE THE PIPE CROWN.
4. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.
5. NO STEPS ARE ALLOWED PER EXETER DPW STANDARDS.
6. BITUMINOUS COATING.



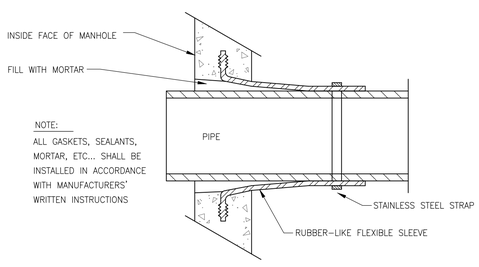
SECTION "B-B"



SECTION "A-A"

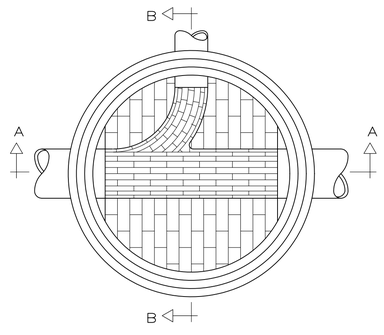


KOR-N-SEAL JOINT SLEEVE
(OR ACCEPTABLE SUBSTITUTE)



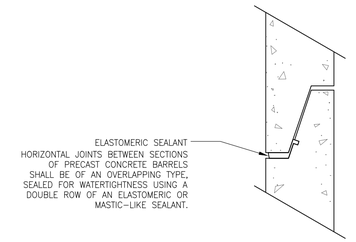
LOCK-JOINT FLEXIBLE MANHOLE SLEEVE
(OR ACCEPTABLE SUBSTITUTE)

DETAIL "A" - PIPE TO MANHOLE JOINTS



TYPICAL MANHOLE - PLAN VIEW

STANDARD MANHOLE

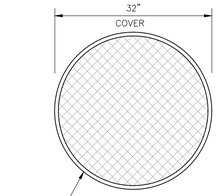


ELASTOMERIC SEALANT

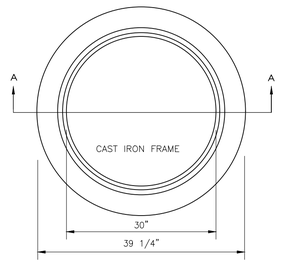
NOTES:
ALL GASKETS AND SEALANTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

STATE OF NEW HAMPSHIRE APPROVED PRODUCTS
A) SIKAFLEX-12-SL
B) SONNEBORN BUILDING PRODUCTS SONOLASTIC SL-1

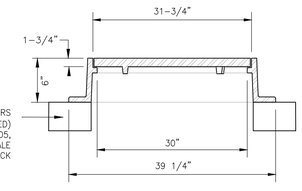
DETAIL "B" - HORIZONTAL JOINTS



COVER



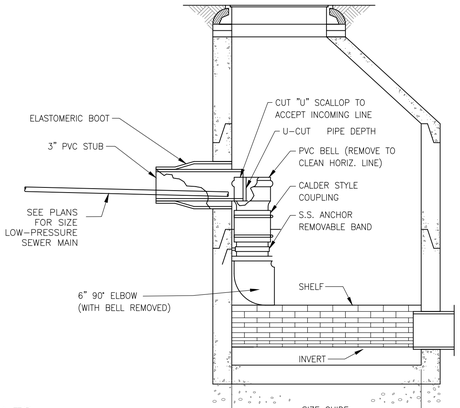
PLAN VIEW



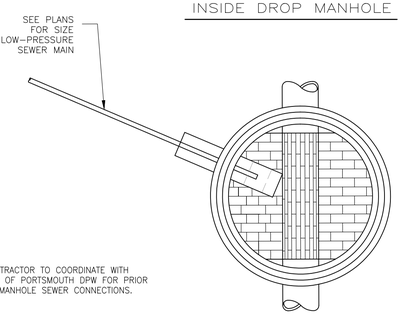
SECTION A-A

BRICK RISERS (IF REQUIRED)
ASTM C32-05, CLAY OR SHALE
SS HARD BRICK

MANHOLE FRAME & COVER



INSIDE DROP MANHOLE



NOTES:
1. CONTRACTOR TO COORDINATE WITH CITY OF PORTSMOUTH DPW FOR PRIOR TO MANHOLE SEWER CONNECTIONS.

PLAN VIEW

PRESSURE TO GRAVITY SEWER DETAIL

SCALE: N.T.S

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE
No. 14950
LICENSED PROFESSIONAL ENGINEER

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB		C-14
		CK	JCC	CADFILE	45407-120_DETAILS	

May 23, 2022 - 4:08pm
P:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Design\PRODUCTION DRAWINGS\45407-120_Details.dwg

LANDSCAPE GUARANTEE AND MAINTENANCE NOTES

1. CONTRACTOR WILL BE RESPONSIBLE FOR ALL MEANS, METHODS AND TECHNIQUES OF WATERING.
2. CONTRACTOR WILL BEGIN WATERING IMMEDIATELY AFTER PLANTING. ALL PLANTS WILL BE THOROUGHLY WATERED TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS WILL BE WATERED WEEKLY, OR MORE OFTEN, IF NECESSARY DURING THE FIRST GROWING SEASON BUT NOT LESS THAN ONE YEAR.
3. WATER ALL LAWNS AS REQUIRED. DO NOT LET NEWLY PLANTED LAWNS DRY OUT DURING THE FIRST FOUR WEEKS MINIMUM.
4. ALL NEW LAWNS WILL BE MAINTAINED AND MOWED A MINIMUM THREE (3) TIMES BEFORE REQUESTING REVIEW BY LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE FOR ACCEPTANCE. MAINTENANCE AND MOWING WILL CONTINUE UNTIL ACCEPTED BY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE IS ISSUED IN WRITING.
5. THE CONTRACTOR WILL MAINTAIN AND GUARANTEE ALL PLANTINGS TO BE IN GOOD HEALTHY, FLOURISHING AND ACCEPTABLE CONDITION FOR A PERIOD OF ONE (1) YEAR BEGINNING AT THE DATE OF ACCEPTANCE BY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE. ALL GRASSES, TREES AND SHRUBS THAT, IN THE OPINION OF THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE SHOWING LESS THAN 80% HEALTHY GROWTH AT THE END OF ONE (1) YEAR PERIOD WILL BE IMMEDIATELY REPLACED BY THE CONTRACTOR.
6.
7. ALL DAY LILIES WILL BE DEADHEADED AND CUT BACK EVERY FALL. ALL ORNAMENTAL GRASSES WILL BE CUT BACK EVERY FALL OR EARLY SPRING.
8. DECIDUOUS PLANT MATERIAL INSTALLED AFTER SEPTEMBER 30 AND BEFORE APRIL 15 WILL NOT BE REVIEWED THAT SEASON FOR ACCEPTANCE DUE TO STAGE OF LEAF PHYSIOLOGY. THIS PLANT MATERIAL WILL NOT BE REVIEWED UNTIL FOLLOWING GROWING SEASON. GUARANTEE PERIOD WILL BEGIN ONLY AFTER ACCEPTANCE BY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE.
9. EVERGREEN PLANT MATERIAL INSTALLED AFTER OCTOBER 30 AND BEFORE APRIL 15 WILL NOT BE REVIEWED THAT SEASON FOR ACCEPTANCE DUE TO END OF GROWTH SEASON. THIS PLANT MATERIAL WILL NOT BE REVIEWED UNTIL FOLLOWING GROWING SEASON. GUARANTEE PERIOD WILL BEGIN ONLY AFTER ACCEPTANCE BY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE.

HYDROSEEDING NOTES

1. HYDROSEEDING MAY BE USED AS AN ALTERNATE METHOD OF SEEDING. THE APPLICATION OF LIMESTONE AS NECESSARY, FERTILIZER AND GRASS SEED MAY BE ACCOMPLISHED IN ONE OPERATION BY THE USE OF A SPRAYING MACHINE APPROVED BY THE LANDSCAPE ARCHITECT OR CIVIL ENGINEER. THE MATERIALS SHALL BE MIXED WITH WATER IN THE MACHINE AND SHALL CONFORM TO RELATIVE REQUIREMENTS OF SECTION 644 OF NH. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
2. (FOR MASSACHUSETTS PROJECTS PLUG IN – SECTION 765.65 OF MASS. DPW CURRENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES).

INVASIVE PLANT NOTES

1. EXISTING NON–NATIVE, INVASIVE PLANT SPECIES WILL BE IDENTIFIED, REMOVED, DESTROYED AND LEGALLY DISPOSED OF OFF–SITE IN ACCORDANCE WITH THE LATEST UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION METHODS OF DISPOSING NON–NATIVE INVASIVE PLANTS. SEE "MANAGE AND CONTROL INVASIVES" AND PROPERLY DISPOSE OF INVASIVE PLANTS".

PRICING & CONSTRUCTION DOCUMENT NOTES

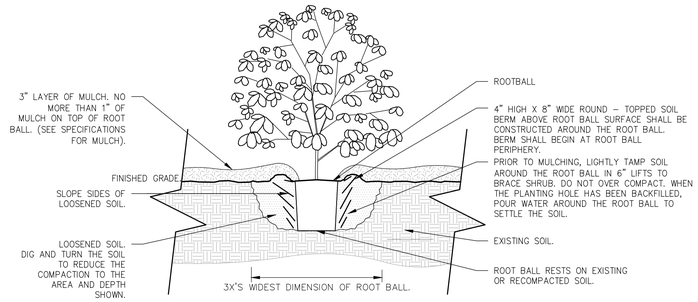
1. CONTRACTOR WILL PRICE PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE PLANTINGS GRAPHICALLY SHOWN ON THESE DRAWINGS OR IN PLANT LIST, WHICHEVER IS GREATER. IN CASES OF DISCREPANCY BETWEEN PLAN AND LIST CLARIFY WITH LANDSCAPE ARCHITECT PRIOR TO PLACING PURCHASE ORDER AND AGAIN PRIOR TO PLANTING.
2. CONTRACTOR WILL VERIFY PRIOR TO PRICING IF SITE SOILS ARE VERY POORLY DRAINING OR IF LEDGE IS PRESENT. IF CONTRACTOR ENCOUNTERS VERY POORLY DRAINING SOILS (BATH TUB EFFECT) OR LEDGE THAT IMPACTS PROPOSED PLANTING PLAN, NOTIFY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE FOR DIRECTION PRIOR TO PRICING AND AGAIN PRIOR TO PERFORMING ANY WORK.
3. PARKING AREA PLANTED ISLANDS WILL HAVE MINIMUM OF 1'–0" TOPSOIL PLACED TO THE TOP OF CURB ELEVATION. REMOVE ALL CONSTRUCTION DEBRIS BEFORE PLACING TOPSOIL.
4. EXISTING TREES SHOWN ON THE PLAN WILL REMAIN UNDISTURBED. ALL EXISTING TREES SHOWN TO REMAIN WILL BE PROTECTED WITH A 4–FOOT SNOW FENCE PLACED AT THE DRIP LINE OF THE BRANCHES OR AT 8 FEET MINIMUM FROM THE TREE TRUNK.
5. CONTRACTOR WILL STAKE OR PLACE ON GROUND ALL PROPOSED PLANT MATERIALS PER PLAN. CONTACT LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
6. COORDINATE WITH LANDSCAPE ARCHITECT'S CONTRACTED NUMBER OF SITE VISITS WHEN PLANNING FOR INSPECTION. NOTIFY LANDSCAPE ARCHITECT 72 HOURS MINIMUM IN ADVANCE OF REQUESTED SITE VISIT.
7. CONTRACTOR WILL DEVELOP A WRITTEN WATERING SCHEDULE AND WILL SUBMIT WATERING SCHEDULE TO OWNERS' REPRESENTATIVE. CONTRACTOR WILL WATER ALL NEW PLANTS INCLUDING LAWNS THAT ARE NOT "IRRIGATED" VIA A PERMANENT IRRIGATION SYSTEM FOR THE FIRST 12 MONTHS.

PORTSMOUTH NOTES

1. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNER'S WILL BE RESPONSIBLE FOR THE MAINTENANCE AND OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS INDICATED ON THESE PLAN(S).
2. ALL REQUIRED PLANT MATERIAL WILL BE TENDED TO AND KEPT FREE OF REFUSE AND DEBRIS.
3. ALL REQUIRED FENCES AND WALLS WILL BE MAINTAINED IN GOOD REPAIR.
4. THE PROPERTY OWNER WILL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.
5.
6. ALL IMPROVEMENTS SHOWN ON THIS PLAN WILL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THIS PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES WILL BE MADE TO THIS PLAN WITHOUT THE WRITTEN APPROVAL OF THE PORTSMOUTH PLANNING BOARD OR PLANNING DIRECTOR.
7. THE LANDSCAPE PLAN WILL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
8. MAINTENANCE OF LANDSCAPING TO FOLLOW THE NOFA STANDARDS FOR ORGANIC LAND CARE 6TH EDITION PRACTICES FOR THE DESIGN AND MAINTENANCE OF ECOLOGICAL LANDSCAPES. ("NOFA STANDARDS FOR ORGANIC LAND CARE," NOFA STANDARDS FOR ORGANIC LAND CARE 6TH EDITION PRACTICES FOR THE DESIGN AND MAINTENANCE OF ECOLOGICAL LANDSCAPES, NORTHEAST ORGANIC FARMING ASSOCIATION OF CONNECTICUT, INC, 2017, HTTP://WWW.ORGANICLANDCARE.NET/SITES/DEFAULT/FILES/NOFA_ORGANIC_LAND_CARE_STANDARDS_6THEDITION_2017_OPT.PDF.)

SEEDING NOTES

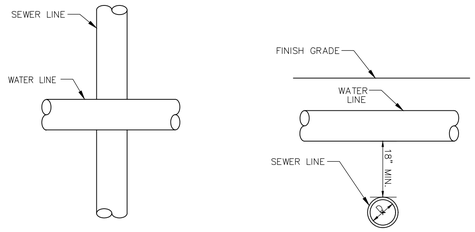
1. SLOPES UP TO AND INCLUDING 3:1 GRADE, SEED WILL BE NEW ENGLAND EROSION CONTROL & RESTORATION MIX PER NEW ENGLAND WETLANDS PLANTS INC., AMHERST, MA.
2. SLOPES STEEPER THAN 3:1 GRADE, SEED WILL BE NEW ENGLAND EROSION CONTROL & RESTORATION MIX PER NEW ENGLAND WETLANDS PLANTS INC., AMHERST, MA. SEE CIVIL FOR ADDITIONAL EROSION CONTROL MEASURES.
3. GENERAL SEED WILL BE NHDOT SPECIFICATION SECTION 644, TABLE 644–1–PARK SEED TYPE 15, INCLUDING NOTES TO TABLE 1, 2 & 3.



SECTION VIEW

SHRUB PLANTING

NOT TO SCALE



PLAN VIEW PROFILE VIEW

NOTES:

1. A 10 FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18" MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER AND SANITARY SEWER CROSSINGS.
2. PROTECTION OF WATER SUPPLIES:
   A. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND A SEWER OR SEWER APPURTENANCE WHICH WOULD PERMIT THE PASSAGE OF SEWAGE OR POLLUTED WATER INTO THE POTABLE SUPPLY. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER OR SEWER MANHOLE.
   B. NO SEWER SHALL BE LOCATED WITHIN THE WELL PROTECTED RADII ESTABLISHED IN ENV–WS 300 FOR ANY PUBLIC WATER SUPPLY WELLS OR WITHIN 100 FEET OF ANY PRIVATE WATER SUPPLY WELL.
   C. SEWERS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN.
   D. A DEVIATION FROM THE SEPARATION REQUIREMENTS OF (B) OR (C) ABOVE SHALL BE ALLOWED WHERE NECESSARY TO AVOID CONFLICT WITH SUBSURFACE STRUCTURES, UTILITY CHAMBERS, AND BUILDING FOUNDATIONS, PROVIDED THAT THE SEWER IS CONSTRUCTED IN ACCORDANCE WITH THE FORCE MAIN CONSTRUCTION REQUIREMENTS SPECIFIED IN ENV–WQ 704.06.
   E. WHENEVER SEWERS MUST CROSS WATER MAINS, THE SEWER SHALL BE CONSTRUCTED AS FOLLOWS:
      a. VERTICAL SEPARATION OF THE SEWER AND WATER MAIN SHALL BE NOT LESS THAN 18 INCHES, WITH WATER ABOVE SEWER AND
      b. SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATER MAIN.

WATER & SEWER CROSSING

NOT TO SCALE

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

STATE OF NEW HAMPSHIRE – JOHN J. McTIGUE No. 14050 LICENSED PROFESSIONAL ENGINEER

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

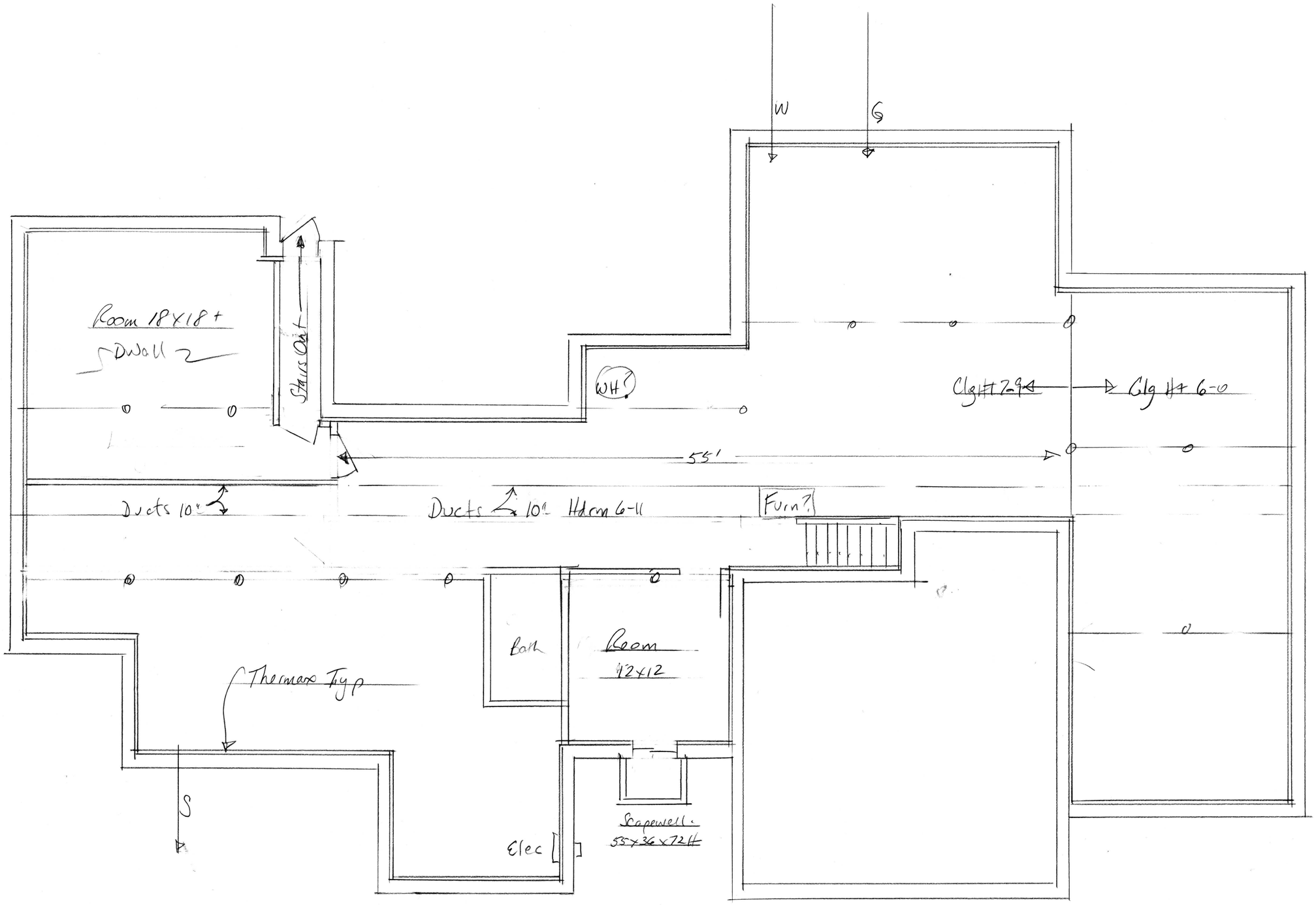
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472–4488
Fax (603) 472–9747
www.tfmoran.com

FILE	45407–120	DR	JSM	FB		C–15
		CK	JCC	CADFILE	45407–120_DETAILS	

62-0
22-0
14-0
26-0
Patio
Elev 37.11
Scr Porch
Elev 38.37
B-4
12-8
5½
4-6½
1-10
¾
6-9¾
6-9¾
7¼
7¼
13-6
4-9
6-3
5-9
33-6
14-0
12-0
3-9
1-0
12-7¼
3½
3-2
16-0¾
FF 39.0
5½
5=1
5½
10-10
10-2¾
5=0¾
7¼
7¼
7¼
FP
Electric Service
2' Planter Shlp
3-6 Wall
4-6
6-0
2-6
6"
2-6
13-6
31-0
33-6
31-0
33-6
13-4
22-8

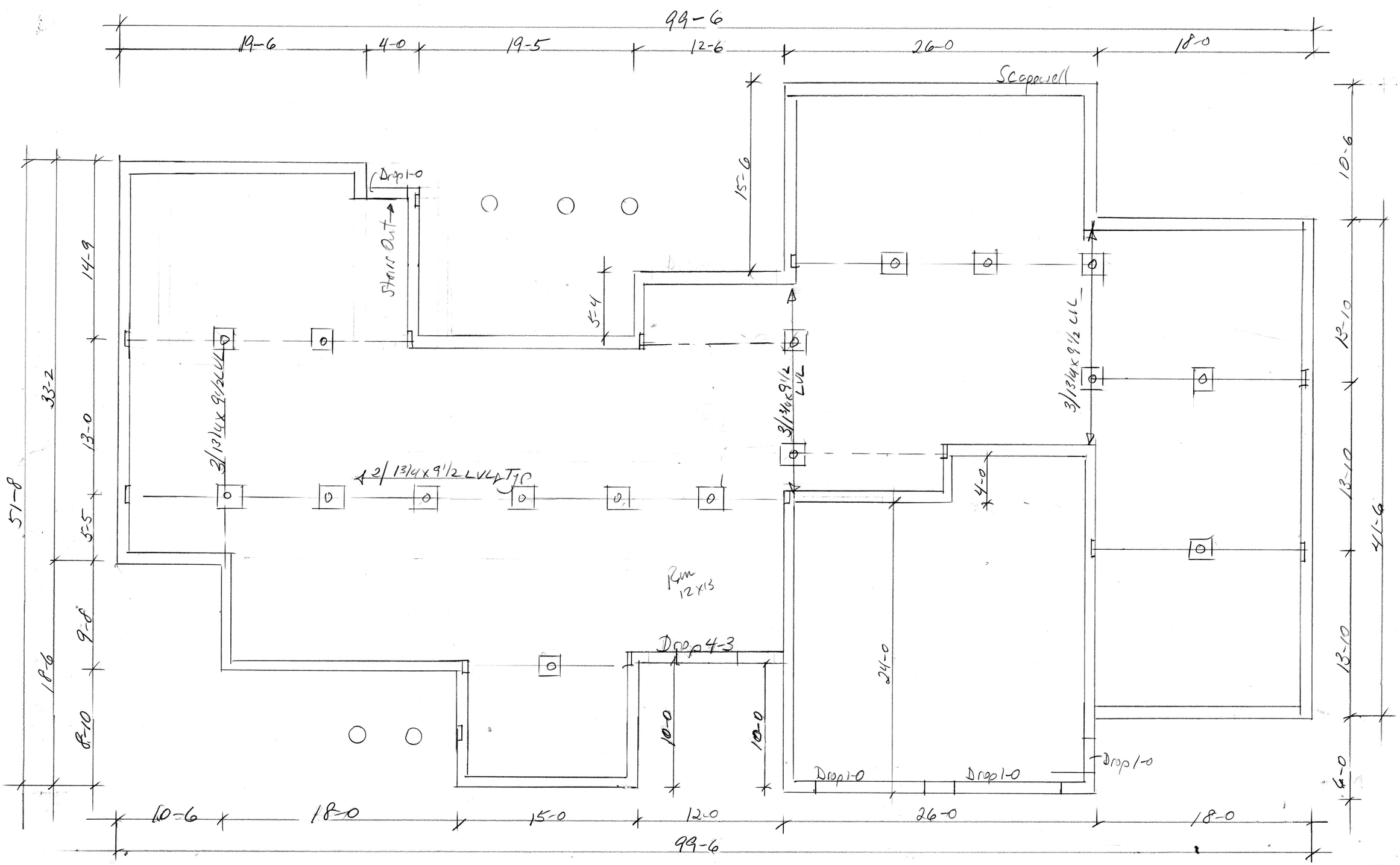
Lot 1	437 Lafayette Rd
SCALE: 1/4	APPROVED BY:
DRAWN BY	
DATE: 4/6/22	REVISED 5/10/22
Smithfield	
First Floor Plan	DRAWING NUMBER

Finished Area 26x34-6 897st
3859-2
12x15
12x14-8
Clg Ht 8-1 1/4
3678t
3665-3
MBR
18-4x14
Deck
19x12
Bsmt Stairs Out
Beam B
3-2 + Brngs
3672-3
Bkfast
12x11
6x8 Essen
6x8 Essen
Clg Ht 8-1 1/4
Clg Ht 10'-1 1/4
LR
17(19)x18
Pantry
9-0x5-6
Linen
B
T/s
42" Van
BR
14-9x12-6
Closet
Cubbies
2-8
W/D
4' Sh
42" Van
W27
B27
W30
B30
Rg
Ref
Bench
BINS
Pipe Railing
Oak Treads
DN
Ref
3-9
B0.92
10-10
3-9 1/2
6-7
3-9
3 1/2
Lounge
25x23
624st
Pantry
B30
Sink
DW
B-30
1/2 wall
Table
5x2-6
LR
14-9x13-0
TV
Couch
Ch
3672
3672
18x41-6 747st
18-0
WIC
10x8-2
S
D
W
Beam
Counter
Linen
B48
FP 60"
B48
? Add Upper Cabs ?
Beam A 20'6" + Brngs
Cntr 11x4
10 of cabs
16-6 Base + Stacked Wall (45" Wall)
11-9 Base Only
S
Rg
18' LR
18' DR
Clg Ht 8-1 1/4
Study
8x9
Entry
2854 Csmt Egress
2x4 Recess
2828 Awning
Porch
10x4
Table
4x10
DR
13-10x18-0
3053 Casements Triple
This area drop bottom Chord of Trusses 2'
Three:
3418 Awning mulled to 3472 DH
Field Mull
10-6
18-0
15-0
558st
12-0
26
Outside
26x58' Deep
2/20/22 Lot 3 Artwill 1/4"=1'
House 2817 St
Overall 99-6
19-5
12-7
26-0
18-0
14-6
18-8 532 ft
9-8
8-10
15-6
5-4
37-2
32-6
10-0
10-0
58-0
18-6
41-6
6-0



Lot 3 Antwill

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/12/22		REVISED
Smithfield		
Basement Floor Plan		DRAWING NUMBER



8" PC Walls on 8x16 Footers 3500psi Min Wall Ht 7-10, 2/#4 Bars on Footers & on bottom + top tier (6 total)

Int Footers 2'x2'x8"

Lot 3 Artwill

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/10/22		REVISED
Smithfield Foundation Plan		DRAWING NUMBER

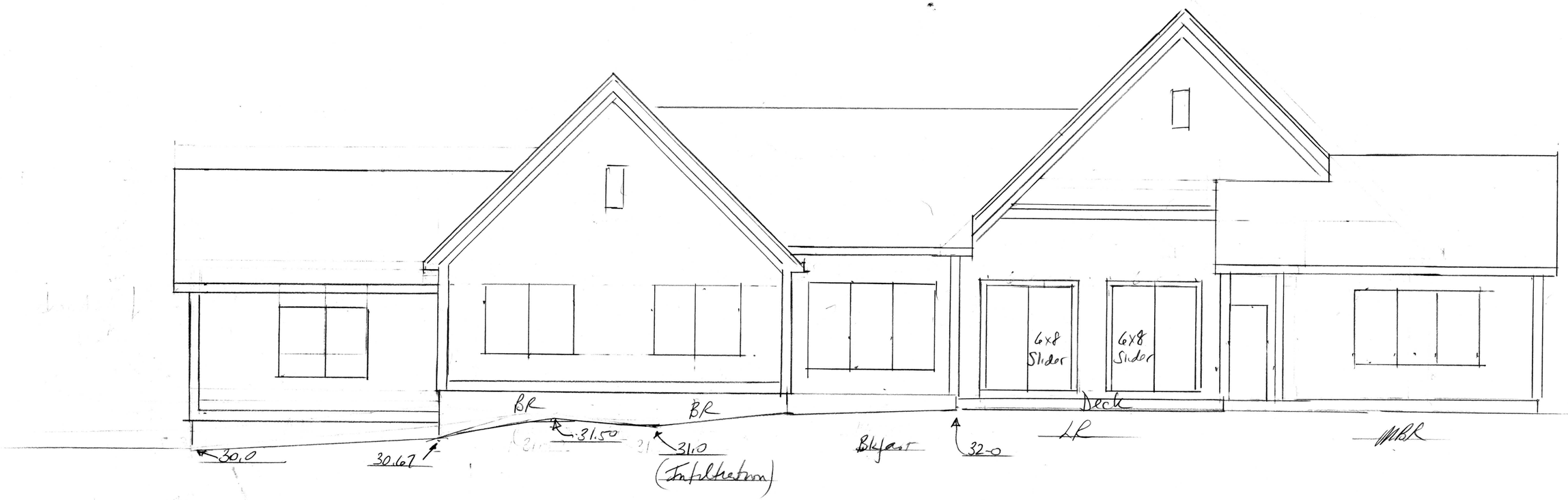
Lot 3 Arctwell

SCALE:	APPROVED BY:	DRAWN BY
DATE: 2/12/22		REVISED

Smithfield

Front Elev w/ ADU - 1/4"

DRAWING NUMBER



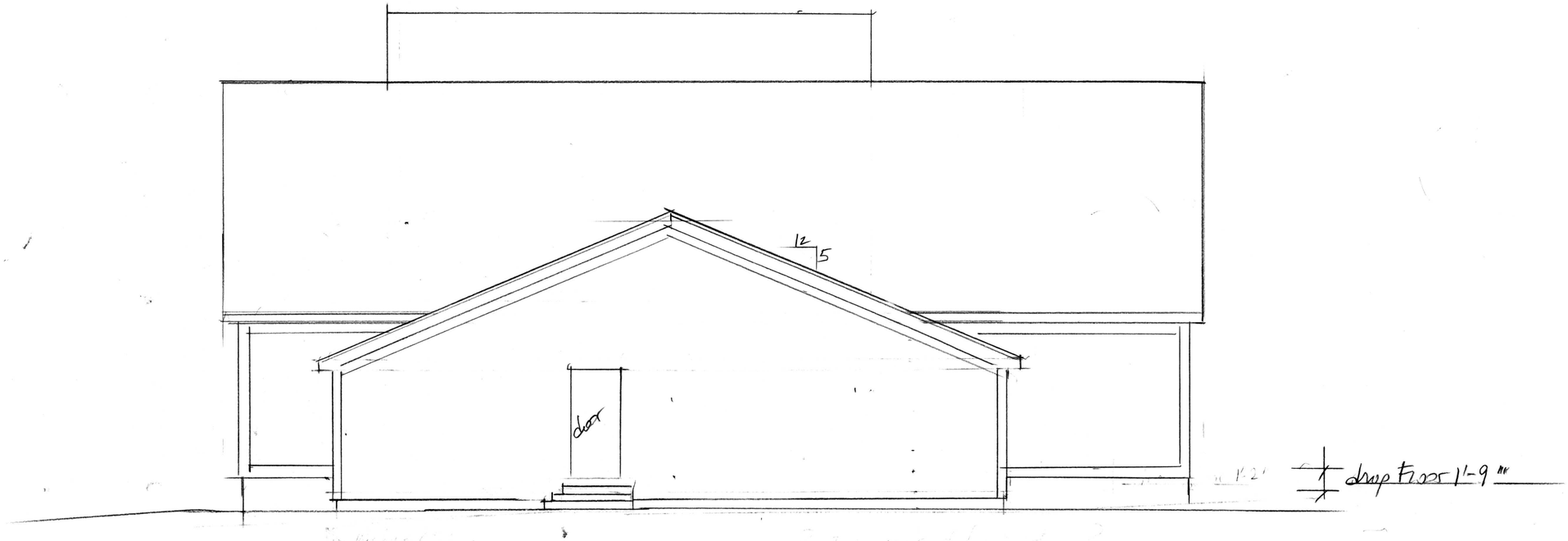
Lot 3 Artwell

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/12/22		REVISED

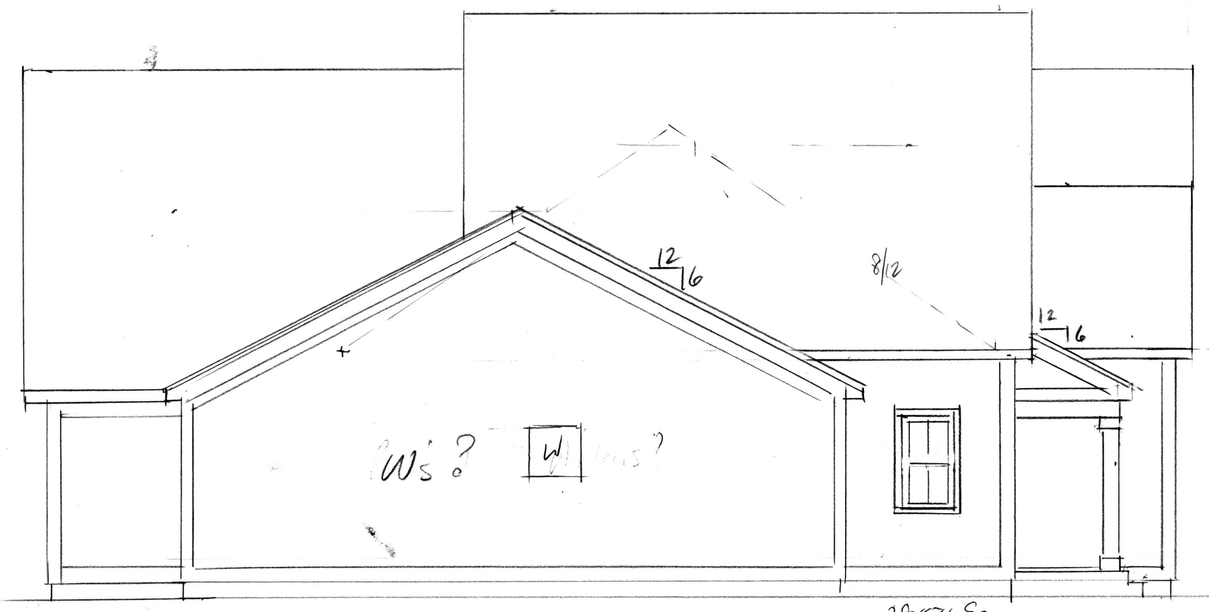
Smithfield

Rear Elev w/Swale

DRAWING NUMBER



Right Elevation



Left Elevation

Lot 3 Antwill

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/12/22		REVISED

Smithfield

Side Elevations

DRAWING NUMBER

99-6

19-6 | 23-6 | 12-6 | 26-0 | 18-0

2/PT 2x12 + 1/2" ply

PT 2x10x14 160C

15-6

15-3

30-6

15-3

10-6

13-10

11-6

13-10

6-0

14-9

33-2

13-0

51-8

5-5

8-8

18-6

9-10

All AJS 150 11 7/8 240C

PT 2x6 160C Triple Beam → 5-0

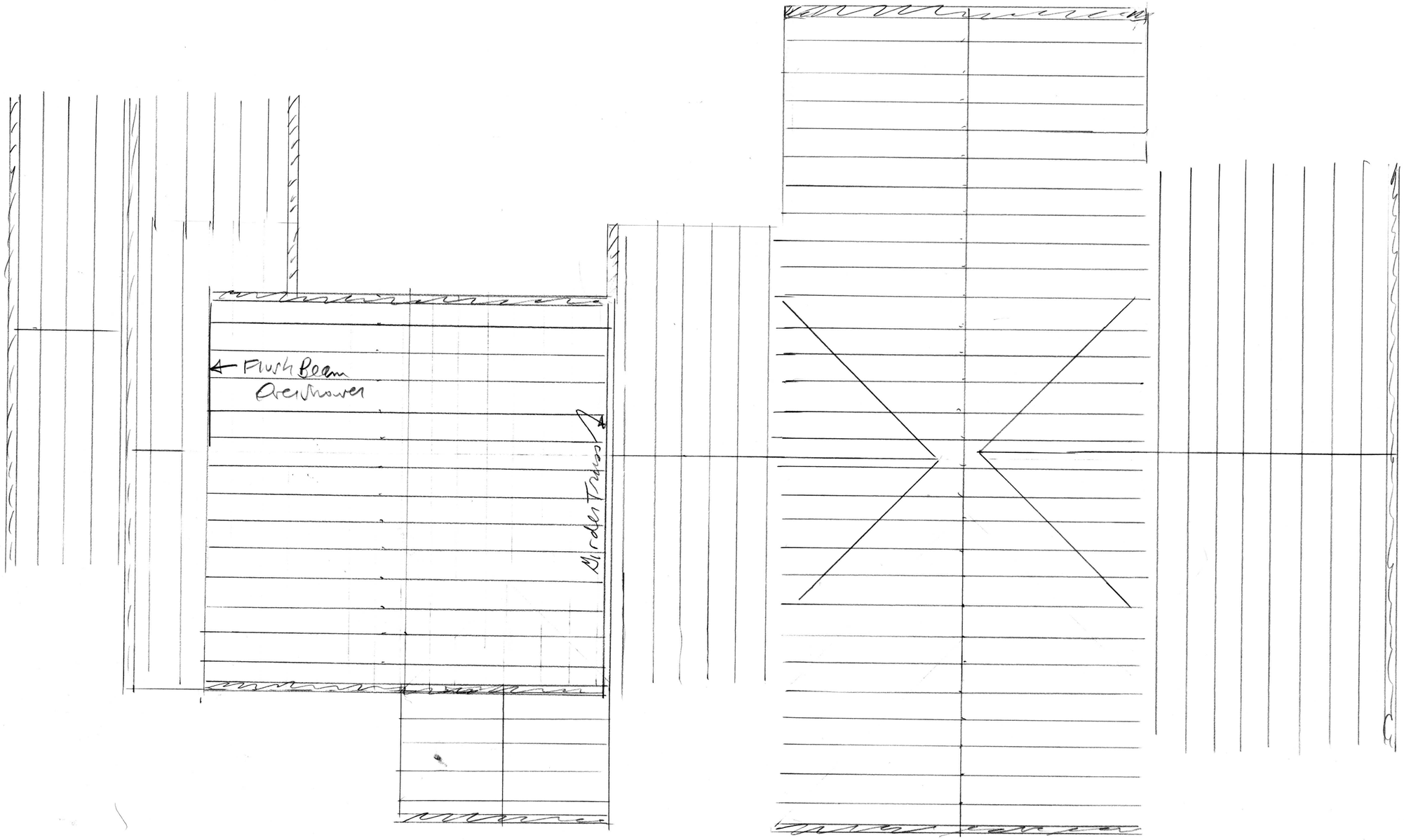
8-0

8-6 | 20-0 | 15-0 | 12-8 | 25-4 | 18-8

99-6

1 of 3 Artwork

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/10/22		REVISED
Smith Gold		
1st Fl Framing Plan		DRAWING NUMBER



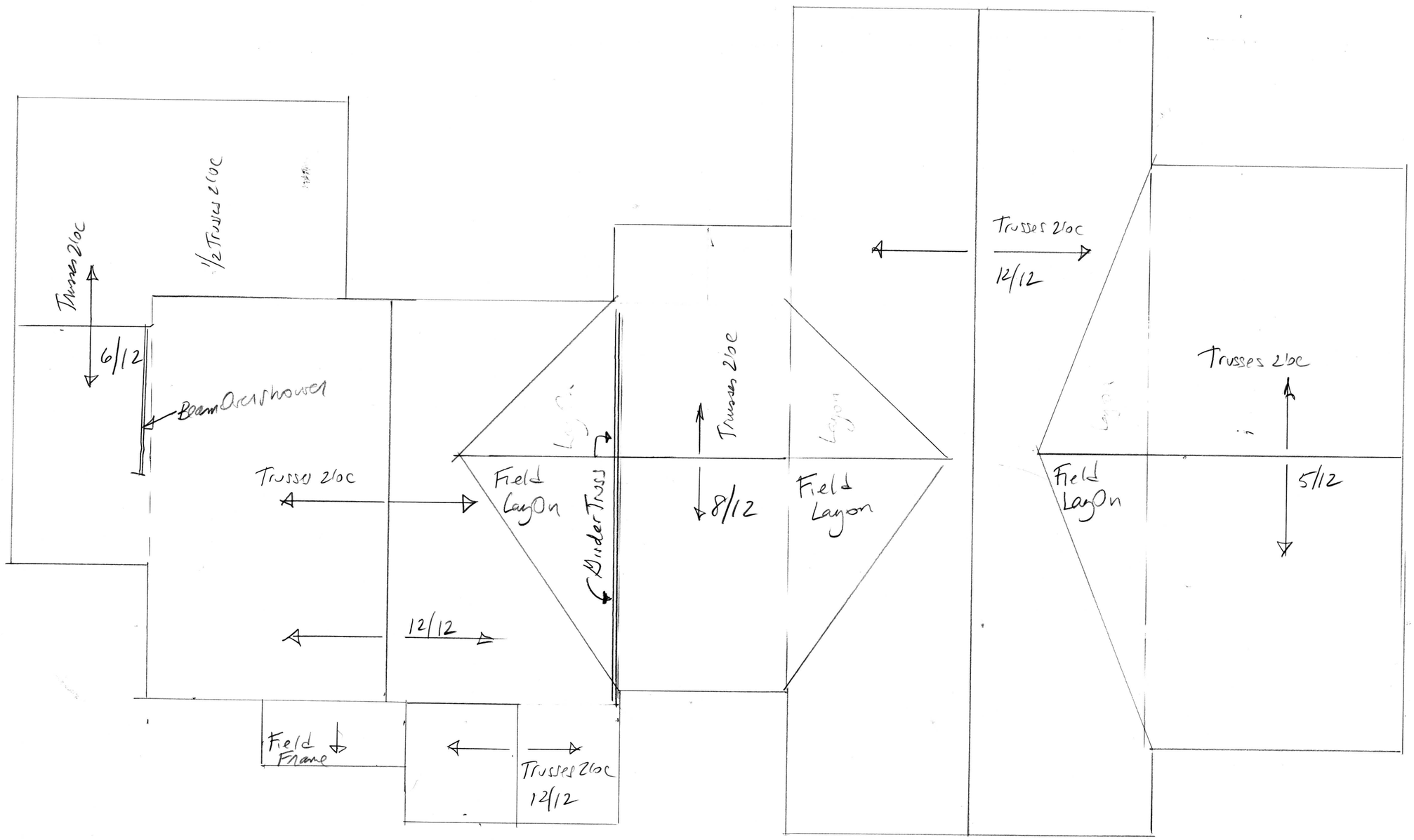
Lot 3 Antwill

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/12		REVISED

Smith for 66

Truss Plan

DRAWING NUMBER



Lot 3 Arctwill

SCALE: 3/16	APPROVED BY:	DRAWN BY
DATE: 2/12		REVISED
Smithfield		
Roof Diagram + Trusses		DRAWING NUMBER

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

Job #45407.120

NHDES

Application for Sewer Connection Permit

F O R

Proposed 3-Lot Subdivision

437 Lafayette Road
Portsmouth, New Hampshire

Tax Map 229, Lot 1

May 20, 2022

Prepared By:

TFMoran, Inc.
48 Constitution Drive, Bedford, NH 03110
T(603) 472-4488 www.tfmoran.com

TFMoran, Inc. Seacoast Division
170 Commerce Way–Suite 102, Portsmouth, NH 03801
T(603) 431-2222

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

NEW HAMPSHIRE 200

May 25, 2022

Dennis Greene, PE
NHDES Wastewater Engineering Bureau
29 Hazen Drive
PO Box 95
Concord, NH 03302

via email: dennis.greene@des.nh.gov & robert.daniel@des.nh.gov

RE: NHDES Sewer Connection Permit Application Submittal
437 Lafayette Road – Artwill, LLC – Tax Map 229 Lot 1
Project #45407.120

Dear Mr. Greene:

On behalf of our client, Artwill, LLC, please find a NHDES Application for Sewer Connection Permit submission relative to the above-referenced project. The following materials are included in this submission:

- **Check in the amount of $1,800.00 to Treasurer State of NH for permit fees**
- **Application for Sewer Connection Permit (City signature pending)**
- **Calculated Design Sewer Flow & NHDES Env-Wq 1000 Table 1008-1: Unit Design Flow**
- **Environmental One Corportation Pressure Sewer Design Report, dated May 19, 2022**
- **Partial Set of Site Development Plans titled "Proposed 3 Lot Subdivision, 437 Lafayette Road, Portsmouth, New Hampshire", prepared by TFMoran, Inc., dated April 19, 2022, last revised May 25, 2022 (1 copy - 22"x34"). Sheets included in this submittal:**
  - **C-00 Cover**
  - **C-01 Notes & Legend**
  - **S-01 Existing Conditions Plan**
  - **C-05 Utility Plan**
  - **C-12 – C-14 Details**

Project Description

This proposal is for the subdivision of a single lot into three proposed lots, and the construction of two single-family dwelling units and an attached accessory dwelling unit. Other improvements associated with this project include but not limited to grading, utility installation, stormwater management, landscaping, and paving. The existing lot is located at 437 Lafayette Road and is identified on the City of Portsmouth Assessor's Map 229 as Lot 1, and is approximately 65,365 sf (1.50 ac) in size. The site is

NHDES Sewer Connection Permit Application Submittal
437 Lafayette Road – Artwill, LLC – Tax Map 229 Lot 1
Project #45407.120

May 25, 2022

located in the Single Residence B (SRB) Zone and currently contains one single-family residential building and a detached garage.

The proposed house on Lot #1 is to be serviced by a 6" PVC gravity sewer line, which will tie into an existing manhole at the intersection of Lafayette Road and Artwill Ave. The houses on Lots #2 and #3 will be serviced by 1-1/4" PVC pressure sewer lines that will each connect to a proposed 1-1/2" PVC force main line that runs along Artwill Ave before ultimately connecting to the existing sewer manhole at the intersection.

The proposed project consists of 84 linear feet (LF) of 6" SDR-35 PVC pipe, 239 LF of 1-1/2" SRD-11 PVC pipe, 105 LF of 1-1/4" SDR-11 PVC pipe, two cleanouts along the gravity sewer service line, two E/One grinder pumps, and a terminal flushing manhole for the pressure sewer main.

The City of Portsmouth is concurrently reviewing this application. Any revisions based on their comments will be circled on the plans and forwarded to you.

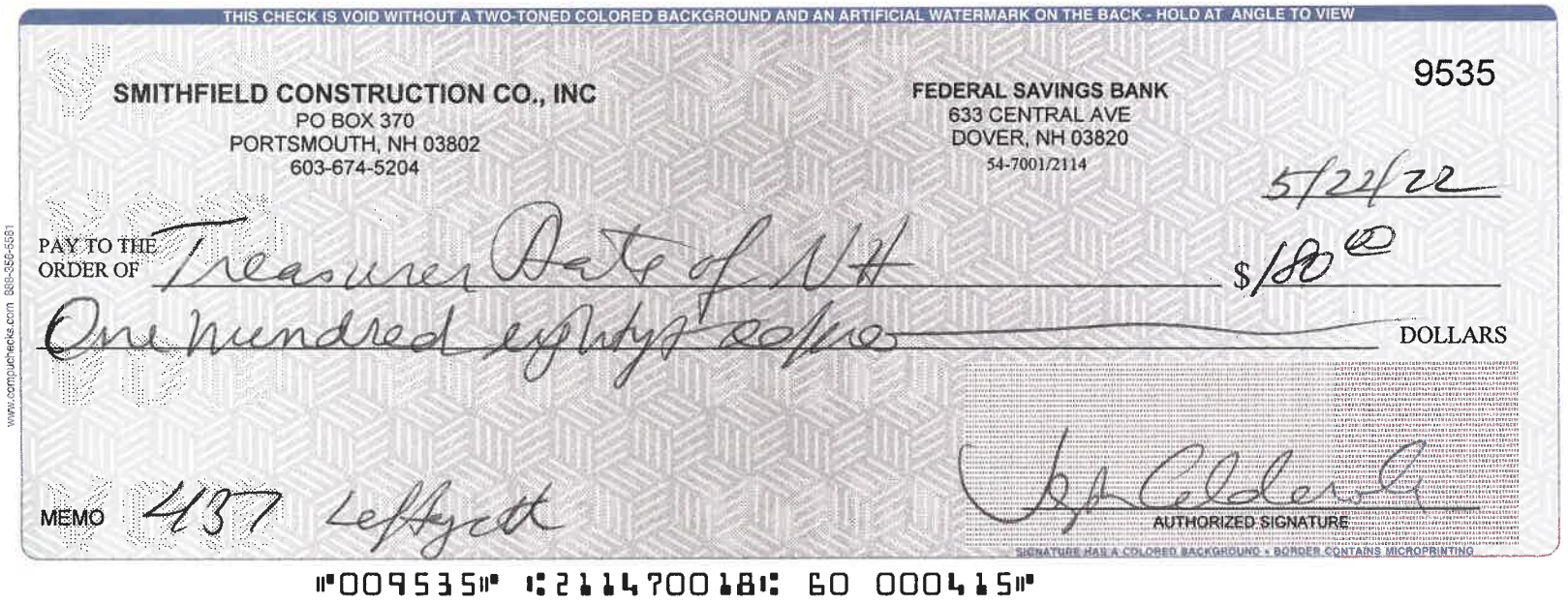
If you have any questions or concerns, please do not hesitate to contact us.

Respectfully,
TFMoran, Inc.

Justin Macek, EIT
Project Manager

JSM/sdr

cc: Joe Caldarola, Smithfield Construction, Inc. (via joe@smithfieldconstruction.com)



THIS CHECK IS VOID WITHOUT A TWO-TONED COLORED BACKGROUND AND AN ARTIFICIAL WATERMARK ON THE BACK - HOLD AT ANGLE TO VIEW

SMITHFIELD CONSTRUCTION CO., INC
PO BOX 370
PORTSMOUTH, NH 03802
603-674-5204

FEDERAL SAVINGS BANK
633 CENTRAL AVE
DOVER, NH 03820
54-7001/2114

9535

5/24/22

PAY TO THE ORDER OF Treasurer State of NH $ 180.00

One hundred eighty 00/100 DOLLARS

MEMO 437 Left yoke

AUTHORIZED SIGNATURE

SIGNATURE HAS A COLORED BACKGROUND • BORDER CONTAINS MICROPRINTING

www.compuchecks.com 888-356-5581

"009535" ⑆211470018⑆ 60 000415"

NHDES-W-09-008

APPLICATION FOR SEWER CONNECTION PERMIT
Water Division/Wastewater
Engineering Bureau Design Review Section

RSA/Rule: RSA 485-A:37 / Env-Wq 703.07

TYPE OR PRINT CLEARLY

Use this application for Sewer Connection Permit to request NHDES review/approval for any proposed sewerage design. Under RSAs 485 and 485-A, design plans for new sewerage facilities – whether publicly or privately owned, and regardless of design flow – must be submitted to NHDES for review/approval action at least 30 days prior to construction. Pursuant to Env-Wq 703, design submittals must include 1 set of engineering plans/specifications, pertinent design calculations, the required fee, and a Municipal Certification (signed by an authorized municipal official, see page 2).

1. Engineer of Record - Contact Information		
Engineer / Contact: Justin Macek	*Company: TFMoran Inc.*	
Mailing Address: 170 Commerce Way, Suite 102		
Town/City: Portsmouth	*State:* NH	*ZIP:* 03801
Phone Number: 603-431-2222	*Email: jmacek@tfmoran.com*	

2. Description of Proposed Work (check all that apply)	
☐	An extension of a collector or interceptor;
☐	A sewage pumping station greater than 50 gpm or serving more than one building;
☒	A proposed sewer that serves more than one building or that requires a manhole at the connection.

Project Name or Description: Smithfield Construction - 3 Lot Subdivision - Residential		
Project Location - Street Address: 437 Lafayette Road		
Project Location - Town / City: Portsmouth		
Name Of Receiving WWTF: Portsmouth Wastewater Treatment Plant		
Average Design Flow (ADF, gal/day): 1,800		
Proposed Sewer Length (Linear ft)	Pipe Diameter (inches)	Pipe Material
84	6	SDR-35 PVC
239	1-1/2	SDR-11 PVC
105	1-1/4	SDR-11 PVC

3. Required Fee	
☒	Sewer connection design submittals must be accompanied by a review fee payment based on the project's average design flow - $0.10 per gal/day ("a dime a gallon") for design flows up to 10,000 gal/day, plus $0.05 per gal/day for any flows in excess thereof.
☐	A fee of $200 per plan sheet shall be paid for review of modifications to privately owned pump stations, force mains, interceptors, and wastewater treatment facilities which are not associated with an increase in wastewater flow.
☐	Fees are not required of municipalities for municipal projects.
Fee Enclosed: $180.00	Please make checks payable to "Treasurer State of NH".

Italics indicate items are optional.

RSA/Rule: RSA 485-A:37 / Env-Wq 703.07

4. Municipal Certification	
On behalf of this Proposed 3-Lot Subdivision,the Town or City of Portsmouth hereby provides the following municipal certification.	
The municipal sewage collection system and wastewater treatment facilities have been demonstrated, pursuant to Env-Wq 703.07(d), to have adequate processing capability for the proposed added hydraulic flow and organic flow at the time of connection. The proposed sewer connection and/or sewerage design meet with the approval of the local jurisdictional authority.	
Name Of Municipal Official (Project Location): *Terry Desmarais, P.E.*	Title: City Engineer
Signature:	Date:
Email Address: tldesmarais@cityofportsmouth.com	
When the Receiving WWTF is in a different Municipality from that of the Project Location, the following additional certification is required.	
Name Of WWTF Official (Host Community):	Title:
Signature:	Date:
Email Address:	

Submit completed application package to:

NHDES Wastewater Engineering Bureau
Design Review Section
29 Hazen Drive
P.O. Box 95
Concord, NH 03302-0095

NOTE: A Separate INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) May be Required For Industrial Waste Contributions, Depending On Quantity And Quality. For Further Information, Contact The Industrial Pretreatment Supervisor Of The Wastewater Engineering Bureau At (603)-271-2052.

Project	**Proposed 3-Lot Subdivision**	Date: 5/20/2022
Location	**437 Lafayette Road**	
	Portsmouth, NH	

Unit Sewer Flows

Total Number of Units	3	
Based on	100%	4 Bedroom Units

4 Bedroom Houses

Residences Single Family - 2 Bedroom	300
Additional Flow for 2 Additional Bedroom	300
Gallons Perd Day per 4 Bedroom Unit	600

Design Sewer Flows

	Number of Units	GPD/ Unit	GPD
Number of 4 Bedroom	3	600	1,800
Total Design Flow	3		1,800

State Fee

Cost per GPD	$ 0.10	1,800	$ 180.00
Total Cost			$ 180.00

(2) Metered water readings for uses that are as similar as possible to the proposed use, taking into consideration factors such as occupancy and frequency of use, determined as specified in (d), below.

(d) Design flows based on metered water readings shall be calculated:

(1) By finding the average of water meter readings over a period of time that is representative of the volume of water used and multiplying the average by a minimum peaking factor of 2 for commercial light flow or a maximum peaking factor of 3 for commercial heavy flow; or

(2) By measuring not less than 6 months of consecutive daily meter readings, including the month(s) of heaviest use for uses that are seasonal in nature, and using the highest daily flow without application of a peaking factor;

(e) The unit design flow figures referenced in (b) and (c), above, shall be as listed in Table 1008-1, below, subject to (f), below:

Table 1008-1: Unit Design Flow Figures

Use	**Unit Design Flow**
AIRPORTS	5 GPD/Transient plus 10 GPD/Employee
APARTMENTS	See Dwellings
BARS, LOUNGES	See Food Service
BED & BREAKFAST	60 GPD/Guest, based on the greater of 2 guests per room or the actual number of guests the room is designed to accommodate, plus 10 GPD/Employee
BUNKHOUSE	60 GPD/Person
CAMPS:	
Campground with Central Comfort Station	45 GPD/site, plus 20 GPD/Site for the dump station
Recreational Campgrounds with 3-way hookups	60 GPD/Site
Construction Camps	50 GPD/Person
Day Camps (not including meals)	15 GPD/Person
Dining Facility	3 GPD/Person/meal
Residential Youth Recreation Camps	25 GPD/Person plus 3 GPD/Person/meal
CATERERS – Function Rooms	12 GPD/patron
CHURCHES:	
Sanctuary Seating	3 GPD/Seat
Church Suppers	12 GPD/Seat
COUNTRY CLUBS – PRIVATE	
Dining Room	10 GPD/Seat
Snack Bar	10 GPD/Seat
Locker & Showers	20 GPD/Locker
DAY CARE CENTERS	10 GPD/Person
DENTISTS	10 GPD/Chair plus 35 GPD/Staff Member
DOCTOR'S OFFICES	250 GPD/Doctor
DOG KENNELS	50 GPD/Kennel, with one dog per kennel
DWELLINGS:	
Apartment - Studio or One-Bedroom	225 GPD
Apartment - 2 or More Bedrooms	150 GPD/Bedroom
Residence - Single-Family	300 GPD plus 150 GPD for each bedroom over 2
Residence - Duplex	300 GPD plus 150 GPD for each bedroom over 2 for each unit
Rooming House – With Meals	60 GPD/Person
Rooming House – Without Meals	40 GPD/Person
Senior Housing	See Senior Housing

Environment One Corporation

Pressure Sewer Preliminary

Cost and Design Analysis

For

437 Lafayette Rd-Portsmouth NH

Prepared For:
Justin Macek TF Moran
170 Commerce Way - Suite 102
Portsmouth NH 03801
Tel: (603) 431-2222
Fax:
Prepared By: D.Coppola
May 19, 2022

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:
D.Coppola

437 Lafayette Rd-Portsmouth NH

May 19, 2022

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR21PVC										Friction loss calculations were based on a Constant for inside roughness "C" of:							150
1.00	1.00	2	2	600	11.00	2	22.00	1.50	3.04	238.00	2.15	5.12	5.12	30.00	24.00	6.00	11.12

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

\\CWMDFS02\Home - Remote\dcoppola\My Documents\EONE\New Hampshire\Portsmouth\437 Lafayette Rd\437 Lafayette Rd.EOne

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:
D.Coppola

437 Lafayette Rd-Portsmouth NH

May 19, 2022

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for:			SDR21PVC					Gals per Day per Dwelling		200
1.00	1.00	2	1.50	12.07	238.00	28.73	1,200	41.77	0.57	0.57

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One

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www.frmahony.com • www.amphidrome.com
info@frmahony.com

E/ONE Pressure System Design Report

For

437 Lafayette Rd

Portsmouth, NH

May 19, 2022

SERVICE OPERATIONS
30 DuPaul Street
Southbridge, MA 01550
D: (508) 765-0051
F: (508) 765-1244

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info@frmahony.com

May 19th, 2022

Justin Macek, EIT
Civil Project Engineer
TFMoran Seacoast Division
170 Commerce Way - Suite 102
Portsmouth, NH 03801
(603) 431-2222
RE: 437 Lafayette Rd Portsmouth, NH

Dear Justin;

This preliminary design analysis examines the use of the E/One Pressure Sewer System for your project. E/One is celebrating 50 years of installation and O&M experience along with considerable research and development leading to continuous product and system improvements. E/One remains the worldwide industry standard and industry leader in the pressure sewer technology. The unique characteristics of the E/One Pressure Sewer approach provides not only a technical solution, but also an economic advantage to be realized with low up front and O&M costs.

System Analysis

Using the information you provided, we ran the enclosed preliminary pressure sewer pipe sizing analysis. This was run through our Low Pressure Sewer Design Software that employs our Flow Velocity and Friction Head Loss vs. Pumps in Simultaneous Operation Spreadsheet. We have used the surface topography provided to make our analyses.

Zone Layout

Using the preliminary information we laid this into a single 1 1/2 inch flow zone discharging into a gravity main on Lafayette Rd.

Computations are based on the Hazen-Williams formula for friction loss, using calculations of cross-sectional area and flow rate to determine pipe sizes that create ”self-cleaning” velocities of 2.0 fps or higher. A "C" factor of 150, SDR 21 PVC pipe and the average expected daily volumes for single family homes are also used in this analysis.

The highest Total Dynamic Head generated is approximately 13 feet which is

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comprised of static head and friction loss in the proposed pipelines. This is well below our pump's continuous-run rating of 185 ft, and well within its intermittent, i.e., normal, operating range. Flow velocity throughout the system meets or exceeds 2 fps. These characteristics and low retention time indicate that this will be a reliable, low-maintenance system.

Design Flows & System Velocity

We normally use average daily flows for system designs rather than the peak design flows commonly used for gravity sewer sizing. We do this because the system is sealed and void of inflow and infiltration commonly allowed for in gravity sewer designs. We size the system for an average daily flow of 600+/- gpd generally for single family homes. The pumps selected are rated to flows up to 700 gpd thus peak flows are easily handled. We size the pipelines for the proper scouring velocity based on the pump's output which has a consistent flow rate over a wide range of head conditions. We then look at the pipeline retention time to optimize the line size for the lowest retention that will pass wastewater in a short period of time to reduce sediment in the lines and prevent odor issues. This makes for a very reliable and maintenance free wastewater collection system.

Often we are asked to use the published "State" design values from various flow tables in order to secure approval. We can do this; but then we run the reports based on the actual predicted average flow to optimize the line size as mentioned above.

Many of our installations have seen flows that more closely mirror the EPA water use goals of 70 gpd/capita. We also look at seasonal uses a little more closely due to greater reductions in flow in the offseason. In applications of this type we look to find the best for both seasons.

Appurtenances

- Cleanouts, Air/Vacuum Release

Our normal recommendations for valve placement are as follows: flushing connections at 1,000' to 1,500' intervals and at branch ends and junctions; isolation valves at branch junctions; and air release valves at peaks of 25 ft. or more and/or at intervals of 2,000 to 2,500 ft. We recommend one flushing manhole labeled on PDF FRMA markup.

- Service Laterals and Check Valves

Common practice in pressure sewers requires the ability to isolate each lot with a corporation stop off the main and service lateral kit to the lot line. E/One now requires that each pump connection be isolated with a combination curb stop/redundant check valve.

E/One has developed a true wastewater rated check valve which is built in to our stainless steel lateral kit shown in this report. These components are rated to 235 psi and with standard connection fittings rated to 150 psi. These items are included in the budget analyses and shown in this report.

We strongly advise against the use of waterworks check valves as they are not rated for sewage environments. We do not like to recommend brass due to concerns for corrosion. **WEF Manual of Practice FD-12, Second Edition**, page 45 speaks to the limited success of brass or bronze alloys.

> "Besides corrosion considerations, brass is subject to de-alloying, while some bronze, such as 85-5-5, will give better performance. The terms *brass* and *bronze* are used loosely, despite having different meanings; the engineer is advised to evaluate these materials with caution."

We have also seen PVC body check valves with pressure rating to 150 psi that do not have the same rating for back pressure on the check valve. This can result in damage to the check valve and pumping issues as the check valve disc can become dislodged under pressure and then become a line obstruction.

- Corporation Stops/ Mainline Connections

Connections to the main pressure line do not require WYE type fittings. We commonly use a TEE or saddle connection. We isolate each connection to the main line with a stainless steel corporation valve in the same manner used for other utilities such as gas and water services.

We recommend that the service laterals connect to the mainline and do not need to enter a cleanout manhole or other structure. These connections are very similar to a connection of a water service off of a water main.

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Budget Notes

We show our outdoor Model DH071-93 station. We show this model in our budget we can formally quote when project gets closer. Please note budget does not include freight.

Costs of pipeline excavation and pump installation are best obtained from sources in your region. You may be better able to determine these costs.

I am looking forward to working with you on this and future projects. Please contact me if you have any questions or require additional information.

Best regards,

Daryl Coppola
Outside Sales Engineer
781-820-5808
dcoppola@frmahony.com

Enclosures

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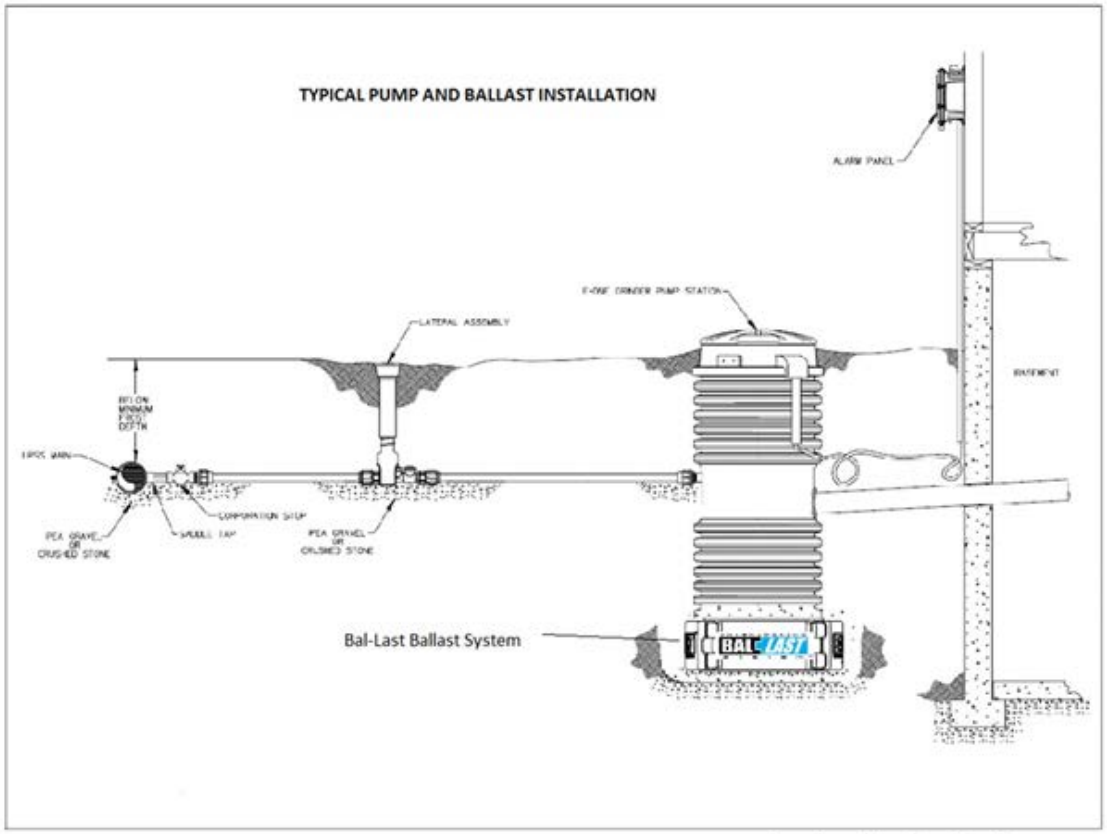

This image shows the typical layout of an outdoor pump unit for single-family home use. The pump unit is furnished complete, ready for installation. The installer needs to confirm the power cord length and discharge and inlet configuration. Standard products are supplied with 32 foot power supply cable. Standard inlets are 4-inch Schedule 40 Grommets (@ zero degrees) with 1-1/4 inch discharge (@ 180 degrees). Other configurations are available.

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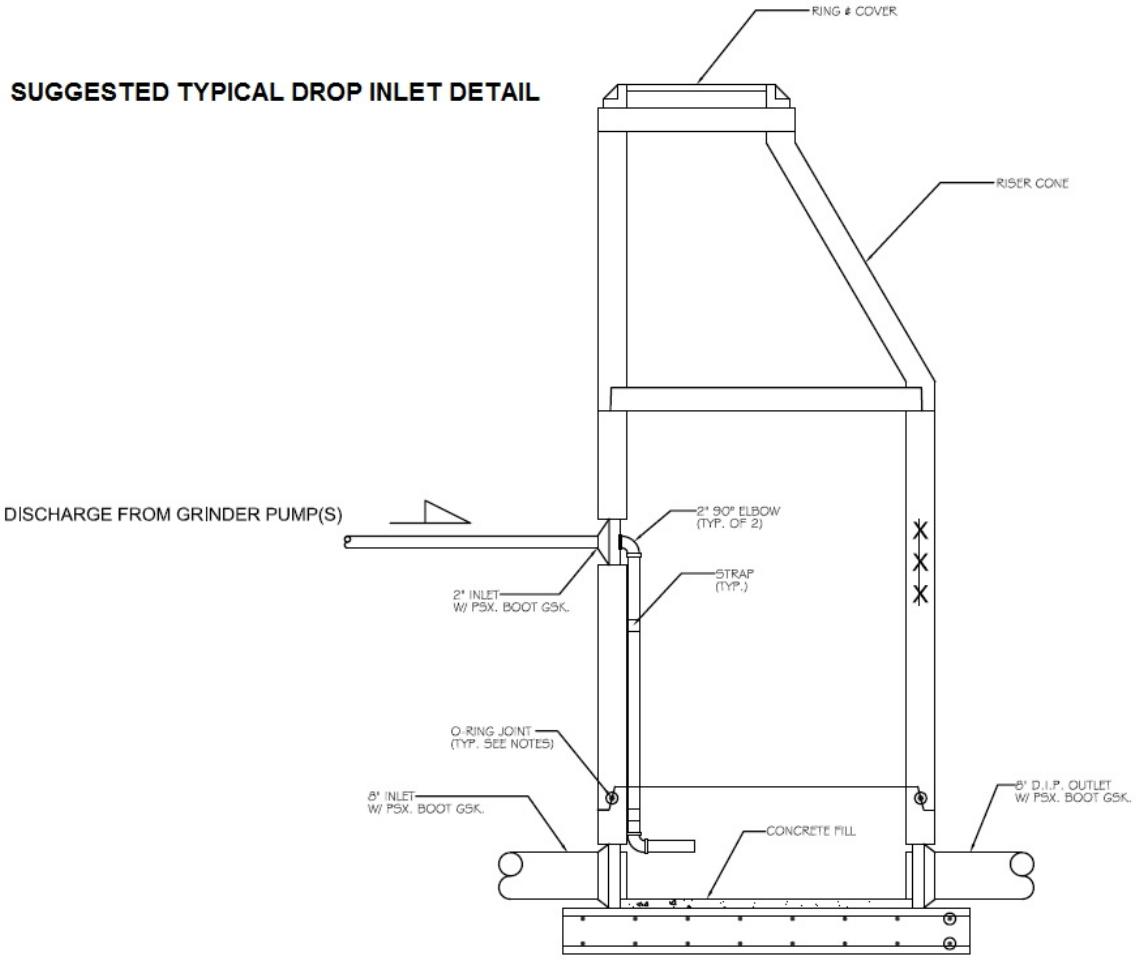
info@frmahony.com

SUGGESTED TYPICAL DROP INLET DETAIL



IN-LINE MANHOLE
ELEVATION VIEW

This detail is shown as a concept sketch when major grade adjustments are required. We recommend that smaller inlet lines match the crown of outlet gravity sewer lines in all cases in order to direct flow to properly drain to the gravity sewer

F.R. MAHONY & ASSOC.
frma
water supply and pollution control equipment

A Division Of
CUMMINS-WAGNER
100% Employee Owned

273 Weymouth Street, Rockland, MA 02370
tel. 781-982-9300 • fax. 781-982-1056
www.frmahony.com • www.amphidrome.com
info@frmahony.com

Standard alarm panels are the Sentry® panel mounted outside of the home as shown in the drawing (above).
Options include emergency generator connection (see photo) and Redundant alarm Remote Sentry® panel shown. Other panel configurations are available. See the partial listing of panel options below.

- Basic Panels include circuit breaker for the pump and separate breaker for the alarm. These panels include alarm light, alarm buzzer and alarm silence button. ***All F. R. Mahony panels are equipped with dry contacts to enable the connection of the Remote Sentry® (battery powered redundant alarm panel option)***

- Standard options include auto transfer generator connection shown above. This panel provides automatic power transfer without having to open the alarm panel or having to operate any manual transfer switching. This feature can be added to the basic panel or the panels offered below.

- Popular options include the **"Protection Package"** which monitors and protects the system from:
  - Pump Run Dry Condition (Pump running out of water)
  - Pump Overpressure Condition (Closed valve)
  - Brownout Condition (Main voltage under 12% of nameplate)
  - High Liquid Level

- The **"Protect Plus"** panel features offer the same items in the "Protection Package" plus the following:
  - High & Low Amperage draw by the pump
  - High & Low voltage to the pump
  - Extended Runtime by the pump (indicating wear or excessive flow) (field adjustable settings)
  - Monitoring of:
    - Real-time Pump Voltage and Current
    - Cycles & Hours (can be reset)
    - Minimum & Maximum Amperage (can be reset)
    - Minimum, Maximum, Average, and Last Run Cycle (in minutes, can be reset)

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Emergency Generator Transfer Options.

The indoor pump units may be furnished with a receptacle for connection of emergency power supplies. The image to the right shows the connection receptacle on the right side of our Sentry panels. This connection may be connected by your electrician to a remote connection port outside of the home.

Wiring must be performed by a licensed electrician and conforming to NEC and local electrical codes.

The box (left) is shown in the face view (face up) and is intended to be mounted on the outside wall to permit connection of a portable generator to the receptacle on the bottom. Generator operation must always be in well ventilated areas outside of any living space.

The pump may be operated under emergency power provided the automatic transfer option is selected with the Sentry® panel. Normal pump run times are short and should not require the continuous connection of a generator. A single portable generator may be used to service several homes effectively.

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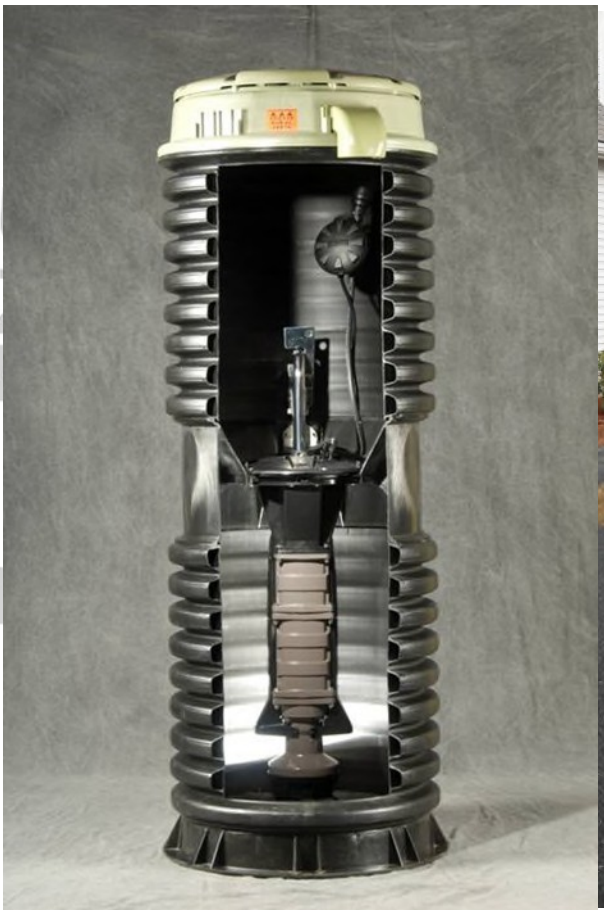
Other station configurations are available for higher flow requirements. Please contact us for more information. Additional information may be found at www.eone.com

Model DH071-93 Outdoor Pump With Bal-Last™



The outdoor model is complete - ready for installation and connection to exterior plumbing and power supply. This unit is fully tested for operation and factory leak tested. No assembly is required and there are no floats to adjust. The pump is furnished complete with the alarm panel and direct bury power supply cable.
Standard cable length is 32 feet with 50, 75, and 100 and up to 150 foot cables available. (See Alarm Panel options above)

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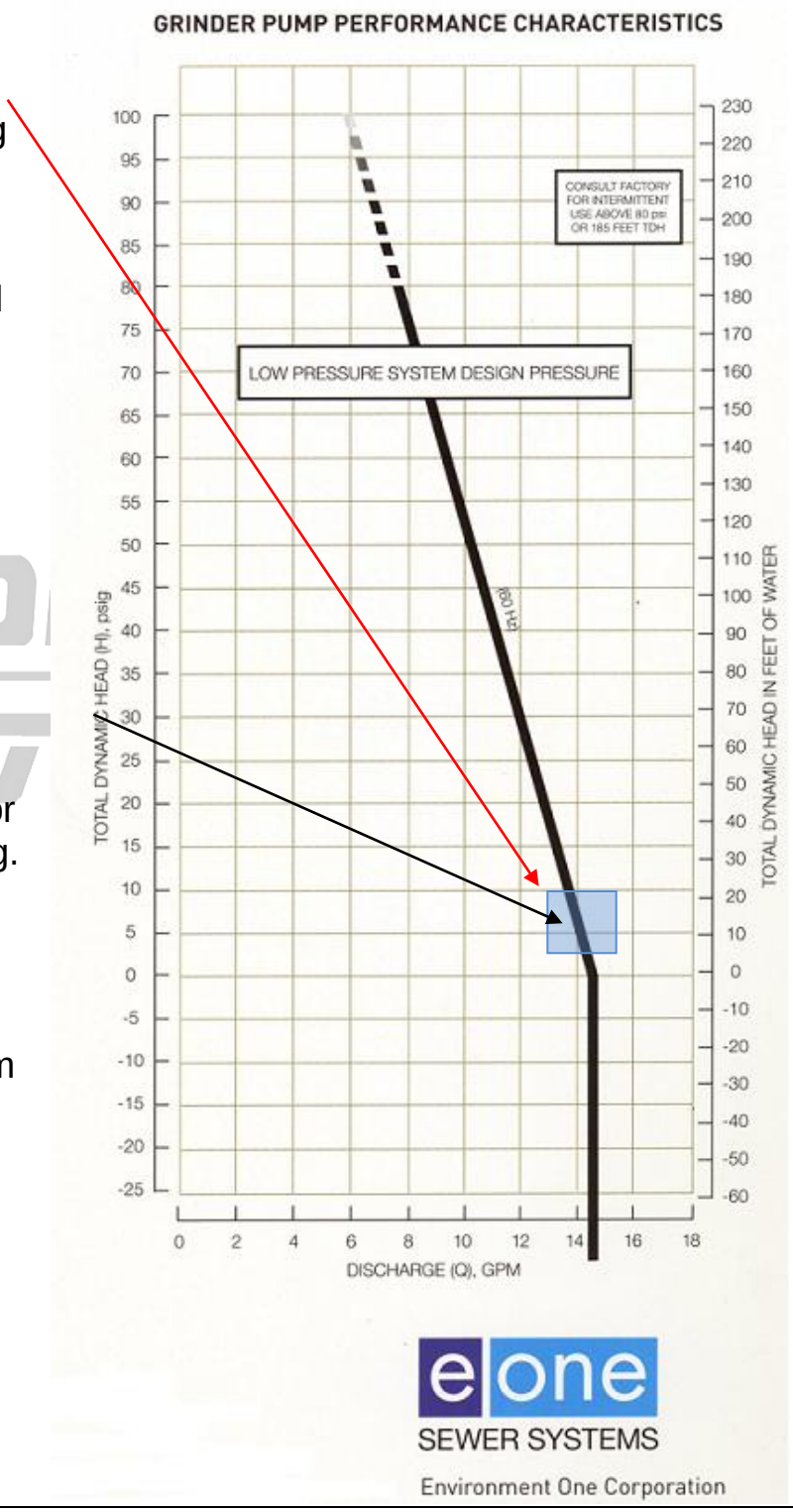
Operation Conditions

11.12 Feet is the highest TDH at simultaneous operating conditions with the expected number of pumps operating in each zone, or the head of an individual pump operating in a single zone condition.

Operating range of E/One pumps from 0-185 feet TDH and from 0 to -60 feet TDH.

Your System Range

Anti-siphon valves in E/One cores provide for negative head pumping. In common systems with negative heads of 25-30 feet or more we recommend the use of combination air/vacuum release valves as described below.



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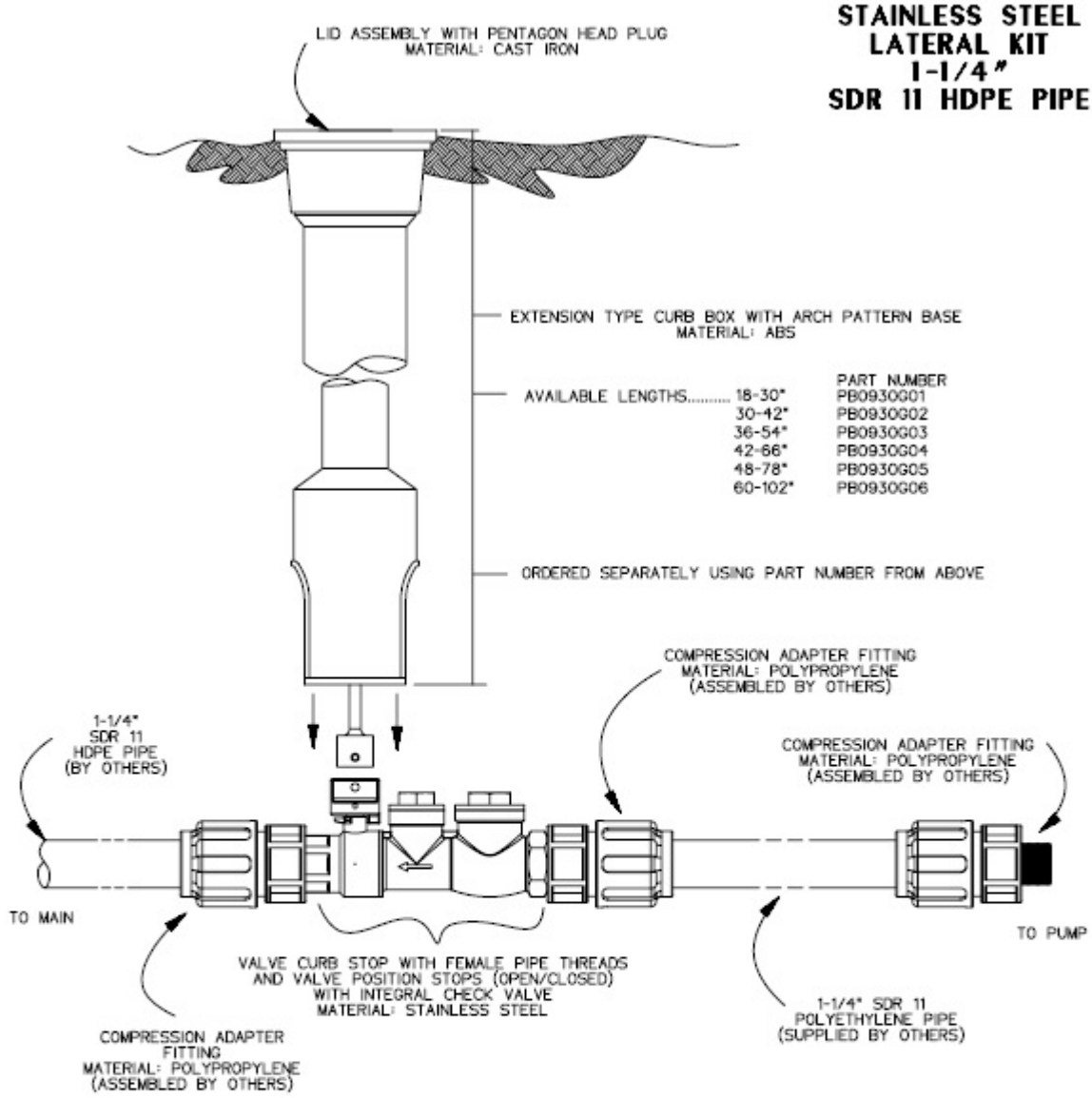
STAINLESS STEEL LATERAL KIT 1-1/4" SDR 11 HDPE PIPE



KIT PARTS ARE NOT ASSEMBLED

NOTES:

1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC0193G01
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

SGS	DN	11/02/11	A	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE

e|one
SEWER SYSTEMS

STAINLESS STEEL LATERAL KIT
1-1/4" SDR 11 HDPE PIPE

NA0330P02

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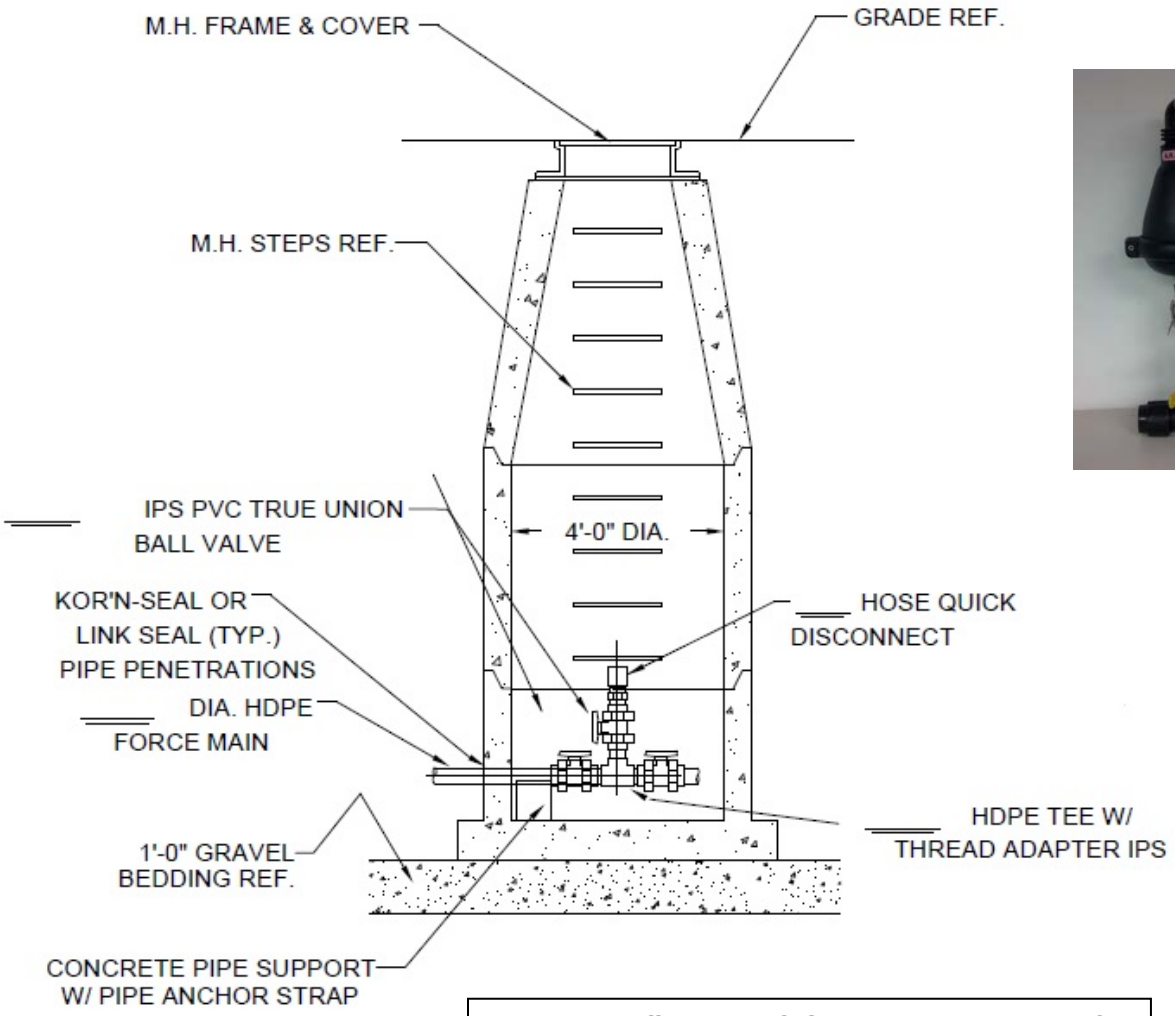
Example of Typical Cleanout Detail

(Optional Air/Vacuum Valve shown –right)



Designer/Installer must include proper pipe supports with corrosion resistant (Stainless Steel) hardware. Supports will vary depending on cleanout configuration.

Cleanout detail can be modified to match typical installation needs. Inline shut offs may be added to isolate flow direction. Image shown is flow through cleanout. These structures can be terminal end of line cleanouts, or junction cleanouts as may be required. Optional air and vacuum relief valves may be added when required.

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

APRIL 19, 2022
LAST REVISED: MAY 25, 2022

GENERAL INFORMATION

OWNER
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802

APPLICANT
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802

PREPARED FOR
MAP 229 LOT 1
ARTWILL, LLC
P.O. BOX 370
PORTSMOUTH, NH 03802

RESOURCE LIST

PLANNING/ZONING DEPARTMENT
1 JUNKINS AVE
PORTSMOUTH, NH 03801
603-610-7216

BUILDING DEPARTMENT
1 JUNKINS AVE
PORTSMOUTH, NH 03801
603-610-7243
ROBERT MARSILIA,
CHIEF BUILDING INSPECTOR

PUBLIC WORKS
600 PEVERLY HILL RD
PORTSMOUTH, NH 03801
603-472-1530
PETER RICE, PUBLIC WORKS DIRECTOR

POLICE DEPARTMENT
3 JUNKINS AVE
PORTSMOUTH, NH 03801
603-427-1510
MARK NEWPORT, CHIEF

FIRE DEPARTMENT
170 COURT ST
PORTSMOUTH, NH 03801
603-427-1515
PATRICK HOWE, CHIEF

ASSOCIATED PROFESSIONALS
ARCHITECT
SMITHFIELD CONSTRUCTION, INC.
PO BOX 370
PORTSMOUTH, NH 03802
603-674-5204

VICINITY PLAN

INDEX OF SHEETS

SHEET	SHEET TITLE
C-00	COVER
C-01	NOTES & LEGEND
S-01	EXISTING CONDITIONS PLAN
S-02	SUBDIVISION PLAN
C-02	SITE PREPARATION & DEMOLITION PLAN
C-03	SITE LAYOUT PLAN
C-04	GRADING & DRAINAGE PLAN
C-05	UTILITY PLAN
C-06	LANDSCAPE PLAN
C-07	EROSION CONTROL PLAN
C-08	EROSION CONTROL NOTES
C-09	TRUCK TURNING PLAN
C-10 - C-15	DETAILS
REFERENCE PLANS BY ASSOCIATED PROFESSIONALS	
-	ARCHITECTURAL ELEVATION PLAN

PERMITS/APPROVALS

	NUMBER	APPROVED	EXPIRES
CITY PLANNING BOARD SITE PLAN REVIEW	-	-	-
CITY PLANNING BOARD SUBDIVISION REVIEW	-	-	-
CITY PLANNING BOARD CONDITIONAL USE PERMIT FOR AADU	-	-	-
NHDES SEWER CONNECTION PERMIT	-	-	-

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1
COVER
PROPOSED 3 LOT SUBDIVISION
437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
OWNED BY & PREPARE FOR
ARTWILL, LLC

SCALE: AS SHOWN **APRIL 19, 2022**

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE
No. 14950
LICENSED
PROFESSIONAL ENGINEER

DIG SAFE
CALL BEFORE YOU DIG
811 OR 1-888-DIG-SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

THESE PLANS ARE PERMIT DRAWINGS ONLY AND HAVE NOT BEEN DETAILED FOR CONSTRUCTION OR BIDDING.

REV	DATE	DESCRIPTION	DR	CK
1	5/23/2022	UPDATE LAST REVISED DATE.	JSM	JJM

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB	-	C-00
PRT		CK	JCC	CADFILE	45407-120_COVER	

LEGEND

PROPOSED

- PROPERTY LINE
- ZONING LINE
- EASEMENT
- BASELINE
- FLOODPLAIN
- EDGE OF WATERBODY
- EDGE OF WETLAND
- SETBACK (WETLAND)
- SETBACK (STRUCTURE)
- SETBACK (PARKING)
- SETBACK (LANDSCAPE)
- GRAVEL ROAD
- EOP — EDGE OF PAVEMENT
- VGC — VERTICAL GRANITE CURB
- SGC — SLOPED GRANITE CURB
- CC — CONCRETE CURB
- ICC — INTEGRATED CONCRETE CURB
- BIT — BITUMINOUS ASPHALT CURB
- CCB — CAPE COD BERM
- SAWCUT
- BUILDING
- BUILDING ROOF OVERHANG
- BUILDING FOUNDATION
- BUILDING ENTRANCE
- OVERHEAD DOOR
- TREE LINE
- FENCE (CHAIN LINK)
- FENCE (WIRE)
- FENCE (STOCKADE)
- GUARDRAIL
- STONE WALL
- RETAINING WALL
- SILT FENCE
- SS — SILT SOCK
- SOIL BOUNDARY
- LIMIT OF GRADING
- XX — CONTOUR
- 100.50 TC / 100.00 BC OR 100.00 FG — PROPOSED SPOT GRADE
- (100.50) FG — EXISTING SPOT GRADE
- ## — PARKING COUNT
- DSLY — YELLOW DOUBLE SOLID LINE
- SSLY — YELLOW SINGLE SOLID LINE
- SSLW — WHITE SINGLE SOLID LINE
- SBLW — WHITE SINGLE BROKEN LINE
- STOP BAR
- CROSSWALK
- ACCESSIBLE PARKING SYMBOL
- PAVEMENT ARROW
- TRAFFIC FLOW ARROW (NOT PAINTED)
- SIGN (SINGLE POST)
- SIGN (DOUBLE POST)
- SIGN (PYLON)
- SIGN (MONUMENT)
- BOLLARD
- D — DUMPSTER PAD

PROPOSED

- CONCRETE
- GRAVEL
- HEAVY DUTY PAVEMENT
- CONSTRUCTION ENTRANCE
- SNOW STORAGE
- RIPRAP
- INLET PROTECTION
- FLOW ARROW
- DRAIN LINE
- DRAINAGE SWALE
- STORMWATER BMP
- S — SEWER LINE
- FM — SEWER FORCE MAIN LINE
- W — WATER LINE
- G — GAS LINE
- OHE — OVERHEAD UTILITY LINE
- UGE — UNDERGROUND UTILITY LINE
- CATCH BASIN
- DRAIN INLET
- OUTLET CONTROL STRUCTURE
- ROOF DRAIN
- DRAIN CLEANOUT
- DRAIN MANHOLE
- FARED END SECTION
- SEWER CLEAN OUT
- SEWER MANHOLE
- SEWER VENT
- DRAIN/SEWER/WATER PLUG OR CAP
- HYDRANT
- FIRE DEPARTMENT CONNECTION
- WATER GATE VALVE
- WATER SHUTOFF
- THRUST BLOCK
- WATER METER
- WATER MANHOLE
- WELL
- GAS GATE VALVE
- GAS SHUT OFF
- GAS METER
- TELEPHONE MANHOLE
- ELECTRIC MANHOLE
- TRAFFIC CONTROL CABINET
- ELECTRIC HANDHOLE
- ELECTRIC PULL BOX
- ELECTRIC METER
- FLOOD LIGHT
- LIGHT POLE
- UTILITY POLE
- GUY POLE
- T — TRANSFORMER PAD
- B-# — BORING LOCATION
- TP-# — TEST PIT LOCATION
- IT-# — INFILTRATION TEST LOCATION
- MW-# — MONITORING WELL

ABBREVIATIONS

GENERAL

ABAN	ABANDON
AC	ACRES
ADJ	ADJUST
APPROX	APPROXIMATE
BC	BOTTOM OF CURB
BIT	BITUMINOUS
BK/PG	BOOK & PAGE
BLDG	BUILDING
BMP	BEST MANAGEMENT PRACTICE
BS	BOTTOM OF SLOPE
BW	BOTTOM OF WALL
CONC	CONCRETE
COORD	COORDINATE
DIA	DIAMETER
ELEV	ELEVATION
EP	EDGE OF PAVEMENT
EXIST	EXISTING
FFE	FINISHED FLOOR ELEVATION
FND	FOUNDATION
HP	HIGH POINT
INV	INVERT ELEVATION
IT	INFILTRATION TEST
L	LENGTH
LF	LINEAR FEET
LSA	LANDSCAPE AREA
MAX	MAXIMUM
MIN	MINIMUM
N/F	NOW OR FORMERLY
NHFG	NEW HAMPSHIRE FISH & GAME
NTS	NOT TO SCALE
OC	ON CENTER
PAVE	PAVEMENT
PERF	PERFORATED
PROP	PROPOSED
R	RADIUS
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
REM	REMOVE
RET	RETAIN
RIM	RIM ELEVATION
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SW	SIDEWALK
TBM	TEMPORARY BENCHMARK
TC	TOP OF CURB
TP	TEST PIT
TW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
WCR	ACCESSIBLE WHEELCHAIR RAMP
W/	WITH

UTILITIES

CB	CATCH BASIN
CIP	CAST IRON PIPE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
COND	CONDUIT
DCB	DOUBLE CATCH BASIN
DIP	DUCTILE IRON PIPE
DMH	DRAIN MANHOLE
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FES	FLARED END SECTION
GT	GREASE TRAP
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HH	HANDHOLE
HW	HEADWALL
HYD	HYDRANT
LP	LIGHT POLE
OCS	OUTLET CONTROL STRUCTURE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
SMH	SEWER MANHOLE
SOS	SEDIMENT OIL SEPARATOR
TSV	TAPPING SLEEVE, VALVE, AND BOX
UP	UTILITY POLE

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GENERAL NOTES

1. THESE PLANS ARE PERMIT DRAWINGS ONLY AND HAVE NOT BEEN DETAILED FOR CONSTRUCTION OR BIDDING.
2. THESE PLANS WERE PREPARED UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER. TFMORAN, INC. ASSUMES NO LIABILITY AS A RESULT OF ANY CHANGES OR NON-CONFORMANCE WITH THESE PLANS EXCEPT UPON THE WRITTEN APPROVAL OF THE ENGINEER OF RECORD.
3. THE SUBDIVISION PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
4. ALL IMPROVEMENTS SHOWN ON THE SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE CITY PLANNING BOARD.
5. ALL WORK SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS OF THE CITY OF PORTSMOUTH, AND SHALL BE BUILT IN A WORKMANLIKE MANNER IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL WORK TO CONFORM TO CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS. ALL WORK WITHIN THE RIGHT-OF-WAY OF THE CITY AND/OR STATE SHALL COMPLY WITH APPLICABLE STANDARDS. COORDINATE ALL WORK WITHIN THE RIGHT-OF-WAY WITH APPROPRIATE CITY, COUNTY, AND/OR STATE AGENCY.
6. THE SITE CONTRACTOR SHALL ENSURE THAT ALL WORK IS PERFORMED IN ACCORDANCE WITH APPLICABLE SECTIONS OF ENV-WQ 1500. THE SITE CONTRACTOR SHALL NOTIFY THE ENGINEER IN ADVANCE OF CONSTRUCTION OF EACH STORMWATER FACILITY TO COORDINATE REQUIRED INSPECTIONS. THE CONTRACTOR SHALL TAKE PROGRESS PHOTOS DURING CONSTRUCTION OF ALL STORMWATER DRAINAGE COMPONENTS AND SEND TO THE ENGINEER.
7. SEE EXISTING CONDITIONS PLAN FOR THE HORIZONTAL AND VERTICAL DATUM.
8. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION. VERIFY TBM ELEVATIONS PRIOR TO CONSTRUCTION.
9. CONTACT EASEMENT OWNERS PRIOR TO COMMENCING ANY WORK WITHIN THE EASEMENTS.
10. PRIOR TO COMMENCING ANY SITE WORK, ALL LIMITS OF WORK SHALL BE CLEARLY MARKED IN THE FIELD.
11. SITE WORK SHALL BE CONSTRUCTED FROM A COMPLETE SET OF PLANS, NOT ALL FEATURES ARE DETAILED ON EVERY PLAN. THE ENGINEER IS TO BE NOTIFIED OF ANY CONFLICT WITHIN THIS PLAN SET.
12. TFMORAN, INC. ASSUMES NO LIABILITY FOR WORK PERFORMED WITHOUT AN ACCEPTABLE PROGRAM OF TESTING AND INSPECTION AS APPROVED BY THE ENGINEER OF RECORD.
13. TEMPORARY FENCING SHALL BE PROVIDED AND COVERED WITH A FABRIC MATERIAL TO CONTROL DUST MITIGATION.
14. ALL DEMOLITION SHALL INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKWAYS, AND ANY OTHER ADJACENT OPERATING FACILITIES. PRIOR WRITTEN PERMISSION FROM THE OWNER/DEVELOPER AND LOCAL PERMITTING AUTHORITY IS REQUIRED IF CLOSURE/OBSTRUCTIONS TO ROADS, STREET, WALKWAYS, AND OTHERS IS DEEMED NECESSARY. CONTRACTOR TO PROVIDE ALTERNATE ROUTES AROUND CLOSURES/OBSTRUCTIONS PER LOCAL/STATE/FEDERAL REGULATIONS.
15. REFER TO ARCHITECTURAL PLANS FOR LAYOUT OF BUILDING FOUNDATIONS AND CONCRETE ELEMENTS WHICH ABUT THE BUILDING SUCH AS STAIRS, SIDEWALKS, LOADING DOCK RAMPS, PADS, AND COMPACTOR PADS. DO NOT USE SITE PLANS FOR LAYOUT OF FOUNDATIONS.
16. IN THE EVENT OF A CONFLICT BETWEEN PLANS, SPECIFICATIONS, AND DETAILS, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY FOR CLARIFICATION.
17. IF CONDITIONS AT THE SITE ARE DIFFERENT THAN SHOWN ON THE PLANS, THE ENGINEER SHALL BE NOTIFIED PRIOR TO PROCEEDING WITH THE AFFECTED WORK.
18. CONTRACTOR'S GENERAL RESPONSIBILITIES:
    A. BID AND PERFORM THE WORK IN ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL CODES, SPECIFICATIONS, REGULATIONS, AND STANDARDS AND CONDITIONS OF ALL PROJECT-SPECIFIC PERMITS AND APPROVALS AS LISTED ON THE COVER SHEET TO THESE PLANS OR OTHERWISE REQUIRED.
    B. NOTIFY ENGINEER IN WRITING OF ANY DISCREPANCIES OF PROPOSED LAYOUT AND/OR EXISTING FEATURES.
    C. EMPLOY A LICENSED SURVEYOR TO DETERMINE ALL LINES AND GRADES AND LAYOUT OF SITE ELEMENTS AND BUILDINGS.
    D. THE CONTRACTOR SHALL BE RESPONSIBLE TO BECOME FAMILIAR WITH THE SITE AND ALL SURROUNDING CONDITIONS. THE CONTRACTOR SHALL ADVISE THE APPROPRIATE AUTHORITY OF INTENTIONS AT LEAST 48 HOURS IN ADVANCE.
    E. TAKE APPROPRIATE MEASURES TO REDUCE, TO THE FULLEST EXTENT POSSIBLE, NOISE, DUST, AND UNSIGHTLY DEBRIS. CONSTRUCTION ACTIVITIES SHALL BE CARRIED OUT BETWEEN THE HOURS OF 7:00 AM AND 9:00 PM, MONDAY THROUGH FRIDAY IN ACCORDANCE WITH THE APPLICABLE MUNICIPAL ORDINANCES AND REGULATIONS OF THE CITY OF PORTSMOUTH, NEW HAMPSHIRE.
    F. MAINTAIN EMERGENCY ACCESS TO ALL AREAS AFFECTED BY WORK AT ALL TIMES.
    G. IN ACCORDANCE WITH RSA 430:53 AND AGR 3800, THE CONTRACTOR SHALL NOT TRANSPORT INVASIVE SPECIES OFF THE PROPERTY, AND SHALL DISPOSE OF INVASIVE SPECIES ON-SITE IN A LEGAL MANNER.
    H. COORDINATE WITH ALL UTILITY COMPANIES AND CONTACT DIGSAFE (811 OR 888-344-7233) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION.
    I. PROTECT NEW AND EXISTING BURIED UTILITIES DURING INSTALLATION OF ALL SITE ELEMENTS. DAMAGED UTILITIES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
    J. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS AT THE SITE. THESE PLANS, PREPARED BY TFMORAN, INC., DO NOT EXTEND TO OR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THEIR EMPLOYEES, AGENTS, OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE SURVEYOR OR ENGINEER HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEMS WHICH MAY BE REQUIRED BY THE US OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND/OR LOCAL REGULATIONS.
    K. WRITTEN DIMENSIONS HAVE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN CASE OF CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWING AND/OR SPECIFICATION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY FOR CLARIFICATIONS.
    L. VERIFY LAYOUT OF PROPOSED BUILDING FOUNDATIONS WITH ARCHITECT AND THAT PROPOSED FOUNDATION MEETS PROPERTY LINE AND/OR WETLAND SETBACKS PRIOR TO COMMENCING ANY FOUNDATION CONSTRUCTION.
    M. PROVIDE AN AS-BUILT PLAN AT THE COMPLETION OF THE PROJECT TO THE PLANNING DIRECTOR AND PER CITY REGULATIONS.
    N. IF ANY DEVIATIONS FROM THE APPROVED PLANS AND SPECIFICATIONS HAVE BEEN MADE, THE SITE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS STAMPED BY A LICENSED SURVEYOR OR QUALIFIED ENGINEER ALONG WITH A LETTER STAMPED BY A QUALIFIED ENGINEER DESCRIBING ALL SUCH DEVIATIONS, AND BEAR ALL COSTS FOR PREPARING AND FILING ANY NEW PERMITS OR PERMIT AMENDMENTS THAT MAY BE REQUIRED.
    O. AT COMPLETION OF CONSTRUCTION, THE SITE CONTRACTOR SHALL PROVIDE A LETTER CERTIFYING THAT THE PROJECT WAS COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS, AND A LETTER STAMPED BY A QUALIFIED ENGINEER THAT THEY HAVE OBSERVED ALL UNDERGROUND DETENTION SYSTEMS, INFILTRATION SYSTEMS, OR FILTERING SYSTEMS PRIOR TO BACKFILL AND THAT SUCH SYSTEMS CONFORM TO THE APPROVED PLANS AND SPECIFICATIONS.

GRADING & DRAINAGE NOTES

1. THE CONTRACTOR SHALL PREPARE, MAINTAIN, AND EXECUTE A S.W.P.P.P. IN ACCORDANCE WITH EPA REGULATIONS AND THE CONSTRUCTION GENERAL PERMIT.
2. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER TO SUBMIT AN eNOI AT LEAST 14 DAYS IN ADVANCE OF ANY EARTHWORK ACTIVITIES AT THE SITE.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK THE ACCURACY OF THE TOPOGRAPHY AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY EARTHWORK BEING PERFORMED ON THE SITE. NO CLAIM FOR EXTRA WORK WILL BE CONSIDERED FOR PAYMENT AFTER EARTHWORK HAS COMMENCED.
4. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT FOR INFORMATION ABOUT SOIL AND GROUNDWATER CONDITIONS. THE CONTRACTOR SHALL FOLLOW THE GEOTECHNICAL ENGINEER'S RECOMMENDED METHODS TO ADDRESS ANY SOIL AND GROUNDWATER ISSUES THAT ARE FOUND ON SITE, INCLUDING AND NOT LIMITED TO DEWATERING METHODS, PERIMETER DRAINS AND TIE INTO STORMWATER MANAGEMENT SYSTEM, ETC.
5. COORDINATE WITH GEOTECHNICAL/STRUCTURAL PLANS FOR SITE PREPARATION AND OTHER BUILDING INFORMATION.
6. COORDINATE WITH ARCHITECTURAL PLANS FOR DETAILED GRADING AT BUILDING, AND SIZE AND LOCATION OF ALL BUILDING SERVICES.
7. COORDINATE WITH MECHANICAL AND PLUMBING PLANS FOR ROOF DRAIN INFORMATION.
8. LIMITS OF WORK ARE SHOWN AS APPROXIMATE. THE CONTRACTOR SHALL COORDINATE ALL WORK TO PROVIDE SMOOTH TRANSITIONS. THIS INCLUDES GRADING, PAVEMENT, CURBING, SIDEWALKS, AND ALIGNMENTS.
9. THE CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE, RAMPS, AND LOADING AREAS.
10. THE SITE SHALL BE GRADED SO ALL FINISHED PAVEMENT HAS POSITIVE DRAINAGE AND SHALL NOT POND WATER DEEPER THAN 1/4" FOR A PERIOD OF MORE THAN 15 MINUTES AFTER FLOODING.
11. ALL ELEVATIONS SHOWN AT CURB ARE TO THE BOTTOM OF CURB UNLESS OTHERWISE NOTED. CURBS HAVE A 6" REVEAL UNLESS OTHERWISE NOTED.
12. ALL SIDEWALK AND OTHER CURB REVEALS SHALL BE 6" WITH A TOLERANCE OF PLUS OR MINUS 3/8". WHERE SIDEWALK IS TO BE FLUSH, THE PAVEMENT REVEAL SHALL BE 1/4" WITH A TOLERANCE OF 1/8".
13. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE PRIOR TO INSTALLATION OF FINISHED PAVEMENT.
14. ROAD AND DRAINAGE CONSTRUCTION SHALL CONFORM TO THE DETAILS SHOWN ON THE PLANS AND SHALL MEET LOCAL STANDARDS AND THE REQUIREMENTS OF THE LATEST NHDOT STANDARD SPECIFICATIONS FOR ROADS AND BRIDGE CONSTRUCTION AND THE NHDOT STANDARD STRUCTURE DRAWINGS UNLESS OTHERWISE NOTED.
15. STORMWATER DRAINAGE SYSTEM SHALL BE CONSTRUCTED TO LINE AND GRADE AS SHOWN ON THE PLANS. CONSTRUCTION METHODS SHALL CONFORM TO NHDOT STANDARD SPECIFICATIONS, SECTION 603. CATCH BASINS AND DRAIN MANHOLES SHALL CONFORM TO SECTION 604. ALL CATCH BASIN GRATES SHALL BE TYPE B AND CONFORM TO NHDOT STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED.
16. NO FILL SHALL BE PLACED IN ANY WETLAND AREA.
17. ALL EXCAVATIONS SHALL BE THOROUGHLY SECURED ON A DAILY BASIS BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION OPERATIONS IN THE IMMEDIATE AREA.
18. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER, AND MULCH.
19. DENSITY REQUIREMENTS:

MINIMUM DENSITY*	LOCATION
95%	BELOW PAVED OR CONCRETE AREAS
95%	TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL
90%	BELOW LOAM AND SEED AREAS

*ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C. FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM D-6938.

UTILITY NOTES

1. LENGTH OF PIPE IS FOR CONVENIENCE ONLY. ACTUAL PIPE LENGTH SHALL BE DETERMINED IN THE FIELD.
2. ALL PROPOSED UTILITY WORK, INCLUDING MATERIAL, INSTALLATION, TERMINATION, EXCAVATION, BEDDING, BACKFILL, COMPACTION, TESTING, CONNECTIONS, AND CONSTRUCTION SHALL BE COORDINATED WITH AND COMPLETED IN ACCORDANCE WITH THE APPROPRIATE REQUIREMENTS, CODES, AND STANDARDS OF ALL CORRESPONDING UTILITY ENTITIES AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES, SHOWN OR NOT SHOWN ON THESE PLANS, PRIOR TO THE START OF ANY CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION BE AGREED TO BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT "DIGSAFE" (811) AT LEAST 72 HOURS BEFORE DIGGING.
4. COORDINATE ALL WORK ADJACENT TO PROPOSED BUILDINGS WITH ARCHITECTURAL BUILDING DRAWINGS. CONFIRM UTILITY PENETRATIONS AND INVERT ELEVATIONS ARE COORDINATED PRIOR TO INSTALLATION.
5. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES OWNING UTILITIES, EITHER OVERHEAD OR UNDERGROUND, WITHIN THE CONSTRUCTION AREA AND SHALL COORDINATE AS NECESSARY WITH THE UTILITY COMPANIES OF SAID UTILITIES. THE PROTECTION OR RELOCATION OF UTILITIES IS ULTIMATELY THE RESPONSIBILITY OF THE CONTRACTOR.
6. THE EXACT LOCATION OF NEW UTILITY CONNECTIONS SHALL BE DETERMINED BY THE CONTRACTOR IN COORDINATION WITH UTILITY COMPANY, COUNTY AGENCY, AND/OR PRIVATE UTILITY COMPANY.
7. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER THE UTILITY INSTALLATION COMPLETE AND OPERATIONAL.
8. ALL UTILITY COMPANIES REQUIRE INDIVIDUAL CONDUITS. CONTRACTOR TO COORDINATE WITH TELEPHONE, CABLE, AND ELECTRIC COMPANIES REGARDING NUMBER, SIZE, AND TYPE OF CONDUITS REQUIRED PRIOR TO INSTALLATION OF ANY CONDUIT.
9. SANITARY SEWER SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATIONS AS SHOWN ON THESE PLANS. ALL SEWER MAINS AND FITTINGS SHALL BE PVC AND SHALL CONFORM TO ASTM F 679 (SDR 35 MINIMUM). FORCE MAINS AND FITTINGS SHALL CONFORM TO NH CODE OF ADMINISTRATIVE RULES ENV-WQ 700. ALL SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH NH CODE OF ADMINISTRATIVE RULES ENV-WQ 700. SANITARY MANHOLES SHALL CONFORM TO NHDES WATER DIVISION WASTEWATER ENGINEERING BUREAU STANDARDS AND SPECIFICATIONS SHOWN HEREON.
10. ON-SITE WATER DISTRIBUTION SHALL BE TO CITY OF PORTSMOUTH STANDARDS AND SPECIFICATIONS. WATER MAINS SHALL HAVE A MINIMUM OF 5.5' COVER. WHERE WATER PIPES CROSS SEWER LINES A MINIMUM OF 18" VERTICAL SEPARATION BETWEEN THE TWO OUTSIDE PIPE WALLS SHALL BE OBSERVED. HORIZONTAL SEPARATION BETWEEN WATER AND SEWER SHALL BE 10' MINIMUM. WHERE A SANITARY LINE CROSSES A WATER LINE, SEWER LINE MUST BE CONSTRUCTED OF FORCE MAIN MATERIALS (PER ENV-WQ 704.08) FROM BUILDING OR MANHOLE TO MANHOLE, OR SUBSTITUTE RUBBER-GASKETED PRESSURE PIPE FOR THE SAME DISTANCE. WHEN SANITARY LINES PASS BELOW WATER LINES, LAY PIPE SO THAT NO JOINT IN THE SANITARY LINE WILL BE CLOSER THAN 6' HORIZONTALLY TO THE WATER LINE.
11. THRUST BLOCKS SHALL BE PROVIDED AT ALL LOCATIONS WHERE WATER LINE CHANGES DIRECTIONS OR CONNECTS TO ANOTHER WATER LINE.
12. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR CONDUIT AND WIRING TO ALL SIGNS AND LIGHTS. CONDUIT TO BE A MINIMUM OF 24" BELOW FINISH GRADE.
13. ALL PROPOSED UTILITIES SHALL BE UNDERGROUND. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES.
14. THE CONTRACTOR SHALL ARRANGE AND PAY FOR ALL INSPECTIONS, TESTING, AND RELATED SERVICES AND SUBMIT COPIES OF ACCEPTANCE TO THE OWNER, UNLESS OTHERWISE INDICATED.
15. PROVIDE PERMANENT PAVEMENT REPAIR FOR ALL UTILITY TRENCHES IN EXISTING ROAD OR PAVEMENT TO REMAIN. SAW CUT TRENCH, PAVEMENT, AND GRANULAR BASE THICKNESS TO MATCH EXISTING PAVEMENT. OBTAIN ALL PERMITS REQUIRED FOR TRENCHING.
16. UNLESS OTHERWISE SPECIFIED, ALL UNDERGROUND STRUCTURES, PIPES, CHAMBERS, ETC. SHALL BE COVERED WITH A MINIMUM OF 18" OF COMPACTED SOIL BEFORE EXPOSURE TO VEHICLE LOADS.
17. THE PROPERTY WILL BE SERVICED BY THE FOLLOWING:

DRAINAGE	PRIVATE
SEWER	MUNICIPAL
WATER	MUNICIPAL
GAS	UNITIL
ELECTRIC	EVERSOURCE
TELEPHONE	CONSOLIDATED COMMUNICATIONS FKA FAIRPOINT COMMUNICATIONS
CABLE	COMCAST

STATE OF NEW HAMPSHIRE — JOHN J. McTIGUE No. 14950 LICENSED PROFESSIONAL ENGINEER

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

NOTES & LEGEND

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: NTS **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

TFM — Civil Engineers, Structural Engineers, Traffic Engineers, Land Surveyors, Landscape Architects, Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB	–	C-01
		CK	JCC	CADFILE	45407-120_NOTES	

May 23, 2022 - 4:05pm
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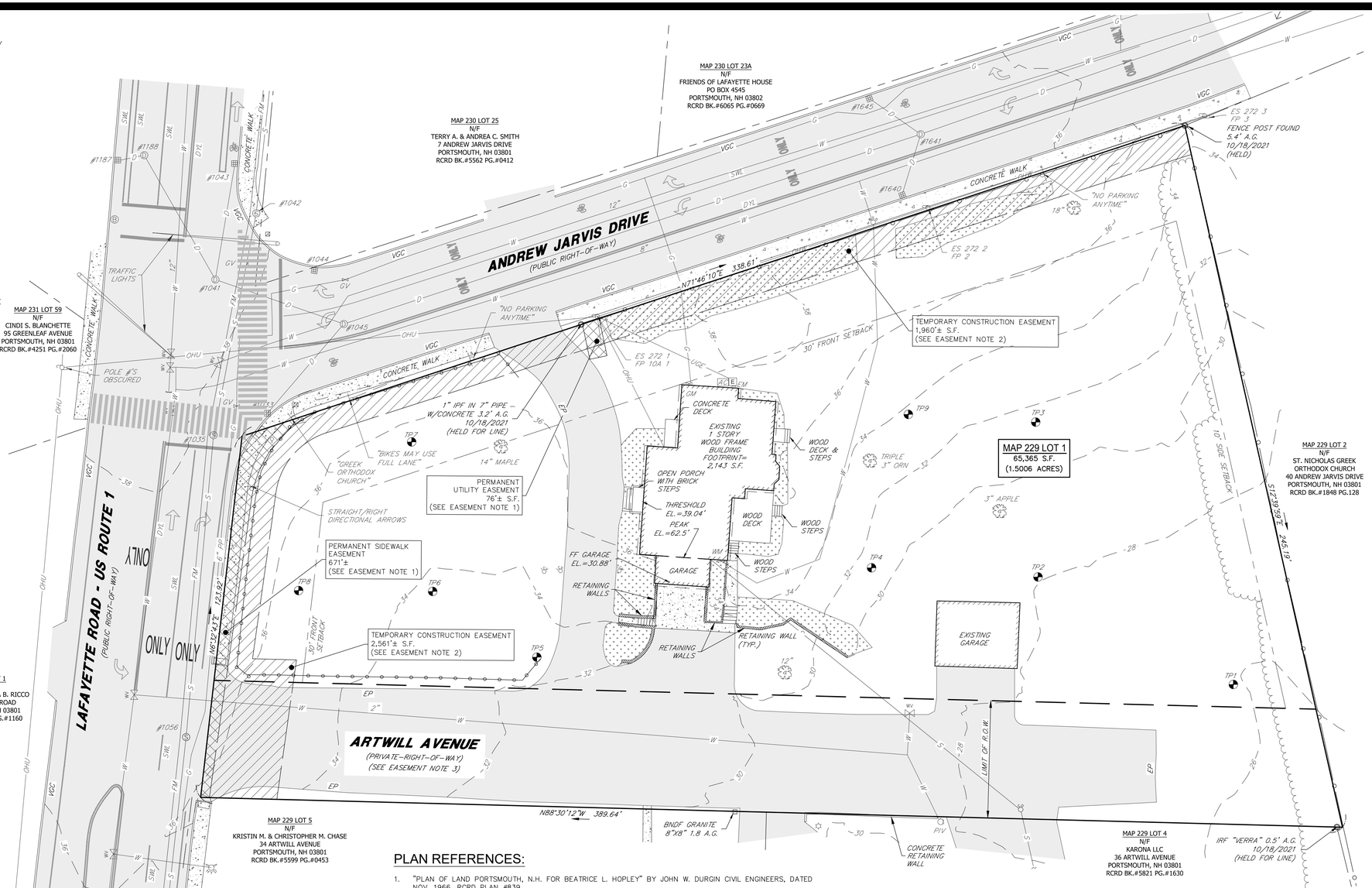
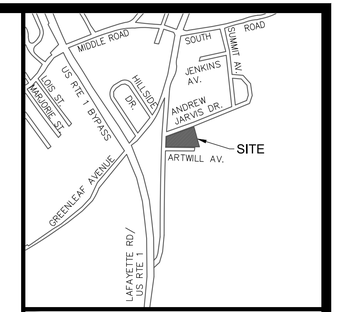
LEGEND:

MAP 229 / LOT 9	ASSESSOR'S MAP NUMBER / LOT NUMBER
A.G.	ABOVE GRADE
BK./PG.	BOOK/PAGE
BNDF	BOUND FOUND
DYL	DOUBLE YELLOW LINE
EL.	ELEVATION
EM	ELECTRIC METER
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
GM	GAS METER
IPF	IRON PIPE FOUND
IRF	IRON ROD FOUND
N/F	NOW OR FORMERLY
ORN	ORNAMENTAL
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
R.O.W.	RIGHT OF WAY
S.F.	SQUARE FEET
SWL	SINGLE WHITE LINE
VGC	VERTICAL GRANITE CURB
WM	WATER METER
	LANDSCAPED AREA
	PAVEMENT
	CONCRETE
	HYDRANT
	IRRIGATION CONTROL VALVE
	WATER SHUT OFF
	WATER VALVE
PIV	POST INDICATOR VALVE
AC	AIR CONDITIONER
E	ELECTRIC BOX
	UTILITY POLE
	LIGHT POST
	SEWER CLEAN OUT
S	SEWER MANHOLE
GV	GAS VALVE
D	DRAINAGE MANHOLE
CB	CATCH BASIN
B	BELL MANHOLE
	BIKE LANE
	SIGN POLE
	DECIDUOUS TREE
TP1	TEST PIT
	PROPERTY LINE
	ABUTTERS LINE
UGE	UNDERGROUND ELECTRIC
OHU	OVERHEAD UTILITIES
D	DRAIN LINE
G	GAS LINE
W	WATER LINE
S	SEWER LINE
FM	FORCE MAIN
	TREE LINE
	SPLIT RAIL FENCE
	CHAINLINK FENCE
36	EXISTING CONTOUR





LOCATION PLAN

NOTES:

1. THE PARCEL IS LOCATED IN THE SINGLE RESIDENCE B (SRB) ZONE.
2. THE PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 229 AS LOT 1.
3. THE PARCEL IS LOCATED IN FLOOD ZONE X (AREAS OF MINIMAL FLOODING) AS SHOWN ON NATIONAL FLOOD INSURANCE PROGRAM (NFIP), FLOOD INSURANCE RATE MAP (FIRM) ROCKINGHAM COUNTY, NEW HAMPSHIRE, PANEL 270 OF 681, VERSION NUMBER 2.3.2.1, MAP NUMBER 33015C0270F, MAP REVISED JANUARY 29, 2021.
4. ZONING REQUIREMENTS:

MINIMUM LOT DIMENSIONS	
LOT AREA	15,000 S.F.
LOT AREA PER DWELLING UNIT	15,000 S.F.
CONTINUOUS STREET FRONTAGE	100'
DEPTH	100'
MINIMUM YARD DIMENSIONS	
FRONT	30'
SIDE	10'
REAR	30'
MAXIMUM STRUCTURE DIMENSIONS	
STRUCTURE HEIGHT:	
SLOPED ROOF	35'
FLAT ROOF	30'
ROOF APPURTENANCE HEIGHT	8'
BUILDING COVERAGE	20%
MINIMUM OPEN SPACE	40%

5. TOTAL PARCEL AREA:
   MAP 229 LOT 1
   65,365 S.F.
   (1.5006 ACRES)
6. OWNER OF RECORD:
   MAP 229 LOT 1
   ARTWILL, LLC
   PO BOX 370
   PORTSMOUTH, NH 03802
   RCRD BK.#6334 PG.#0455
7. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH THE CURRENT LEGAL DESCRIPTIONS. IT IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP OR DEFINE THE LIMITS OF TITLE.
8. THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING FEATURES OF MAP 229 LOT 1.
9. HORIZONTAL DATUM IS NAD 83 (2011) VERTICAL DATUM IS NAVD 88 PER STATIC GPS OBSERVATIONS.
10. FIELD SURVEY COMPLETED BY TODD C. EMERSON IN OCTOBER 2021 USING A LEICA TS-16, A TOPCON HIPER SR AND A CARLSON RT-4 DATA COLLECTOR.
11. EASEMENTS, RIGHTS, AND RESTRICTIONS SHOWN OR IDENTIFIED ARE THOSE WHICH WERE FOUND DURING RESEARCH PERFORMED AT THE ROCKINGHAM COUNTY REGISTRY OF DEEDS. OTHER RIGHTS, EASEMENTS, OR RESTRICTIONS MAY EXIST WHICH A TITLE EXAMINATION OF SUBJECT PARCEL WOULD DETERMINE.
12. THE LOCATION OF ANY UNDERGROUND UTILITY INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE. TFMORAN, INC. MAKES NO CLAIM TO THE ACCURACY OR COMPLETENESS OF UNDERGROUND UTILITIES SHOWN. PRIOR TO ANY EXCAVATION ON SITE THE CONTRACTOR SHALL CONTACT DIG SAFE.

PLAN REFERENCES:

1. "PLAN OF LAND PORTSMOUTH, N.H. FOR BEATRICE L. HOPLEY" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED NOV. 1966. RCRD PLAN #839.
2. "PLAN OF LOTS OWNED BY BEATRICE L. HOPLEY LAFAYETTE ROAD PORTSMOUTH, N.H.", DATED JUNE 1940, REVISED FROM ORIGINAL PLAN BY JOHN W. DURGIN, REVISED MAY, 1946, REVISED FEB. 1957. RCRD PLAN #2637.
3. "STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION CONSTRUCTION PLANS FEDERAL AID PROJECT OF PROPOSED BRIDGE REMOVAL BRIDGE NO. 173/071 & RECONFIGURATION OF US ROUTE 1 BYPASS AND US ROUTE 1 (LAFAYETTE ROAD) FEDERAL PROJECT X-A000(994) NH PROJECT NO. 13455-A, CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM", APPROVED 6/27/12. RCRD PLAN #13455.
4. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO-R37-A, CITY OF PORTSMOUTH ROCKINGHAM COUNTY". PLAN #50031.
5. "STATE OF NEW HAMPSHIRE STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT LAFAYETTE ROAD NO. 37 LAFAYETTE ROAD". PLAN #50147.
6. "CORRECTIVE SEWER EASEMENT PLAN OVER LAND OF KARONA, LLC 36 ARTWILL AVENUE PORTSMOUTH, NEW HAMPSHIRE ASSESSOR'S PARCEL 229-4 FOR KARONA, LLC" BY JAMES VERRA AND ASSOCIATES, INC., DATED 1/19/2021. RCRD PLAN #C-42611.
7. "SUBDIVISION PLAN OF LAND OF J. PHILIP MCCAFFERY FOR GREAT BAY SCHOOL AND TRAINING CENTER LAFAYETTE RD. COUNTY OF ROCKINGHAM PORTSMOUTH NH", BY RICHARD P. MILLETTE AND ASSOCIATES, DATED DEC. 1981, WITH REV.1 FROM 1/7/82. RCRD PLAN #D-10590.
8. "SUBDIVISION PLAN TAX MAP 230 – LOT 23 OWNER: GREAT BAY SCHOOL AND TRAINING CENTER FOR LEMIEUX BUILDERS, INC." 417 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED SEPTEMBER 2013, WITH REVISION 2 DATED 12/23/13. RCRD PLAN #D-38079.
9. "EASEMENT PLAN TAX MAP 230 – LOT 25 D.R. LEMIEUX BUILDERS, INC. TO THE CITY OF PORTSMOUTH 7 ANDREW JARVIS DRIVE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC., DATED JUNE 2014, WITH REVISION 2 DATED 7/25/14. RCRD PLAN #D-38417.
10. "EASEMENT PLAN TAX MAP 229 – LOT 1 HARLON P. WILLIS REVOCABLE TRUST AND JEAN P. WILLIS REVOCABLE TRUST TO THE CITY OF PORTSMOUTH 437 LAFAYETTE ROAD CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED OCTOBER 26, 2015, WITH REVISION 1 DATED 10/26/2015. RCRD PLAN #D-40626.
11. "EASEMENT PLAN TAX MAP 229 – LOT 5 KRISTEN M. CHASE AND CHRISTOPHER M. CHASE TO THE CITY OF PORTSMOUTH 34 ARTWILL AVENUE CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STATE OF NEW HAMPSHIRE" BY GPI GREENMAN-PEDERSEN, INC., DATED JANUARY 20, 2016, WITH REVISION 2 DATED 12/2/2016. RCRD PLAN #D-40627.
12. "INTERSECTION IMPROVEMENT PROJECT U.S. ROUTE 1 AT ANDREW JARVIS DRIVE IN THE CITY OF PORTSMOUTH ROCKINGHAM COUNTY STATE OF NEW HAMPSHIRE PREPARED FOR CITY OF PORTSMOUTH DEPT OF PUBLIC WORKS" BY GREENMAN-PEDERSON, INC., DATED 12/22/17.

EASEMENT NOTES:

1. MAP 229 LOT 1 IS SUBJECT TO PERMANENT EASEMENTS FOR THE INSTALLATION & MAINTENANCE OF A PUBLIC SIDEWALK AND FOR THE INSTALLATION & MAINTENANCE OF TRAFFIC SIGNAL EQUIPMENT. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 1 & 3).
2. MAP 229 LOT 1 IS SUBJECT TO TEMPORARY EASEMENTS FOR THE PURPOSE OF INSTALLING AND MAINTAINING A SIDEWALK. SEE RCRD BK. 5888 PG. 1860 AND PLAN REFERENCE 10 (PARCELS 2 & 4).
3. MAP 229 LOT 1 IS SUBJECT TO RIGHTS OVER A PORTION OF THE PREMISES SHOWN AS "ARTWILL AVENUE" GRANTED TO MAP 229 LOT 2 FOR THE PURPOSES OF INGRESS & EGRESS, CONNECTION TO A 2 INCH WATERLINE AND THE EXTENSION THEREOF, CONNECTION TO THE CITY SEWER ON LAFAYETTE ROAD AND THE RIGHT TO FIRST REFUSAL TO PURCHASE A 50 FOOT STRIP OF LAND. SEE RCRD BK.1848 PG. 128.
4. MAP 229 LOT 1 HAS THE BENEFIT OF A 20' WIDE SEWER EASEMENT FOR REPAIR AND MAINTENANCE ACROSS LAND OF MAP 229 LOT 4. SEE RCRD BK. 6236 PG. 731 AND PLAN REFERENCE 6.

DIG SAFE
ME NH RI VT
811 TOLL FREE
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

20 10 0 20
Graphic Scale in Feet

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY THOSE UNDER MY DIRECT SUPERVISION AND ARE THE RESULT OF A FIELD SURVEY CONDUCTED IN OCTOBER, 2021. THIS SURVEY CONFORMS TO THE ACCURACY REQUIREMENTS OF AN URBAN SURVEY OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS.
I FURTHER CERTIFY THAT THIS SURVEY IS CORRECT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, AND THE FIELD TRAVERSE SURVEY EXCEEDS A PRECISION OF 1:15,000.

STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — No. 844 — J. COREY COLWELL — SIGNATURE

LICENSED LAND SURVEYOR

2022-05-25
DATE

REV.	DATE	DESCRIPTION	DR	CK
1	5/25/2022	NO REVISIONS THIS SHEET	BMK	JCC

TAX MAP 229 LOT 1
EXISTING CONDITIONS PLAN
SMITHFIELD CONSTRUCTION
437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
COUNTY OF ROCKINGHAM
OWNED BY
ARTWILL, LLC

SCALE: 1" = 20' (22x34)
1" = 40' (11x17)
APRIL 19, 2022

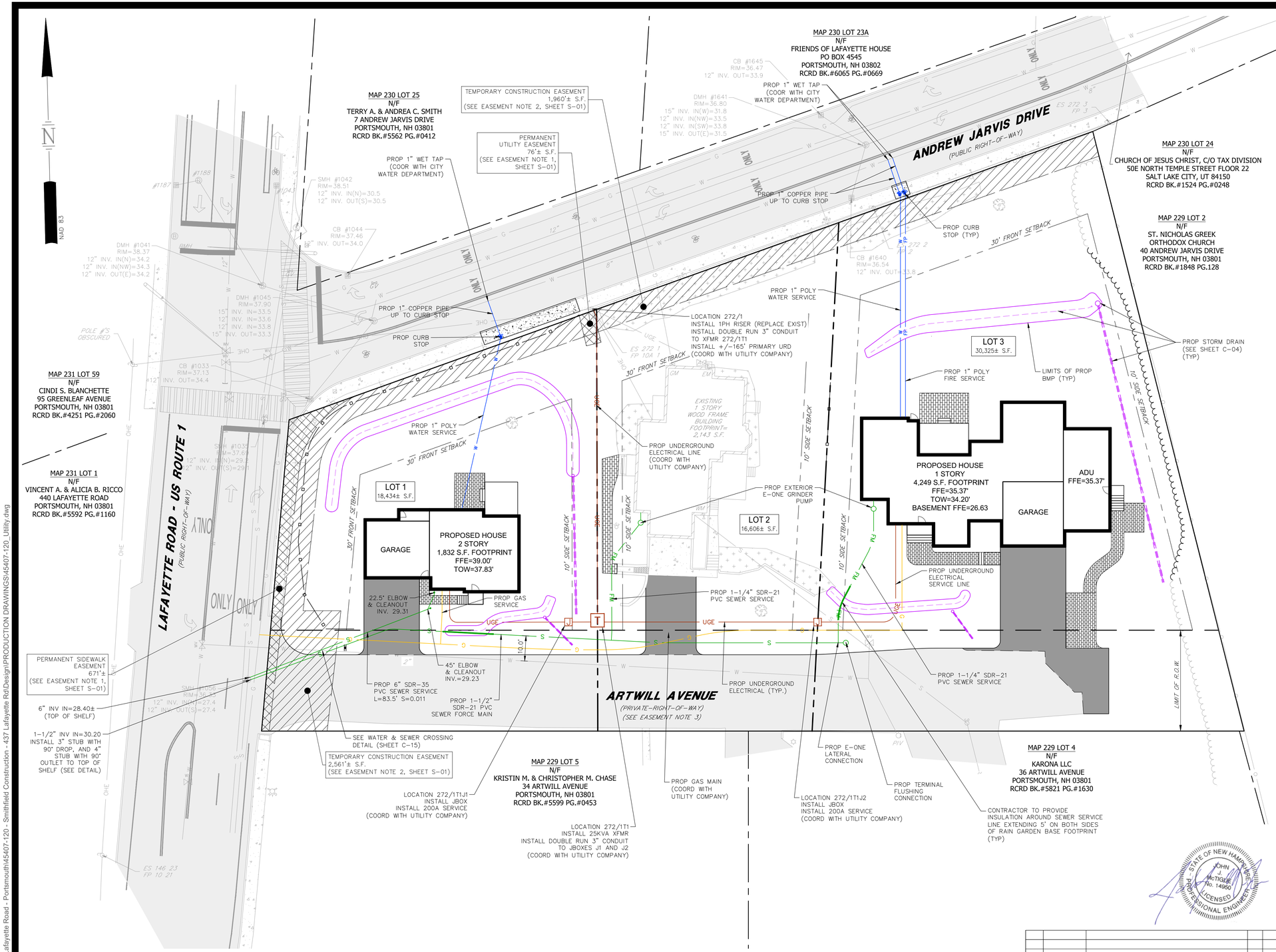
Seacoast Division
TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
170 Commerce Way, Suite 102
Portsmouth, NH 03801
Phone (603) 431-2222
Fax (603) 431-0910
www.tfmoran.com

FILE	DR	ID	FB		
45407-120	CK	JCC	CADFILE	583	S-01

May 24, 2022 - 2:54pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Carlson Survey\Dwgs\45407-120 Survey.dwg

NOTES

1. SEE UTILITY NOTES ON SHEET C-01.
2. CONTRACTOR SHALL COORDINATE WITH CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTING SEWER MANHOLE CONNECTION.



SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

UTILITY PLAN

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

1"=40' (11"X17")
SCALE: 1"=20' (22"X34")

APRIL 19, 2022

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE No. 14060 LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DR	CK
1	5/13/2022	ADD GAS MAIN AND CHANGE FIRE SERVICE TO 1"	JSM	JCC

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB		C-05
		CK	JCC	CADFILE	45407-120_UTILITY	

May 23, 2022 - 4:06pm
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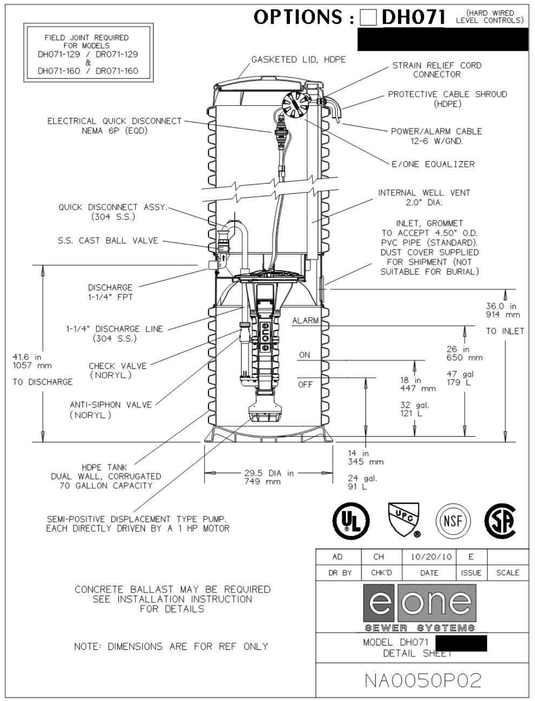


AD	CH	10/20/10	E	
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

MODEL DH071 [redacted]
DETAIL SHEET

NA0050P02

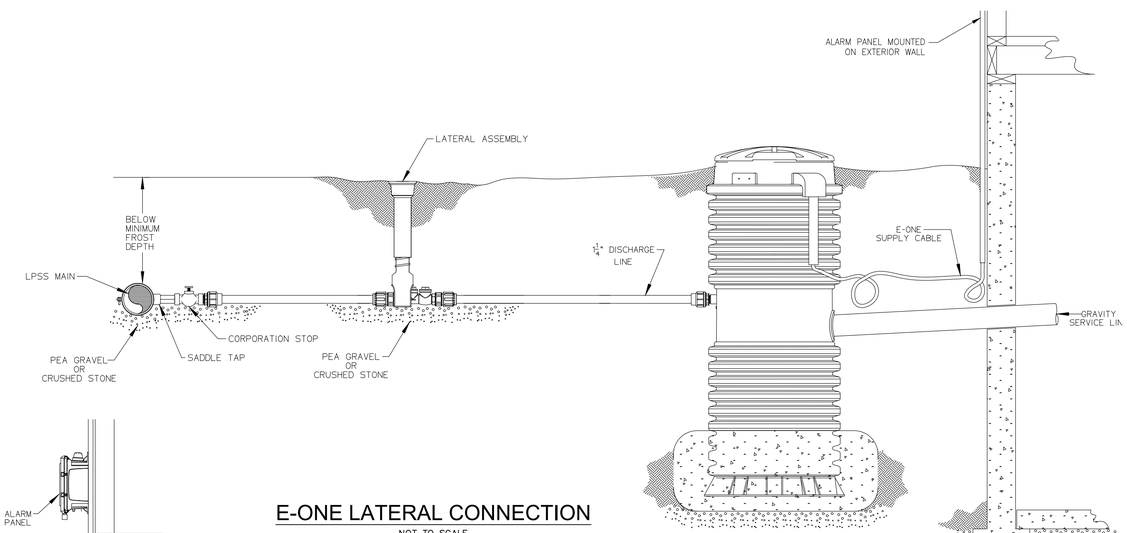
PRESSURE SEWER TESTING NOTES

1. PIPE AND JOINT MATERIALS:
   A. PRESSURE SEWERS SHALL BE CONSTRUCTED OF DUCTILE IRON (DI), HIGH DENSITY POLYETHYLENE (HDPE), OR PVC MATERIAL.
   B. PRESSURE SEWERS SHALL BE TREATED AS GRAVITY SEWERS FOR PURPOSES OF FOUNDATION BEDDING AND BACKFILL REQUIREMENTS.
   C. PVC PIPE USED PRESSURE SEWERS SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D2241 OR ASTM D1785 STANDARDS IN EFFECT WHEN THE PIPE IS MANUFACTURED.
   D. HDPE PIPE USED FOR PRESSURE SEWERS SHALL BE CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM D3035 STANDARD IN EFFECT WHEN THE PIPE IS MANUFACTURED.
   E. IF DI PIPE IS USED IN AN ENVIRONMENT THAT COULD CAUSE CORROSION OR OTHER DETERIORATION OF OR DAMAGE TO AN IRON PIPE, OR OTHERWISE REDUCE THE TYPICAL LIFE EXPECTANCY OF THE PIPE, SUCH AS MAY OCCUR WITH CERTAIN SOIL TYPES, LOW PH LEVELS, OR WATER CONDITIONS, THE PIPE SHALL BE PROTECTED AGAINST CORROSION, SUCH AS WITH CATHODIC PROTECTION.
2. TESTING: THE COMPLETED SEWER SERVICE SHALL BE SUBJECTED TO A THIRD PARTY LEAKAGE TEST ANY OF THE FOLLOWING MANNERS: (PRIOR TO BACKFILLING) PRESSURE SEWERS SHALL BE TESTED IN ACCORDANCE WITH SECTION 5 OF THE AWWA C600, "INSTALLATION OF CAST IRON WATER MAINS AND THEIR APPURTENANCES"STANDARD IN EFFECT WHEN THE TEST IS CONDUCTED AT A PRESSURE EQUAL TO THE GREATER OF 150 PERCENT OF THE DESIGN OPERATING TOTAL DYNAMIC HEAD OR AT LEAST 100 PSI.
3. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.
4. JOINTS SHALL BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATER-TIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AS AT THE STREET SEWER WYE OR AT THE FOUNDATION WALL, APPROPRIATE MANUFACTURED ADAPTERS SHALL BE USED.
5. SEWER SERVICE INSTALLATION: THE PIPE SHALL BE HANDLED, PLACED AND JOINTED IN ACCORDANCE WITH INSTALLATION GUIDES OF THE APPROPRIATE MANUFACTURER. IT SHALL BE CAREFULLY BEDDED ON A 6 INCH LAYER OF CRUSHED STONE AND/OR GRAVEL AS SPECIFIED IN NOTE 11. BEDDING AND RE-FILL FOR DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED BY HAND OR WITH APPROPRIATE MECHANICAL DEVICES.
6. PIPE JOINTS MUST BE MADE UNDER DRY CONDITIONS. IF WATER IS PRESENT, ALL NECESSARY STEPS SHALL BE TAKEN TO DEWATER THE TRENCH.
7. THE CENTERLINE OF ALL BUILDING CONNECTIONS SHALL ENTER THE TOP HALF OF THE SEWER.
8. ILLEGAL CONNECTIONS: NOTHING BUT SANITARY WASTE FLOW FROM TOILETS, SINKS, LAUNDRY ETC. SHALL BE PERMITTED. ROOF LEADERS, FOOTING DRAINS, SUMP PUMPS OR OTHER SIMILAR CONNECTIONS CARRYING RAIN WATER, DRAINAGE OR GROUND WATER SHALL NOT BE PERMITTED.
9. PRESSURE SEWERAGE SHALL HAVE AN ISOLATION VALVE OR CURB STOP VALVE INSTALLED AT THE PROPERTY LINE / LIMITED COMMON AREA. IF A CHECK VALVE IS USED AT THE PROPERTY LINE, THE VALVE SHALL BE INSTALLED WITHIN A VAULT TO FACILITATE MAINTENANCE.
10. WATER SERVICE SHALL NOT BE LAID IN SAME TRENCH AS SEWER SERVICE.
11. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATERIAL AND MEETING ASTM C33/C33M STONE SIZE 67 AND FREE FROM CLAY, LOAM AND ORGANNIC MATTER. THE EXCAVATION SHALL BE PROPERLY DEWATERED WHILE PLACING BEDDING MATERIAL AND SETTING OF THE BASE OR POURING CONCRETE.

100% PASSING	1 INCH SCREEN
90%-100% PASSING	3/4 INCH SCREEN
20%-55% PASSING	3/8 INCH SCREEN
0%-10% PASSING	#4 SIEVE
0%-5% PASSING	#8 SIEVE

WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, SCREENED GRAVEL OR CRUSHED STONE 1/2 INCH TO 1 1/2 INCH SHALL BE USED.

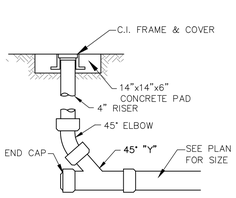
12. LOCATION: THE LOCATION OF THE TEE OR WYE SHALL BE RECORDED AND FILED IN THE MUNICIPAL RECORDS.
13. INTERNAL STEPS IN MANHOLES ARE PROHIBITED PER PORTSMOUTH DPW STANDARDS.



E-ONE LATERAL CONNECTION

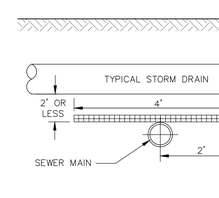
NOT TO SCALE

environment one CORPORATION

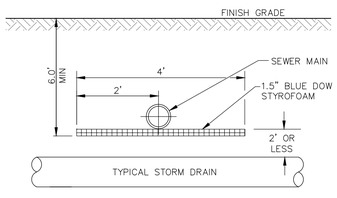


SEWER CLEAN OUT

NOT TO SCALE



CONDITION I

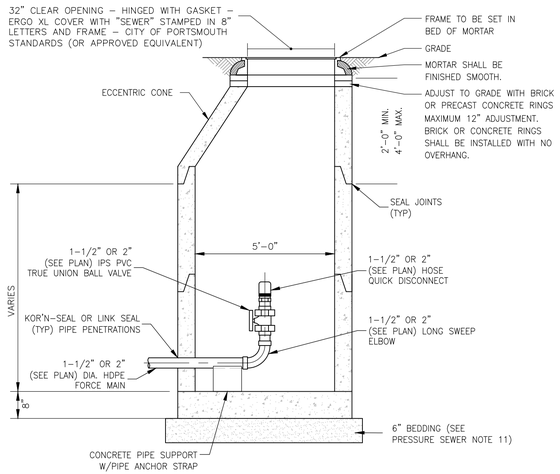


CONDITION II

NOTES:
1. THE LENGTH OR WIDTH OF INSULATION SHALL EXTEND 1 STORM DRAIN PIPE DIAMETER BEYOND THE EDGE OF STORM DRAIN PIPE IN EACH DIRECTION OR A MINIMUM OF 2' BEYOND THE CENTERLINE OF THE STORM DRAIN PIPE, WHICHEVER IS GREATER.
2. ALL BUTT JOINT SEAMS TO BE OVERLAPPED WITH A 1' PIECE OF INSULATION CENTERED OVER SEAM.
3. 18" VERTICAL CLEARANCE SHALL BE PROVIDED BETWEEN WATER MAIN/SERVICES AND SEWER MAIN/SERVICES, WATER OVER SEWER.

INSULATION AT STORM DRAIN & SEWER MAIN CROSSINGS

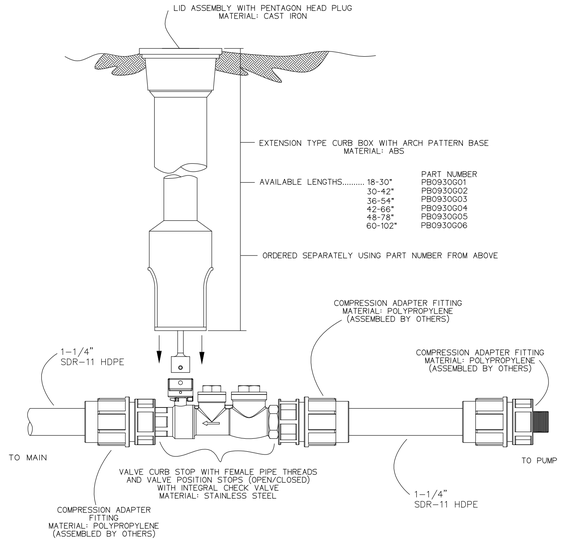
NOT TO SCALE



E-ONE TERMINAL FLUSHING MANHOLE

NOT TO SCALE

NOTES:
1. MANHOLE FRAME & GRATE SHALL BE NEENAH R-3589-A OR APPROVED EQUAL.
2. ALL COMPONENTS SHALL BE DESIGNED FOR HS-20 LOADING.
3. REINFORCING SHALL CONFORM TO ASTM 185 OR ASTM 1497 & ASTM A615, GRADE 60.
4. ALL CONCRETE SHALL BE NHDOT CLASS A.
5. LARGER DIAMETER STRUCTURES SHALL BE USED AS REQUIRED DUE TO NUMBER, ORIENTATION OR SIZE OF PIPES AT THE STRUCTURE.
6. "CL" USED AT ALL LOCATIONS WITHOUT CURB AND "C" TO BE USED AT ALL TO NUMBER, SIZE OR ORIENTATION OF PIPES AT THE BASIN.
7. ALL CASTINGS SHALL BE MADE IN THE USA.
8. INSTALL PIPE SUPPORTS ON THE SWEEP ELBOW.
9. ALL PIPE FITTINGS ARE TO BE RESTRAINED JOINT STYLE.
   A. HDPE TO BE FUSION, ELECTROFUSION OR MECHANICAL JOINT.
   B. PVC WOULD BE SOLVENT GLUE.
   C. ALL JOINTS TO BE THREADED AND PRESSURE RATED TO 200 PSI
10. MANHOLE STRUCTURES SHALL MEET THE DESIGN REQUIREMENTS OF ENV-WQ 704.12 THROUGH ENV-WQ 704.17.
11. A.R.I. D-025 STAINLESS STEEL AIR RELEASE VALVE OR EQUIVALENT.



NOTES:
1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS
   *FOR SS FITTING INTO SS THREAD, USE EITHER PIPE DOPE OR TEFLON TAPE, NOT BOTH
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC0193G02
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

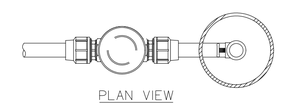
KIT PARTS ARE NOT ASSEMBLED

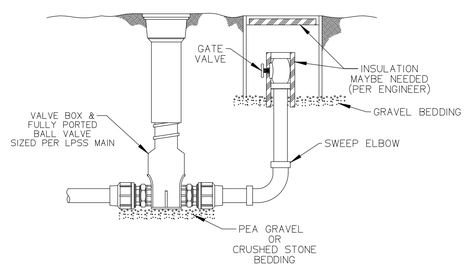
SGS	DN	11/02/11	B	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

STAINLESS STEEL LATERAL KIT
1-1/2" SDR 11 HDPE PIPE

NA0330P03





E-ONE TERMINAL FLUSHING CONNECTION

NOT TO SCALE

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: AS SHOWN **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK
1	5/23/2022	ADDED PRESSURE SEWER TESTING NOTES.	JSM	JJM

TFM © Civil Engineers, Structural Engineers, Traffic Engineers, Land Surveyors, Landscape Architects, Scientists
48 Constitution Drive, Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

FILE	45407-120	DR	JSM	FB		C-12
		CK	JCC	CADFILE	45407-120_DETAILS	

DIG SAFE — CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

May 23, 2022 - 4:07pm
F:\MSC Projects\45407 - Lafayette Road - Portsmouth\45407-120 - Smithfield Construction - 437 Lafayette Rd\Design\PRODUCTION DRAWINGS\45407-120_Details.dwg

SEWER SERVICE NOTES

1. MINIMUM SIZE PIPE FOR SEWER SERVICE SHALL BE FOUR INCHES.

2. PIPE AND JOINT MATERIALS:
   A. PLASTIC SEWER PIPE
      1. PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:

ASTM STANDARDS	GENERIC PIPE MATERIAL	SIZES APPROVED
D3034	*PVC (SOLID WALL)	8" THROUGH 15" (SDR 35)
F679	PVC (SOLID WALL)	18" THROUGH 27" (T-1 & T-2)
F789	PVC (SOLID WALL)	4" THROUGH 18" (T-1 TO T-3)
F794	PVC (RIBBED WALL)	8" THROUGH 36"
D2680	*ABS (COMPOSITES WALL)	8" THROUGH 15"

*PVC: POLY VINYL CHLORIDE
*ABS: ACRYLONITRILE-BUTADIENE-STYRENE

      2. JOINTS SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D-3212 AND SHALL BE PUSH-ON, BELL AND SPIGOT TYPE.

         ABS TRUSS PIPE AND FITTINGS SHALL CONFORM TO ASTM D-2680, POLYMER COMPOUNDING SHALL BE TO ASTM D-1788 (CLASS 322).

         JOINTS FOR ABS TRUSS PIPE SHALL BE CHEMICAL WELDED COUPLINGS TYPE SC IN ACCORDANCE WITH ASTM D-2680, FORMING A CHEMICAL WELDED JOINT.

   B. DUCTILE-IRON PIPE, FITTINGS AND JOINTS.

      1. DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE UNITED STATES OF AMERICA STANDARDS INSTITUTE:
         A21.50 THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A-536 DUCTILE IRON CASTINGS.
         A21.51 DUCTILE IRON PIPE, CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS FOR WATER OR OTHER LIQUIDS.
      2. JOINTS SHALL BE OF THE MECHANICAL OR PUSH-ON TYPE. JOINTS AND GASKETS SHALL CONFORM TO:
         A21.11 RUBBER GASKETS JOINTS FOR CAST IRON PRESSURE PIPE & FITTINGS

3. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.

4. JOINTS SHALL BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATER-TIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AS AT THE STREET SEWER WYE OR AT THE FOUNDATION WALL, APPROPRIATE MANUFACTURED ADAPTERS SHALL BE USED.

5. TEES AND WYES: WHERE A TEE OR WYE IS NOT AVAILABLE IN THE EXISTING STREET SEWER, AN APPROPRIATE CONNECTION SHALL BE MADE, FOLLOWING MANUFACTURERS' INSTRUCTIONS USING A BOLTED, CLAMPED OR EPOXY-CEMENTED SADDLE TAPPED INTO A SMOOTHLY DRILLED OR SAWN OPENING IN THE SEWER. THE PRACTICE OF BREAKING AN OPENING WITH A SLEDGE HAMMER, STUFFING CLOTH OR OTHER SUCH MATERIAL AROUND THE JOINT, OR APPLYING MORTAR TO HOLD THE CONNECTION, AND ANY OTHER SIMILAR CRUDE PRACTICES OR INEPT OR HASTY IMPROVISATIONS WILL NOT BE PERMITTED. THE CONNECTION SHALL BE CONCRETE ENCASED AS SHOWN IN THE DETAIL UP TO AND INCLUDING 15" DIAMETER.

6. SEWER SERVICE INSTALLATION: THE PIPE SHALL BE HANDLED, PLACED AND JOINTED IN ACCORDANCE WITH INSTALLATION GUIDES OF THE APPROPRIATE MANUFACTURER. IT SHALL BE CAREFULLY BEDDED ON A 6 INCH LAYER OF CRUSHED STONE AND/OR GRAVEL AS SPECIFIED IN NOTE 10. BEDDING AND RE-FILL FOR DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED BY HAND OR WITH APPROPRIATE MECHANICAL DEVICES.

   THE PIPE SHALL BE LAID AT A CONTINUOUS AND CONSTANT GRADE FROM THE STREET SEWER CONNECTION TO THE FOUNDATION AT A GRADE OF NOT LESS THAN 1/4" INCH PER FOOT. PIPE JOINTS MUST BE MADE UNDER DRY CONDITIONS. IF WATER IS PRESENT, ALL NECESSARY STEPS SHALL BE TAKEN TO DEWATER THE TRENCH.

7. TESTING: THE COMPLETED SEWER SERVICE SHALL BE SUBJECTED TO A THIRD PARTY LEAKAGE TEST IN ANY OF THE FOLLOWING MANNERS: (PRIOR TO BACKFILLING)

   A. AN OBSERVATION TEE SHALL BE INSTALLED AS SHOWN AND WHEN READY FOR TESTING, AN INFLATABLE BLADDER OR PLUG SHALL BE INSERTED JUST UPSTREAM FROM THE OPENING IN THE TEE. AFTER INFLATION, WATER SHALL BE INTRODUCED INTO THE SYSTEM ABOVE THE PLUG TO A HEIGHT OF 5 FEET ABOVE THE LEVEL OF THE PLUG.

   B. THE PIPE SHALL BE LEFT EXPOSED AND LIBERALLY HOSED WITH WATER, TO SIMULATE, AS NEARLY AS POSSIBLE, WET TRENCH CONDITIONS OR, IF TRENCH IS WET, THE GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. INSPECTIONS FOR LEAKS SHALL BE MADE THROUGH THE CLEANOUT WITH A FLASHLIGHT.

   C. DRY FLUORESCENE DYE SHALL BE SPRINKLED INTO THE TRENCH OVER THE PIPE. IF THE TRENCH IS DRY, THE PIPE SHALL BE LIBERALLY HOSED WITH WATER, OR IF THE TRENCH IS WET, GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. OBSERVATION FOR LEAKS SHALL BE MADE IN THE FIRST DOWN-STREAM MANHOLE.

   LEAKAGE OBSERVED IN ANY ONE OF THE ABOVE ALTERNATE TESTS SHALL BE CAUSE FOR NON-ACCEPTANCE AND THE PIPE SHALL BE DUG-UP IF NECESSARY AND RE-LAID SO AS TO ASSURE WATER TIGHTNESS.

8. ILLEGAL CONNECTIONS: NOTHING BUT SANITARY WASTE FLOW FROM TOILETS, SINKS, LAUNDRY ETC. SHALL BE PERMITTED. ROOF LEADERS, FOOTING DRAINS, SUMP PUMPS OR OTHER SIMILAR CONNECTIONS CARRYING RAIN WATER, DRAINAGE OR GROUND WATER SHALL NOT BE PERMITTED.

9. WATER SERVICE SHALL NOT BE LAID IN SAME TRENCH AS SEWER SERVICE.

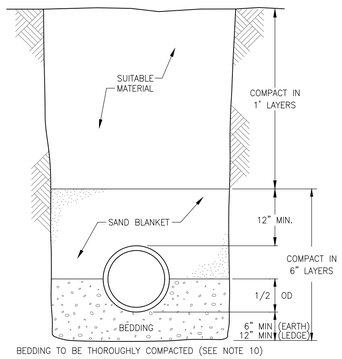
10. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATERIAL AND MEETING ASTM C33-67.

100% PASSING	1 INCH SCREEN
90%-100% PASSING	3/4 INCH SCREEN
20%-55% PASSING	3/8 INCH SCREEN
0%-10% PASSING	#4 SIEVE
0%-5% PASSING	#8 SIEVE

   WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, SCREENED GRAVEL OR CRUSHED STONE 1/2 INCH TO 1 1/2 INCH SHALL BE USED.

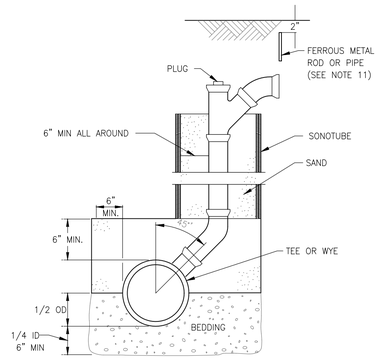
11. LOCATION: THE LOCATION OF THE TEE OR WYE SHALL BE RECORDED AND FILED IN THE MUNICIPAL RECORDS. IN ADDITION, A FERROUS METAL ROD OR PIPE SHALL BE PLACED OVER THE TEE OR WYE AS DESCRIBED IN THE TYPICAL "CHIMNEY" DETAIL, TO AID IN LOCATING THE BURIED PIPE WITH A DIP NEEDLE OR PIPEFINDER.

12. CHIMNEYS: IF VERTICAL DROP INTO SEWER IS GREATER THAN 4 FEET, A CHIMNEY SHALL BE CONSTRUCTED FOR THE SEWER CONNECTION. CHIMNEY INSTALLATION AS RECOMMENDED BY THE PIPE MANUFACTURER MAY BE USED IF APPROVED BY THE ENGINEER.



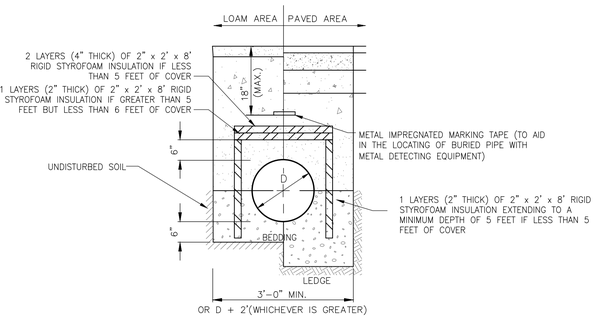
BEDDING TO BE THOROUGHLY COMPACTED (SEE NOTE 10)

TRENCH CROSS-SECTION
NOT TO SCALE



BACKFILLING TO BE BROUGHT UP EVENLY ON ALL SIDES.

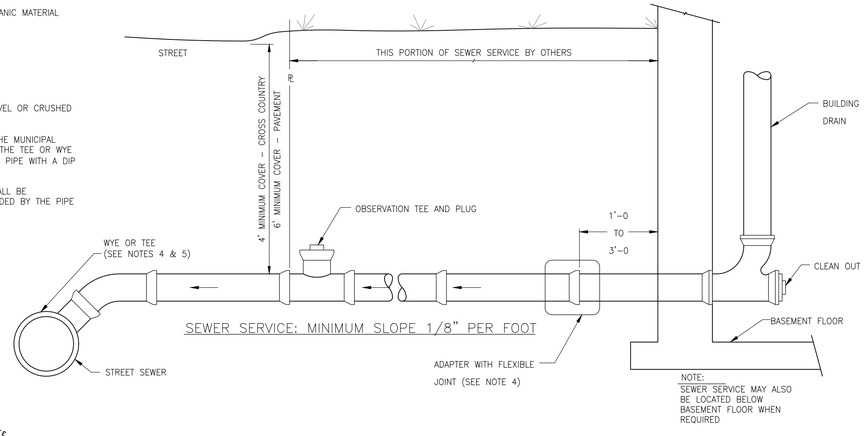
CHIMNEY (SEE NOTE 12)
NOT TO SCALE



NOTES

1. GAPS BETWEEN SECTIONS OF INSULATION TO BE COVERED WITH 2" x 2' x 2' PIECE OF INSULATION CENTERED OVER GAP.

SEWER TRENCH WITH INSULATION
NOT TO SCALE



NOTE:
SEWER SERVICE MAY ALSO BE LOCATED BELOW BASEMENT FLOOR WHEN REQUIRED

SEWER SERVICE DETAILS
NOT TO SCALE

GRAVITY SEWER NOTES

1. MINIMUM SIZE PIPE FOR GRAVITY SEWER SHALL BE 8-INCHES.

2. PIPE AND JOINT MATERIALS FOR PLASTIC SEWER PIPE SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:

ASTM STANDARDS	GENERIC PIPE MATERIAL	SIZES APPROVED
D3034-04a	* PVC (SOLID WALL)	8" THROUGH 15" (SDR 35)
F679-03	PVC (SOLID WALL)	18" THROUGH 27" (T-1 & T-2)
F794-03	PVC (RIBBED WALL)	8" THROUGH 36"
F1760-01(2005)e1	PVC, RECYCLED	ALL DIAMETERS

*PVC: POLY VINYL CHLORIDE

3. PLASTIC SEWER PIPE SHALL HAVE A PIPE STIFFNESS RATING OF AT LEAST 46 POUNDS PER SQUARE INCH AT 5 PERCENT PIPE DIAMETER DEFLECTION, AS MEASURED IN ACCORDANCE WITH ASTM D2412-02 DURING MANUFACTURE.

4. JOINTS SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D-3212-96(a)(2003)e1 AND SHALL BE PUSH-ON, BELL AND SPIGOT TYPE.

5. DUCTILE-IRON PIPE, FITTINGS AND JOINTS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE AMERICAN WATER WORKS ASSOCIATION (AWWA).

   AWWA C151/A21.51-02 THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A-536-84 (2004) DUCTILE IRON CASTINGS.

   AWWA C151/A21.51-02 DUCTILE IRON PIPE, CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS FOR WATER OR OTHER LIQUIDS.

   JOINTS SHALL BE OF THE MECHANICAL OR PUSH-ON TYPE. JOINTS AND GASKETS SHALL CONFORM TO AWWA C151/A21.11 RUBBER GASKETS JOINTS FOR CAST IRON PRESSURE PIPE & FITTINGS.

6. CONCRETE PIPE SHALL CONFORM TO AWWA C302-04.

7. PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS SHALL CONFORM TO AWWA C301-99.

   JOINTS SEALS FOR CONCRETE CYLINDER PIPE SHALL BE OIL RESISTANT ELASTOMERIC MATERIAL CONFORMING TO ASWWA C301-99 SPECIFICATIONS.

8. DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.

9. GRAVITY SEWER PIPE TESTING SHALL BE AS FOLLOWS:

   ALL NEW GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.

   LOW PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH:

   ASTM F1417-92(2005) "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW PRESSURE AIR".

   UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, "LOW PRESSURE AIR TESTING OF INSTALLED SEWER PIPE".

10. ALL NEW GRAVITY SEWERS SHALL BE CLEANED AND VISUALLY INSPECTED AND SHALL BE TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE AND VISUALLY INSPECT USING LAMP TEST.

11. ALL PLASTIC SEWER PIPE SHALL BE DEFLECTION TESTED NOT LESS THAN 30 DAYS AND NO MORE THAN 90 DAYS FOLLOWING INSTALLATION.

12. THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5 PERCENT OF THE AVERAGE INSIDE DIAMETER.

13. TRENCH CONSTUCTION SHALL CONFORM TO THE FOLLOWING:

    SEWERS SHALL BE BURIED TO A MINIMUM DEPTH OF 6' BELOW GRADE IN ALL ROADWAY LOCATIONS AND TO A MINIMUM DEPTH OF 4 FEET BELOW GRADE IN ALL CROSS COUNTRY LOCATIONS.

    WHERE SEWER LINES CROSS WATER PIPES, A MINIMUM OF 18" VERTICAL SEPARATION BETWEEN THE TWO OUTSIDE PIPE WALLS SHALL BE OBSERVED. AT SEWER/WATER INTERSECTIONS, A MINIMUM OF 6 FEET SHALL BE PROVIDED FROM THE WATER LINE TO THE SEWER PIPE JOINT. 12" SEPARATION BETWEEN THE TWO OUTSIDE PIPE WALLS SHALL BE REQUIRED BETWEEN SEWER LINES AND ALL OTHER PIPES.

    TRENCH DIMENSIONS FOR SEWER PIPE LESS THAN 15 INCHES IN DIAMETER, THE ALLOWABLE TRENCH WIDTH AT A PLANE 12 INCHES ABOVE THE PIPE SHALL BE NO MORE THAN 36 INCHES AND FOR PIPE 15 INCHES AND LARGER, THE ALLOWABLE WIDTH SHALL BE EQUAL TO THE PIPES OUTSIDE DIAMETER PLUS 24 INCHES.

    PIPE TRENCH BEDDING MATERIAL AND FILL MATERIAL FOR EXCAVATION BELOW GRADE SHALL BE SCREENED GRAVEL OR CRUSHED STONE TO ASTM C33-03 STONE SIZE NO. 67. THE PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND FREE FROM ANY ORGANIC MATERIALS, GRADED SUCH THAT 100 PERCENT PASSED THE 1/2-INCH SIEVE AND A MAXIMUM OF 15 PERCENT PASSES A #200 SIEVE. IN LIEU OF A SAND BLANKET, A STONE ENVELOPE 6 INCHES THICK COMPLETELY AROUND THE PIPE USING 3/4-INCH STONE MAY BE USED.

    PIPE BEDDING MATERIAL SHALL EXTEND FROM A HORIZONTAL PLANE THROUGH THE PIPE AXIS TO 6-INCHES BELOW THE BOTTOM OF THE OUTSIDE SURFACE OF THE PIPE.

    PIPE SAND BLANKET MATERIAL SHALL COVER THE PIPE A MINIMUM OF 12 INCHES ABOVE THE CROWN OF THE OUTSIDE SURFACE.

    COMPACTION SHALL BE IN 12-INCH LAYERS FOR BEDDING AND BLANKET MATERIALS.

    BACKFILL MATERIAL SHALL BE IN 3-FOOT LAYERS TO THE GROUND SURFACE EXCEPT FOR ROAD CONSTRUCTION WHERE THE FINAL 3-FEET SHALL BE COMPACTED IN 12-INCH LAYERS TO THE ROAD BASE SURFACE.

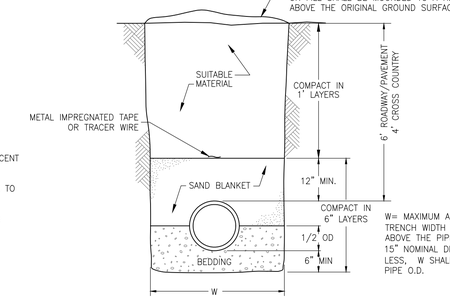
    TRENCH BACKFILL MATERIAL IN ROADWAY LOCATIONS SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION, EXCLUDING DEBRIS, PAVEMENT PIECES, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT, CLAY, EXCAVATED LEDGE, ROCKS OVER 6 INCHES IN THE LARGEST DIMENSION, OR ANY OTHER UNSUITABLE MATERIAL NOT APPROVED BY THE ENGINEER.

    TRENCH BACKFILL AT CROSS-COUNTRY LOCATIONS SHALL BE AS DESCRIBED ABOVE EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLE RECONSTRUCTION, WHEN NECESSARY WILL BE PRESERVED. BACKFILL SHALL BE MOUNDED 6-INCHES ABOVE ORIGINAL GROUND.

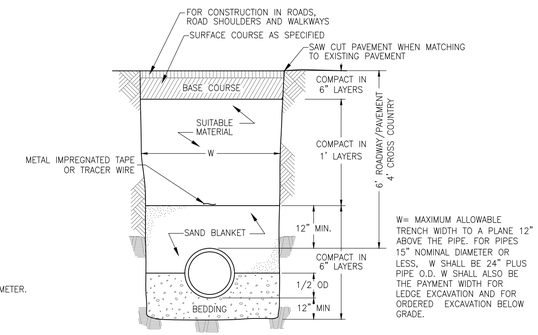
    BASE COURSE MATERIALS FOR TRENCH REPAIRS SHALL MEET THE REQUIREMENTS OF DIVISION 300 OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION.

    WHERE SHEETING IS PLACED ALONG SIDE OF THE PIPE AND EXTENDS BELOW MID-DIAMETER, THE SHEETING SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION NOT LESS THAN ONE FOOT ABOVE THE TOP OF THE PIPE AND AT LEAST 3 FEET BELOW FINISH GRADE.

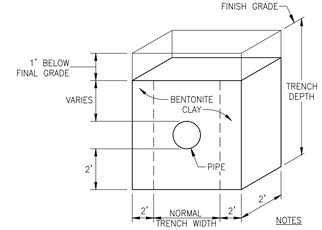
    TRENCHES FOR SEWER PIPES WITH SLOPES OVER 0.08 FEET PER FOOT AND TRENCHES FOR SEWER PIPES BELOW THE SEASONAL HIGH GROUND WATER LEVEL SHALL HAVE IMPERVIOUS TRENCH DAMS CONSTRUCTED EVERY 300 FEET TO PREVENT POTENTIAL DISTURBANCE TO PIPE BEDDING AND BLANKET MATERIALS.



EARTH CONSTRUCTION
NOT TO SCALE



LEDGE CONSTRUCTION
NOT TO SCALE



INSTALL AT CENTER OF EACH GRAVITY PIPE RUN

NOTES

1. DAM SHALL BE LOCATED EVERY 300' OF SEWER PIPE RUN.
2. NO FITTING SHALL BE LOCATED WITHIN 4' OF DAM.

SEWER TRENCH DAM
NOT TO SCALE

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

JOHN J. MCTIGUE No. 14950 — STATE OF NEW HAMPSHIRE — LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DR	CK

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

48 Constitution Drive
Bedford, NH 03110
Phone (603) 472-4488
Fax (603) 472-9747
www.tfmoran.com

PRT		DR	JSM	FB		
	45407-120	CK	JCC	CADFILE	45407-120_DETAILS	C-13

DIG SAFE — CALL 811 OR 1-800-344-7233 — CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

GENERAL NOTES

1. IT IS THE INTENTION THAT THE MANHOLE, INCLUDING ALL COMPONENT PARTS, HAVE ADEQUATE SPACE, STRENGTH AND LEAKPROOF QUALITIES CONSIDERED NECESSARY FOR THE INTENDED SERVICE. SPACE REQUIREMENTS AND CONFIGURATIONS, SHALL BE AS SHOWN ON THE DRAWING. MANHOLES SHALL BE AN ASSEMBLY OF PRECAST SECTIONS, WITH STEEL REINFORCEMENT, WITH ADEQUATE JOINTING, OR CONCRETE CAST MONOLITHICALLY IN PLACE WITH REINFORCEMENT. IN ANY APPROVED MANHOLE, THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND LOADS OF 8 TONS (H-20 LOADING) WITHOUT FAILURE AND PREVENT LEAKAGE IN EXCESS OF ONE GALLON PER DAY PER VERTICAL FOOT OF MANHOLE, CONTINUOUSLY FOR THE LIFE OF THE STRUCTURE. A PERIOD GENERALLY IN EXCESS OF 25 YEARS IS TO BE UNDERSTOOD IN BOTH CASES.

2. BARRELS, CONE SECTIONS AND CONCRETE GRADE RINGS SHALL BE PRECAST REINFORCED CONCRETE AND SHALL CONFORM ENV-WQ 704.12 & 704.13.

3. PRECAST CONCRETE BARREL SECTIONS, CONES AND BASES SHALL CONFORM TO ASTM C478-06.

4. BASE SECTIONS SHALL BE OF MONOLITHIC CONSTRUCTION TO A POINT AT LEAST 6 INCHES ABOVE THE CROWN OF THE INCOMING PIPE.

5. MANHOLE CONE SECTIONS SHALL BE ECCENTRIC IN SHAPE.

6. ALL PRECAST SECTIONS AND BASES SHALL HAVE THE DATE OF MANUFACTURE AND THE NAME OR TRADEMARK OF THE MANUFACTURER IMPRESSED OR INDELIBLY MARKED ON THE INSIDE WALL.

7. ALL PRECAST SECTIONS AND BASES SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP-PROOFING COATING.

8. SHALLOW MANHOLE: IN LIEU OF A CONE SECTION, WHEN MANHOLE DEPTH IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER MAY BE USED HAVING AN ECCENTRIC ENTRANCE OPENING AND CAPABLE OF SUPPORTING H-20 LOADS.

9. HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF AN OVERLAPPING TYPE, SEALED FOR WATERTIGHTNESS USING A DOUBLE ROW OF AN ELASTOMERIC OR MASTIC-LIKE SEALANT. APPROVED ELASTOMERIC SEALANTS ARE:
   - SIKAFLEX-12-SL
   - SONNEBORN BUILING PRODUCTS-SONOLASTIC SL-1

10. THE MINIMUM INTERNAL DIAMETER OF MANHOLES SHALL BE 48 INCHES. FOR SEWERS LARGER THAN 24-INCH DIAMETER. MANHOLE DIAMETERS SHALL BE INCREASED SO AS TO PROVIDE AT LEAST 12-INCHES OF SHELF ON EACH SIDE OF THE SEWER.

11. LEAKAGE TEST SHALL BE PERFORMED IN ACCORDANCE TO ENV-WQ 704.17.

    (a) ALL MANHOLES SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST IN ACCORDANCE WITH THE ASTM C1244 STARNDARD IN EFFECT WHEN THE TESTING IS PERFORMED.

    (b) THE MANHOLE VACUUM TEST SHALL CONFORM TO THE FOLLOWING:

        1. THE INITIAL VACUUM GUAGE TEST PRESSURE SHALL BE 10 INCHES Hg.

        2. THE MINIMUM ACCEPTABLE TEST HOLD TIME FOR 1-INCH Hg PRESSURE DROP TO 9 INCHES SHALL BE:

            A. NOT LESS THAN 2 MINUTES FOR MANHOLES LESS THAN 10 FEET DEEP.

            B. NOT LESS THAN 2.5 MINUTES FOR MANHOLES 10 TO 15 FEET DEEP.

            C. NOT LESS THAN 3 MINUTES FOR MANHOLES MORE THAN 15 FEET DEEP.

    (c) THE MANHOLE SHALL BE REPAIRED AND RETESTED IF THE TEST HOLD TIMES FAIL TO ACHIEVE THE ACCEPTANCE LIMITS SPECIFIED IN (b) ABOVE.

    (d) INVERTS AND SHELVES SHALL NOT BE INSTALLED UNTIL AFTER SUCCESSFUL TESTING IS COMPLETE.

    (e) FOLLOWING COMPLETION OF THE LEAKAGE TEST, THE FRAME AND COVER SHALL BE PLACED ON TOP OF THE MANHOLE OR SOME OTHER MEANS USED TO PREVENT ACCIDENTAL ENTRY BY UNAUTHORIZED PERSONS, CHILDREN OR ANIMALS, UNTIL THE CONTRACTOR IS READY TO MAKE FINAL ADJUSTMENT TO GRADE.

12. BRICK MASONRY FOR SHELF, INVERT AND GRADE ADJUSTMENT SHALL COMPLY WITH ASTM C32-05, CLAY OR SHALE, FOR GRADE SS HARD BRICK.

13. MORTAR SHALL BE COMPOSED OF PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE:
    (a) 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
    (b) 4.5 PARTS SAND, 1 PART CEMENT AND 0.5 PART HYDRATED LIME

    CEMENT SHALL BE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C150-05. HYDRATED LIME SHALL BE TYPE S CONFORMING TO ASTM C207-06 "STANDARD SPECIFICATIONS FOR HYDRATED LIME FOR MASONRY PURPOSES". SAND SHALL CONSIST OF INERT NATURAL SAND CONFORMING TO ASTM C33-03 "STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES".

14. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED OR PRECAST CONCRETE SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF THE PIPE AND FLOW. AT CHANGES IN DIRECTIONS, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPE TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.

15. FRAMES AND COVERS: FRAMES AND COVERS: SEWER MANHOLE FRAMES AND COVERS SHALL BE CITY OF PORTSMOUTH STANDARD, AND SHALL BE PURCHASED AND PICKED UP AT PORTSMOUTH DEPARTMENT OF PUBLIC WORKS WATER DEPARTMENT. THEY SHALL BE OF HEAVY DUTY DESIGN, CLASS 30, CONFORMING TO ASTM A48/48M AND PROVIDE A 30-INCH CLEAR OPENING. THE CASTING SHALL BE OF EVEN GRAINED CAST IRON, SMOOTH, AND FREE FROM SCALE, LUMPS, BLISTERS, SAND HOLES AND DEFECTS. CONTACT SURFACES OF COVERS AND FRAMES SHALL BE MACHINED AT THE FOUNDRY TO PREVENT ROCKING OF COVERS IN ANY ORIENTATION.

16. BEDDING: PRECAST BASES SHALL BE PLACED ON A 6-INCH LAYER OF COMPACTED BEDDING MATERIAL THAT CONFORMS TO ASTM C33-03 NO. 67 STONE AND FREE FROM CLAY, LOAM AND ORGANNIC MATTER. THE EXCAVATION SHALL BE PROPERLY DEWATERED WHILE PLACING BEDDING MATERIAL AND SETTING OF THE BASE OR POURING CONCRETE. WATER-STOPS SHALL BE USED AT THE HORIZONTAL JOINT OF THE CAST-IN-PLACE MANHOLES.

100% PASSING	1" SCREEN
90-100% PASSING	3/4" SCREEN
20-55% PASSING	3/8" SCREEN
0-10% PASSING	#4 SIEVE
0-5% PASSING	#8 SIEVE

17. FLEXIBLE JOINT: A FLEXIBLE JOINT SHALL BE PROVIDED WIbHIN THE FOLLOWING DISTANCES FROM ANY MANHOLE CONNECTION: (a) WITHIN 48 INCHES FOR REINFORCED CONCRETE PIPE (RCP). (b) WITHIN 60 INCHES FOR PVC PIPE LARGER THAN 15" DIAMETER.

18. NO FLEXIBLE JOINT SHALL BE REQUIRED FOR DUCTILE IRON PIPE OR PVC PIPE UP THROUGH 15-INCH DIAMETER.

19. INTERNAL STEPS ARE PROHIBITED PER CITY OF PORTSMOUTH DPW STANDARDS.

20. REFERENCE NHDES ENV-WQ 700 IN PLACE OF ASTM STANDARDS.

21. PIPE TO MANHOLE JOINTS SHALL BE ONLY AS FOLLOWS:

    A. ELASTOMERIC, RUBBER SLEEVE WITH WATERTIGHT JOINTS AT THE MANHOLE OPENING AND PIPE SURFACES.

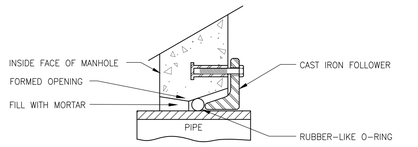
    B. CAST INTO WALL OR SECUREED WITH STAINLESS STEEL CLAMPS.

    C. ELASTOMERIC SEALING RING CAST IN THE MANHOLE OPENING WITH THE SEAL FORMED ON THE SURFACE OF THE PIPE BY COMPRESSION OF THE RING.

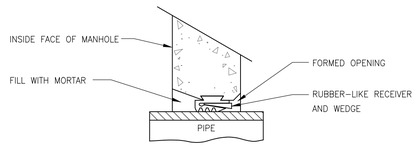
    D. NON-SHRINK GROUTED JOINTS WHERE WATERTIGHT BONDING TO THE MANHOLE AND PIPE CAN BE OBTAINED.

22. THE INVERT OF THE INCOMING PIPE SHALL BE NO MORE THAN 6 INCHES ABOVE THE OUTGOING PIPE UNLESS A DROP ENTRY IS USED.

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION



RES-SEAL
(OR ACCEPTABLE SUBSTITUTE)



PRESS-WEDGE II
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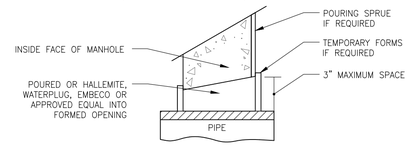

MORTARED JOINT
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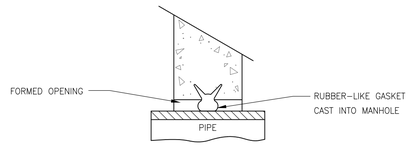
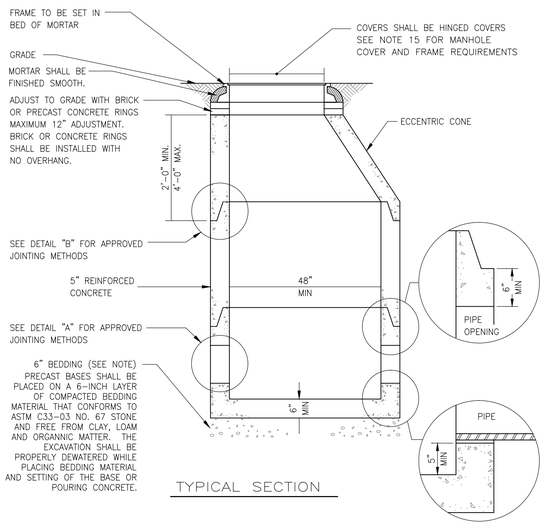


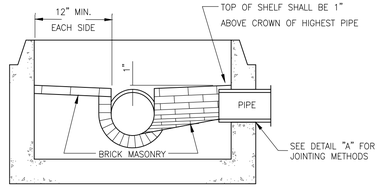
A-LOK
(OR ACCEPTABLE SUBSTITUTE)



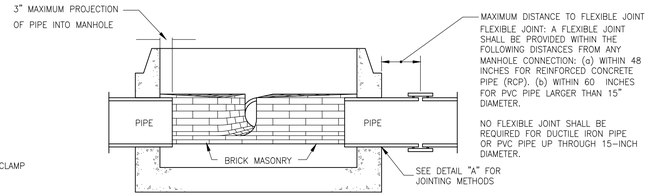
TYPICAL SECTION

NOTES:

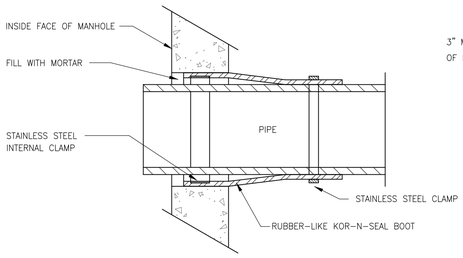
1. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST.
2. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT. INVERT BRICKS SHALL BE LAID ON EDGE.
3. BASE SECTION TO BE FULL WALL THICKNESS AND MONOLITHIC TO A POINT 6" ABOVE THE PIPE CROWN.
4. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.
5. NO STEPS ARE ALLOWED PER EXETER DPW STANDARDS.
6. BITUMINOUS COATING.



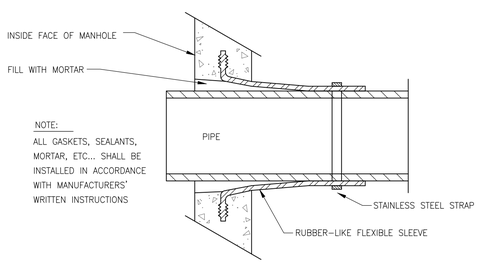
SECTION "B-B"



SECTION "A-A"

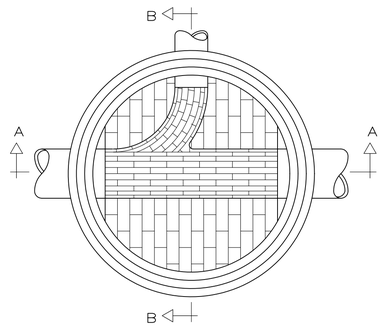


KOR-N-SEAL JOINT SLEEVE
(OR ACCEPTABLE SUBSTITUTE)



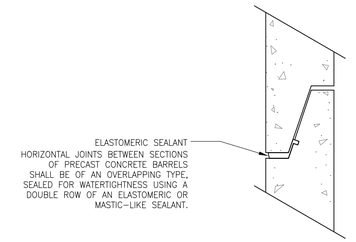
LOCK-JOINT FLEXIBLE MANHOLE SLEEVE
(OR ACCEPTABLE SUBSTITUTE)

DETAIL "A" - PIPE TO MANHOLE JOINTS



TYPICAL MANHOLE - PLAN VIEW

STANDARD MANHOLE

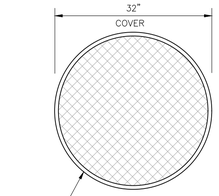


ELASTOMERIC SEALANT

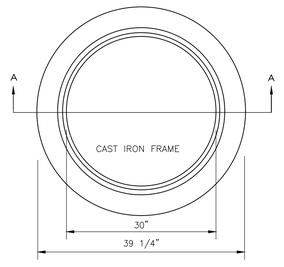
NOTES:
ALL GASKETS AND SEALANTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

STATE OF NEW HAMPSHIRE APPROVED PRODUCTS
A) SIKAFLEX-12-SL
B) SONNEBORN BUILDING PRODUCTS SONOLASTIC SL-1

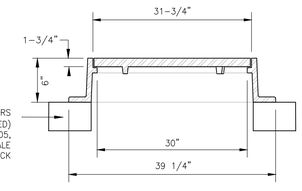
DETAIL "B" - HORIZONTAL JOINTS



COVER



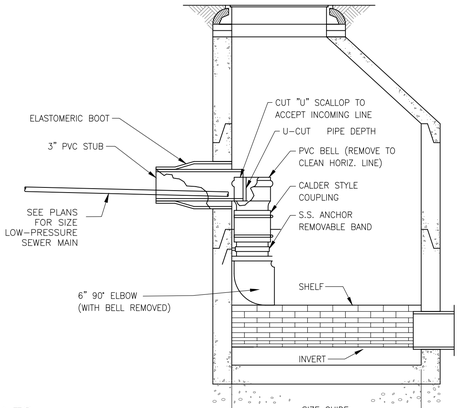
PLAN VIEW



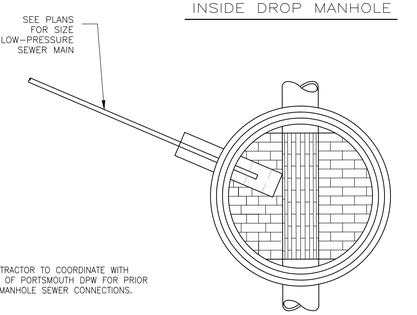
SECTION A-A

BRICK RISERS (IF REQUIRED)
ASTM C32-05, CLAY OR SHALE
SS HARD BRICK

MANHOLE FRAME & COVER



INSIDE DROP MANHOLE



NOTES:
1. CONTRACTOR TO COORDINATE WITH CITY OF PORTSMOUTH DPW FOR PRIOR TO MANHOLE SEWER CONNECTIONS.

PLAN VIEW

PRESSURE TO GRAVITY SEWER DETAIL

SCALE: N.T.S

STATE OF NEW HAMPSHIRE
JOHN J. McTIGUE
No. 14950
LICENSED PROFESSIONAL ENGINEER

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

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FILE	45407-120	DR	JSM	FB		C-14
		CK	JCC	CADFILE	45407-120_DETAILS	

May 23, 2022 - 4:08pm
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LANDSCAPE GUARANTEE AND MAINTENANCE NOTES

1. CONTRACTOR WILL BE RESPONSIBLE FOR ALL MEANS, METHODS AND TECHNIQUES OF WATERING.
2. CONTRACTOR WILL BEGIN WATERING IMMEDIATELY AFTER PLANTING. ALL PLANTS WILL BE THOROUGHLY WATERED TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS WILL BE WATERED WEEKLY, OR MORE OFTEN, IF NECESSARY DURING THE FIRST GROWING SEASON BUT NOT LESS THAN ONE YEAR.
3. WATER ALL LAWNS AS REQUIRED. DO NOT LET NEWLY PLANTED LAWNS DRY OUT DURING THE FIRST FOUR WEEKS MINIMUM.
4. ALL NEW LAWNS WILL BE MAINTAINED AND MOWED A MINIMUM THREE (3) TIMES BEFORE REQUESTING REVIEW BY LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE FOR ACCEPTANCE. MAINTENANCE AND MOWING WILL CONTINUE UNTIL ACCEPTED BY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE IS ISSUED IN WRITING.
5. THE CONTRACTOR WILL MAINTAIN AND GUARANTEE ALL PLANTINGS TO BE IN GOOD HEALTHY, FLOURISHING AND ACCEPTABLE CONDITION FOR A PERIOD OF ONE (1) YEAR BEGINNING AT THE DATE OF ACCEPTANCE BY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE. ALL GRASSES, TREES AND SHRUBS THAT, IN THE OPINION OF THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE SHOWING LESS THAN 80% HEALTHY GROWTH AT THE END OF ONE (1) YEAR PERIOD WILL BE IMMEDIATELY REPLACED BY THE CONTRACTOR.
6.
7. ALL DAY LILIES WILL BE DEADHEADED AND CUT BACK EVERY FALL. ALL ORNAMENTAL GRASSES WILL BE CUT BACK EVERY FALL OR EARLY SPRING.
8. DECIDUOUS PLANT MATERIAL INSTALLED AFTER SEPTEMBER 30 AND BEFORE APRIL 15 WILL NOT BE REVIEWED THAT SEASON FOR ACCEPTANCE DUE TO STAGE OF LEAF PHYSIOLOGY. THIS PLANT MATERIAL WILL NOT BE REVIEWED UNTIL FOLLOWING GROWING SEASON. GUARANTEE PERIOD WILL BEGIN ONLY AFTER ACCEPTANCE BY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE.
9. EVERGREEN PLANT MATERIAL INSTALLED AFTER OCTOBER 30 AND BEFORE APRIL 15 WILL NOT BE REVIEWED THAT SEASON FOR ACCEPTANCE DUE TO END OF GROWTH SEASON. THIS PLANT MATERIAL WILL NOT BE REVIEWED UNTIL FOLLOWING GROWING SEASON. GUARANTEE PERIOD WILL BEGIN ONLY AFTER ACCEPTANCE BY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE.

HYDROSEEDING NOTES

1. HYDROSEEDING MAY BE USED AS AN ALTERNATE METHOD OF SEEDING. THE APPLICATION OF LIMESTONE AS NECESSARY, FERTILIZER AND GRASS SEED MAY BE ACCOMPLISHED IN ONE OPERATION BY THE USE OF A SPRAYING MACHINE APPROVED BY THE LANDSCAPE ARCHITECT OR CIVIL ENGINEER. THE MATERIALS SHALL BE MIXED WITH WATER IN THE MACHINE AND SHALL CONFORM TO RELATIVE REQUIREMENTS OF SECTION 644 OF NH. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
2. (FOR MASSACHUSETTS PROJECTS PLUG IN – SECTION 765.65 OF MASS. DPW CURRENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES).

INVASIVE PLANT NOTES

1. EXISTING NON–NATIVE, INVASIVE PLANT SPECIES WILL BE IDENTIFIED, REMOVED, DESTROYED AND LEGALLY DISPOSED OF OFF–SITE IN ACCORDANCE WITH THE LATEST UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION METHODS OF DISPOSING NON–NATIVE INVASIVE PLANTS. SEE "MANAGE AND CONTROL INVASIVES" AND PROPERLY DISPOSE OF INVASIVE PLANTS".

PRICING & CONSTRUCTION DOCUMENT NOTES

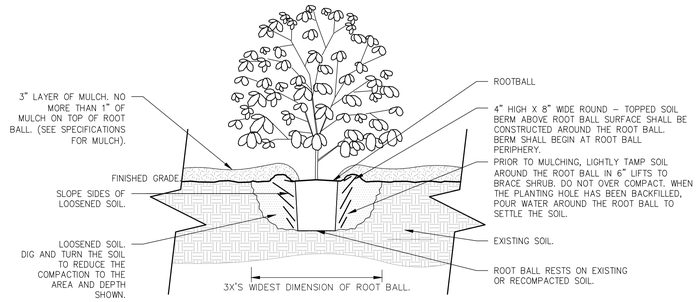
1. CONTRACTOR WILL PRICE PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE PLANTINGS GRAPHICALLY SHOWN ON THESE DRAWINGS OR IN PLANT LIST, WHICHEVER IS GREATER. IN CASES OF DISCREPANCY BETWEEN PLAN AND LIST CLARIFY WITH LANDSCAPE ARCHITECT PRIOR TO PLACING PURCHASE ORDER AND AGAIN PRIOR TO PLANTING.
2. CONTRACTOR WILL VERIFY PRIOR TO PRICING IF SITE SOILS ARE VERY POORLY DRAINING OR IF LEDGE IS PRESENT. IF CONTRACTOR ENCOUNTERS VERY POORLY DRAINING SOILS (BATH TUB EFFECT) OR LEDGE THAT IMPACTS PROPOSED PLANTING PLAN, NOTIFY LANDSCAPE ARCHITECT OR OWNERS' REPRESENTATIVE FOR DIRECTION PRIOR TO PRICING AND AGAIN PRIOR TO PERFORMING ANY WORK.
3. PARKING AREA PLANTED ISLANDS WILL HAVE MINIMUM OF 1'–0" TOPSOIL PLACED TO THE TOP OF CURB ELEVATION. REMOVE ALL CONSTRUCTION DEBRIS BEFORE PLACING TOPSOIL.
4. EXISTING TREES SHOWN ON THE PLAN WILL REMAIN UNDISTURBED. ALL EXISTING TREES SHOWN TO REMAIN WILL BE PROTECTED WITH A 4–FOOT SNOW FENCE PLACED AT THE DRIP LINE OF THE BRANCHES OR AT 8 FEET MINIMUM FROM THE TREE TRUNK.
5. CONTRACTOR WILL STAKE OR PLACE ON GROUND ALL PROPOSED PLANT MATERIALS PER PLAN. CONTACT LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
6. COORDINATE WITH LANDSCAPE ARCHITECT'S CONTRACTED NUMBER OF SITE VISITS WHEN PLANNING FOR INSPECTION. NOTIFY LANDSCAPE ARCHITECT 72 HOURS MINIMUM IN ADVANCE OF REQUESTED SITE VISIT.
7. CONTRACTOR WILL DEVELOP A WRITTEN WATERING SCHEDULE AND WILL SUBMIT WATERING SCHEDULE TO OWNERS' REPRESENTATIVE. CONTRACTOR WILL WATER ALL NEW PLANTS INCLUDING LAWNS THAT ARE NOT "IRRIGATED" VIA A PERMANENT IRRIGATION SYSTEM FOR THE FIRST 12 MONTHS.

PORTSMOUTH NOTES

1. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNER'S WILL BE RESPONSIBLE FOR THE MAINTENANCE AND OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS INDICATED ON THESE PLAN(S).
2. ALL REQUIRED PLANT MATERIAL WILL BE TENDED TO AND KEPT FREE OF REFUSE AND DEBRIS.
3. ALL REQUIRED FENCES AND WALLS WILL BE MAINTAINED IN GOOD REPAIR.
4. THE PROPERTY OWNER WILL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.
5.
6. ALL IMPROVEMENTS SHOWN ON THIS PLAN WILL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THIS PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES WILL BE MADE TO THIS PLAN WITHOUT THE WRITTEN APPROVAL OF THE PORTSMOUTH PLANNING BOARD OR PLANNING DIRECTOR.
7. THE LANDSCAPE PLAN WILL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
8. MAINTENANCE OF LANDSCAPING TO FOLLOW THE NOFA STANDARDS FOR ORGANIC LAND CARE 6TH EDITION PRACTICES FOR THE DESIGN AND MAINTENANCE OF ECOLOGICAL LANDSCAPES. ("NOFA STANDARDS FOR ORGANIC LAND CARE," NOFA STANDARDS FOR ORGANIC LAND CARE 6TH EDITION PRACTICES FOR THE DESIGN AND MAINTENANCE OF ECOLOGICAL LANDSCAPES, NORTHEAST ORGANIC FARMING ASSOCIATION OF CONNECTICUT, INC, 2017, HTTP://WWW.ORGANICLANDCARE.NET/SITES/DEFAULT/FILES/NOFA_ORGANIC_LAND_CARE_STANDARDS_6THEDITION_2017_OPT.PDF.)

SEEDING NOTES

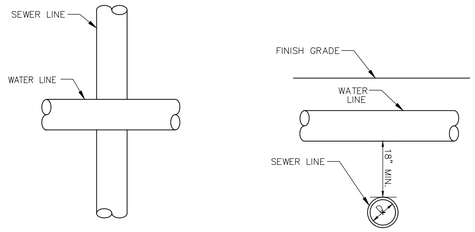
1. SLOPES UP TO AND INCLUDING 3:1 GRADE, SEED WILL BE NEW ENGLAND EROSION CONTROL & RESTORATION MIX PER NEW ENGLAND WETLANDS PLANTS INC., AMHERST, MA.
2. SLOPES STEEPER THAN 3:1 GRADE, SEED WILL BE NEW ENGLAND EROSION CONTROL & RESTORATION MIX PER NEW ENGLAND WETLANDS PLANTS INC., AMHERST, MA. SEE CIVIL FOR ADDITIONAL EROSION CONTROL MEASURES.
3. GENERAL SEED WILL BE NHDOT SPECIFICATION SECTION 644, TABLE 644–1–PARK SEED TYPE 15, INCLUDING NOTES TO TABLE 1, 2 & 3.



SECTION VIEW

SHRUB PLANTING

NOT TO SCALE



PLAN VIEW PROFILE VIEW

NOTES:

1. A 10 FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18" MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER AND SANITARY SEWER CROSSINGS.
2. PROTECTION OF WATER SUPPLIES:
   A. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND A SEWER OR SEWER APPURTENANCE WHICH WOULD PERMIT THE PASSAGE OF SEWAGE OR POLLUTED WATER INTO THE POTABLE SUPPLY. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER OR SEWER MANHOLE.
   B. NO SEWER SHALL BE LOCATED WITHIN THE WELL PROTECTED RADII ESTABLISHED IN ENV–WS 300 FOR ANY PUBLIC WATER SUPPLY WELLS OR WITHIN 100 FEET OF ANY PRIVATE WATER SUPPLY WELL.
   C. SEWERS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN.
   D. A DEVIATION FROM THE SEPARATION REQUIREMENTS OF (B) OR (C) ABOVE SHALL BE ALLOWED WHERE NECESSARY TO AVOID CONFLICT WITH SUBSURFACE STRUCTURES, UTILITY CHAMBERS, AND BUILDING FOUNDATIONS, PROVIDED THAT THE SEWER IS CONSTRUCTED IN ACCORDANCE WITH THE FORCE MAIN CONSTRUCTION REQUIREMENTS SPECIFIED IN ENV–WQ 704.06.
   E. WHENEVER SEWERS MUST CROSS WATER MAINS, THE SEWER SHALL BE CONSTRUCTED AS FOLLOWS:
      a. VERTICAL SEPARATION OF THE SEWER AND WATER MAIN SHALL BE NOT LESS THAN 18 INCHES, WITH WATER ABOVE SEWER AND
      b. SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATER MAIN.

WATER & SEWER CROSSING

NOT TO SCALE

DIG SAFE
CONTACT DIG SAFE 72 BUSINESS HOURS PRIOR TO CONSTRUCTION

STATE OF NEW HAMPSHIRE – JOHN J. McTIGUE No. 14050 LICENSED PROFESSIONAL ENGINEER

SITE DEVELOPMENT PLANS

TAX MAP 229 LOT 1

DETAILS

PROPOSED 3 LOT SUBDIVISION

437 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

OWNED BY & PREPARE FOR

ARTWILL, LLC

SCALE: **APRIL 19, 2022**

REV	DATE	DESCRIPTION	DR	CK

TFM
Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists
48 Constitution Drive
Bedford, NH 03110
Phone (603) 472–4488
Fax (603) 472–9747
www.tfmoran.com

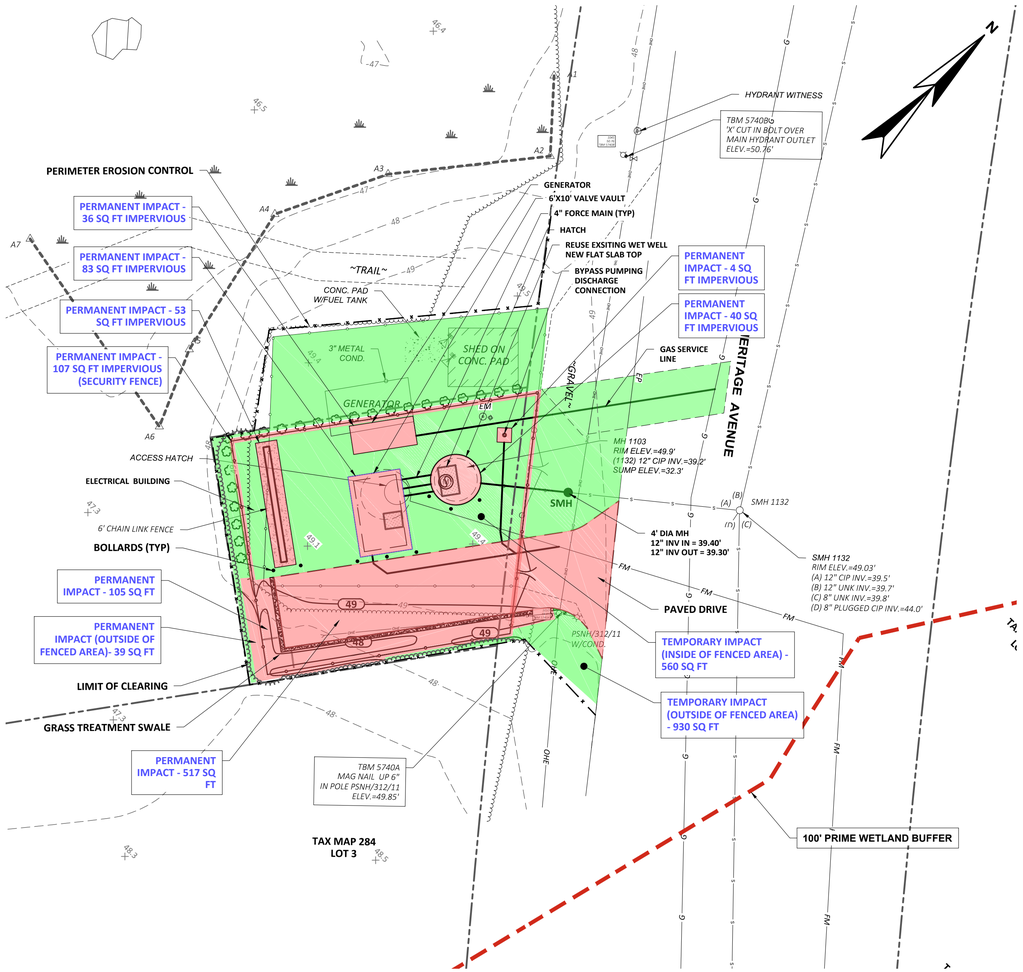
FILE	45407–120	DR	JSM	FB		C–15
		CK	JCC	CADFILE	45407–120_DETAILS	

Heritage Avenue Pump Station Narrative

The City of Portsmouth, NH (City) owns, operates, and maintains the Heritage Avenue Pump Station, which is one of several City operated stations that are critical to the collection and treatment of the City's wastewater. The station is located on a fenced 1,300 square foot property on Heritage Avenue in Portsmouth. Heritage Avenue Pump Station was constructed in 1976 and is a "can" style station with constant speed pumps and piping located in a below grade steel structure adjacent to a separate, precast concrete 6-ft diameter wet well. Also located on the site are an above ground emergency generator within a fiberglass enclosure, diesel fuel tank, and pad-mounted 8-foot by 10-foot shed housing electrical gear, operator display, and pump controls.

The Heritage Avenue Pump Station and its equipment have reached the end of their useful life and warrant replacement. The City is planning to replace the Heritage Avenue Pump Station to improve pump station reliability, accessibility, and safety with the conversion from a dry pit to a submersible station. In addition, the project will demolish the existing diesel emergency generator with a new natural gas driven emergency generator at the City's request.

The proposed project includes 1,490 sq. ft. of temporary impacts to the 100 ft. Prime Wetland Buffer for demolition of the existing pump station, construction access, and trench pipe installation. An additional 984 sq. ft. of permanent impacts to the 100 ft. Prime Wetland Buffer for the construction of the electrical control cabinet, generator, wet well, valve vault, gravel drive, and perimeter fencing. No direct wetland impacts are proposed as a result of this project. A grass treatment swale and check dams are proposed to collect, treat, and convey stormwater. Temporary impact areas outside of the new fence will be restored using a native wetland seed mix. Additionally, native shrub plantings are proposed to between the new pump station and wetlands.



WETLANDS IMPACT FIGURE

SCALE: 1"=10'

LEGEND:

TEMPORARY PRIME WETLAND BUFFER IMPACT AREA	
PERMANENT PRIME WETLAND BUFFER IMPACT AREA	
PERIMETER EROSION CONTROL	
EDGE OF WETLANDS	
100' PRIME WETLAND BUFFER	

0 10 20

NOTES:

TEMPORARY IMPACTS TO WETLAND BUFFER: 1490 SQ FT

PERMANENT IMPACTS TO WETLAND BUFFER: 984 SQ FT

IMPERVIOUS AREA REMOVED: 220 SQ FT
PROPOSED IMPERVIOUS AREA : 743 SF

JURISDICTIONAL WETLANDS DEPICTED WERE DELINEATED ON AUGUST 9, 2019 BY MARC JACOBS, NH, CERTIFIED WETLANDS SCIENTIST NUMBER 90. A DELINEATION REPORT IS ATTACHED FOR REFERENCE. SURVEY OF THE PROJECT AREA WAS COMPLETED BY DOUCET SURVEY INC.

- HORIZONTAL DATUM: NEW HAMPSHIRE STATE NAD 83
- VERTICAL DATUM: APPROXIMATE NAVD88 (GEOID12A)(±.2')
- UNITS: US SURVEY FEET
- FOR NOTES, LEGEND AND ABBREVIATIONS REFER TO DRAWING C-1.
- FORCE MAIN LOCATION BASED ON CITY'S GIS. LOCATION TO BE CONFIRMED VIA TEST PITS AS SHOWN.

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			
6			

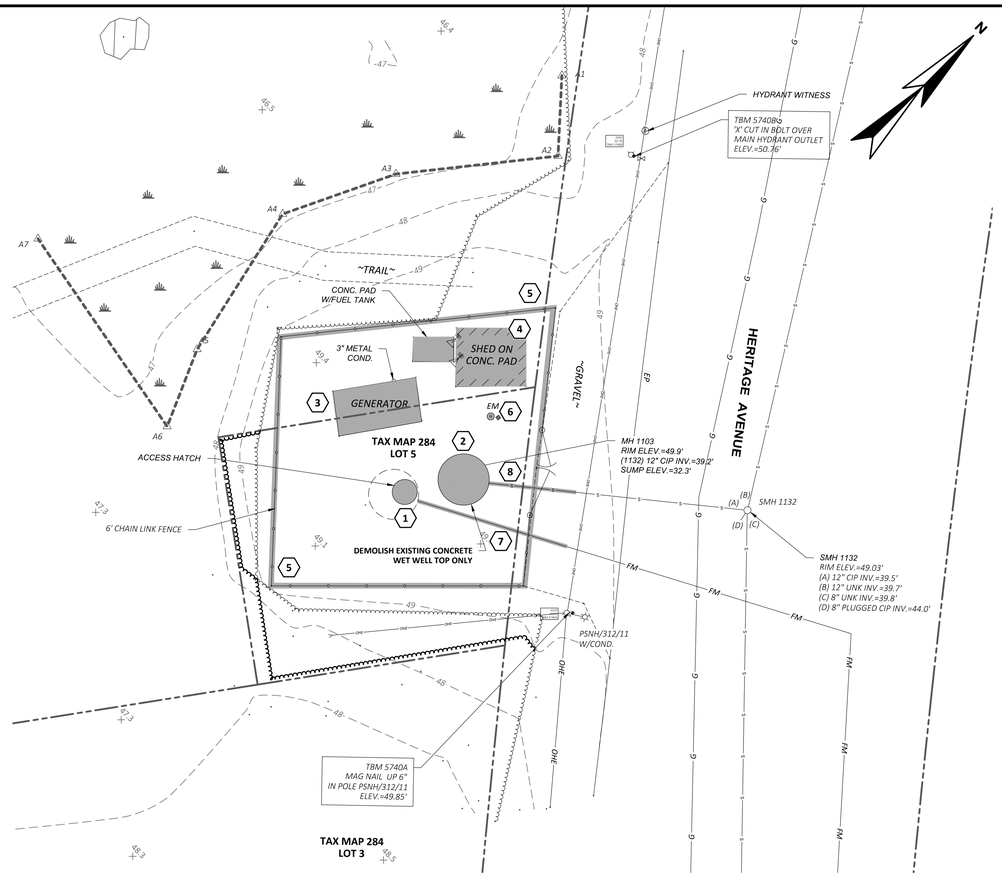
PROJECT NO: 20105
DESIGNED:
CAD COORD: K.TURNER
CAD:
CHECKED:
DATE:
APPROVED:
DATE:
SUBMISSION:

WRIGHT-PIERCE
603.430.3728 | www.wright-pierce.com
230 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801

CITY OF PORTSMOUTH, NEW HAMPSHIRE
HERITAGE AVENUE PUMP STATION
REPLACEMENT

WETLANDS IMPACT FIGURE

DRAWING
FIGURE-1

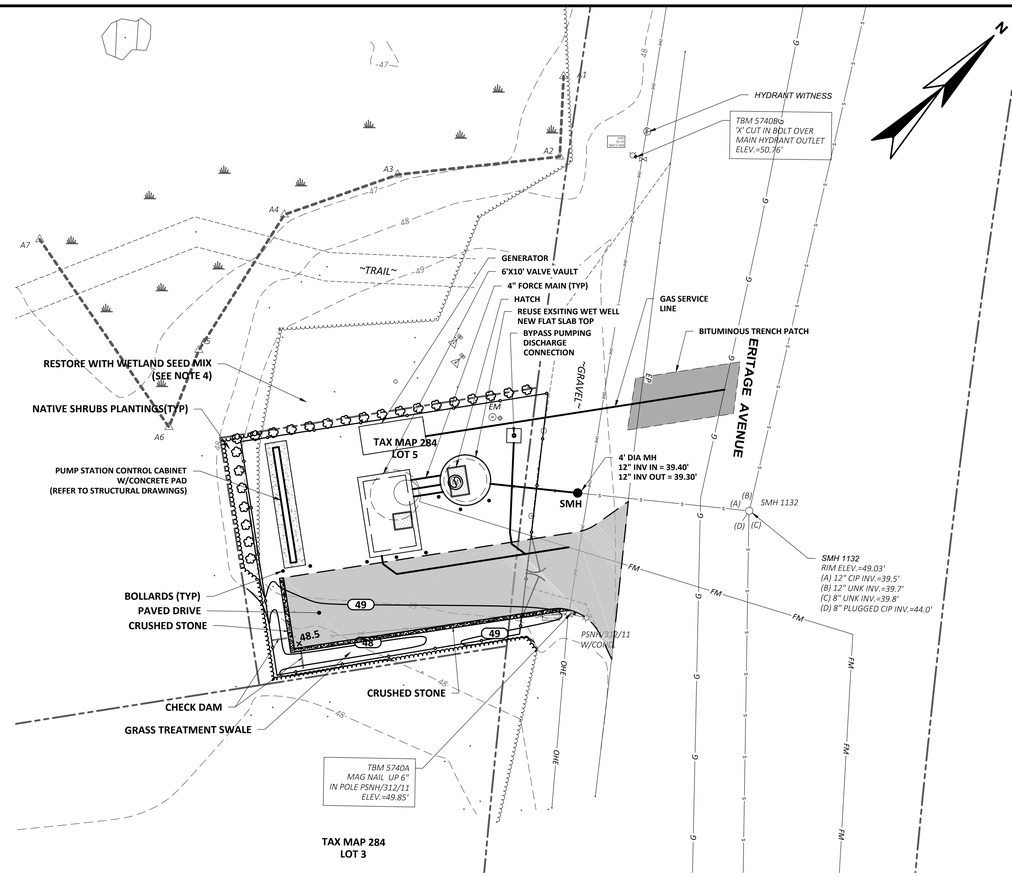


SITE DEMOLITION PLAN

SCALE: 1"=10'

DEMOLITION NOTES:

1. REMOVE/DEMOLISH EXISTING PUMP STATION DRY WELL, CHIMNEY, PIPING AND EQUIPMENT - DRY WELL TO BE FILLED WITH FLOWABLE FILL. REFER TO PUMP STATION DEMOLITION PLANS
2. REMOVE/DEMOLISH EXISTING WET WELL SLAB TOP INCLUDING CONCRETE TOP, MANHOLE COVER.
3. REMOVE/DEMOLISH EXISTING GENERATOR INCLUDING BUT NOT LIMITED TO GENERATOR, CONCRETE PAD, ALL ELECTRICAL APPURTENANCES, CONTROLS, UNDERGROUND ELECTRICAL FEEDS, CONDUIT ETC.
4. REMOVE/DEMOLISH EXISTING SHED IN IT ENTIRETY.
5. REMOVE/DEMOLISH EXISTING CHAIN LINK FENCE AND GATE.
6. REMOVE/DEMOLISH EXISTING ELECTRICAL METER AND POST.
7. REMOVE/DEMOLISH EXISTING CI 6" FM TO THE EXTENTS SHOWN.
8. REMOVE/DEMOLISH EXISTING 12" SEWER TO THE EXTENTS SHOWN.

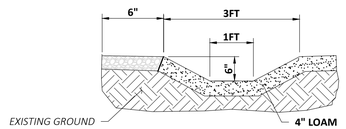


SITE MODIFICATION PLAN

SCALE: 1"=10'

MODIFICATIONS NOTES:

1. PROVIDE A MINIMUM OF 5-FEET OF SEPARATION BETWEEN GENERATOR AND BUILDING.
2. PROVIDE A MINIMUM OF 5-FEET OF SEPARATION BETWEEN WET WELL VENT PIPE TO ANY ELECTRICAL EQUIPMENT.
3. SET TOP OF VALVE VAULT AT ELEVATION 50.80
4. RESTORE DISTURBED AREA OUTSIDE OF FENCE LINE WITH WETLAND SEED MIX. SEE SPECIFICATION 02485.



GRASS TREATMENT SWALE

SCALE: NTS

NOTES:

1. FOR NOTES, LEGEND AND ABBREVIATIONS REFER TO DRAWING C-1.
2. FORCE MAIN LOCATION BASED ON CITY'S GIS. LOCATION TO BE CONFIRMED VIA TEST PITS AS SHOWN.

0 10 20

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

PROJECT NO: 20105
DESIGNED:
CAD COORD: K.TURNER
CAD:
CHECKED:
DATE:
APPROVED:
DATE:
SUBMISSION:

WRIGHT-PIERCE
603.430.3728 | www.wright-pierce.com
230 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801

CITY OF PORTSMOUTH, NEW HAMPSHIRE
HERITAGE AVENUE PUMP STATION
REPLACEMENT

EXISTING SITE CONDITIONS DEMOLITION AND MODIFICATIONS PLAN

DRAWING
C-2

EROSION AND SEDIMENTATION CONTROL NOTES

THIS PLAN HAS BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE NEW HAMPSHIRE STORMWATER MANUAL BY THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES, TERRAIN ALTERATION BUREAU, DATED DECEMBER 2008

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL STRUCTURES REQUIRED ARE SHOWN ON THE DRAWINGS. PROVIDE SILT FENCE, STONE CHECK DAMS AND OTHER EROSION CONTROL MEASURES AS REQUIRED TO ADEQUATELY PREVENT SEDIMENT TRANSPORT AS NOTED IN THE BMP.

ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANAGEMENT MANUAL AND THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES, ENV-Wq 1500: ALTERATION OF TERRAIN, DECEMBER 2008

1. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION, IN NO CASE AT MORE THAN 5 ACRES AT A TIME, WILL BE MAINTAINED IN AN UNTREATED OR UN-VEGETATED CONDITION FOR THE MINIMUM TIME REQUIRED. IN GENERAL, AREAS TO BE VEGETATED SHALL BE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE OF THE SOIL.
2. TEMPORARY STORAGE OF STOCKPILED MATERIAL SHALL BE STABILIZED IN A MANNER THAT WILL MINIMIZE EROSION.
3. EROSION CONTROL MEASURES SUCH AS SEDIMENT BARRIERS (SILT FENCE, STONE CHECK DAMS, ETC.) AND OUTLET PROTECTION (WHERE APPLICABLE) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OR EARTH MOVING OPERATIONS OF UPGRADIENT DRAINAGE AREAS.
4. FUGITIVE DUST MUST BE CONTROLLED IN ACCORDANCE WITH NEW HAMPSHIRE STANDARDS.
5. ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED AND/OR REPAIRED EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSURE. SEDIMENT DEPOSITS MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE THIRD THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED AND/OR WILL NOT ERODE UNDER THE CONDITIONS OF A 10-YEAR STORM. STABILIZATION SHALL BE DEFINED AS ONE OF THE FOLLOWING:
   A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
   B. A MINIMUM OF 85% VEGETATIVE GROWTH HAS BEEN ESTABLISHED;
   C. A MINIMUM OF 3" OF NON-EROSIVE MATERIALS SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
6. NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL NOT BE STEEPER THAN THREE HORIZONTAL TO ONE VERTICAL (3 TO 1) UNLESS STABILIZED WITH PERMANENT EROSION CONTROL MEASURES. IF MOWING IS TO OCCUR, MAXIMUM SLOPE ANGLE SHALL BE THREE HORIZONTAL TO ONE VERTICAL (3 TO 1). ON SLOPES FOUR HORIZONTAL TO ONE VERTICAL (4 TO 1), FINAL PREPARATION SHOULD INCLUDE SURFACE ROUGHING.
7. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND RE-GRADED ONTO OPEN AREAS. POST SEEDING SEDIMENT, IF ANY, WILL BE DISPOSED OF IN AN ACCEPTABLE MANNER. AT NO TIME SHALL THE INTEGRITY OF THE EROSION CONTROL FENCE BE IN DANGER DUE TO BUILD UP OF SEDIMENT.
8. RE-VEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND RE-VEGETATED.
9. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR HAY AT A RATE OF 2 BALES (70-90 LBS) PER 1,000 SQUARE FEET OR 1.5 TO 2 TONS (90-100 BALES) PER ACRE TO COVER 75 TO 90% OF THE GROUND SURFACE.
10. DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
11. SEED MIX SELECTION AND APPLICATION RATES WILL BE CONSISTENT WITH THE FOLLOWING TABLES AS REFERENCED FROM MINNICK, E.L. AND H.T. MARSHALL, STORMWATER MANAGEMENT AND EROSION CONTROL FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE, ROCKINGHAM COUNTY CONSERVATION DISTRICT, AUGUST 1992, AND TABLES 4-1 THROUGH 4-3 OF SECTION 3 IN THE NEW HAMPSHIRE STORMWATER MANUAL. NOTE: REED CANARY GRASS SHALL NOT BE USED.
12. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE WORK AREA IS STABILIZED.
13. WETLANDS (EXCEPT THOSE WHICH ARE TO BE FILLED IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS) WILL BE PROTECTED WITH SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
14. IN GENERAL, AREAS WITHIN 100 FEET OF DELINEATED WETLANDS OR STREAMS SHALL HAVE A MAXIMUM PERIOD OF EXPOSURE OF NOT MORE THAN 15 DAYS.
15. FOLLOW APPROPRIATE EROSION CONTROL MEASURES PRIOR TO EACH STORM IN ALL AREAS WITHIN 100 FEET OF DELINEATED WETLANDS OR STREAMS.

EROSION CONTROL DURING WINTER CONSTRUCTION

1. WINTER CONSTRUCTION PERIOD DEFINED: NOVEMBER 1 THROUGH MAY 1
2. WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.
3. EXPOSED AREAS SHOULD BE LIMITED TO WHICH CAN BE MULCHED IN ONE DAY PRIOR TO ANY PRECIPITATION EVENT.
4. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
5. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
6. AFTER NOVEMBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3

LIME AND FERTILIZER SCHEDULE

SEEDING TYPE	SEED DATES	LIME RATE (TONE/ACRE)	FERTILIZER RATE/RATIO (TYPE) (LBS/1,000 SQ. FT.)
PERMANENT AND/OR TEMPORARY	MAY. 1 - SEPT. 15	3	600/ENGINEER APPROVED (N-P205-K20)

NOTES:
1. USE LOW PHOSPHATE FERTILIZER AT ALL TIMES AND SLOW RELEASE NITROGEN FERTILIZER WHEN BETWEEN 25 AND 250 FEET OF A SURFACE WATER BODY.
2. NO FERTILIZER EXCEPT LIMESTONE SHOULD BE APPLIED WITHIN 25 FEET OF THE SURFACE WATER.
3. APPLY LIMESTONE AT 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE.

TEMPORARY VEGETATION (TABLE 4-1)

ADDITIONAL TEMPORARY SEED MIXTURE (FOR PERIODS LESS THAN 12 MONTHS)

DATES	SEED	RATE
PRIOR TO MAY 15	OATS	80 LBS/ACRE
AUG. 15 - SEP. 15	ANNUAL RYE GRASS	40 LBS/ACRE
AUG. 15 - SEP. 15	WINTER RYE GRASS	112 LBS/ACRE
APR. 1 - JUN. 1 (AUG. 15 - SEP. 15)	PERENNIAL RYE GRASS	40 LBS/ACRE

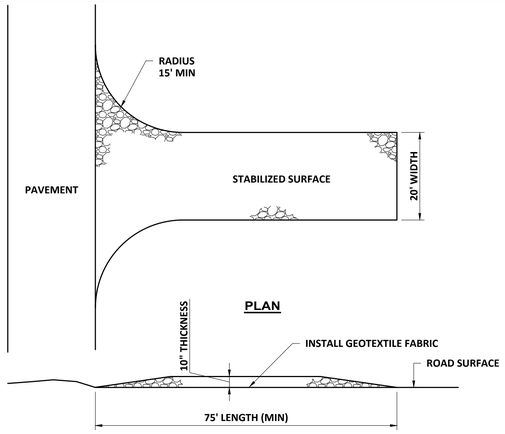
PERMANENT VEGETATION (TABLE 4-2)

USE	MIXTURE TABLES	SOIL DRAINAGE I.	II.	III.	IV.
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXC.	GOOD
	E	FAIR	EXC.	EXC.	POOR
WATERWAYS, EMERGENCY SPILLWAYS AND OTHER CHANNELS WITH FLOWING WATER	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXC.	EXC.	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXC.	EXC.	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF)	F	FAIR	EXC.	EXC.	
	G	FAIR	EXC.	EXC.	

NOTES:
1. I. DROUGHTY
   II. WELL DRAINED
   III. MODERATELY WELL DRAINED
   IV. POORLY DRAINED
2. EXC.= EXCELLENT
3. REFER TO TABLE 4-3 FOR SEED MIXTURE AND APPLICATION RATES

PERMANENT VEGETATION (TABLE 4-3)

MIXTURE	SPECIES	RATE-POUNDS PER ACRE	1,000 SQ. FT.
A	TALL FESCUE	20	0.45
	CREEPING RED FESCUE	20	0.45
	REDTOP	2	0.05
	TOTAL	*42*	*0.95*
B	TALL FESCUE	15	0.35
	CREEPING RED FESCUE	10	0.25
	CROWN VETCH/OR	15	0.35
	FLATPEA	30	0.75
	TOTAL	*40 OR 55*	*0.95 OR 1.35*
C	TALL FESCUE	20	0.45
	CREEPING RED FESCUE	20	0.45
	BIRDSFOOT TREFOIL	8	0.2
	TOTAL	*48*	*1.10*
E	CREEPING RED FESCUE	50	1.15
	KENTUCKY BLUEGRASS	50	1.15
	TOTAL	*100*	*2.30*
F	*TALL FESCUE*	*150*	*3.60*

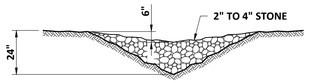


SECTION

NOTES
1. TEMPORARY, TO BE REMOVED PRIOR TO FINAL SITE PAVING
2. REFER TO SPECIFICATION SECTION 02270.
3. STONE SHALL BE 3" CRUSHED STONE.

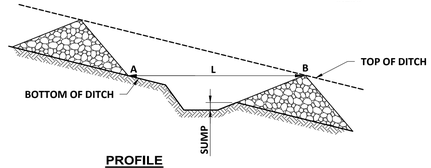
STABILIZED CONSTRUCTION EXIT

SCALE: "NTS"



CROSS SECTION

DITCH SLOPE (FT/FT)	L (FT)
0.020	100
0.030	66
0.040	50
0.050	40
0.080	25
0.100	20
0.120	17
0.150	13

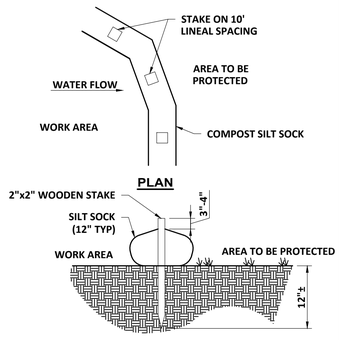


PROFILE

NOTE:
FOR DRAINAGE AREAS 1 ACRE OR LESS

STONE CHECK DAM DETAIL

SCALE: "NTS"

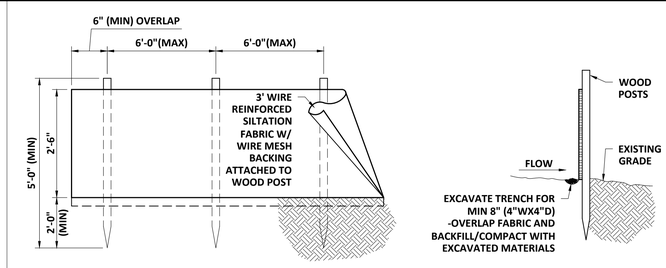


SECTION

NOTES:
1. ALL MATERIAL TO MEET SPECIFICATIONS
2. SILT SOCK COMPOST/SOIL/ROCK/SEED FILL TO MEET APPLICATION REQUIREMENTS
3. SILT SOCK DEPICTED IS FOR MINIMUM SLOPES. GREATER SLOPES MAY REQUIRE LARGER SOCKS PER THE ENGINEER
4. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

SILT SOCK INSTALLATION DETAIL

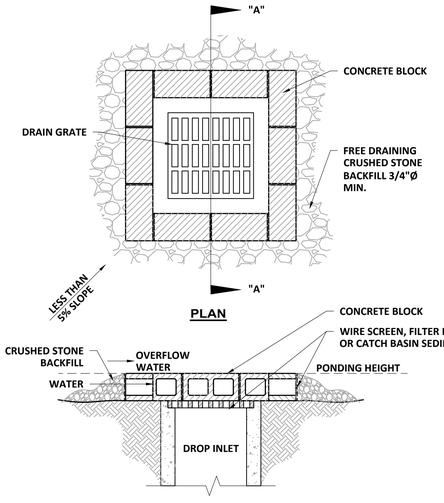
SCALE: "NTS"



NOTES:
1. MAXIMUM LENGTH OF SLOPE ABOVE THE FENCE SHALL BE 100 FEET
2. MAXIMUM SLOPE ABOVE FENCE SHALL BE 2H TO 1V

SILT FENCE INSTALLATION DETAIL

SCALE: "NTS"



SECTION "A"

NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS(LESS THAN 3%).
2. EXCAVATE A BASIN OF SUFFICIENT SIZE ADJACENT TO THE DROP INLET.
3. THE TOP OF THE STRUCTURE, PONDING HEIGHT, MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.
4. SILT BAGS MAY ALSO BE USED FOR CB GRATE INLET PROTECTION.

DROP INLET SEDIMENT BARRIER DETAIL

SCALE: "NTS"

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			
6			

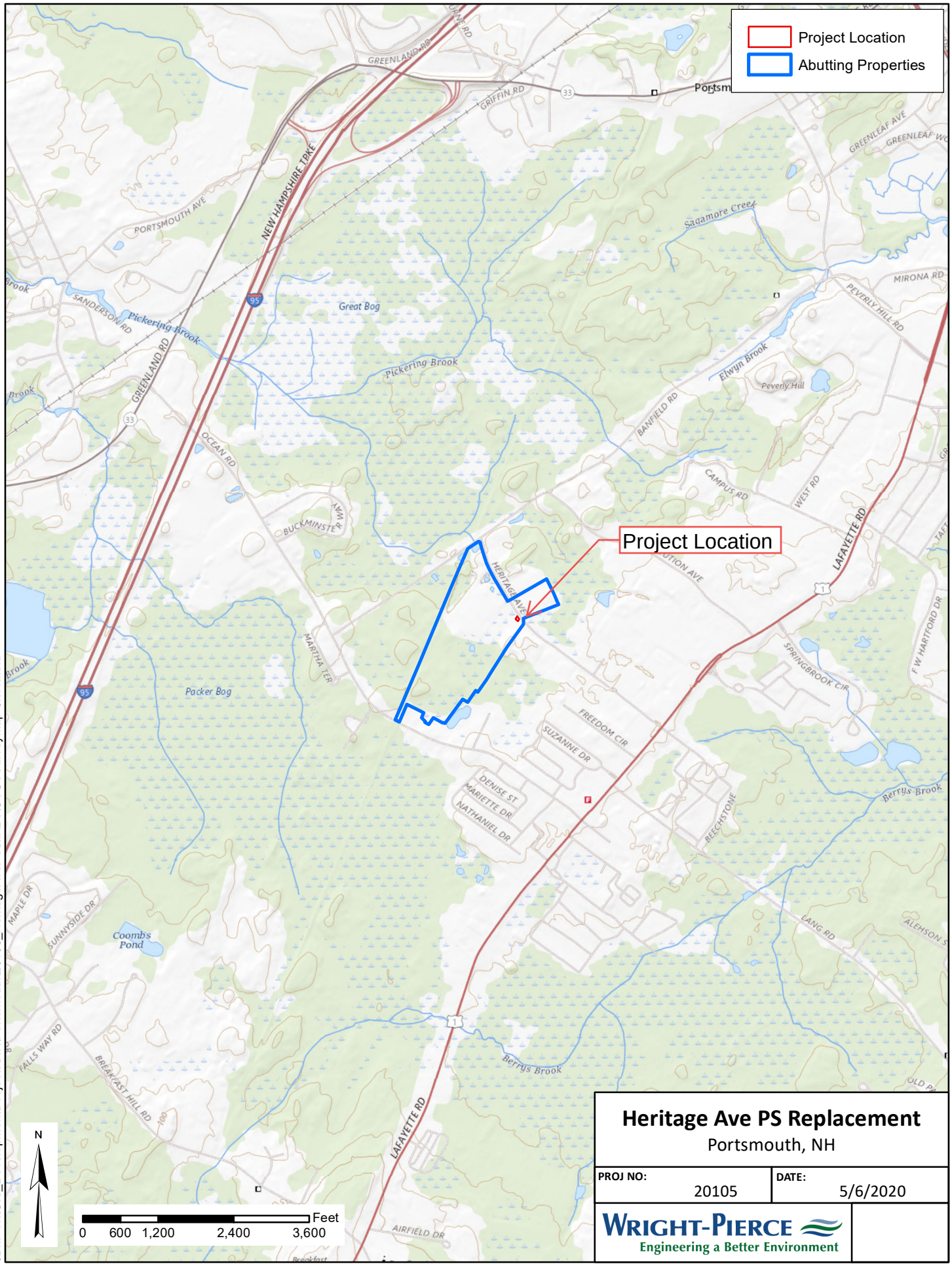
PROJECT NO.: 20105
DESIGNED:
CAD COORD.: K.TURNER
CAD:
CHECKED:
DATE:
APPROVED:
DATE:
SUBMISSION:

WRIGHT-PIERCE
603.430.3728 | www.wright-pierce.com
230 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801

CITY OF PORTSMOUTH, NEW HAMPSHIRE
HERITAGE AVENUE PUMP STATION REPLACEMENT

EROSION CONTROL NOTES AND DETAILS

DRAWING
C-4



Heritage Ave PS Replacement
Portsmouth, NH

PROJ NO:	DATE:
20105	5/6/2020

WRIGHT-PIERCE
Engineering a Better Environment

JDM W:\GIS_Development\Projects\NH\Portsmouth\20105_HeritageAvePS\MXDs\USGSSurveyMap-8x11.mxd


Project Location
Abutting Properties
Parcel Boundary
Heritage Ave PS Replacement
Tax Map
Portsmouth, NH
PROJ NO:
20105
DATE:
5/6/2020
WRIGHT-PIERCE
Engineering a Better Environment
Banfield Rd
Heritage Ave
Cedar Ridge Rd
Ocean Rd
Great Bog
0165-0014-0000
0284-0003-0000
0282-0005-0000
0275-0005-0000
0274-0004-0000
0275-006A-0000
0275-006B-0000
0274-0003-0000
0275-0004-0000
0283-0019-0000
0275-0003-0000
0275-0002-0000
0275-0001-0000
0275-0008-0000
0275-0009-0000
0275-0007-0000
0284-0007-0000
0283-0039-0000
0283-0040-0001
0284-0008-0000
0283-0040-0000
0275-0010-0000
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0284-0002-0000
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0294-0009-0000
0285-0008-0000
0293-0016-0000
0285-0001-0000
0284-0004-0000
0294-0017-0000
0293-0011-0000
0293-0012-0000
0293-0014-0000
0293-0013-0000
0293-0015-0000
0293-0019-0000
0293-0009-0000
0293-0017-0000
0293-0018-0000
0292-0122-0000
0292-0123-0000
0005
N
0 100 200 400 600 Feet
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New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Jacob Shactman, Wright-Pierce
230 Commerce Way
Suite 302
Portsmouth, NH 03801

From: NH Natural Heritage Bureau
Date: 4/12/2022 (valid until 4/12/2023)
Re: Review by NH Natural Heritage Bureau of request submitted 3/24/2022
Permits: GRANT APP - Portsmouth, NHDES - Wetland Permit by Notification (PBN)

NHB ID: **NHB22-1139** **Applicant:** Jacob Shactman

Location: Portsmouth
329 Heritage Ave

Project Description: The proposed Heritage Avenue Pump Station Upgrade will convert the existing station to a submersible type station to improve pump station reliability, accessibility, and safety. In addition, the project will replace the existing diesel emergency generator with a new natural gas driven emergency generator, along with the addition of a 512 sq ft gravel driveway to improve access to the pump station.

The NH Natural Heritage database has been checked by staff of the NH Natural Heritage Bureau and/or the NH Nongame and Endangered Species Program for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government.

It was determined that, although there was a NHB record (e.g., rare wildlife, plant, and/or natural community) present in the vicinity, we do not expect that it will be impacted by the proposed project. This determination was made based on the project information submitted via the NHB Datacheck Tool on 2022-03-24 5:13:21 PM, and cannot be used for any other project.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

MAP OF PROJECT BOUNDARIES FOR: **NHB22-1139**

NHB22-1139

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Construction Sequence

The proposed project is anticipated to begin construction in Spring 2023. A general sequence of construction activities is provided below. The final schedule will be determined by the City and contractor upon receipt of permit approvals.

General Schedule:

1. Contractor mobilizes to project area (Spring 2023).
2. Install applicable erosion and sedimentation control practices.
3. Furnish, install, and test temporary bypass pumping system and discharge pipelines.
4. Begin site demolition as shown on Site Demolition Plan (Drawing C-2).
5. Construct new pump station and associated mechanical/electrical appurtenances while maintaining wastewater pumping capabilities as shown on Site Modification Plan (Drawing C-2).
6. Construct gas service line and demonstrate operation of generator.
7. Take bypass pump offline and demonstrate proper operation of the new pump station .
8. Construct gravel drive and security fencing to provide permanent stabilized site access.
9. Restore disturbed areas with loam and seed.
10. Once the site is permanently stabilized, remove all temporary erosion control measures.

Photographs

Photograph 1: Existing Pump Station (Facing Southwest)

Photograph 2: Existing Pump Station (Facing West)

Photograph 3: Existing Pump Station (Facing South)

Photograph 4: Existing Pump Station (Facing Southwest)

Marc E. Jacobs, *CSS, CWS, PWS, CPESC*
Professional Wetland / Soil Scientist
jacobs2wetsoil2004@yahoo.com

Via email to: Rebecca.saucier@wright-pierce.com

January 10, 2020

Ms. Rebecca Saucier, P.E.
Wright-Pierce
230 Commerce Way, Suite 302
Portsmouth, NH 03801

RE: Sewer Pump Station
Heritage Avenue
Portsmouth, NH
WP # 20105

Dear Ms. Saucier,

The following preliminary remarks summarize observations made during a site inspection at the above-referenced location conducted on August 9, 2019 to identify and delineate wetlands and/or other resource areas. The approximate area-of-interest (AOI) is depicted below in Figure 1.

FIGURE 1

609 Portsmouth Avenue
PO Box 417
Greenland, NH 03840-0417

Phone (603) 686-5097
Fax (603) 686-5142
Mobile (603) 534-SOIL (7645)

Certification Note

Jurisdictional wetlands within the AOI were delineated in August 2019 by Marc Jacobs, Certified Wetland Scientist number 090, according to the standards of the US Army Corps of Engineers - Wetlands Delineation Manual; the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region; the Code of Administrative Rules, NH Department of Environmental Services - Wetlands Bureau – Env-Wt 100-900 and Article 10 – Environmental Protection Standards of the City of Portsmouth, NH Zoning. Soils were evaluated utilizing the Field Indicators for Identifying Hydric Soils in New England, Version 4, April 2019 and the Field Indicators of Hydric Soils in the United States, Version 8, 2016. The indicator status of vegetation as hydrophytic was determined according to the U.S. Army Corps of Engineers - Northcentral and Northeast 2016 Regional Wetland Plant List. Copies of any site plans which depict the delineation that have been reviewed by the wetland scientist are individually stamped, signed and dated. This note has been customized for this project.

Jurisdictional freshwater wetlands were identified and the wetland-upland boundaries within the AOI were delineated in the field with solid color pink survey flags. Each flag bears a letter and number to assist in subsequent field location by survey instrument as well as to ascertain exact field position during any site visits when referencing site plans. The following flag sequence was used: A1-A7.

General Wetland Description

Wet flags A1-A5± appear to represent a man-made wetland-upland boundary located at the toe-of-fill which was presumably deposited for construction of the sewer pump station. (The pump station is situated entirely on filled soils.) The fill was not deposited recently (within the last year) but may have been placed after the wetlands law became effective in 1969. Additional investigations would be needed to establish the extent of fill or when the fill was placed. The wetland is bisected by a foot path located on the north side of the sewer pump station. The wetland does not constitute a vernal pool within the confines of the AOI.

Signs of wetland hydrology observed during site investigations suggest that intermittent stream flow enters the wetland near wetland flag A6. Any flow generally originates along Heritage Avenue and is conveyed in a northerly direction by a man-made ditch parallel to Heritage Avenue. Any flow then turns southerly and travels along the base of the east side of the existing fill pad described above and finally spreads out on the south side of the fill pad.

The ditch along Heritage Avenue was created primarily by excavation and, after leaving the ditch, any flow is confined by fill on the north side and adjacent natural topography on the south side where it flows adjacent to the existing sewer pump station. Any stream flow is constituted by storm water runoff originating from Heritage Avenue and the channel / stream does not drain other upgradient jurisdictional wetland areas. The channel / stream was observed to be in a no-flow condition during site investigations.

Wet flags A1-A7± identify wetlands having a substrate of poorly drained mineral soils (adjacent to the wetland-upland boundary) and which are classified as palustrine forested (PFO) according to the Cowardin system. The dominant tree species observed within the canopy includes red maple (*Acer rubrum*). The forested wetland gradually transitions to a palustrine scrub-shrub wetland having very poorly drained mineral soils which closely resemble Maybid series (*Typic Humaquepts*) silt loam soils.

State Jurisdiction

All wetlands and any banks are jurisdictional under NH RSA 482:A and the NH Code of Administrative Rules – Chapter Env-Wt 100-900. The NHDES does not require a buffer to freshwater wetlands, to the extent that any work in adjacent uplands does not cause indirect impacts, such as sedimentation, to areas under NHDES jurisdiction.

Shoreland Protection

There are no water bodies identified on the Comprehensive List of Water Bodies subject to RSA 483-B, the Shoreland Water Quality Protection Act, which are located within 250 feet of the AOI.

Prime Wetlands

The NHDES applies applicable rules and law to all municipally designated prime wetlands (and in certain municipalities all land within 100-feet of municipally designated prime wetlands). Prime wetlands are those wetlands with higher functions and values and receive additional protection under the law. Portsmouth has designated municipal prime wetlands which are recognized by NHDES. The subject wetland is identified as a prime wetland. Portsmouth prime wetlands receive a 100-foot state buffer.

Local Zoning

Chapter 10 of the Portsmouth Zoning Ordinance, specifically Article 10 – Environmental Protection Standards and Section 10.1010 – Wetland Protection, take jurisdiction over the following areas:

- Any inland wetland area greater than 10,000 square feet in size;
- Any vernal pool regardless of size;
- Any non-tidal perennial river or stream; and,
- Any tidal wetlands.

The zoning requires a buffer of all land within 100–feet of any jurisdictional area.

Permitted uses in wetlands and the wetland buffer include any use that does not involve the erection or construction of any structure or impervious surface and will not alter the natural surface configuration by the addition of fill or dredging.

Any use or activity not specifically permitted is prohibited unless authorized by the Portsmouth Planning Board by Conditional Use Permit (CUP) after review by the Portsmouth Conservation Commission. Regarding CUP applications, the following specific criteria for approval apply to public and private utilities within rights-of-way in wetlands and wetland buffers:

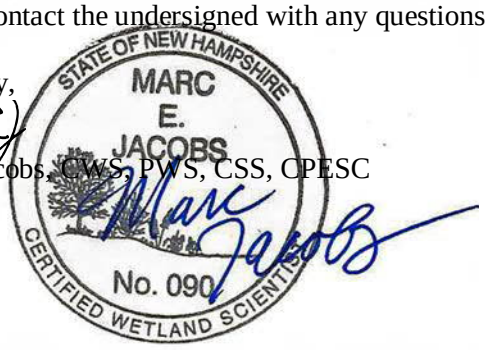
- The proposed construction is in the public interest;
- Design, construction and maintenance methods will utilize best management practices to minimize impact and will include restoration of sites as nearly as possible to the original grade;
- No alternative feasible route exists; and
- Alteration of natural vegetation will occur only to the extent necessary.

The zoning identifies performance standards for stormwater management and vegetation management, including fertilizer and herbicide application, within local jurisdiction. The zoning requires vegetation buffers within the overall 100-foot buffer.

The above represents a brief summary of the applicable local wetland zoning and state jurisdiction. We recommend that you consult this office, the Portsmouth Planning Department or the NHDES for further guidance before proceeding with any design, permitting or construction at this location.

Please contact the undersigned with any questions regarding the above-referenced information.

Cordially,



Marc Jacobs, CWS, PWS, CSS, CPESC

May 4, 2022

To: Portsmouth Conservation Commission

From: John Rice

RE: Installation of a split rail fence in the Woodlands Buffer Zone.

This application is before you because the wetlands buffer zone line goes through the back of my house as shown on the map in your packet. I have recently acquired an athletic husky-mix dog (Tuck) that thinks nothing of bursting through typical electronic fences. Once through, like any husky, he takes off and only returns when he feels like it. I have determined that we need a humane, but effective way to contain him. Further, our neighborhood approves fences only if they conform to zoning laws and through the mutual consent of the Woodlands Board of Directors and our abutters. The abutters all love Tuck and are firmly on board with the project. The BOD is waiting for your approval before issuing me an OK, but they are also on board. I prefer a natural look for the fence as we are surrounded by woods. Therefore, we have decided with your approval to put up a natural, three-rail cedar fence with vinyl-coated mesh. The enclosure will allow Tuck to run around without stress and allow me not to worry about Tuck running off. Please note that less than 6 square feet of ground will be disturbed and absolutely no wet areas, of which there is only one in my back yard. The exact details are below.

Thank you very much for your time and consideration.

John and Joan Rice

Detailed Description of Proposed Work *

Installation of a roughly 220-foot three-railed western cedar split rail fence with three gates. The fence will be 48" tall and have a vinyl-coated chainlink over galvanized steel mesh in between rails. There will be about 30-posts installed. They are 5”X5” square. There will be two, single-leaf 4' gates and one 6' feet double leaf. The setting of these gate posts will require concrete. Two gates will be abutting the house and one will be at the end of the property near but not beyond the edge of wet. The fence will roughly follow the outline of the lawn as drawn. The purpose of the fence is to create an enclosure for my husky-mix dog who would easily break through an electric fence.

Brief Description of Existing Land Use *
This is a backyard lawn.

Land Use Application Fee Calculation

Area of disturbance in wetland or wetland buffer (s.f.)
5.2

Wetland Conditional Use Permit -- Impacted Jurisdictional Areas

Inland Wetland
--

Tidal Wetland
--

Inland Wetland Buffer

Tidal Wetland Buffer
--

Vernal Pool
--

Wetland or Wetland Buffer Activity

Total Area of Inland Wetland (both on and off the parcel) (Sq.Ft.)
UK

Total Area of Vernal Pool (both on and off the parcel) (Sq.Ft.)
None

Distance of proposed structure or activity to edge of wetland (ft.):
3

Wetland Buffer Total Area on Lot (Sq.Ft.)
9,000

Wetland Buffer Area to be Disturbed (Sq.Ft.)

5.2

Inland Wetland Total Area on Lot (Sq.Ft.)
None

Inland Wetland Area to be Disturbed (Sq.Ft.)
0

Vernal Pool Total Area on Lot (Sq.Ft.)
0

Vernal Pool Area to be Disturbed (Sq.Ft.)
0

Tidal Wetland Total Area on Lot (Sq.Ft.)
7,500 (I am not sure where this number comes from.)

Tidal Wetland Area to be Disturbed (Sq.Ft.)
0

460 FW Hartl
450
450
100
Feet
50
25

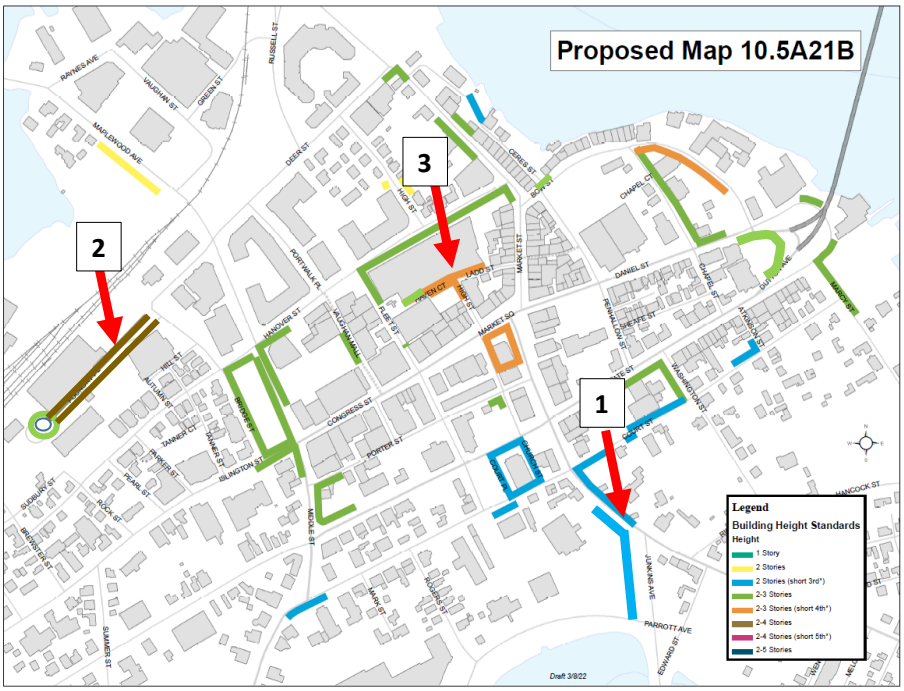
ORDINANCE #

THE CITY OF PORTSMOUTH ORDAINS

That the Ordinances of the City of Portsmouth, Chapter 10 – Zoning Ordinance, be amended as follows:

Amend Article 5 – Dimensional and Intensity Standards - Section 10.5A21.10: Contents of Regulating Plan as follows (deletions from existing language ~~stricken~~; additions to existing language colored and underlined; remaining language unchanged from existing):

1) **Amend Section 10.5A21B - Building Height Standards Map as follows:**
   a. **Add the following Building Height Standards:**



   b. **Amended the following note on Map 10.5A21B as follows:**

Incentive Overlay Districts

Within the Incentive Overlay Districts, certain specified development standards, including height, density and parking, may be modified pursuant to Section 10.5A4~~7~~6.

Commented [NJC1]:
Purpose:
1. To add building height standards for municipal and civic properties;
2.To add building height standards for new streets or public places (i.e. Foundry Place)
3.To modify the building height standard for a small portion of High Street and Haven Court.

Comment – These changes will enable municipal and civic properties to be aligned within their surrounding context. Foundry Place will be added as a street and be consistent with the building heights supported by the North End Vision Plan. High Street and Haven Court will be consistent with the existing context.

Commented [NJC2]:
Purpose – To correct an incorrect reference.
Comment – 10.5A47 does not exist in the code.

2) **Amend Article 5 - Section 10.5A21.20 - Building Height Standards (deletions from existing language ~~stricken~~; additions to existing language colored and underlined; remaining language unchanged from existing):**

a. Amend Section 10.5A21.21 as follows:

10.5A21.21 Assignments for specific **building height** require a building to have no more than the designated maximum number of **stories** or the maximum height in feet (whichever is lower) and no less than the designated minimum number of **stories**. Subject to Section 10.635.70 – Review Criteria, within the Historic District, the approved **building height** may be lower than the maximum designated number of **stories** or the maximum height in feet provided in Section 10.5A43.30 but shall be not lower than the minimum designated number of **stories** or the minimum height in feet provided.

b. Amend Section 10.5A21.21 as follows:

10.5A21.22 When a **lot** is assigned to more than one **building height** standard the **lot** shall be apportioned as follows:

(a) A **building height** standard designated along ~~the~~ a **front lot line** ~~or~~ on a **street** or **public place** shall apply to the portion of the **lot** that is 50 feet or less from such **lot line** or **street** or **public place**.
(b) A **building height** standard designated along a water body shall apply to the portion of the **lot** that is 100 feet or less from the mean high water line.
(c) More than 50 feet from a **front lot line** ~~or~~ on a **street** or **public place** and more than 100 feet from a water body, the **building height** may increase to the highest **building height** standard designated for the **lot**.
(d) Where a **lot** has less depth from ~~the~~ a **front lot line**, **street, public place** or water body than the required minimum distances stated above, the lowest **building height** standard for the **lot** shall be applied to the required linear distance from the **lot line**, **street**, **public place**, or water body.

Commented [NJC3]:
Purpose – To make explicit that within the Historic District the HDC has jurisdiction over height, scale, and massing of any new construction.
Comment - Like building placement or design, the maximum height must be determined to be appropriate by the HDC.

Commented [NJC4]:
Purpose – To clarify that the maximum building height is assigned to all lot lines fronting on a street or public place and that corner, though, or waterfront lots allow for encroachment of a higher building height on the lot provided the taller sections of the building are located at least 50 feet from the lot line along a street or public place with a lower building height standard.
Comment – This change will remove the ambiguity as to how building heights are apportioned on corner, through, or waterfront lots.

3) **Amend Article 5 – Section 10.5A50: Civic Districts (deletions from existing language stricken; additions to existing language colored and underlined; remaining language unchanged from existing):**

a. Amend Section 10.5A52.40 as follows:
10.5A52.40. New structures, alterations and expansions of existing structures in the Civic district are exempt from the requirements of 10.5A42 and 10.5A43 provided all **uses** remain civic and shall conform to the Building Placement, Occupation, and Form Standards for Principal and Outbuildings listed in 10.5A41.10A.

Commented [NJC5]:
Purpose – To assign dimensional standards to Civic properties.
Comment – Properties within the Civic District currently have no dimensional controls. The CD4-L1/2 dimensional standards are proposed as most Civic properties have a lower intensity of use than properties within the CD4 or CD5 Districts.

4) **Amend Article 15 – Definitions - Section 10.1530: Terms of General Applicability (deletions from existing language ~~stricken~~; additions to existing language colored and underlined; remaining language unchanged from existing):**

Lot line, front
A boundary of a **lot** that separates the **lot** from either a **street** or a **public place**. A **corner lot** or a **through lot** or a waterfront **lot** shall have ~~two~~ multiple **front lot lines**. In the case of a **corner lot** or a **through lot** or a waterfront **lot**, the ~~**front lot line**~~ **principal front yard** shall

be the line bordering a **street** or a **public place** on which the **lot** has its address as defined by the City.

Public place

A **street**, way, park, **pedestrian alleyway** or other **community space** type that provides public access.

Existing grade plane

For all buildings located outside the Character or Gateway Districts, a reference plane representing the average of existing ground levels adjoining the building at all exterior walls. When the existing ground level slopes away from exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, when the lot line is more than 6 feet from the building, between the building and a point 6 feet from the building. For all buildings located within the Character or Gateway Districts, a reference plane representing the average existing ground level along **lot line** adjoining a **street** or a **public place**. (See also **building height**).

Finished grade plane

For all buildings located outside the Character or Gateway Districts, a reference plane representing the average of finished ground levels adjoining the building at all exterior walls. When the finished ground level slopes away from exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, when the lot line is more than 6 feet from the building, between the building and a point 6 feet from the building. For all buildings located within the Character or Gateway Districts, a ~~point~~ reference plane representing the average finished ground level along any **lot line** adjoining a **street** or a **public place**. (See also **building height**.).

Penthouse

A habitable space within the uppermost portion of a **building** above the **cornice** which is set back at least ~~15~~ 20 feet from all edges of the roof adjoining a **street** or **public place** and at least 15 feet from all other edges. ~~and~~ The total floor area of the **penthouse** shall not exceed 50% of the area of the **story** below and the height of the **penthouse** shall not exceed 10 feet above the **story** below for flat roof surface or 14 feet for a gable, hip, or hip-topped **mansard roof** surface. Except for elevator or stairwell access allowed under Section 10.517, no other **roof appurtenances** shall exceed the maximum allowed height of a **penthouse**. For internal courtyards at least 40 feet from a street or vehicular right-of-way or easement, the **penthouse** shall be setback at least 8 feet from the edge of the roof of the story below.

Building Height

The greatest vertical measurement between two reference points defined as follows:

(a) For buildings located outside the Character or Gateway Districts ~~T~~the lower reference point shall be the **existing** or **finished grade plane**, whichever is lower, as defined herein. For buildings located within the Character or Gateway Districts ~~T~~the lower reference point shall be established from the average **existing** or **finished grade plane**, whichever is lower, of the **building** façade that is closest to any **lot line** adjoining a **street** or a **public place**. In the case of a corner or through lot the provisions of Section 5A.21.21 shall apply. The vertical distance between the lower and upper reference points shall not exceed the maximum number of stories or **building height**.

Commented [NJC6]:
Purpose – To clarify that corner, through, or waterfront lots can have multiple front lot lines and the property address only determines the principle front lot line.
Comment – This avoids any confusion as to how building heights are allocated on corner, through, or waterfront lots.

Commented [NJC7]:
Purpose – To add a definition for public places.
Comment – Public places include, but are not limited to, the existing community space types that provide public access.

Commented [NJC8]:
Purpose – To add a new definition for existing grade plane in order to measure and determine building height.
Comment – Outside the Character or Gateway Districts, this change will use the existing grade around the entire building height to calculate the building height. Within the Character or Gateway Districts it will only focus on the street facing façade(s) of the building.

Commented [NJC9]:
Purpose – To modify the definition to better protect the street edge.
Comment – Outside the Character or Gateway Districts, this change will use the finished grade around the entire building height to calculate the building height. Within the Character or Gateway Districts it will only focus on the street facing façade(s) of the building.

Commented [NJC10]:
Purpose – To modify the dimensional standards for penthouses to minimize public views from a street or public place.
Comment – The proposed dimensional standards will minimize the view of a penthouse from a street or public place and encourage the use of sloped roofs. This will also allow a penthouse to be treated as a rooftop appurtenance and add functionality and architectural interest to the top of buildings.

Commented [NJC11]:
Purpose – Within the Character or Gateway Districts the building height will focus on the building faced(s) along a street edge or public place versus averaging all four sides into the overall building height.
Comment – Either the existing or finished grade plane will be used, whichever is lower, to calculate the building height.

(b) The upper reference point shall be any of the following:
(1) For a flat or flat-topped **mansard roof**, the highest point of the roof surface;
(2) For a pitched roof, hip-topped **mansard roof**, or gambrel roof, the elevation midway between the level of the eaves and highest point of the roof. For this purpose, the "level of the eaves" shall mean the highest level where the plane of the roof intersects the plane of the outside wall on a side containing the eaves, but at no time shall this level be lower than the floor level of the uppermost **story** or **attic**.

(c) ~~A **parapet wall**, fence, railing or similar structure that extends more than two feet above the roof surface shall be included in the determination of the **building height**, but shall not be included if it does not extend more than two feet above the roof surface.~~ A **roof appurtenance**, as defined under 10.517, shall not be included in the determination of **building height**.

(d) To determine **building height**~~,~~ outside a Character or Gateway District, the measurements between the lower and upper reference points shall be taken at least every 5 feet around the entire perimeter of the **building.** Within a Character or Gateway District, the measurements shall be taken at least every 5 feet along the **building** façade that is closet to any **lot line** on a **street** or a **public place**. An average is calculated from these measurements and the average shall be the **building**'s height for purposes of this Ordinance.

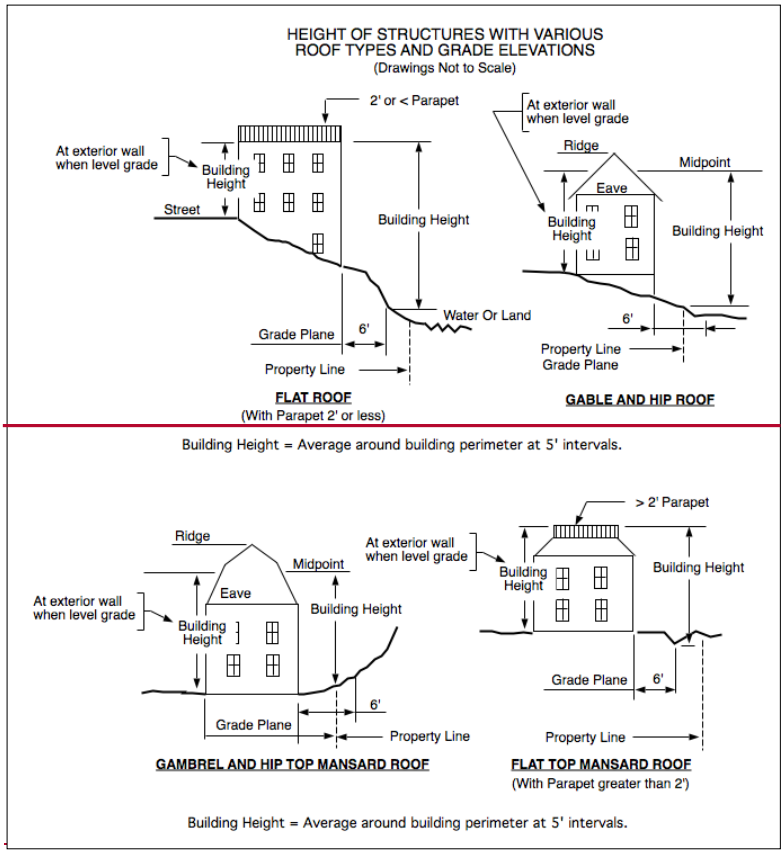
(See also: **existing** and **finished grade plane**, **parapet wall** and **penthouse**)

Commented [NJC12]:
Purpose – To clarify and differentiate how building height is measured between a flat- and hip-topped (or sloped) mansard roof.
Comment – Encourages hip-topped mansard roofs.

Commented [NJC13]:
Purpose – Remove redundancy between the rooftop appurtenances and the calculation of building height.
Comment – Building height will refer to the modified dimensional requirements for rooftop appurtenances under Section 10.517.

Commented [NJC14]:
Purpose – Revise the building height measurement to the lot line(s) adjoining a street or public place.
Comment – Building height is differentiated between a Character and Gateway District and all other zoning districts.

Commented [NJC15]:
Purpose – To remove the diagram to avoid confusion on how building height is determined.
Comment – Although the diagram is still applicable to buildings outside the Character or Gateway Districts it will likely confuse readers and complicate administration of the building height. Section a) and b) above outline how building height is measured.


HEIGHT OF STRUCTURES WITH VARIOUS
ROOF TYPES AND GRADE ELEVATIONS
(Drawings Not to Scale)
2' or < Parapet
At exterior wall when level grade
Building Height
Street
Building Height
Water Or Land
Grade Plane
6'
Property Line
FLAT ROOF
(With Parapet 2' or less)
At exterior wall when level grade
Ridge
Midpoint
Eave
Building Height
Building Height
6'
Property Line
Grade Plane
GABLE AND HIP ROOF
Building Height = Average around building perimeter at 5' intervals.
Ridge
Midpoint
At exterior wall when level grade
Eave
Building Height
Building Height
6'
Grade Plane
Property Line
GAMBREL AND HIP TOP MANSARD ROOF
> 2' Parapet
At exterior wall when level grade
Building Height
Building Height
Grade Plane
6'
Property Line
FLAT TOP MANSARD ROOF
(With Parapet greater than 2')
Building Height = Average around building perimeter at 5' intervals.

10.517 Roof Appurtenances and Other Rooftop Features

10.517.10 A **roof appurtenance** may exceed the maximum allowed **structure** height for the zoning district by up to the additional height allowed in Section 10.521 or Section 10.531, as applicable, subject to the provisions of Section 10.517.

10.517.20 In the Character Districts and Gateway Neighborhood Mixed Use Districts, features for rooftop access and **use** may exceed the maximum allowed **structure** height for the zoning district as follows:

10.517.21 ~~An elevator enclosure for an elevator providing rooftop access may extend an additional 5 feet above the allowed appurtenance height, provided that it is set back at least 30 feet from all edges of the roof and that the combined area of all such enclosure shall not exceed 300 square feet in area.~~ A **penthouse** is permitted to exceed the maximum building height when located on a **building** no greater than 4 stories in height. An elevator or stairwell enclosure providing rooftop or **penthouse** access may extend an additional 5 feet above the allowed appurtenance height, whichever is greater, provided that it is set back at least 25 feet from all edges of the roof and that the combined area of all such enclosures shall not exceed 300 square feet in area.

10.517.22 ~~Elevator vestibules and partial shelters such as trellises and pergolas may extend up to the height allowed for rooftop appurtenance provided that all such features shall be set back from all edges of the roof a distance at least equal to their height above the allowed **structure** height, and that the total area of such features shall not exceed 15 percent of the total roof area of the **structure**.~~ Uninhabitable **roof appurtenance**s such as mechanical equipment and screens, or other similar **roof appurtenance**s may extend up to the height allowed for rooftop appurtenances or 8 feet, whichever is higher, provided that all such features shall be set back from all edges of the roof a distance of at least 20 feet. Decorative **roof appurtenance**s such as a raised cornice, parapet walls, or other uninhabitable tower elements are permitted to be located along the edge of the roof and shall be ~~less~~no greater than 8 feet in height.

10.517.23 Railings around rooftop use areas may extend above the allowed **structure** height provided that they are less than 4 feet above the roof surface and are set back at least ~~twice~~ half their height from the edge of the roof.

10.517.30 All **roof appurtenance**s that exceed the allowed **structure** height for the zoning district shall not exceed ~~33~~ 50 percent of the total roof area of the **structure**. ~~and, except for elevators and stair towers, shall be set back at least 10 feet from any edge of the roof.~~

10.517.31 Solar energy panels shall not be subject to the ~~33~~ 50 percent limitation. ~~provided that they are not visible from a point 20 feet above the edge of the **street** right-of-way on the opposite side of the **street**.~~

10.517.40 The area of **roof appurtenance**s shall not be considered as part of the **building**'s **gross floor area** calculations.

Commented [NJC16]:
Purpose – To add the Character Districts to this section.
Comment – The former Zoning Districts (CBA, CBB and MRO) that were replaced with the Character Districts previously allowed for rooftop appurtenances under Section 10.520 and should have, like the Gateway Neighborhood Mixed Use District, been added into this section when originally adopted.

Commented [NJC17]:
Purpose – To allow for penthouses to be added to building up to 4 stories in height.
Comment – A penthouse that meets the definition and dimensional controls will not be visible from a street or public place and will add architectural interest and value to the city's skyline.

Commented [NJC18]:
Purpose – Refine the dimensional requirements for rooftop mechanical systems as well as decorative edge treatments.
Comment – The 20 foot setback from the roof edge for mechanical equipment and screening or shelters will largely remove them from view from a street or public place. The decorative rooftop appurtenances will significantly add interest and needed architectural character to the roof edge of new buildings.

Commented [NJC19]:
Purpose – Reduce the setback requirements for railings from the roof edge.
Comment – There is no overriding public purpose to require a railing be located 8 feet or more from the edge of a roof. Decorative railings are typically located along or near the edge of the roof.

Commented [NJC20]:
Purpose – Increase the percentage of the roof that can be used for rooftop appurtenances.
Comment – The increase to 50% corresponds to the penthouse standards and past practice for mechanical and roof deck appurtenances.

Commented [NJC21]:
Purpose – Remove the visibility standard as most pitched or sloped roofs would not support solar panels with this requirement.
Comment – The current 20 foot standard above the sidewalk is unreasonable and significantly limits the feasibility of installing solar panels.

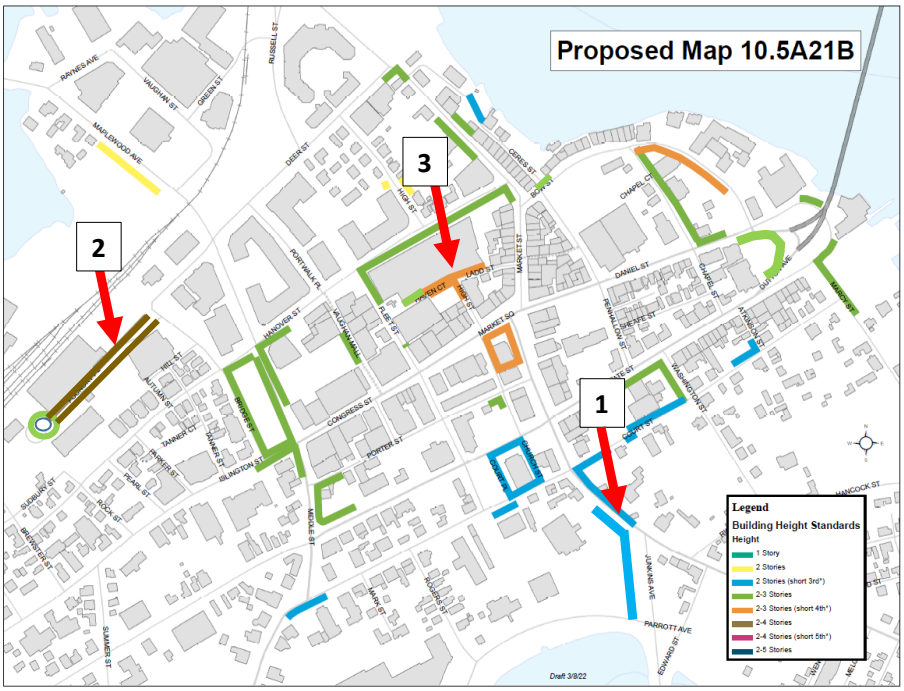
ORDINANCE #

THE CITY OF PORTSMOUTH ORDAINS

That the Ordinances of the City of Portsmouth, Chapter 10 – Zoning Ordinance, be amended as follows:

Amend Article 5 – Dimensional and Intensity Standards - Section 10.5A21.10: Contents of Regulating Plan as follows (deletions from existing language ~~stricken~~; additions to existing language colored and underlined; remaining language unchanged from existing):

1) **Amend Section 10.5A21B - Building Height Standards Map as follows:**
   a. **Add the following Building Height Standards:**



   b. **Amended the following note on Map 10.5A21B as follows:**

Incentive Overlay Districts

Within the Incentive Overlay Districts, certain specified development standards, including height, density and parking, may be modified pursuant to Section 10.5A46.

Commented [NJC1]:
Purpose:
1. To add building height standards for municipal and civic properties;
2.To add building height standards for new streets or public places (i.e. Foundry Place)
3.To modify the building height standard for a small portion of High Street and Haven Court.

Comment – These changes will enable municipal and civic properties to be aligned within their surrounding context. Foundry Place will be added as a street and be consistent with the building heights supported by the North End Vision Plan. High Street and Haven Court will be consistent with the existing context.

Commented [NJC2]:
Purpose – To correct an incorrect reference.
Comment – 10.5A47 does not exist in the code.

2) **Amend Article 5 - Section 10.5A21.20 - Building Height Standards (deletions from existing language ~~stricken~~; additions to existing language colored and underlined; remaining language unchanged from existing):**

a. Amend Section 10.5A21.21 as follows:

10.5A21.21 Assignments for specific **building height** require a building to have no more than the designated maximum number of **stories** or the maximum height in feet (whichever is lower) and no less than the designated minimum number of **stories**. Subject to Section 10.635.70 – Review Criteria, within the Historic District, the approved **building height** may be lower than the maximum designated number of **stories** or the maximum height in feet provided in Section 10.5A43.30 but shall be not lower than the minimum designated number of **stories** or the minimum height in feet provided.

b. Amend Section 10.5A21.21 as follows:

10.5A21.22 When a **lot** is assigned to more than one **building height** standard the **lot** shall be apportioned as follows:

(a) A **building height** standard designated along a **front lot line** on a **street** or **public place** shall apply to the portion of the **lot** that is 50 feet or less from such **lot line** or **street** or **public place**.
(b) A **building height** standard designated along a water body shall apply to the portion of the **lot** that is 100 feet or less from the mean high water line.
(c) More than 50 feet from a **front lot line** on a **street** or **public place** and more than 100 feet from a water body, the **building height** may increase to the highest **building height** standard designated for the **lot**.
(d) Where a **lot** has less depth from a **front lot line**, **street, public place** or water body than the required minimum distances stated above, the lowest **building height** standard for the **lot** shall be applied to the required linear distance from the **lot line**, **street**, **public place**, or water body.

3) **Amend Article 5 – Section 10.5A50: Civic Districts (deletions from existing language stricken; additions to existing language colored and underlined; remaining language unchanged from existing):**

a. Amend Section 10.5A52.40 as follows:
10.5A52.40. New structures, alterations and expansions of existing structures in the Civic district are exempt from the requirements of 10.5A42 and 10.5A43 provided all **uses** remain civic and shall conform to the Building Placement, Occupation, and Form Standards for Principal and Outbuildings listed in 10.5A41.10A.

4) **Amend Article 15 – Definitions - Section 10.1530: Terms of General Applicability (deletions from existing language ~~stricken~~; additions to existing language colored and underlined; remaining language unchanged from existing):**

Lot line, front
A boundary of a **lot** that separates the **lot** from either a **street** or a **public place**. A **corner lot** or a **through lot** or a waterfront **lot** shall have multiple **front lot line**s. In the case of a **corner**

Commented [NJC3]:
Purpose – To make explicit that within the Historic District the HDC has jurisdiction over height, scale, and massing of any new construction.
Comment - Like building placement or design, the maximum height must be determined to be appropriate by the HDC.

Commented [NJC4]:
Purpose – To clarify that the maximum building height is assigned to all lot lines fronting on a street or public place and that corner, though, or waterfront lots allow for encroachment of a higher building height on the lot provided the taller sections of the building are located at least 50 feet from the lot line along a street or public place with a lower building height standard.
Comment – This change will remove the ambiguity as to how building heights are apportioned on corner, through, or waterfront lots.

Commented [NJC5]:
Purpose – To assign dimensional standards to Civic properties.
Comment – Properties within the Civic District currently have no dimensional controls. The CD4-L1/2 dimensional standards are proposed as most Civic properties have a lower intensity of use than properties within the CD4 or CD5 Districts.

lot or a **through lot** or a waterfront **lot**, the **principal front yard** shall be the line bordering a **street** or a **public place** on which the **lot** has its address as defined by the City.

Public place

A **street**, way, park, **pedestrian alleyway** or other **community space** type that provides public access.

Existing grade plane

For all buildings located outside the Character or Gateway Districts, a reference plane representing the average of existing ground levels adjoining the building at all exterior walls. When the existing ground level slopes away from exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, when the lot line is more than 6 feet from the building, between the building and a point 6 feet from the building. For all buildings located within the Character or Gateway Districts, a reference plane representing the average existing ground level along **lot line** adjoining a **street** or a **public place**. (See also **building height**).

Finished grade plane

For all buildings located outside the Character or Gateway Districts, a reference plane representing the average of finished ground levels adjoining the building at all exterior walls. When the finished ground level slopes away from exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, when the lot line is more than 6 feet from the building, between the building and a point 6 feet from the building. For all buildings located within the Character or Gateway Districts, a reference plane representing the average finished ground level along any **lot line** adjoining a **street** or a **public place**. (See also **building height**.).

Penthouse

A habitable space within the uppermost portion of a **building** above the **cornice** which is set back at least 20 feet from all edges of the roof adjoining a **street** or **public place** and at least 15 feet from all other edges. The total floor area of the **penthouse** shall not exceed 50% of the area of the **story** below and the height of the **penthouse** shall not exceed 10 feet above the **story** below for flat roof surface or 14 feet for a gable, hip, or hip-topped **mansard roof** surface. Except for elevator or stairwell access allowed under Section 10.517, no other **roof appurtenance**s shall exceed the maximum allowed height of a **penthouse**. For internal courtyards at least 40 feet from a street or vehicular right-of-way or easement, the **penthouse** shall be setback at least 8 feet from the edge of the roof of the story below.

Building Height

The greatest vertical measurement between two reference points defined as follows:

(a) For buildings located outside the Character or Gateway Districts the lower reference point shall be the **existing** or **finished grade plane**, whichever is lower, as defined herein. For buildings located within the Character or Gateway Districts the lower reference point shall be established from the average **existing** or **finished grade plane**, whichever is lower, of the **building** façade that is closet to any **lot line** adjoining a **street** or a **public place**. In the case of a corner or through lot the provisions of Section 5A.21.21 shall apply. The vertical distance between the lower and upper reference points shall not exceed the maximum number of stories or **building height**.

Commented [NJC6]:
Purpose – To clarify that corner, through, or waterfront lots can have multiple front lot lines and the property address only determines the principle front lot line.
Comment – This avoids any confusion as to how building heights are allocated on corner, through, or waterfront lots.

Commented [NJC7]:
Purpose – To add a definition for public places.
Comment – Public places include, but are not limited to, the existing community space types that provide public access.

Commented [NJC8]:
Purpose – To add a new definition for existing grade plane in order to measure and determine building height.
Comment – Outside the Character or Gateway Districts, this change will use the existing grade around the entire building height to calculate the building height. Within the Character or Gateway Districts it will only focus on the street facing façade(s) of the building.

Commented [NJC9]:
Purpose – To modify the definition to better protect the street edge.
Comment – Outside the Character or Gateway Districts, this change will use the finished grade around the entire building height to calculate the building height. Within the Character or Gateway Districts it will only focus on the street facing façade(s) of the building.

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Purpose – To modify the dimensional standards for penthouses to minimize public views from a street or public place.
Comment – The proposed dimensional standards will minimize the view of a penthouse from a street or public place and encourage the use of sloped roofs. This will also allow a penthouse to be treated as a rooftop appurtenance and add functionality and architectural interest to the top of buildings.

Commented [NJC11]:
Purpose – Within the Character or Gateway Districts the building height will focus on the building faced(s) along a street edge or public place versus averaging all four sides into the overall building height.
Comment – Either the existing or finished grade plane will be used, whichever is lower, to calculate the building height.

(b) The upper reference point shall be any of the following:
(1) For a flat or flat-topped **mansard roof**, the highest point of the roof surface;
(2) For a pitched roof, hip-topped **mansard roof**, or gambrel roof, the elevation midway between the level of the eaves and highest point of the roof. For this purpose, the "level of the eaves" shall mean the highest level where the plane of the roof intersects the plane of the outside wall on a side containing the eaves, but at no time shall this level be lower than the floor level of the uppermost **story** or **attic**.

(c) A **roof appurtenance**, as defined under 10.517, shall not be included in the determination of **building height**.

(d) To determine **building height** outside a Character or Gateway District, the measurements between the lower and upper reference points shall be taken at least every 5 feet around the entire perimeter of the **building.** Within a Character or Gateway District, the measurements shall be taken at least every 5 feet along the **building** façade that is closet to any **lot line** on a **street** or a **public place**. An average is calculated from these measurements and the average shall be the **building**'s height for purposes of this Ordinance.

(See also: **existing** and **finished grade plane**, **parapet wall** and **penthouse**)

Commented [NJC12]:
Purpose – To clarify and differentiate how building height is measured between a flat- and hip-topped (or sloped) mansard roof.
Comment – Encourages hip-topped mansard roofs.

Commented [NJC13]:
Purpose – Remove redundancy between the rooftop appurtenances and the calculation of building height.
Comment – Building height will refer to the modified dimensional requirements for rooftop appurtenances under Section 10.517.

Commented [NJC14]:
Purpose – Revise the building height measurement to the lot line(s) adjoining a street or public place.
Comment – Building height is differentiated between a Character and Gateway District and all other zoning districts.

Commented [NJC15]:
Purpose – To remove the diagram to avoid confusion on how building height is determined.
Comment – Although the diagram is still applicable to buildings outside the Character or Gateway Districts it will likely confuse readers and complicate administration of the building height. Section a) and b) above outline how building height is measured.

10.517 Roof Appurtenances and Other Rooftop Features

10.517.10 A **roof appurtenance** may exceed the maximum allowed **structure** height for the zoning district by up to the additional height allowed in Section 10.521 or Section 10.531, as applicable, subject to the provisions of Section 10.517.

10.517.20 In the Character Districts and Gateway Neighborhood Mixed Use Districts, features for rooftop access and **use** may exceed the maximum allowed **structure** height for the zoning district as follows:

10.517.21 A **penthouse** is permitted to exceed the maximum building height when located on a **building** no greater than 4 stories in height. An elevator or stairwell enclosure providing rooftop or **penthouse** access may extend an additional 5 feet above the allowed appurtenance height, whichever is greater, provided that it is set back at least 25 feet from all edges of the roof and that the combined area of all such enclosures shall not exceed 300 square feet in area.

10.517.22 . Uninhabitable **roof appurtenance**s such as mechanical equipment and screens, or other similar **roof appurtenance**s may extend up to the height allowed for rooftop appurtenances or 8 feet, whichever is higher, provided that all such features shall be set back from all edges of the roof a distance of at least 20 feet. Decorative **roof appurtenance**s such as a raised cornice, parapet walls, or other uninhabitable tower elements are permitted to be located along the edge of the roof and shall be no greater than 8 feet in height.

10.517.23 Railings around rooftop use areas may extend above the allowed **structure** height provided that they are less than 4 feet above the roof surface and are set back at least half their height from the edge of the roof.

10.517.30 All **roof appurtenance**s that exceed the allowed **structure** height for the zoning district shall not exceed 50 percent of the total roof area of the **structure**..

10.517.31 Solar energy panels shall not be subject to the 50 percent limitation.

10.517.40 The area of **roof appurtenance**s shall not be considered as part of the **building**'s **gross floor area** calculations.

Commented [NJC16]:
Purpose – To add the Character Districts to this section.
Comment – The former Zoning Districts (CBA, CBB and MRO) that were replaced with the Character Districts previously allowed for rooftop appurtenances under Section 10.520 and should have, like the Gateway Neighborhood Mixed Use District, been added into this section when originally adopted.

Commented [NJC17]:
Purpose – To allow for penthouses to be added to building up to 4 stories in height.
Comment – A penthouse that meets the definition and dimensional controls will not be visible from a street or public place and will add architectural interest and value to the city's skyline.

Commented [NJC18]:
Purpose – Refine the dimensional requirements for rooftop mechanical systems as well as decorative edge treatments.
Comment – The 20 foot setback from the roof edge for mechanical equipment and screening or shelters will largely remove them from view from a street or public place. The decorative rooftop appurtenances will significantly add interest and needed architectural character to the roof edge of new buildings.

Commented [NJC19]:
Purpose – Reduce the setback requirements for railings from the roof edge.
Comment – There is no overriding public purpose to require a railing be located 8 feet or more from the edge of a roof. Decorative railings are typically located along or near the edge of the roof.

Commented [NJC20]:
Purpose – Increase the percentage of the roof that can be used for rooftop appurtenances.
Comment – The increase to 50% corresponds to the penthouse standards and past practice for mechanical and roof deck appurtenances.