Findings of Fact | Site Plan Review
City of Portsmouth Planning Board

Date: August 7, 2024
Property Address: 1035 Lafayette Road
Application #: LU-24-92
Decision: ☐ Approve ☐ Deny ☐ Approve with Conditions

Findings of Fact:

Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Site Plan Regulations Section 2.9 Evaluation Criteria - in order to grant site plan review approval, the TAC and the Planning Board shall find that the application satisfies evaluation criteria pursuant to NH State Law and listed herein. In making a finding, the TAC and the Planning Board shall consider all standards provided in Articles 3 through 11 of these regulations.

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
1	Compliance with all City Ordinances and Codes and these regulations. Applicable standards:	Meets Does Not Meet	Applicable standards: The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
2	Provision for the safe development, change or expansion of use of the site.	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
3	Adequate erosion control and stormwater management practices and other mitigative measures, if needed, to prevent adverse effects on downstream water quality and flooding of the property or that of another.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the erosion control and stormwater management practices and other mitigative measures for conformance with City design requirements. • A full drainage analysis report was submitted that included analysis of the predevelopment and post development drainage conditions. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
4	Adequate protection for the quality of groundwater.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the erosion control and stormwater management practices and other mitigative measures for conformance with City design requirements. • A full drainage analysis report was submitted that included analysis of the predevelopment and post development drainage conditions. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
5	Adequate and reliable water supply sources.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the water service design for conformance with City design requirements. • The site will be served by city water. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
6	Adequate and reliable	**Meets**	The application has been reviewed by the

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
	sewage disposal facilities, lines, and connections.	Does Not Meet	Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed sewage disposal facilities, lines, and connections for conformance with City design requirements. • The site will be served by municipal sewer. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
7	Absence of undesirable and preventable elements of pollution such as smoke, soot, particulates, odor, wastewater, stormwater, sedimentation or any other discharge into the environment which might prove harmful to persons, structures, or adjacent properties.	Meets Does Not Meet	Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the erosion control and stormwater management practices and other mitigative measures for conformance with City design requirements. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
8	Adequate provision for fire safety, prevention and control.	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
9	Adequate protection of natural features such as, but not limited to, wetlands.	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
10	Adequate protection of historical features on the site.	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • There are no on-site historical features that will be

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
			removed/disturbed. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
11	Adequate management of the volume and flow of traffic on the site and adequate traffic controls to protect public safety and prevent traffic congestion.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the management of the volume and flow of traffic on the site and adequate traffic controls to protect public safety and prevent traffic congestion. for conformance with City design requirements. • A full traffic impact study was submitted that included analysis of the no-build and build conditions. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
12	Adequate traffic controls and traffic management measures to prevent an unacceptable increase in safety hazards and traffic congestion off-site.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the management of the volume and flow of traffic on the site and adequate traffic controls to protect public safety and prevent traffic congestion. for conformance with City design requirements. • A full traffic impact study was submitted that included analysis of the no-build and build conditions. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
13	Adequate insulation from external noise sources.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
			approval on July 2, 2024 at the Technical Advisory Committee Meeting.
14	Existing municipal solid waste disposal, police, emergency medical, and other municipal services and facilities adequate to handle any new demands on infrastructure or services created by the project.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed that police, emergency medical, and other municipal services and facilities adequate to handle any new demands on infrastructure or services created by the project. • Project will not utilize municipal solid waste disposal. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
15	Provision of usable and functional open spaces of adequate proportions, including needed recreational facilities that can reasonably be provided on the site	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the community space areas proposed as part of the design plan. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
16	Adequate layout and coordination of on-site accessways and sidewalks in relationship to off-site existing or planned streets, accessways, bicycle paths, and sidewalks.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the layout and coordination of on-site accessways and sidewalks in relationship to off-site existing or planned streets, accessways, bicycle paths, and sidewalks. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
17	Demonstration that the land indicated on plans submitted with the application shall be of such character that it can be used for building purposes without danger to health.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
18	Adequate quantities, type or arrangement of landscaping and open space for the provision of visual, noise and air pollution buffers.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. • TAC reviewed the quantities, type or arrangement of landscaping and open space. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
19	Compliance with applicable City approved design standards.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum requirements of the Site Plan Regulations. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
	Other Board Findings:		

Findings of Fact | Parking Conditional Use Permit
City of Portsmouth Planning Board

Date: August 7, 2024
Property Address: 1035 Lafayette Road
Application #: LU-24-92
Decision: □ Approve □ Deny □ Approve with Conditions

Findings of Fact:
Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Parking Conditional Use Permit
10.1112.14 The Planning Board may grant a conditional use permit to allow a building or use to provide less than the minimum number of off-street parking spaces required by Section 10.1112.30, Section 10.1112.61, or Section 10.1115.20, as applicable, or to exceed the maximum number of off-street parking spaces allowed by Section 10.1112.51.

	Parking Conditional Use Permit 10.1112.14 Requirements	Finding (Meets Criteria/Requirement)	Supporting Information
1	10.1112.141 An application for a conditional use permit under this section shall include a parking demand analysis, which shall be reviewed by the City's Technical Advisory Committee prior to submission to the Planning Board, demonstrating that the proposed number of off-street parking spaces is sufficient for the proposed use.	Meets Does Not Meet	The parking demand analysis has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Parking CUP. • TAC reviewed the proposed development's consistency with the purpose and intent set forth in Section 10.1112.141. The application was recommended for approval on July 2, 202 at the Technical Advisory Committee Meeting.
2	10.1112.142 An application for a conditional use permit under this section shall identify permanent evidence-based measures to reduce parking demand, including but not limited to provision of	Meets Does Not Meet	The parking demand analysis has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Parking CUP. • TAC reviewed the proposed development's consistency with

	Parking Conditional Use Permit 10.1112.14 Requirements	Finding (Meets Criteria/Requirement)	Supporting Information
	rideshare/microtransit services or bikeshare station(s) servicing the property, proximity to public transit, car/van-pool incentives, alternative transit subsidies, provisions for teleworking, and shared parking on a separate lot subject to the requirements of 10.1112.62.		the purpose and intent set forth in Section 10.1112.142. • Project proposes adding a COAST bus stop on site. The application was recommended for approval on July 2, 202 at the Technical Advisory Committee Meeting.
3	10.1112.143 The Planning Board may grant a conditional use permit only if it finds that the number of off-street parking spaces required or allowed by the permit will be adequate and appropriate for the proposed use of the property. In making this determination, the Board may accept, modify or reject the findings of the applicant's parking demand analysis.	**Meets** **Does Not Meet**	The parking demand analysis has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Parking CUP. The application was recommended for approval on July 2, 202 at the Technical Advisory Committee Meeting.
4	10.1112.144 At its discretion, the Planning Board may require more off-street parking spaces than the minimum number requested by the applicant, or may allow fewer spaces than the maximum number requested by the applicant.	**Meets** **Does Not Meet**	The parking demand analysis has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Parking CUP. The application was recommended for approval on July 2, 202 at the Technical Advisory Committee Meeting.
5	**Other Board Findings:**		
6	**Additional Conditions of Approval:**		

Findings of Fact | Development Site Conditional Use Permit
City of Portsmouth Planning Board

Date: August 7, 2024
Property Address: 1035 Lafayette Road
Application #: LU-24-92
Decision: ☐ Approve ☐ Deny ☐ Approve with Conditions

Findings of Fact:
Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Development Site Conditional Use Permit
10.5B43.10 For a development that contains multiple buildings in the Gateway District, the Planning Board may grant a conditional use permit, if all of the following criteria are met:

	Development Site Conditional Use Permit 10.5B43.10 Findings	Finding (Meets Criteria/Requirement)	Supporting Information
1	The development project is consistent with the Portsmouth Master Plan.	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Development Site CUP. • TAC reviews the proposed development's consistency with Goals 1.2, 2.1, & 3.1 of the City of Portsmouth Master Plan. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
2	The development project has been designed to allow uses that are appropriate for its context and consistent with City's planning goals and objectives for the area.	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Development Site CUP. • TAC reviews the proposed development's use relative to the City's planning goals and objectives for the area. The application was recommended for approval on July 2, 2024 at the Technical

	Development Site Conditional Use Permit 10.5B43.10 Findings	Finding (Meets Criteria/Requirement)	Supporting Information
			Advisory Meeting.
3	The project includes measures to mitigate or eliminate anticipated impacts on traffic safety and circulation, demand on municipal services, stormwater runoff, natural resources, and adjacent neighborhood character.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Development Site CUP. • TAC reviewed the proposed project's anticipated impacts on traffic safety and circulation, demand on municipal services, stormwater runoff, natural resources, and adjacent neighborhood character. • The Project will have a negligible impact on traffic due to the existing large traffic volumes on Lafayette Road. A traffic study has been prepared and is being reviewed by NHDOT. • The development site has been designed to mitigate stormwater runoff with the use of detention and filtration stormwater treatment practices. The proposed project is a significant improvement over existing conditions as there is no stormwater treatment on site. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
4	The project is consistent with the purpose and intent set forth in Section 10.5B11.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Development Site CUP. • TAC reviews the proposed development's consistency with the purpose and intent set forth in Section 10.5B11. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
5	**<u>Other Board Findings:</u>**		

	Development Site Conditional Use Permit 10.5B43.10 Findings	Finding (Meets Criteria/Requirement)	Supporting Information

Findings of Fact | Density Bonus Incentives Conditional Use Permit

City of Portsmouth Planning Board

Date: August 7, 2024
Property Address: 1035 Lafayette Road
Application #: LU-24-92
Decision: ☐ Approve ☐ Deny ☐ Approve with Conditions

Findings of Fact:
Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Density Bonus Incentives Conditional Use Permit
10.5B72 A conditional use permit may be granted by the Planning Board for increased housing density or for increased building height and footprint.

	Density Bonus Incentive Findings	**Finding** (Meets Criteria/Requirement)	**Supporting Information**
1	The proposed project (and any conditions of approval) satisfies the requirements in Section 10.5B73 for providing workforce housing and Public Realm improvements (if seeking more than 1 incentive).	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviewed the proposed development's consistency with the purpose and intent set forth in Section 10.5B73. The application was recommended for approval on July 2, 202 at the Technical Advisory Committee Meeting.
2	The proposed project is consistent with the purpose and intent set forth in Section 10.5B11	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviewed the proposed development's consistency with the purpose and intent set forth in Section 10.5B11.

	Density Bonus Incentive Findings	Finding (Meets Criteria/Requirement)	Supporting Information
			The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
3	10.5B11.10 Purpose of Article 5B is to implement and support the goals of the City's Master Plan and Housing Policy to encourage walkable mixed-use development and continued economic vitality in the City's primary gateway areas, ensure that new development complements and enhances its surroundings, provide housing stock that is suited for changing demographics, and accommodate the housing needs of the City's current and future workforce.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviews the proposed development's consistency with the purpose and intent set forth in Section 10.5B11.10. • The project will support goals of the City master plan to encourage a walkable multi-family development. • The project will also accommodate current and future housing needs for the workforce. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
4	10.5B11.20 a) Promote development that is consistent with the goals of the Master Plan to create vibrant, authentic, diverse, connected and resilient neighborhoods;	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviews the proposed development's consistency with the purpose and intent set forth in Section 10.5B11.20a. • The project will support goals of the City master plan to create vibrant, authentic, diverse, connected and resilient neighborhoods. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
	b) Encourage high quality housing for a variety of household types and income ranges;	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviews the proposed development's consistency with the purpose and intent set forth in Section 10.5B11.20b.

	Density Bonus Incentive Findings	Finding (Meets Criteria/Requirement)	Supporting Information
			• The project will provide high quality housing suitable for different income ranges. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
	c) Guide the physical character of development by providing a menu of building and site development types that are based on established community design principles; and	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviews the proposed development's consistency with the purpose and intent set forth in Section 10.5B11.20c. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
	d) Create quality places by allowing for whole site development with meaningful public spaces and neighborhood centers.	**Meets** **Does Not Meet**	The application has been reviewed by the Technical Advisory Committee for conformance with the minimum criteria of the Density Bonus Incentives CUP. • TAC reviews the proposed development's consistency with the purpose and intent set forth in Section 10.5B11.20d. • The project will provide quality public space. The application was recommended for approval on July 2, 2024 at the Technical Advisory Committee Meeting.
5	**Other Board Findings:**		

P5118-001
July 24, 2024

Mr. Rick Chellman, Chair
City of Portsmouth Planning Board
1 Junkins Avenue
Portsmouth NH, 03801

Re: Request for Site Plan & Conditional Use Permits (LU-24-92)
Proposed Mixed-Use Development, 1035 Lafayette Road, Portsmouth, NH

Dear Chairman Chellman:

On behalf of Christ Church Parish (Owner), and Portsmouth Housing Authority (Applicant), we are pleased to submit one (1) set of hard copies and digital copies of the following information to support a request for a Site Review Permit for the above referenced project:

- One (1) full size & one (1) half size copy of the Site Plan Set, last revised July 24, 2024
- Owner Authorization, dated March 25, 2024
- Applicant Authorization, dated March 24, 2024
- Technical Advisory Committee (TAC) Conditions Response, dated July 24, 2024
- Parking Demand Analysis, dated July 24, 2024
- Traffic Impact Study, dated July 24, 2024
- Drainage Analysis, last revised July 24, 2024
- Long-Term Operation & Maintenance Plan, last revised June 17, 2024
- Truck Turning Exhibit, last revised July 24, 2024
- Green Building Statement, dated June 17, 2024
- Ground Penetrating Radar Survey, dated February 2024
- Site Review Checklist, dated May 20, 2024
- Application fee calculation form for the Site Review Permit

PROJECT SUMMARY

Existing Conditions

The proposed project is located at 1035 Lafayette Road on a parcel of land identified as Map 246 Lot 1 on the City of Portsmouth Tax Maps and is located in the Gateway Neighborhood Mixed Use Corridor, G2 District. The existing parcel is approximately 3.5 acres and is bound to the west by Route 1 and to the North, East, and South by a State of New Hampshire Conservation Urban Forestry Center parcel. The sites current uses include the Christ Episcopal Church and Little Blessings Child Care Center. The site is accessed by two driveways on Route 1, a right in / right out at the center of the property and a signalized intersection at Mirona Road on the north side of property.

Proposed Redevelopment

For the proposed project, the Portsmouth Housing Authority will construct a 4-story, 44-unit multi-family residential building to the south of the existing church building. In addition, HAVEN will convert and renovate the first floor of the existing church into office space and will construct a 7-unit transitional housing addition to the north of their new office. The lower level of the existing church will be renovated for Little Blessings Child Care Center. The Christ Episcopal Church will be relocated to the existing rectory building on the southern portion of the site. The project will include associated site improvements such as parking, pedestrian connections, access to public transportation, utilities, stormwater management, lighting, and landscaping. The site will continue to be accessed via the existing driveways on Route 1.

LAND USE PERMIT APPLICATIONS

The proposed project will require the following site-related approvals from the Planning Board:

- Site Plan Review Permit
- Conditional Use Permit for Off-Street Parking
- Conditional Use Permit for Development Site
- Conditional Use Permit for Density Bonus Incentives

The project will also require the following site related approvals from the State of New Hampshire:

- NHDES Alteration of Terrain Permit – the enclosed Drainage Analysis will be included as supporting information for this permit application.
- NHDES Sewer Connection Permit – the average daily flow calculations included in the Technical Advisory Committee (TAC) calculations and Utilities Plans will be included as supporting information for this permit application.
- NHDES Shoreland Impact Permit – the project has grading impacts within the 250' shoreland buffer area.
- NHDOT Driveway Permit – the enclosed Traffic Impact Study will be included as supporting information for this permit application. As noted in the conclusions of the Traffic Impact Study, the additional site generated traffic is expected to have negligible effect on the traffic operations within the study area.

SITE PLAN REVIEW PERMIT

The applicant is seeking a Site Plan Review Permit for the proposed redevelopment described above in the project summary. To date the applicant has attended the following meetings with the local land-use boards related to the Site Plan:

- April 18, 204 – Planning Board Conceptual Consultation
- June 4, 2024 – TAC Meeting
- July 2, 2024 – TAC Meeting

On July 2, 2024, TAC voted to recommend approval to the Planning Board with the conditions listed in the TAC Letter of Decision dated July 8, 2024. The enclosed materials and TAC Conditions of Approval Response address each of these conditions.

CONDITIONAL USE PERMITS

The following describes how the proposed redevelopment project meets the criteria of the three (3) Conditional Use Permits that are being requested:

Conditional Use Permit for Off-Street Parking

Due to the mix of uses, a shared parking calculation has been applied as allowed by Section 10.1112.61 of the Zoning Ordinance. The parking occupancy rates utilized for each use are the rates identified in the Parking Occupancy Rate table in Section 10.1112.61 of the Zoning Ordinance with the exception of a daycare parking occupancy rate. The daycare parking occupancy rate that has been utilized is the institutional use as there is no occupancy rate outlined in section 10.1112.61 for a daycare facility. The institutional use was chosen as it best reflects the anticipated working hours of the proposed daycare of Monday through Friday 8 AM to 5PM.

Because a use other than daycare was utilized for the shared parking calculation to more accurately reflect parking demand, the project will require Conditional Use Permit for Off-Street Parking. Under Section 10.1112.14, the applicant is respectfully requesting that a Conditional Use Permit be granted by the Planning Board to allow the Project to provide less than the minimum off-street parking spaces required by Section 10.1112.30 or Section 10.1112.61.

- Section 10.1112.141 – The enclosed Parking Demand Analysis has been provided as required by this section. The Parking Demand Analysis demonstrates the off-street parking provided by the Project is sufficient for its Uses.
- Section 10.1112.142 – This section indicates an application for a Conditional Use Permit shall identify permanent evidence-based measures to reduce parking demand. As described in the enclosed Parking Demand Analysis, the Project provides measures that promote alternative modes of transportation such as walking, bicycling, and public transportation.

Development Site Conditional Use Permit

Under Section 10.5B41.10 Development Site Standards are "allowed by Conditional Use Permit approval from the Planning Board, a development site is any lot or group of contiguous lots owned or controlled by the same person or entity, assembled for the purpose of a single development and including more than one principal building or building type". The proposed project meets the definition of a Development Site, as such a CUP to allow the use of the Development Site Standards is being requested for this proposed project.

Conditional Use Permit Criteria

Based on the above-described and enclosed materials, the following addresses how the Project warrants the granting of a Conditional Use Permit for a Development Site by satisfying the following four (4) criteria for approval in Section 10.5B43.10 of the Zoning Ordinance:

(1) The development project is consistent with the Portsmouth Master Plan.

The Project along with the existing site as a whole is consistent with several goals identified in the Master Plan.

- Goal 1.2 is to encourage walkable mixed-use development along existing commercial corridors. The proposed project has been designed to promote alternative modes of transportation such as walking, bicycling, and public transportation by incorporating bicycle storage spaces on-site, pedestrian connections to Lafayette Rd, and the applicant has worked with COAST for the addition of an on-site COAST bus stop.

- Goal 2.1 is to ensure that new development complements and enhances its surroundings. The proposed residential, office and day care uses of the proposed development will further enhance the commercial, retail, and restaurants located along Lafayette Road in close proximity the property.
- Goal 3.1 and Goal 3.2 are to adapt housing stock to accommodate changing demographics and to accommodate the housing needs of low- and moderate-income residents. The Project will add 51 residential units to the local housing stock all of which 44 will be workforce housing and 7 will be transitional housing units.

(2) The development project has been designed to allow uses that are appropriate for its context and consistent with City's planning goals and objectives for the area.

The Project has been designed to be consistent with the surrounding uses already in the neighborhood. Residential buildings are an allowed use within this district and the addition of housing stock and workforce housing is consistent with goals laid out in the City's Master Plan as described in criteria item 1.

(3) The project includes measures to mitigate or eliminate anticipated impacts on traffic safety and circulation, demand on municipal services, stormwater runoff, natural resources, and adjacent neighborhood character.

As described in the attached Traffic Impact Study, it is the professional opinion of Tighe & Bond that the additional traffic expected to be generated by the proposed mixed-use development is not expected to have a significant impact to traffic operations within the study area. The Project will have a minimal impact on traffic due to the existing large traffic volumes on Lafayette Road.

The development site has been designed to mitigate stormwater runoff with the use of surface Bioretention Internal Storage Reservoir (ISR) stormwater treatment and subsurface infiltration practices. The proposed project is a significant improvement over existing conditions as there is no stormwater treatment currently on site.

(4) The project is consistent with the purpose and intent set forth in Section 10.5B11.

Section 10.5B11.10 states that *"The purpose of Article 5B is to implement and support the goals of the City's Master Plan and Housing Policy to encourage walkable mixed-use development and continued economic vitality in the City's primary gateway areas, ensure that new development complements and enhances its surroundings, provide housing stock that is suited for changing demographics, and accommodate the housing needs of the City's current and future workforce."*

The Project meets the standards outlined in Section 10.5B11.20 which are to:

a. ***Promote development that is consistent with the goals of the Master Plan to create vibrant, authentic, diverse, connected and resilient neighborhoods;*** Criteria 1 details that the proposed project is consistent with the goals of the Master Plan.

b. ***Encourage high quality housing for a variety of household types and income ranges.*** All of the proposed units will be workforce and transitional housing units ensuring that the Project will provide high quality housing for a variety of income ranges.

c. ***Guide the physical character of development by providing a menu of building and site development types that are based on established community design principles;*** The proposed project maintains the existing church building on site with the addition of a new code compliant modern building on site which will enhance the parcel.

d. ***Create quality places by allowing for whole site development with meaningful public spaces and neighborhood centers.*** The Project will enhance the whole-site development approach by maintaining and enhancing the existing historic features which include the addition of the Memorial and Cemetery Fence surrounding the existing burial grounds.

Density Bonus Conditional Use Permit

Under Section 10.5B72 Density Bonus Incentives "A conditional use permit may be granted by the Planning Board for increased housing density or for increased building height. Such conditional use permit shall be contingent upon satisfying the requirements of Section 10.5B73". The Project is requesting a CUP for increased dwelling units per building allowed under Section 10.5B72.10.

Conditional Use Permit Criteria

Based on the above-described and enclosed materials, the following addresses how the Project warrants the granting of a Conditional Use Permit for a Development Site by satisfying the following requirements for approval in Section 10.5B73.10 of the Zoning Ordinance which indicates at least 20% of the dwelling units in the development, but no less than three units, shall be workforce housing units for sale or rent complying with the following criteria:

(1) For sale units shall be at least the average gross floor area of the proposed units in the building or 1,000 sq. ft., whichever is greater.

All the proposed dwelling units will be for rent workforce housing units.

(2) Rental units shall be at least the average gross floor area of the proposed units in the building or 800 sq. ft., whichever is greater.

All the proposed units will be workforce housing units.

(3) The workforce housing units shall be distributed throughout the building wherever dwelling units are located.

All the proposed units will be workforce housing units.

MODIFICATION OF STANDARDS

As allowed by Section 10.5B74.30 of the Zoning Ordinance, and in granting a density bonus conditional use permit, the Planning Board may modify specific standards and requirements set forth in Section 10.5B20, 10.5B30, 10.5B40 and 10.5B70 provided that the Planning Board finds such modification will promote design flexibility and overall project quality. As part of the granting of a CUP for Density Bonus Incentives the applicant is respectfully requesting the modification of the standards under 10.5B40. The standards that are being requested to be modified are described as follows:

Section 10.5B41.80, Open Space and Community Space

Section 10.5B40 outlines the Development Standards for a Mixed-Use Development which includes the requirement of section 10.5B41.80 to provide 20% community space. The applicant is requesting the Planning Board modify this standard to allow 0% community space for the project where 20% is required. In lieu of providing the 20% community space the applicant is proposing to provide 100% workforce housing where only 20% is required per section 10.5B73.10. The applicant feels that providing 100% workforce housing in lieu of community space is more aligned with the goals with the City's Master Plan.

In addition to providing 100% workforce housing, the proposed development directly abuts the State Urban Forestry Center parcel which includes over 150 acres of conservation land and contains numerous public walking trails. The applicant has coordinated with the forestry center which has agreed to allow a pedestrian connection from the central portion of the development to an established trail directly to the east of the project parcel.

CONCLUSION

We respectfully request to be placed on the Planning Board meeting agenda for August 15, 2024. If you have any questions or need any additional information, please contact Neil Hansen by phone at (603) 294-9213 or by email at NAHansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Patrick M. Crimmins, PE
Vice President

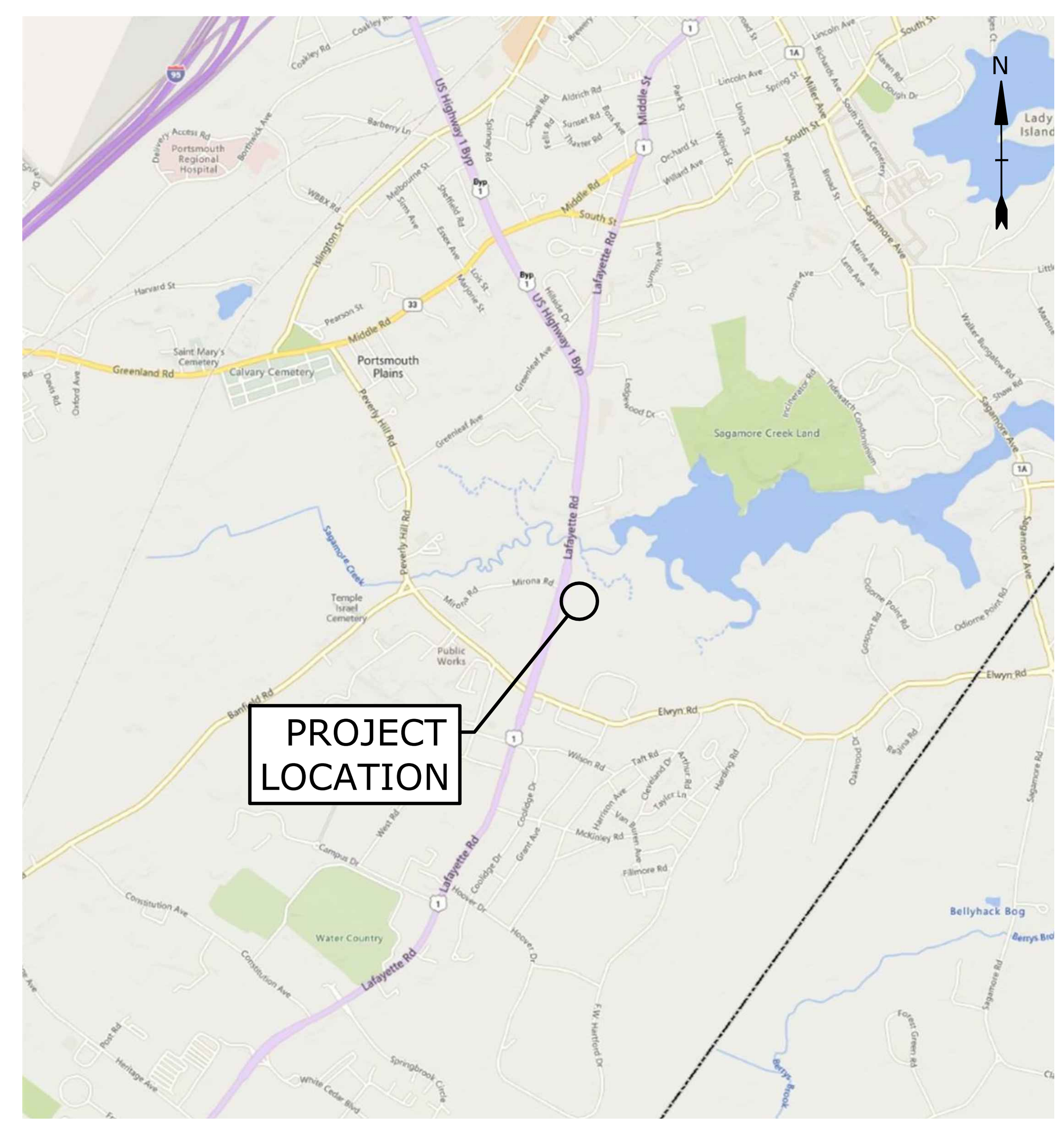
Neil A. Hansen, PE
Project Manager

Cc: Portsmouth Housing Authority
Christ Church Parish

1035 LAFAYETTE ROAD
PROPOSED MULTI-FAMILY DEVELOPMENT
PORTSMOUTH, NEW HAMPSHIRE
DATE: MAY 20, 2024
LAST REVISED: JULY 24, 2024

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	7/24/2024
1 OF 1	TOPOGRAPHIC PLAN	4/2/2024
G-100	GENERAL NOTES AND LEGEND	7/24/2024
C-101	EXISTING CONDITIONS & DEMOLITION PLAN	7/24/2024
C-102	SITE PLAN	7/24/2024
C-103	GRADING, DRAINAGE, & EROSION CONTROL PLAN	7/24/2024
C-104	UTILITY PLAN	7/24/2024
C-105	PHOTOMETRIC PLAN	7/24/2024
C-501	EROSION CONTROL NOTES AND DETAILS SHEET	7/24/2024
C-502	DETAILS SHEET	7/24/2024
C-503	DETAILS SHEET	7/24/2024
C-504	DETAILS SHEET	7/24/2024
C-505	DETAILS SHEET	7/24/2024
C-506	DETAILS SHEET	7/24/2024
C-507	DETAILS SHEET	7/24/2024
C-508	DETAILS SHEET	7/24/2024
L-1	LANDSCAPE PLAN	7/24/2024
TAC-01	COVER SHEET	6/17/2024
LS-01	CODE SEARCH AND LIFE SAFETY DRAWINGS	6/17/2024
TAC-02	FIRST FLOOR PLAN	6/17/2024
TAC-03	SECOND FLOOR PLAN	6/17/2024
TAC-04	THIRD FLOOR PLAN	6/17/2024
TAC-05	FOURTH FLOOR PLAN	6/17/2024
TAC-06	ROOF PLAN	6/17/2024
TAC-07	EXTERIOR ELEVATIONS	6/17/2024
TAC-08	EXTERIOR ELEVATIONS	6/17/2024
PR1.01	LEVEL 1 FLOOR PLAN	5/20/2024
PR1.04	NORTH AND WEST ELEVATION	5/20/2024
PR1.05	EAST AND SOUTH ELEVATION	5/20/2024

LIST OF PERMITS		
LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT	PENDING	
CONDITIONAL USE PERMIT - DEVELOPMENT SITE	PENDING	
CONDITIONAL USE PERMIT - DENSITY BONUS	PENDING	
STATE		
NHDES - SEWER CONNECTION PERMIT	PENDING	
NHDES - ALTERATION OF TERRAIN PERMIT	PENDING	
FEDERAL		
NPDES - CONSTRUCTION GENERAL PERMIT	PENDING	



LOCATION MAP
SCALE: 1" = 2000'

CONSTRUCTION NOTES:
1. THE CONTRACTOR SHALL NOT RELY ON SCALED DIMENSIONS AND SHALL CONTACT THE ENGINEER FOR CLARIFICATION IF A REQUIRED DIMENSION IS NOT PROVIDED ON THE PLANS.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS, AND FOR SITE CONDITIONS THROUGHOUT CONSTRUCTION. NEITHER THE PLANS NOR THE SEAL OF THE ENGINEER AFFIXED HEREON EXTEND TO OR INCLUDE SYSTEMS REQUIRED FOR THE SAFETY OF THE CONTRACTOR, THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING AND IMPLEMENTING SAFETY PROCEDURES AND SYSTEMS AS REQUIRED BY THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), AND ANY STATE OR LOCAL SAFETY REGULATIONS.

3. TIGHE & BOND ASSUMES NO RESPONSIBILITY FOR ANY ISSUES LEGAL OR OTHERWISE, RESULTING FROM CHANGES MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION OF TIGHE & BOND.

PREPARED BY:

Tighe&Bond
177 CORPORATE DRIVE
PORTSMOUTH, NH 03801
603-433-8818

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
7/24/24

STATE OF NEW HAMPSHIRE NEIL A HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
07/24/2024

APPLICANT:

PORTSMOUTH HOUSING AUTHORITY
245 Middle Street
Portsmouth, NH 03801

OWNER:

CHRIST CHURCH PARISH
1035 Lafayette Rd
Portsmouth, NH 03801

LANDSCAPE ARCHITECT:

WOODBURN & COMPANY
103 Kent Place
Newmarket, NH 03857

ARCHITECT:

JSA DESIGN
273 Corporate Dr Suite 100
Portsmouth, NH 03801

LASSEL ARCHITECTS
370 Main St
South Berwick, ME 03908

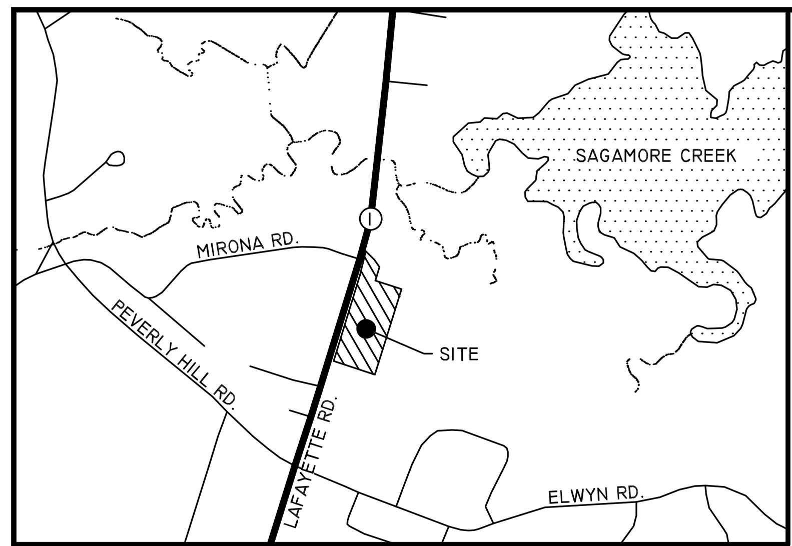
SURVEYOR:

JAMES VERRA & ASSOCIATES, INC.
101 Shattuck Way, Suite 8
Newington, NH 03801

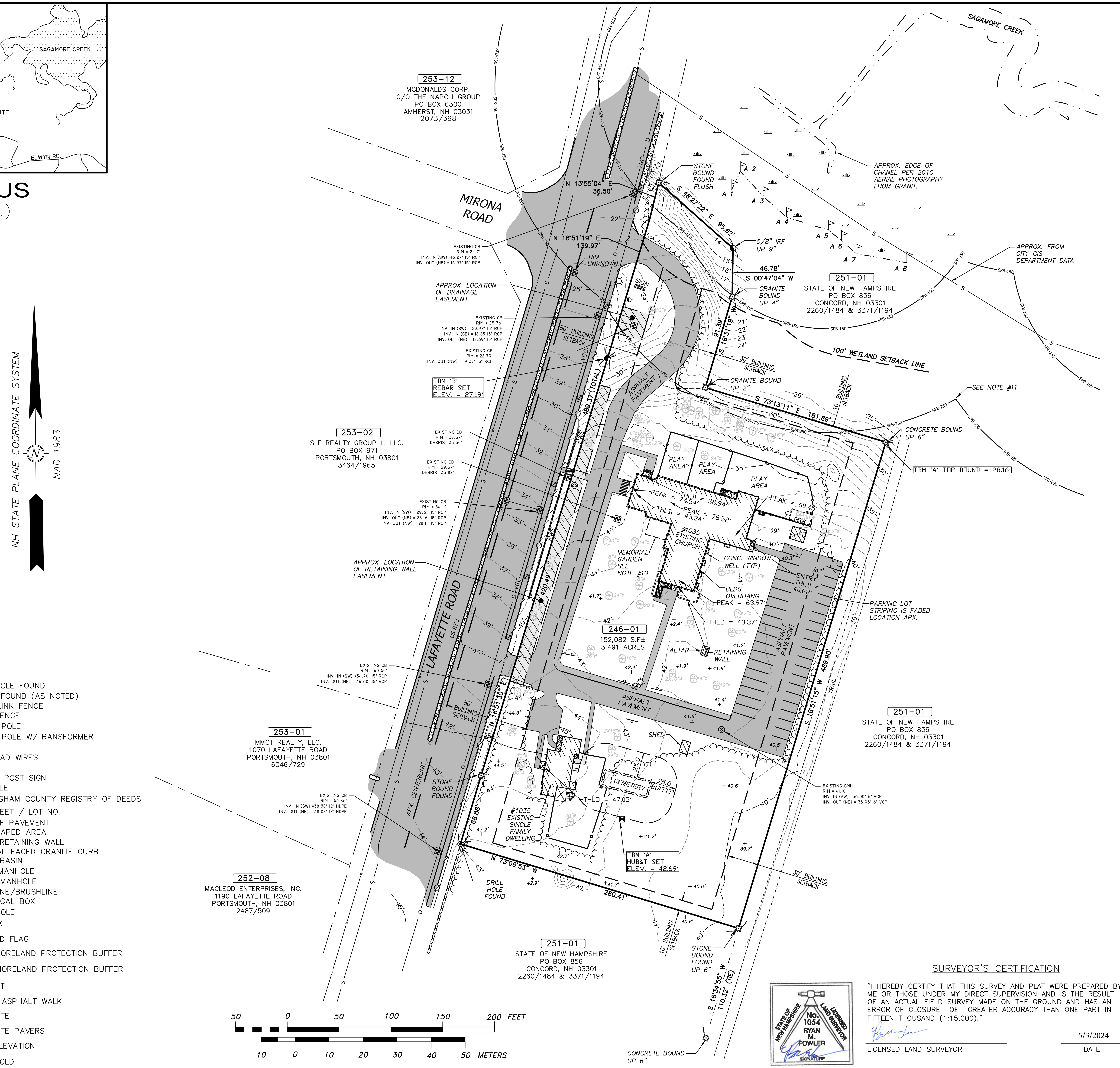
811 DigSafe MA·ME·NH·RI·VT

PLANNING BOARD SUBMISSION
COMPLETE SET 29 SHEETS

Last Save Date: June 26, 2024 4:52 PM By: MBRYAN
Plot Date: Monday, July 22, 2024 Plotted By: Benjamin Curcio
T&B File Location: \\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-COVER.dwg Layout Tab: CS



LOCUS
(N.T.S.)



NOTES:

1. OWNER OF RECORD..................THE PARISH OF CHRIST CHURCH IN PORTSMOUTH
   ADDRESS....................................1035 LAFAYETTE ROAD, PORTSMOUTH, NH 03801
   DEED REFERENCE......................1720/453 & 3371/1195
   TAX SHEET / LOT....................246-01
2. ZONED: ....SINGLE RESIDENCE B (SRB)

   MINIMUM LOT AREA ..15,000 S.F. FRONTAGE ....100'
   FRONT YARD SETBACK .....30'* SIDE YARD SETBACK ....10' REAR YARD SETBACK ......30'

   * SEE PORTSMOUTH ZONING SECTION 10.533 FOR SPECIAL YARD REQUIREMENTS ON LAFAYETTE ROAD. (80' FROM CENTERLINE OF LAFAYETTE ROAD.)
3. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF THE SUBJECT PARCEL AND THE IMPROVEMENTS THEREON FOR FUTURE SITE REDEVELOPMENT.
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: NAD83, VERTICAL DATUM: NAVD88. ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND PROCESSED BY OPUS. UNITS: US SURVEY FOOT.
6. THE PLAN IS BASED UPON A FIELD SURVEY COMPLETED IN JULY - AUGUST OF 2023 & MARCH 2024 WITH TRIMBLE S5 ROBOTIC TOTAL STATION, CARLSON BRX7 RTK GPS UNITS, PANASONIC FZ-M1/TRIMBLE TSC7 DATA COLLECTORS.
7. THE PARCEL SHOWN HEREON LIES WITHIN ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0270F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
8. WETLANDS WERE DELINEATED BY JOSEPH NOEL, CWS #86 ON 6/22/2023 AND WERE FIELD LOCATED BY JVA.
9. 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.
10. IT IS BELIEVED THAT THE "MEMORIAL GARDEN" DOES NOT HAVE ANY REMAINS OR URNS BURIED THERE BASED ON INFORMATION PROVIDED BY REPRESENTATIVES AT THE EPISCOPAL CHURCH OF NEW HAMPSHIRE. THERE IS A POSSIBILITY THAT ASHES HAVE BEEN SPRINKLED IN THE GARDEN. BASED ON THE INFORMATION PROVIDED THE MEMORIAL GARDEN MAY NOT BE CONSIDERED A CEMETERY AND WOULD NOT BE SUBJECT TO THE 25' BUFFER. FURTHER EXPLORATION SHOULD BE CONDUCTED TO CONFIRM NO HUMAN REMAINS ARE LOCATED IN THE GARDEN, EXTREME CAUTION SHOULD BE USED IN ANY EXCAVATION WITHIN 25' OF THE MEMORIAL GARDEN.
11. SHORELAND PROTECTION BUFFER SHOWN IS BASED ON THE CHANNEL LOCATION TAKEN FROM AERIAL PHOTOGRAPHY.

REFERENCE PLANS:

1. "PLAN OF LAND, PORTSMOUTH, N.H., FOR CHRIST EPSICOPOL CHURCH." REVISED SEPT. 1964, AND PREPARED BY JOHN W. DURGIN (JWD). JWD FILE NO. 2320S, PLAN NO. 8393. NOT RECORDED AND ON FILE WITH THIS OFFICE.
2. "LOT LINE ADJUSTMENT OF THE LANDS OF: D.R.E.D. & THE PARISH OF CHRIST CHURCH." LAST REVISED JUNE 22, 1999 AND PREPARED BY RICHARD D. BARTLETT & ASSOCIATES, INC. NOT RECORDED, BUT ON FILE WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF NATURAL & CULTURAL RESOURCES, DIVISION OF FORESTS & LANDS. BARTLET JOB #298.111.
3. "STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION, RIGHT-OF-WAY, PLANS OF PROPOSED FEDERAL AID PROJECT, STP-X-T-001-1(90), N.H. PROJECT NO. 11855, US ROUTE 1 OVER SAGAMORE CREEK." DATED MARCH 14, 2000 AND PREPARED BY NHDOT & KIMBALL CHASE. RCRD PLAN #D-28308.

LEGEND:

- DRILL HOLE FOUND
- BOUND FOUND (AS NOTED)
- CHAIN LINK FENCE
- WOOD FENCE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- GUY
- —OHW— OVERHEAD WIRES
- SIGN
- DOUBLE POST SIGN
- FLAGPOLE
- RCRD ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 246-01 TAX SHEET / LOT NO.
- EOP EDGE OF PAVEMENT
- LA LANDSCAPED AREA
- RWS STONE RETAINING WALL
- VGC VERTICAL FACED GRANITE CURB
- CATCH BASIN
- DRAIN MANHOLE
- SEWER MANHOLE
- TREE LINE/BRUSHLINE
- ELECTRICAL BOX
- LIGHT POLE
- MAILBOX
- WETLAND FLAG
- —SPB-150— 150' SHORELAND PROTECTION BUFFER
- —SPB-250— 250' SHORELAND PROTECTION BUFFER
- ASPHALT
- RAISED ASPHALT WALK
- CONCRETE
- CONCRETE PAVERS
- + 41.6' SPOT ELEVATION
- THLD THRESHOLD

SURVEYOR'S CERTIFICATION

"I HEREBY CERTIFY THAT THIS SURVEY AND PLAT WERE PREPARED BY ME OR THOSE UNDER MY DIRECT SUPERVISION AND IS THE RESULT OF AN ACTUAL FIELD SURVEY MADE ON THE GROUND AND HAS AN ERROR OF CLOSURE OF GREATER ACCURACY THAN ONE PART IN FIFTEEN THOUSAND (1:15,000)."

STATE OF NEW HAMPSHIRE — RYAN M. FOWLER — No. 1054 — LICENSED LAND SURVEYOR

LICENSED LAND SURVEYOR — 5/3/2024 DATE

REV. NO.	DATE	DESCRIPTION	APPR'D
#1	5/3/24	COMMENTS PER PHAN & TEAM	RMF

TOPOGRAPHIC PLAN
1035 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
TAX MAP #246-01

LAND OF:
THE PARISH OF CHRIST CHURCH IN PORTSMOUTH
PREPARED FOR:
PORTSMOUTH HOUSING AUTHORITY

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

RMF DRAWN BY
RMF PROJECT MGR

DATE:	4/2/2024
JOB NO:	24-2012
SCALE:	1" = 50'
DWG NAME:	24-2012_EX
PLAN NO:	24-2012
SHEET:	1 of 1

J:\2024 PROJECTS\24-2012 PHA 1035 LAFAYETTE RD PORTSMOUTH NH\24-2012\DWG\24-2012_EXCON_2.dwg 2024-05-03

GENERAL NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
3. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED LAND SURVEYOR TO DETERMINE ALL LINES AND GRADES.
4. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES AND COMPLY WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR AND COMPLY WITH ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
7. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO EXISTING BUSINESSES AND HOMES THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS AND HOME SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES AND SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
8. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES & SPECIFICATIONS.
9. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
10. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
11. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCH BASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
12. SEE EXISTING CONDITIONS PLAN FOR BENCH MARK INFORMATION.

DEMOLITION NOTES:

1. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
2. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES.
3. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
4. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
5. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
7. UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY AND CITY OF PORTSMOUTH STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK UNLESS OTHERWISE NOTED.
8. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
9. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.
10. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, LIGHTING, MANHOLES, CATCH BASINS, UNDER GROUND PIPING, POLES, STAIRS, SIGNS, FENCES, RAMPS, WALLS, BOLLARDS, BUILDING SLABS, FOUNDATION, TREES AND LANDSCAPING.
11. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
12. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
13. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
15. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
16. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.

SITE NOTES:

1. PAVEMENT MARKINGS SHALL BE INSTALLED AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, ADA SYMBOLS, PAINTED ISLANDS, FIRE LANES, CROSS WALKS, ARROWS, LEGENDS AND CENTERLINES. ALL MARKINGS EXCEPT CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING WHITE PAVEMENT MARKINGS. ALL THERMOPLASTIC PAVEMENT MARKINGS INCLUDING LEGENDS, ARROWS, CROSSWALKS AND STOP BARS SHALL MEET THE REQUIREMENTS OF AASHTO M249. ALL PAINTED PAVEMENT MARKINGS INCLUDING CENTERLINES, LANE LINES AND PAINTED MEDIANS SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F".
2. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
3. SEE DETAILS FOR PAVEMENT MARKINGS, ADA SYMBOLS, SIGNS AND SIGN POSTS.
4. CENTERLINES SHALL BE FOUR (4) INCH WIDE YELLOW LINES.
5. PAINTED ISLANDS SHALL BE FOUR (4) INCH WIDE DIAGONAL LINES AT 3'-0" O.C. BORDERED BY FOUR (4) INCH WIDE LINES.
6. STOP BARS SHALL BE EIGHTEEN (18) INCHES WIDE, WHITE THERMOPLASTIC AND CONFORM TO CURRENT MUTCD STANDARDS.
7. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAW CUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
8. SEE ARCHITECTURAL/BUILDING DRAWINGS FOR ALL CONCRETE PADS & SIDEWALKS ADJACENT TO BUILDING.
10. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
11. COORDINATE ALL WORK ADJACENT TO BUILDING WITH BUILDING CONTRACTOR.
12. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
13. THE PROPERTY MANAGER WILL BE RESPONSIBLE FOR TIMELY SNOW REMOVAL FROM ALL PRIVATE SIDEWALKS, DRIVEWAYS, AND PARKING AREAS. SNOW REMOVAL WILL BE HAULED OFF-SITE AND LEGALLY DISPOSED OF WHEN SNOW BANKS EXCEED 6 FEET IN HEIGHT.
14. CONTRACTOR SHALL COORDINATE WITH OWNER AND ELECTRICAL DRAWINGS FOR THE PROPOSED DUAL ELECTRIC VEHICLE CHARGING STATION TYPE, ELECTRICAL REQUIREMENTS AND CONDUIT LAYOUT PRIOR TO CONSTRUCTION.

GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:

BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

* 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-2922.

2. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR EQUAL) OR RCP CLASS IV, UNLESS OTHERWISE SPECIFIED.
3. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
4. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
5. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
6. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
7. ALL PROPOSED CATCH BASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 4' SUMPS.

EROSION CONTROL NOTES:

1. SEE SHEET C-501 FOR GENERAL EROSION CONTROL NOTES AND DETAILS.

UTILITY NOTES:

1. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
   - NATURAL GAS - UNITIL
   - WATER - CITY OF PORTSMOUTH
   - SEWER - CITY OF PORTSMOUTH
   - ELECTRIC - EVERSOURCE
   - COMMUNICATIONS - CONSOLIDATED COMM/FAIRPOINT/COMCAST
2. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, CEMENT LINED DUCTILE IRON PIPE.
3. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF PORTSMOUTH WATER DEPARTMENT.
4. ALL SEWER PIPE SHALL BE PVC SDR 35 UNLESS OTHERWISE STATED.
5. CONNECTION TO EXISTING WATER MAIN SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH DPW STANDARDS.
6. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE DEPARTMENT OF PUBLIC WORKS STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
7. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
8. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE APPLICABLE UTILITY COMPANIES.
9. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
10. 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 INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
11. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES.
12. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
13. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN
14. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF PORTSMOUTH.
15. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH.
16. ALL SEWER PIPE WITH LESS THAN 6' OF COVER IN PAVED AREAS OR LESS THAT 4' OF COVER IN UNPAVED AREAS SHALL BE INSULATED.
17. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
18. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PROVIDED BY THE PROJECT ELECTRICAL ENGINEER.
19. CONTRACTOR SHALL CONSTRUCT ALL UTILITIES AND DRAINS TO WITHIN 10' OF THE FOUNDATION WALLS AND CONNECT THESE TO SERVICE STUBS FROM THE BUILDING.
20. CONTRACTOR SHALL FIELD VERIFY EXISTING SEWER LINE LOCATION, INVERT AND DIAMETER PRIOR TO CONSTRUCTION AND SHALL SUBMIT FIELD INFORMATION TO ENGINEER FOR REVIEW. MODIFICATIONS TO THE NEW SEWER CONNECTION LOCATION AND ELEVATION MAY BE NECESSARY BASED ON THE OBSERVED EXISTING CONDITIONS.
21. EACH UTILITY CONNECTION WITHIN THE LAFAYETTE ROAD RIGHT OF WAY WILL REQUIRE A NHDOT RIGHT OF WAY ACTIVITIES PERMIT.
22. FINAL SEWER CONNECTION LOCATION AND INVERT TO BE COORDINATED WITH CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTION.
23. EXISTING SEWER LINE IS ASSUMED TO BE ASBESTOS CEMENT PIPE. CONTRACTOR SHALL UTILIZE A LICENSED ASBESTOS SPECIALIST FOR THE REMOVAL OF ANY ASBESTOS PIPE.
24. CONTRACTOR SHALL FIELD VERIFY AND IDENTIFY ALL EXISTING SEWER AND WATER BUILDING CONNECTIONS PRIOR TO CONSTRUCTION AND COORDINATE WITH THE CITY OF PORTSMOUTH DPW, OWNER AND ENGINEER FOR LIMITS OF REMOVAL AND ABANDONMENT.

EXISTING CONDITIONS PLAN NOTES:

1. EXISTING CONDITIONS ARE BASED ON A FIELD SURVEY BY JAMES VERRA & ASSOCIATES, INC. DATED 5/3/2024.

LEGEND

APPROXIMATE LIMIT OF SAWCUT
LIMIT OF WORK
APPROXIMATE LIMIT OF PAVEMENT & CONCRETE TO BE REMOVED
EXISTING TREES TO BE REMOVED
EXISTING BUILDING TO BE REMOVED
APPROXIMATE LIMIT OF PAVEMENT TO RECEIVE MILL & OVERLAY
LOCATION OF PROPOSED BUILDING
PROPERTY LINE
PROPOSED EDGE OF PAVEMENT
PROPOSED CURB
PROPOSED GRAVEL PAVEMENT SECTION
PROPOSED PAVEMENT SECTION
PROPOSED CONCRETE
PROPOSED MAJOR CONTOUR LINE
PROPOSED MINOR CONTOUR LINE
D — EXISTING STORM DRAIN
EXISTING DRAIN CATCH BASIN
XS — APPROXIMATE SANITARY SEWER
W — EXISTING WATER
G — EXISTING GAS
OHW — EXISTING OVERHEAD UTILITY
EXISTING APPROXIMATE SEWER MANHOLE
EXISTING SEWER MANHOLE
EXISTING HYDRANT
EXISTING UTILITY POLE
PROPOSED DRAIN MANHOLE
PROPOSED CATCH BASIN
PROPOSED INLET PROTECTION BARRIER
PROPOSED DRAINLINE
PROPOSED SEWER MANHOLE
PS — PROPOSED SEWER LINE
G — PROPOSED GAS LINE
PW — PROPOSED WATER LINE
PROPOSED WATER VALVE
PROPOSED THRUST BLOCK
PE — PROPOSED UNDERGROUND ELECTRIC LINE
T — PROPOSED TRANSFORMER
100' WETLAND BUFFER
50' LIMITED CUT BUFFER
25' VEGETATIVE BUFFER
250' TIDAL BUFFER
150' WOODLAND BUFFER
100' TIDAL BUFFER
50' TIDAL BUFFER

ABBREVIATIONS

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
AC	ACRES
ADA	AMERICANS WITH DISABILITIES ACT
AGGR	AGGREGATE
BLDG	BUILDING
BC	BOTTOM OF CURB
CB	CATCH BASIN
CONST	CONSTRUCT
COORD	COORDINATE
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DMH	DRAINAGE MANHOLE
DWG	DRAWING
ELEV	ELEVATION
EP	EDGE OF PAVEMENT
EV	ELECTRIC VEHICLE
FF	FINISHED FLOOR
FGC	FLUSH GRANITE CURB
HDPE	HIGH DENSITY POLYETHYLENE
HMA	HOT MIX ASPHALT
HYD	HYDRANT
ID	INSIDE DIAMETER
INV	INVERT
L	LENGTH
LF	LINEAR FEET
MAX	MAXIMUM
MIN	MINIMUM
OC	ON CENTER
PCB	PROPOSED CATCH BASIN
PDMH	PROPOSED DRAINAGE MANHOLE
POS	PROPOSED OUTLET STRUCTURE
PROP	PROPOSED
PSMH	PROPOSED SEWER MANHOLE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT OF WAY
SGC	SLOPED GRANITE CURB
SF	SQUARE FEET
STD	STANDARD
TBR	TO BE REMOVED
TC	TOP OF CURB
TYP	TYPICAL
UD	UNDERDRAIN
W	WIDTH
W/	WITH
YD	YARD DRAIN

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
7/24/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

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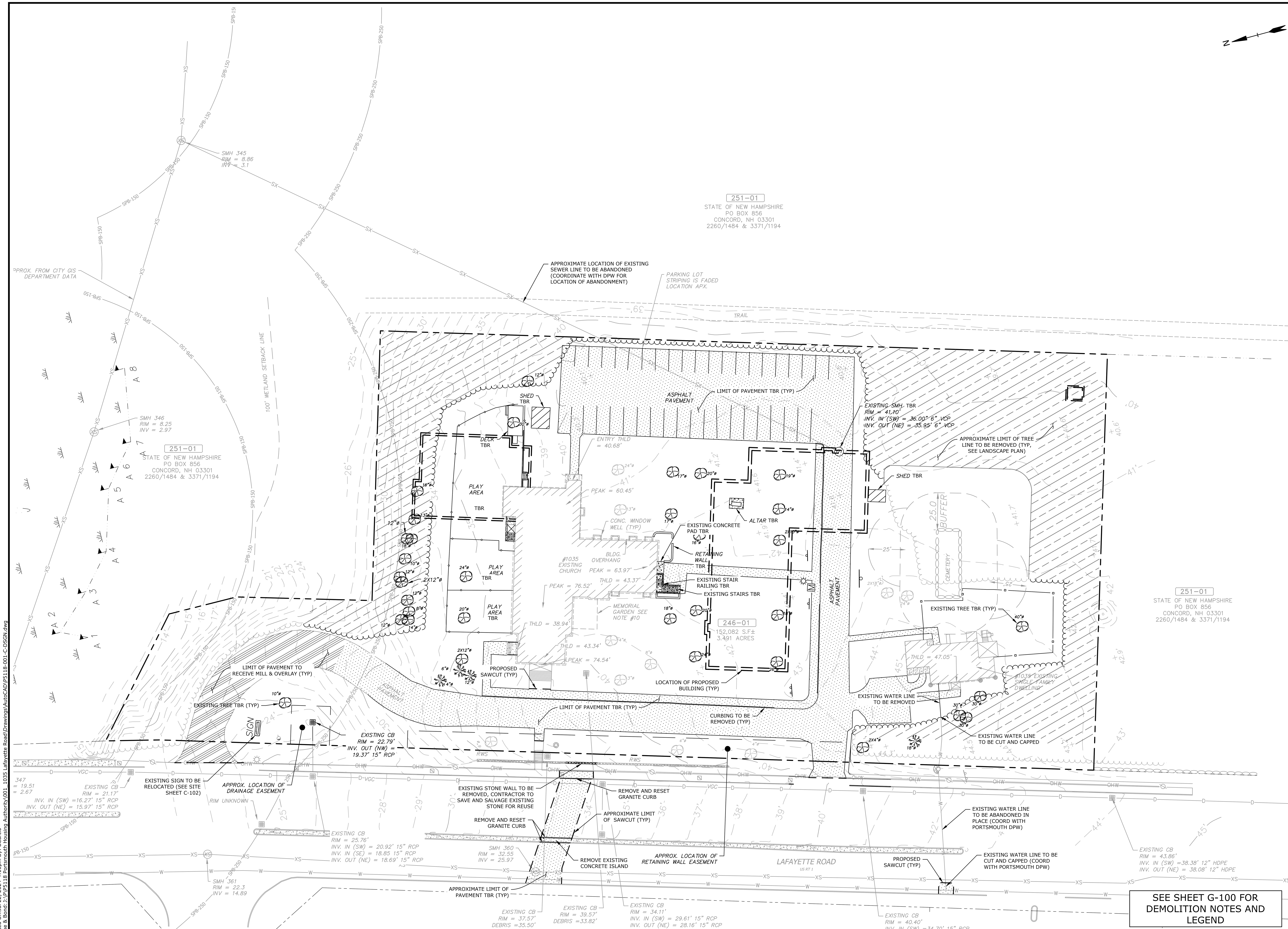
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

GENERAL NOTES

SCALE: AS SHOWN

G-100



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Tighe&Bond

STATE OF NEW HAMPSHIRE — PATRICK CRIMMINS — No. 12378 — LICENSED PROFESSIONAL ENGINEER — 7/24/24

STATE OF NEW HAMPSHIRE — NEIL A HANSEN — No. 15227 — LICENSED PROFESSIONAL ENGINEER — 07/24/2024

0 30' 60'
GRAPHIC SCALE

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EXISTING CONDITIONS & DEMOLITION PLAN

SCALE: AS SHOWN

C-101

SITE DATA:

LOCATION: TAX MAP 273, LOT 3

OWNER: THE PARISH OF CHIRST CHURCH IN PORTSMOUTH
1035 LAFAYETT RD
PORTSMOUTH, NH 03801

ZONING DISTRICT: GATEWAY CORRIDOR (G2)
PROPOSED USE: MIXED USE
MULTIFAMILY
PROPOSED LOT SIZE: ±3.491 ACRES (±152,082 SF)

BUILDING PLACEMENT & LOT STANDARDS

APARTMENT BUILDING STANDARDS:	REQUIRED	PROPOSED
MINIMUM LOT DEPTH:	100 FT	±208 FT
MINIMUM STREET FRONTAGE:	50 FT	±666 FT
FRONT YARD SETBACK:		
LAFAYETTE ROAD SETBACK	70-90 FT	± 110 FT(1)
MINIMUM SIDE BUILDING SETBACK:	15 FT	± 25 FT
MINIMUM REAR BUILDING SETBACK:	20 FT	± 68 FT
MINIMUM OPEN SPACE COVERAGE:	20%	±72%
FRONT LOT LINE BUILDOUT:	75%	48%(1)
BUILDING DESIGN STANDARDS:		
MAXIMUM BUILDING HEIGHT:	4 STORIES	4 STORIES
	50 FT	<50 FT
MINIMUM STREET FACING FACADE HEIGHT:	24 FT	>24 FT
MAXIMUM FINISHED FLOOR SURFACE OF GROUND FLOOR ABOVE SIDEWALK GRADE:	36 IN	<36 IN
MAXIMUM BUILDING FOOTPRINT:	20,000 SF	10,900 SF
MAXIMUM FACADE MODULATION LENGTH:	50 FT	<50 FT
MINIMUM STREET FACING FACADE GLAZING:	20% GROUND FLOOR	>20%
DEVELOPMENT SITE STANDARDS:(3)		
MINIMUM DEVELOPMENT SITE AREA:	20,000 SF	±152,082 SF
MINIMUM SITE WIDTH:	100 FT	±666 FT
MINIMUM SITE DEPTH:	100 FT	±280 FT
MINIMUM PERIMETER BUFFER FROM RESIDENTIAL, MIXED RESIDENTIAL, OR CD4-L1 DISTRICTS:	75 FT	N/A
MAXIMUM DEVELOPMENT BLOCK DIMENSIONS:		
BLOCK LENGTH:	800 FT	N/A
ERIMETER:	200 FT	N/A
MAXIMUM BUILDING COVERAGE:	70%	14
MINIMUM OPEN SPACE COVERAGE:	20%	±72
FRONT LOT LINE BUILDOUT:	75%	48%(1)
DENSITY THRESHOLDS AND BONUSES:		
DWELLING UNITS PER ACRE:	16 UNITS	14.6 UNITS
DWELLING UNITS PER BUILDING:	36 UNITS	44 UNITS(2)(3)

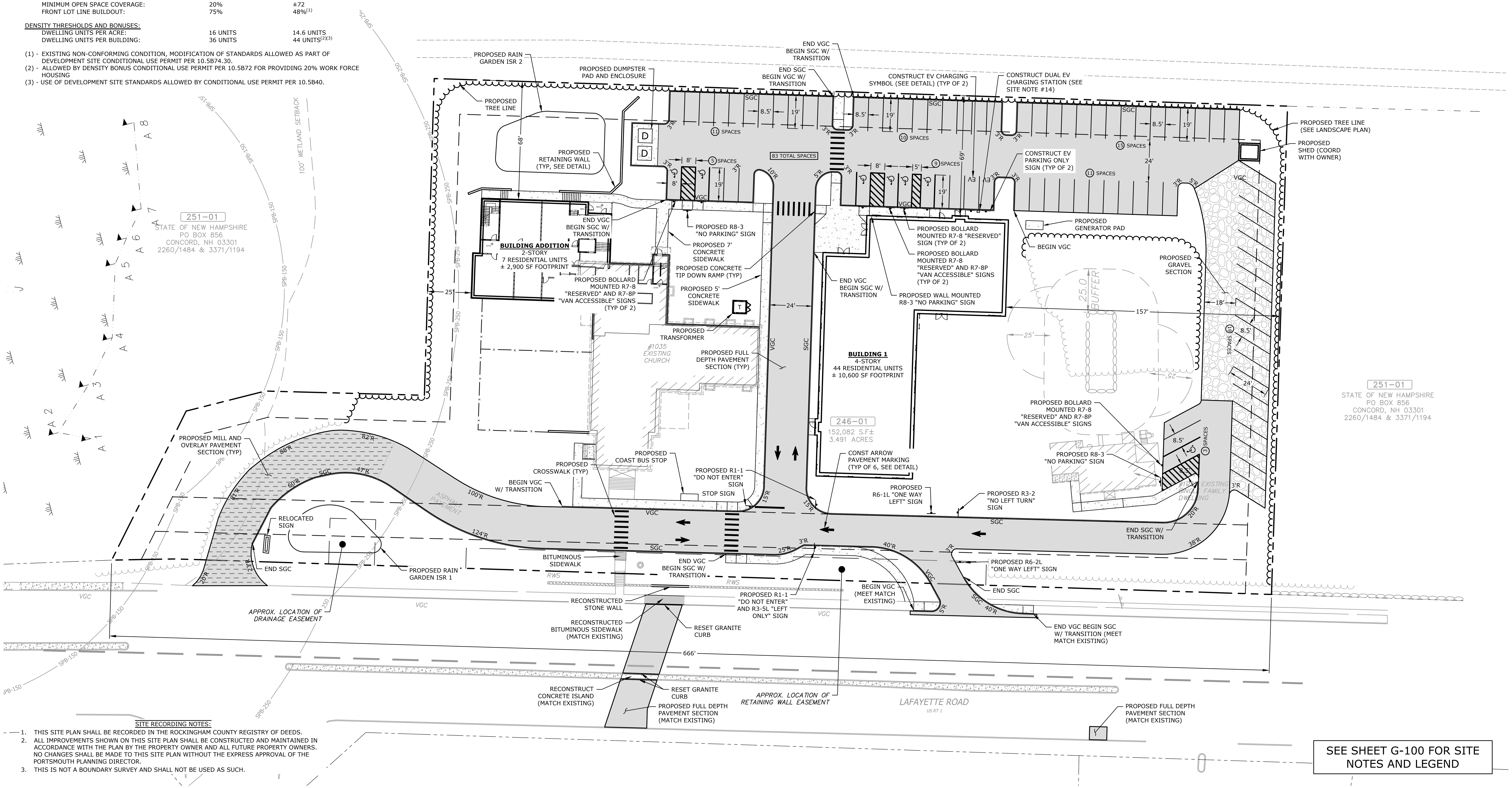
(1) - EXISTING NON-CONFORMING CONDITION, MODIFICATION OF STANDARDS ALLOWED AS PART OF DEVELOPMENT SITE CONDITIONAL USE PERMIT PER 10.5B74.30.
(2) - ALLOWED BY DENSITY BONUS CONDITIONAL USE PERMIT PER 10.5B72 FOR PROVIDING 20% WORK FORCE HOUSING
(3) - USE OF DEVELOPMENT SITE STANDARDS ALLOWED BY CONDITIONAL USE PERMIT PER 10.5B40.

PARKING CALCULATIONS:

PARKING SPACE REQUIREMENTS:	
ZONING REQUIRED PARKING SPACES	
OFFICE:	
1 PER 350 SF GFA x 6,900 SF	= 20 SPACES
RESIDENTIAL:	
1.0 SPACES PER UNIT (500-750 SF) x 11UNITS	= 11 SPACES
1.3 SPACES PER UNIT (>750 SF) x 40 UNITS	= 52 SPACES
+1 VISITOR PER 5 UNITS X 51 UNITS	= 11 SPACES
GROUP DAY CARE:	
0.5 PER STUDENT x 71 STUDENTS	= 36 SPACES
PLACE OF WORSHIP:	
1 PER 4 PERSON MAX CAPACITY (40 PERSON)	= 10 SPACES
TOTAL REQUIRED PARKING	= 140 SPACES
TOTAL REQUIRED PER SHARED PARKING(4)	= 103 SPACES
REQUIRED PARKING SPACES ON A PUBLIC TRANSIT(5) ZONING REQUIREMENTS x 80%	**= 83 SPACES**
PROVIDED PARKING SPACES	
TOTAL PROVIDED SPACES:	**= 83 SPACES**

	REQUIRED	PROPOSED
ACCESSIBLE PARKING SPACES:	4	6
DIMENSIONAL REQUIREMENTS:		
STANDARD 90° PARKING STALL :		
WIDTH	8.5 FT	8.5 FT
LENGTH	19 FT MIN	19 FT
DRIVE AISLE WIDTH:		
90° (2-WAY TRAFFIC)	24 FT	24 FT

(4) - SHARED PARKING ALLOWED PER SECTION 10.1112.61. SEE PARKING CONFORMANCE MEMO.
(5) - PUBLIC TRANSIT 20% REDUCTION IN SPACES ALLOWED PER SECTION 10.5B82.10.



SITE RECORDING 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.
3. THIS IS NOT A BOUNDARY SURVEY AND SHALL NOT BE USED AS SUCH.

SEE SHEET G-100 FOR SITE NOTES AND LEGEND

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Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED PROFESSIONAL ENGINEER
7/24/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED PROFESSIONAL ENGINEER
07/24/2024

GRAPHIC SCALE 0 30' 60'

Proposed Mixed-Use Development

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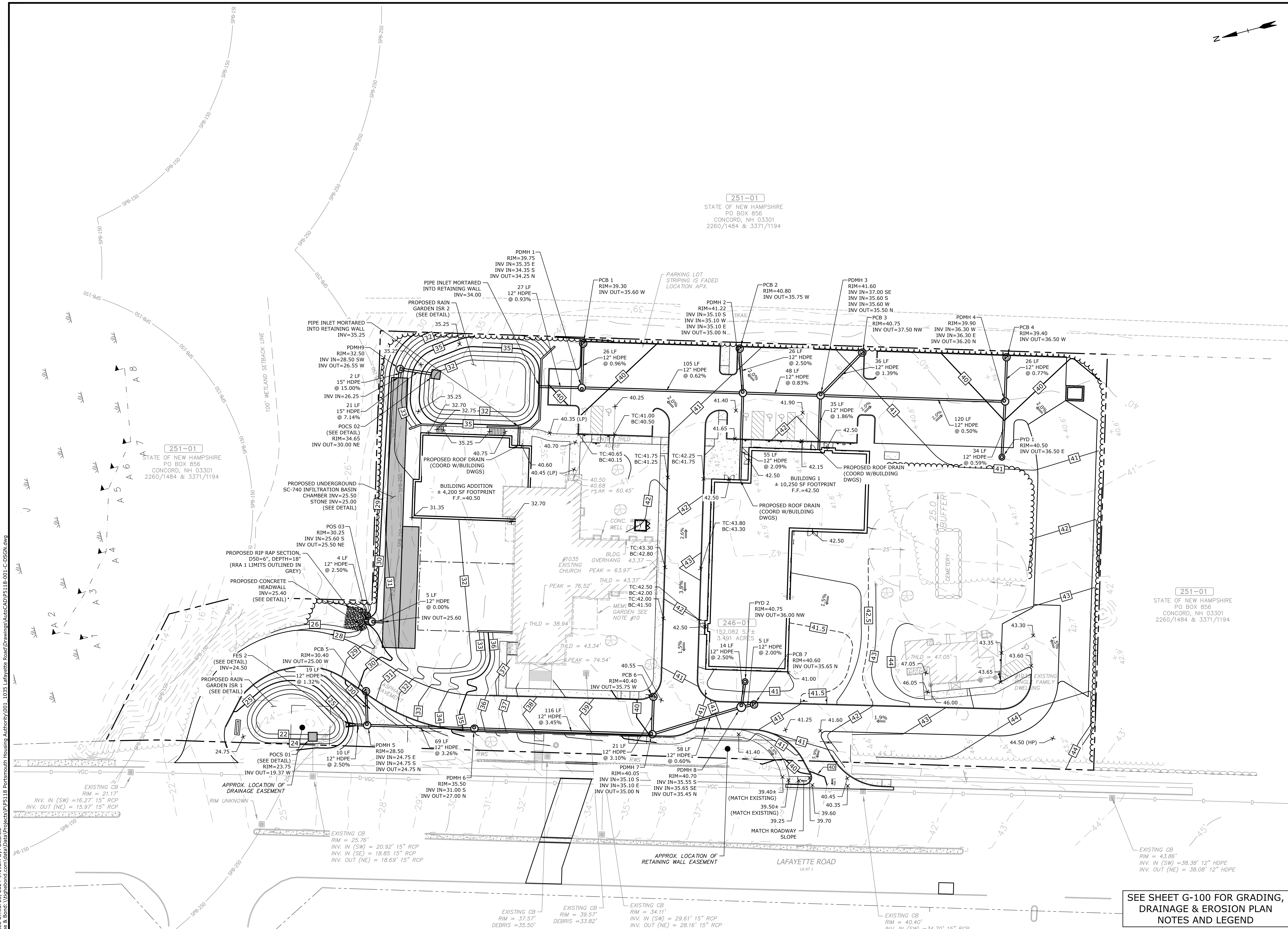
APPROVED:	PMC

SITE PLAN

SCALE: AS SHOWN

C-102



SEE SHEET G-100 FOR GRADING, DRAINAGE & EROSION PLAN NOTES AND LEGEND

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 7/24/24

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APPROVED:	PMC

GRADING, DRAINAGE & EROSION CONTROL PLAN

SCALE: AS SHOWN

C-103

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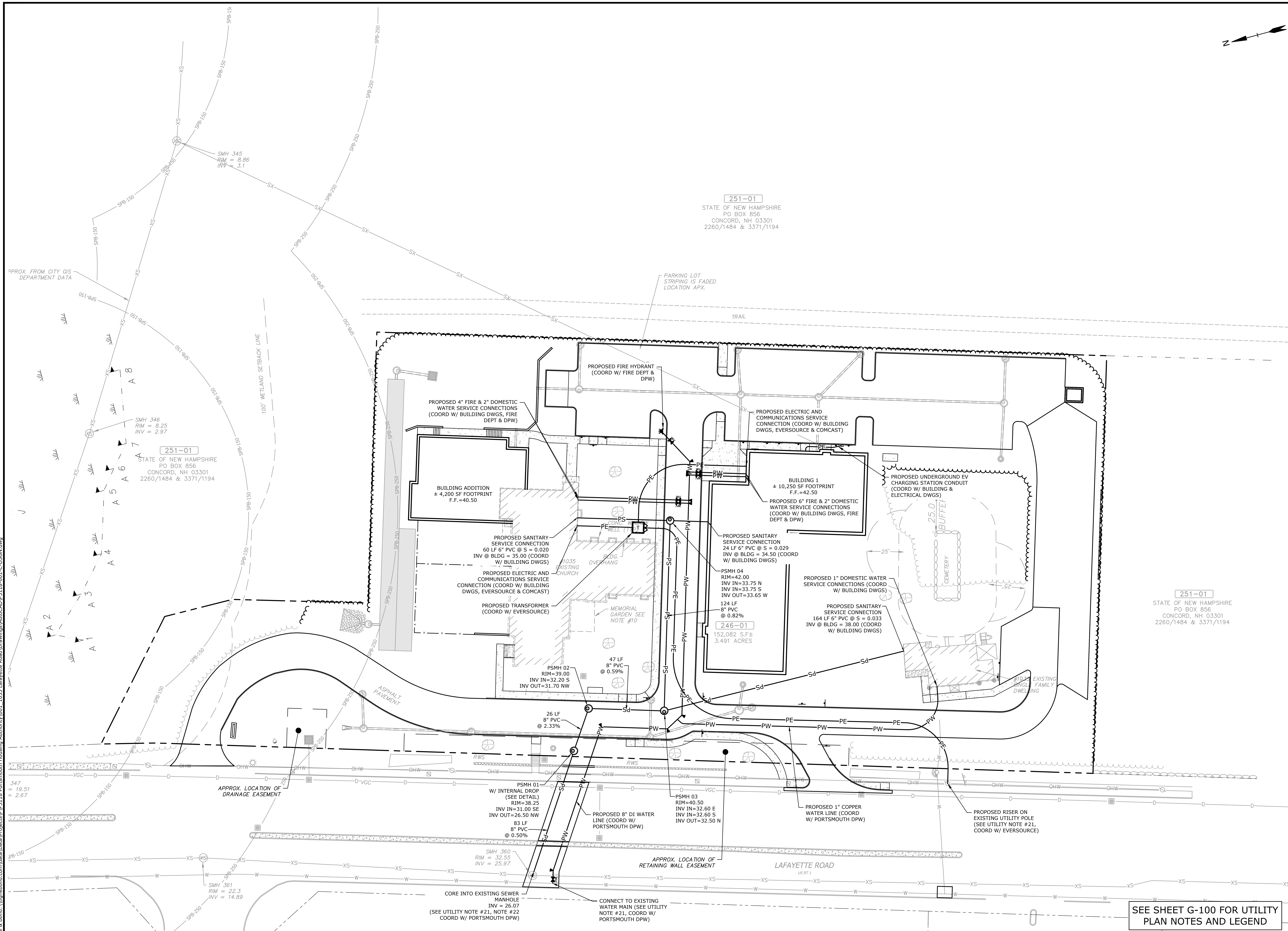

SEE SHEET G-100 FOR UTILITY PLAN NOTES AND LEGEND

Tighe&Bond

STATE OF NEW HAMPSHIRE
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UTILITY PLAN

SCALE: AS SHOWN

C-104

Last Saved: 7/23/2024
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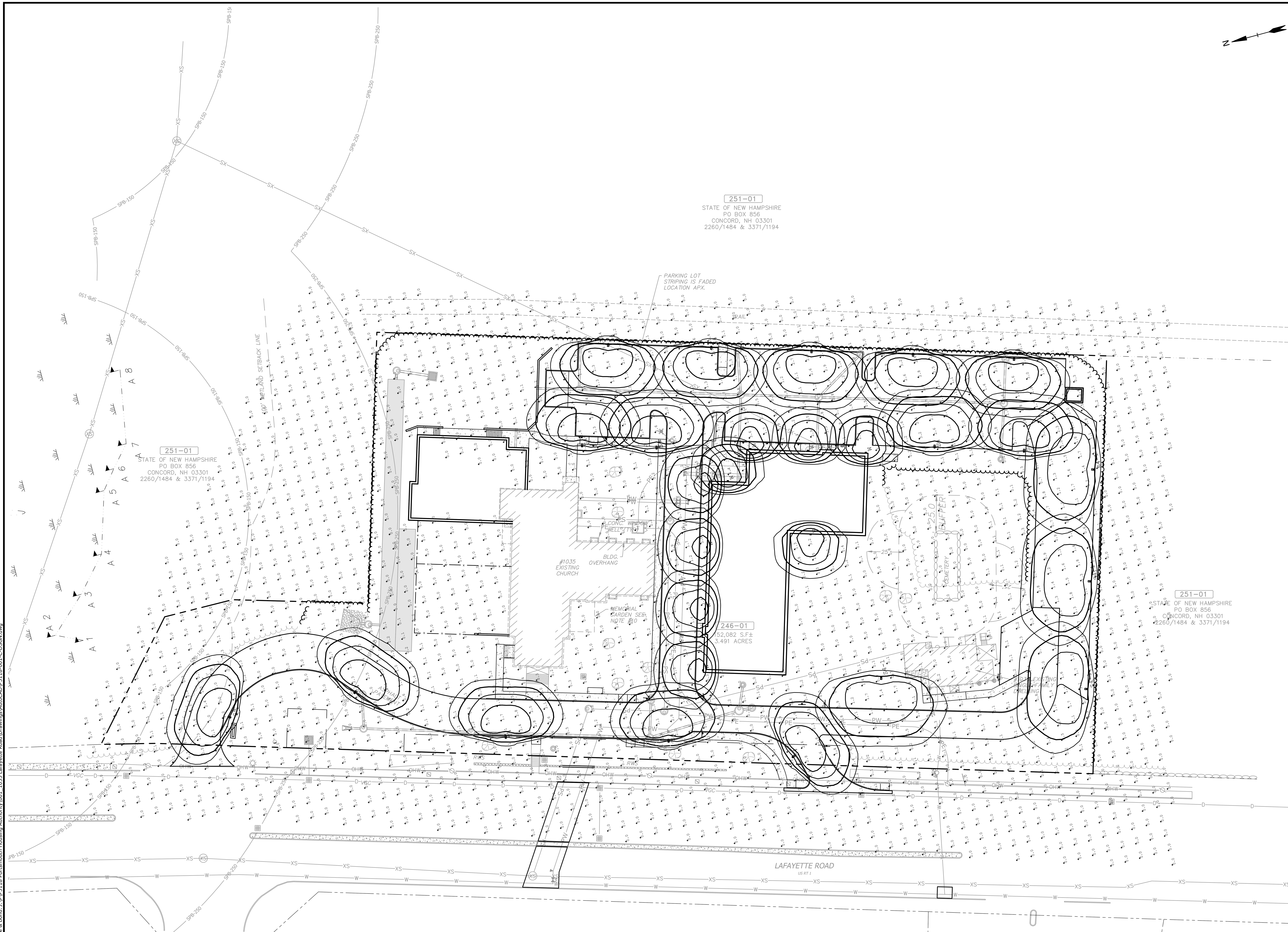

Tighe&Bond

PATRICK CRIMMINS No. 12378 STATE OF NEW HAMPSHIRE LICENSED PROFESSIONAL ENGINEER
7/24/24

NEIL A HANSEN No. 15227 STATE OF NEW HAMPSHIRE LICENSED PROFESSIONAL ENGINEER
07/24/2024

0 30' 60'
GRAPHIC SCALE

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PHOTOMETRIC PLAN

SCALE: AS SHOWN

C-105

Last Saved: 7/22/2024
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GENERAL PROJECT INFORMATION
PROJECT APPLICANT: PORTSMOUTH HOUSING AUTHORITY
PROJECT NAME: PROPOSED MIXED USED DEVELOPMENT
PROJECT ADDRESS: 1035 LAFAYETTE ROAD, PORTSMOUTH NH
PROJECT MAP / LOT: TAX MAP 246, LOT 1
PROJECT LATITUDE: 42°-03'-53"N
PROJECT LONGITUDE: 70°-46'-15"W

PROJECT DESCRIPTION
THE PROPOSED PROJECT CONSISTS OF RENOVATING THE PORTION OF THE EXISTING CHURCH TO REMAIN, CONSTRUCTING A NEW ADDITION TO THE NORTH SIDE OF THE EXISTING CHURCH, AS WELL AS A FOUR STORY APARTMENT BUILDING IN THE CENTRAL PORTION OF THE SITE.

DISTURBED AREA
THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 3.0 ACRES.

SOIL CHARACTERISTICS
BASED ON THE NRCS WEB SOIL SURVEY FOR STRAFFORD COUNTY - NEW HAMPSHIRE, THE SOILS ON SITE CONSIST OF URBAN LAND-CANTON GRAVELLY FINE SANDY LOAM SOILS WHICH HAVE A FAST INFILTRATION RATE WHEN THOROUGHLY WET. THESE SOILS HAVE A HYDROLOGIC SOIL GROUP RATING OF D.

NAME OF RECEIVING WATERS
THE STORM WATER RUNOFF WILL ULTIMATELY DISCHARGE INTO THE SAGAMORE CREEK TO THE SOUTH OF THE SITE.

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:
1. CUT AND CLEAR TREES.
2. CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
   - NEW CONSTRUCTION
   - CONTROL OF DUST
   - NEARNESS OF CONSTRUCTION SITE TO RECEIVING WATERS
   - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
3. ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
4. CLEAR AND DISPOSE OF DEBRIS.
5. CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
6. GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
7. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
9. SEDIMENT TRAPS AND/OR BASINS SHALL BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
10. FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
11. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
12. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
13. REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:
1. THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:
1. ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
2. PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
3. CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALES, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
4. SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
5. PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
6. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
7. ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
8. INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
9. CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:
1. AN AREA SHALL BE CONSIDERED STABLE WHEN ONE OF THE FOLLOWING HAS OCCURRED:
   A. BASE COURSE GRAVELS HAVE BEEN 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 RIPRAP HAS BEEN INSTALLED;
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.;
   E. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.
2. WINTER STABILIZATION PRACTICES:
   A. 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;
   B. 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;
   C. 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, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;
3. STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL 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. STABILIZATION MEASURES TO BE USED INCLUDE:
   A. TEMPORARY SEEDING;
   B. MULCHING.
4. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
5. WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
6. 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 FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY NOVEMBER 15.

DUST CONTROL:
1. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
2. DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
3. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

STOCKPILES:
1. LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
2. ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
3. PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
4. PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:
1. THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:
1. TEMPORARY GRASS COVER:
   A. SEEDBED PREPARATION:
      a. 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;
   B. 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;
   C. MAINTENANCE:
      a. TEMPORARY SEEDING 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.).
2. VEGETATIVE PRACTICE:
   A. FOR PERMANENT MEASURES AND PLANTINGS:
      a. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 7.6;
      b. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
      c. 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;
      d. 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 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
      e. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
      f. 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;
      g. THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
      h. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT THE INDICATED RATE:

SEED MIX	APPLICATION RATE
CREEPING RED FESCUE	20 LBS/ACRE
TALL FESCUE	20 LBS/ACRE
REDTOP	2 LBS/ACRE

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.
3. DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
   A. FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:
1. THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
   A. THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
   B. IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
   C. CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
   D. INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

ALLOWABLE NON-STORMWATER DISCHARGES:
1. FIRE-FIGHTING ACTIVITIES;
2. FIRE HYDRANT FLUSHING;
3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
4. WATER USED TO CONTROL DUST;
5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
6. ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
7. PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
8. UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
9. UNCONTAMINATED GROUND WATER OR SPRING WATER;
10. FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;
11. LANDSCAPE IRRIGATION.

WASTE DISPOSAL:
1. WASTE MATERIAL:
   A. ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
   B. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
   C. ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
2. HAZARDOUS WASTE:
   A. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
   B. SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
3. SANITARY WASTE:
   A. ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION:
1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
   A. GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
      a. ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
      b. ALL MATERIALS STORED ON SITE SHALL 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 SHALL BE FOLLOWED;
      d. THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
      e. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
      f. WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
   B. HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
      g. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
      h. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
      i. SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
   C. PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
      a. PETROLEUM PRODUCTS:
         - ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
         - PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
      b. FERTILIZERS:
         - FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
         - ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
         - STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
      c. PAINTS:
         - ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
         - EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
         - EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
   D. SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
      a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
      b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL 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 SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY AND REPORTED TO PEASE DEVELOPMENT AUTHORITY;
      d. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
      e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
      f. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
   E. VEHICLE FUELING AND MAINTENANCE PRACTICE:
      a. CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPMENT/VEHICLE FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
      b. CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
      c. IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
      d. CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
      e. CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
      f. CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

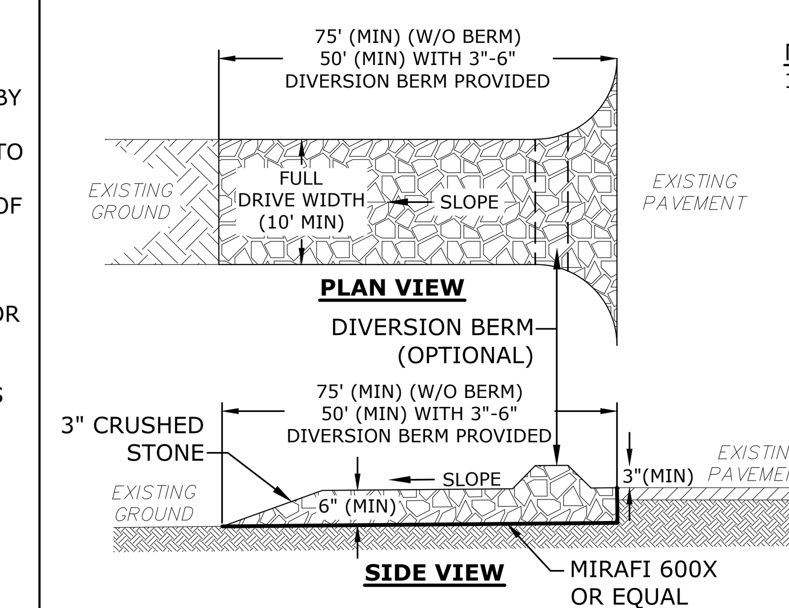
EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES
THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP.

THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:
1. AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, AND THE CONTRACTOR;
2. A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE AND REPAIR ACTIVITIES;
3. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT;
4. AN NPDES NOTICE OF INTENT SHALL BE SUBMITTED.

CITY OF PORTSMOUTH BUFFER VEGETATION NOTES
1. REMOVAL OR CUTTING OF VEGETATION
   1.1. CHEMICAL CONTROL OF VEGETATION IS PROHIBITED IN ALL AREAS OF A WETLAND OR WETLAND BUFFER.
   1.2. THE REMOVAL OR CUTTING OF VEGETATION IS PROHIBITED IN A WETLAND OR VEGETATED BUFFER STRIP, EXCEPT THAT NON-CHEMICAL CONTROL OF PLANTS DESIGNATED BY THE STATE OF NEW HAMPSHIRE AS "NEW HAMPSHIRE PROHIBITED INVASIVE SPECIES" IS PERMITTED.
   1.3. THE REMOVAL OF MORE THAN 50% OF TREES GREATER THAN 6" DIAMETER AT BREAST HEIGHT (DBH) IS PROHIBITED IN THE LIMITED CUT AREA.
2. FERTILIZERS
   2.1. THE USE OF ANY FERTILIZER IS PROHIBITED IN A WETLAND, VEGETATED BUFFER STRIP OR LIMITED CUT AREA.
   2.2. THE USE OF FERTILIZERS OTHER THAN LOW PHOSPHATE AND SLOW RELEASE NITROGEN FERTILIZERS IS PROHIBITED IN ANY PART OF A WETLAND BUFFER.
3. PESTICIDES AND HERBICIDES
   3.1. THE USE OF PESTICIDES OR HERBICIDES IS PROHIBITED IN A WETLAND OR WETLAND BUFFER, EXCEPT THAT APPLICATION OF PESTICIDES BY A PUBLIC AGENCY FOR PUBLIC HEALTH PURPOSES IS PERMITTED.

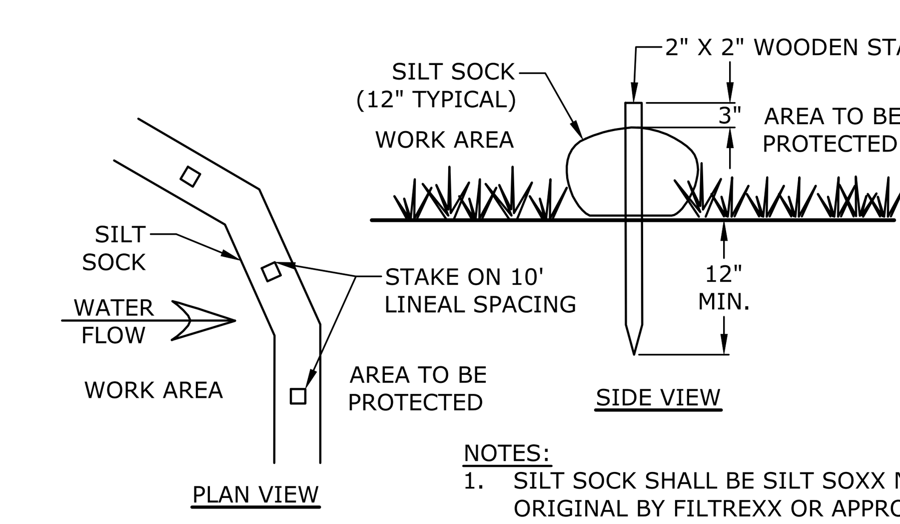
NOTES:
1. CONCRETE WASHOUT SHALL BE "JESCRAFT" STACKABLE CONCRETE WASHOUT PAN (72"x72"x14") OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN CONCRETE WASHOUT IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. CONCRETE WASHOUT SHALL NOT BE PLACED WITHIN 100' WETLAND BUFFER.

CONCRETE WASHOUT DETAIL
NO SCALE



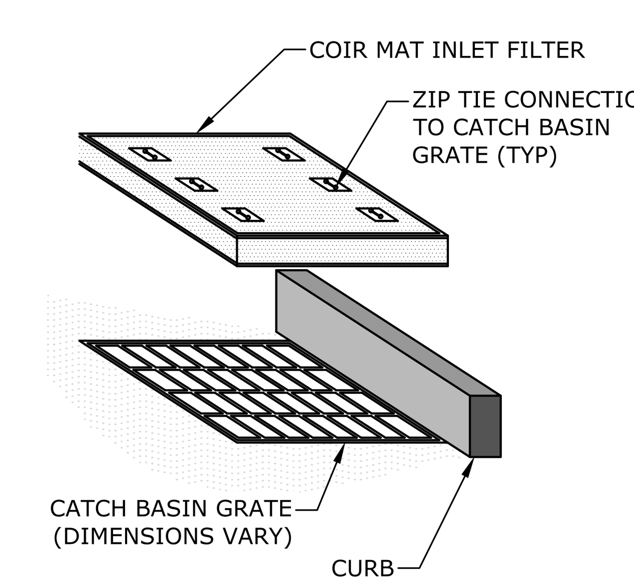
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

STABILIZED CONSTRUCTION EXIT
NO SCALE



NOTES:
1. SILT SOCK SHALL BE SILT SOXX NATURAL ORIGINAL BY FILTREXX OR APPROVED EQUAL.
2. INSTALL SILT SOCK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

SILT SOCK
NO SCALE



NOTES:
1. COIR MAT INLET FILTER SHALL BE STORM WATER INLET FILTER BY BLOCKSOM & CO. OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN INLET PROTECTION IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

INLET PROTECTION
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
7/24/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

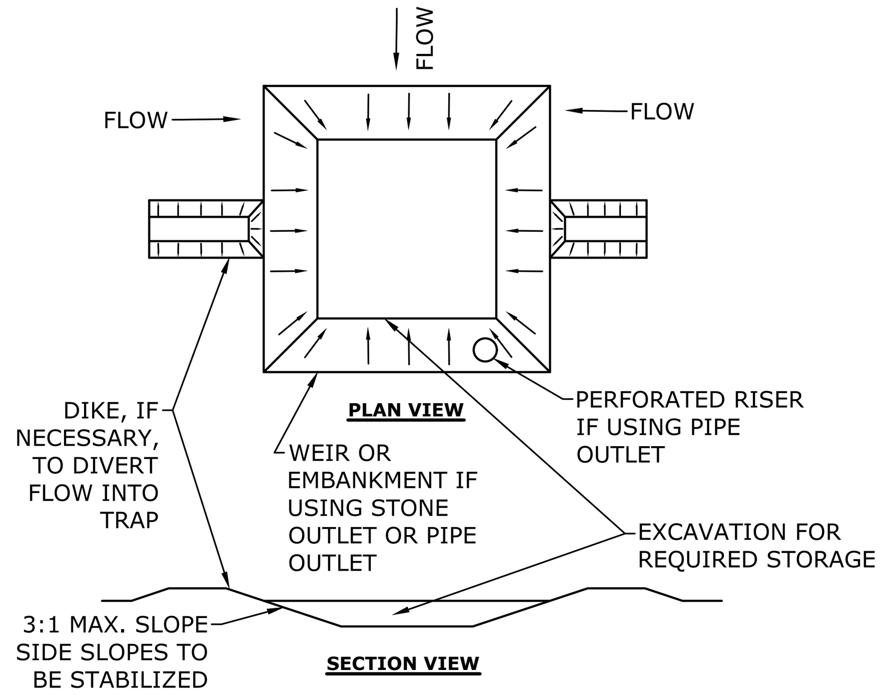
PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

EROSION CONTROL NOTES & DETAILS

SCALE: AS SHOWN

C-501

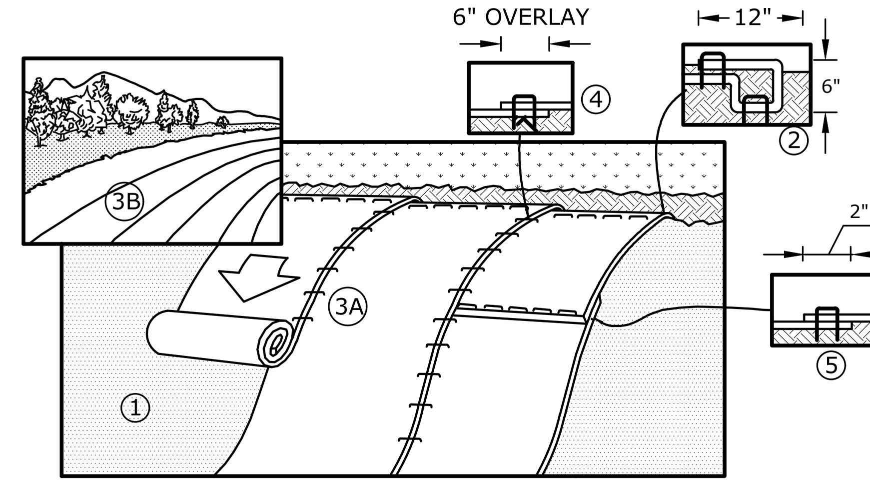
Last Saved: 7/3/2024
Plotted On:Jul 22, 2024-4:20pm By: BCurcio
Tighe & Bond:\\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001 - 1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DTLS.dwg



NOTES:
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING AREA TO A SINGLE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. TRAP OUTLET SHALL BE MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP.
5. TRAP SHALL DISCHARGE TO A STABILIZED AREA.
6. TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.
8. SEDIMENT TRAPS MUST BE USED AS NEEDED TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.

SEDIMENT TRAP

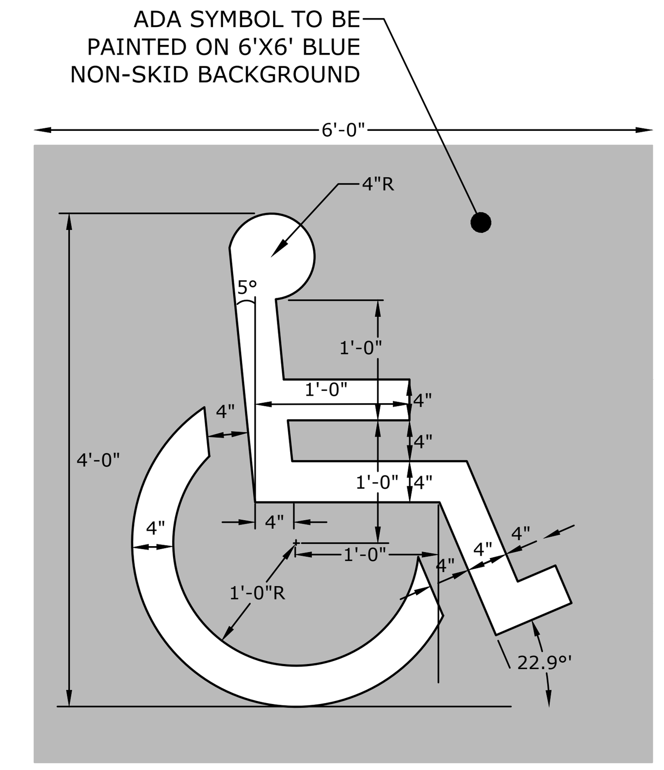
NO SCALE



NOTES:
1. EROSION CONTROL BLANKET SHALL BE AN ALL NATURAL PRODUCT WITH NO PHOTO DEGRADABLE COMPONENTS, NORTH AMERICAN GREEN SC150BN OR APPROVED EQUAL.
2. STAKES SHALL BE BIODEGRADABLE BIOSTAKES OR ALL NATURAL WOOD ECOSTAKES OR APPROVED EQUAL. THE LENGTH OF STAKES SHALL BE BASED OFF OF THE MANUFACTURERS RECOMMENDATION.
3. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, COMPOST AND SEED.
4. BEGIN AT THE TOP OF THE SLOPE, 36" OVER THE GRADE BREAK, BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UPSLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAKES IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAKING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAKES ACROSS THE WIDTH OF THE BLANKET.
5. ROLL THE BLANKETS DOWN THE SLOPE. ALL BLANKETS MUST BE SECURELY FASTENED TO THE SOIL SURFACE BY PLACING STAKES IN APPROPRIATE LOCATIONS AS SHOWN ON THE MANUFACTURERS PATTERN GUIDE.
6. THERE SHALL BE NO PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN 1/8 INCHES MATERIAL UTILIZED.

EROSION CONTROL BLANKET

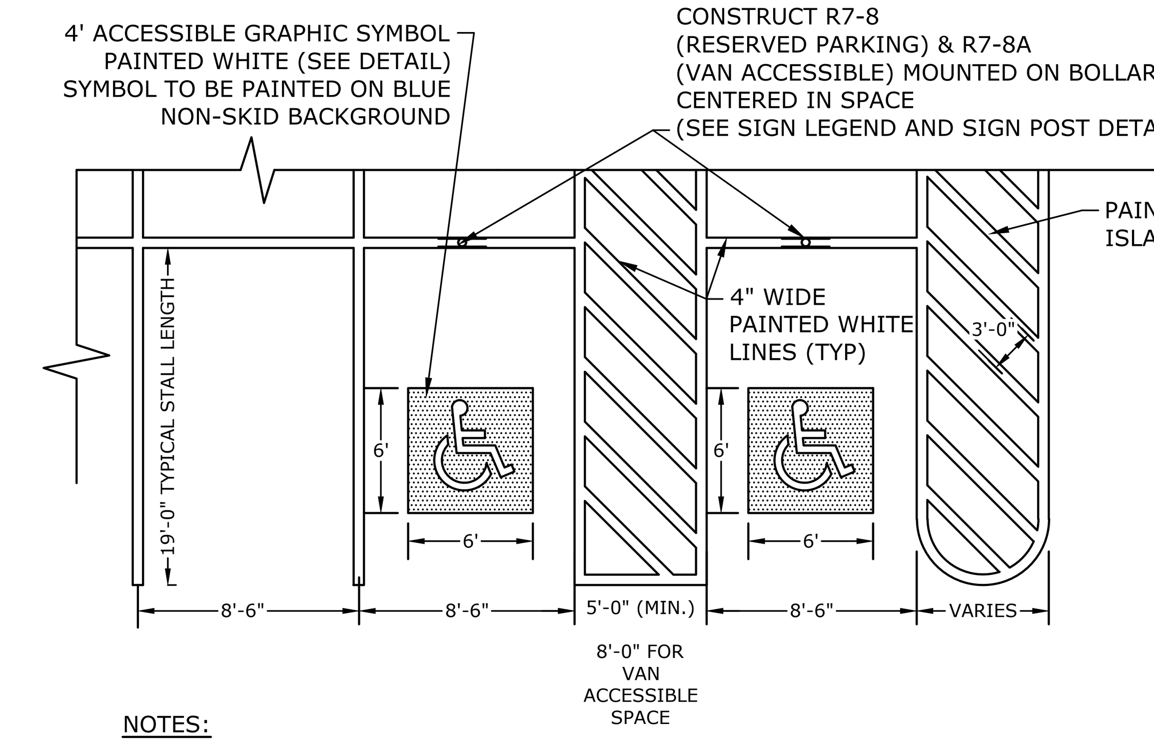
NO SCALE



NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST ADA, STATE AND LOCAL REQUIREMENTS.

ACCESSIBLE SYMBOL

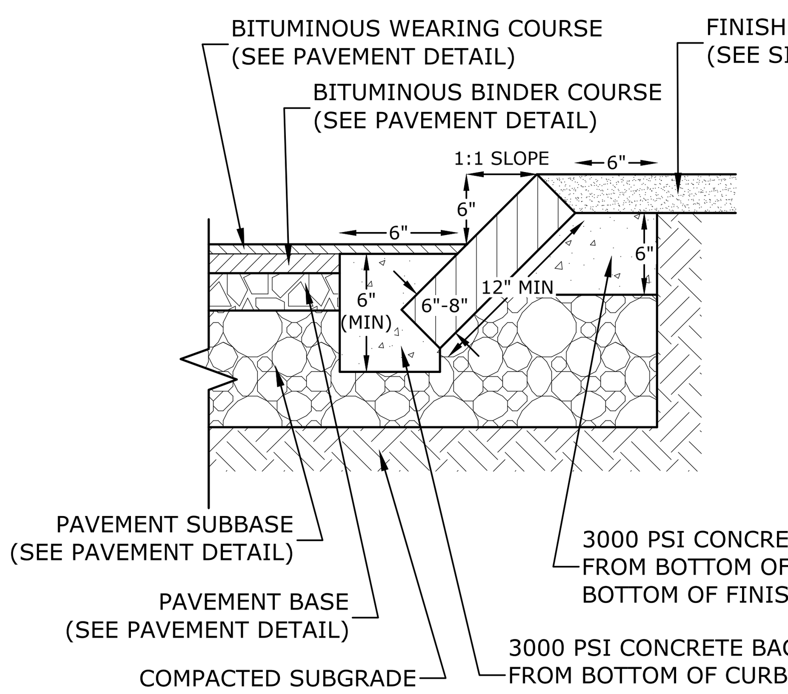
NO SCALE



NOTES:
1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
3. FINISH PAVEMENT GRADES AT ALL HANDICAP ACCESSIBLE STALLS AND PAINTED ACCESS AISLES SHALL NOT EXCEED 2% IN ANY DIRECTION.

PARKING STALL/PAINTED ISLAND STRIPING

NO SCALE

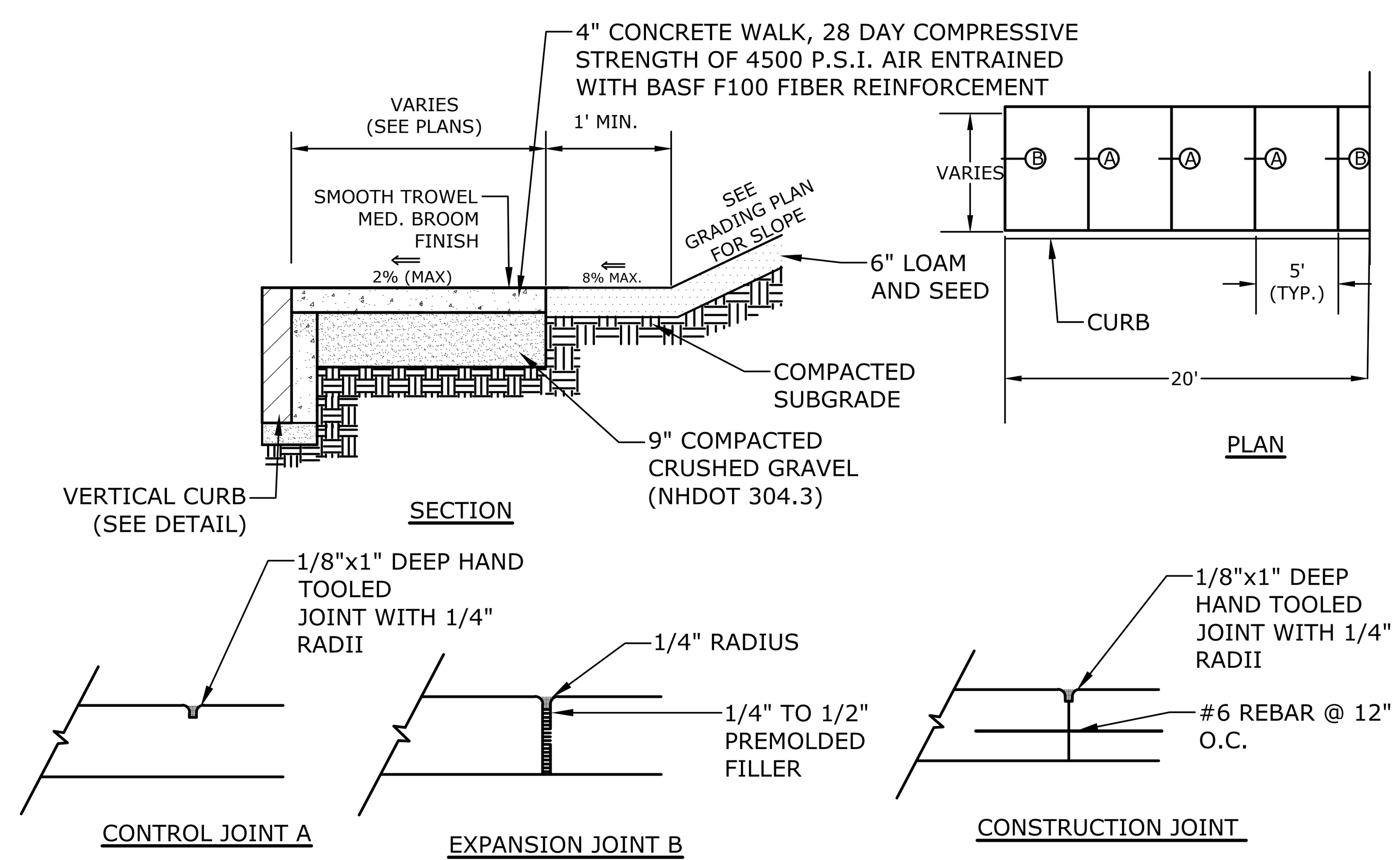


CURB RADIUS TABLE	
RADIUS	MAX LENGTH
<2'	USE CURVED CURB
2'-15'	USE RADIAL JOINTS
16'-28'	1'-6"
29'-41	2'
42'-55'	3'
56'-68'	4'
69'-82'	5'
83'-96'	6'
97'-110'	7'
>110'	8'

NOTES:
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 18"
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 8'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

SLOPED GRANITE CURB

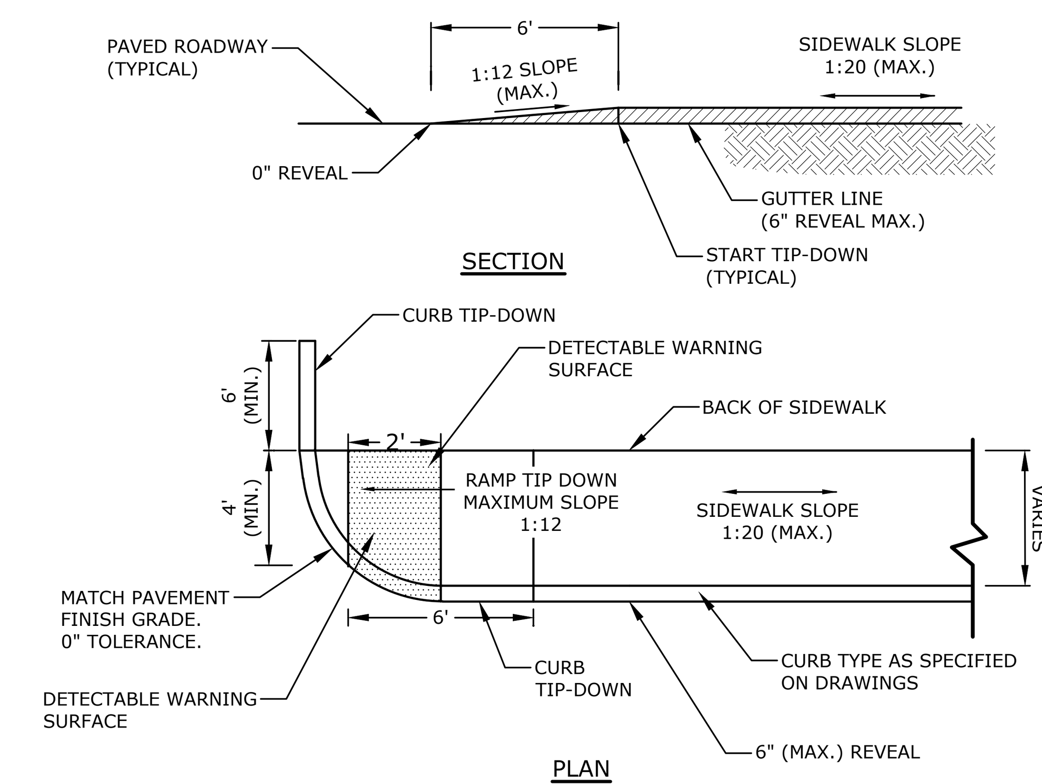
NO SCALE



NOTES:
1. SIDEWALK SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH STANDARDS

CONCRETE SIDEWALK WITH GRANITE CURB

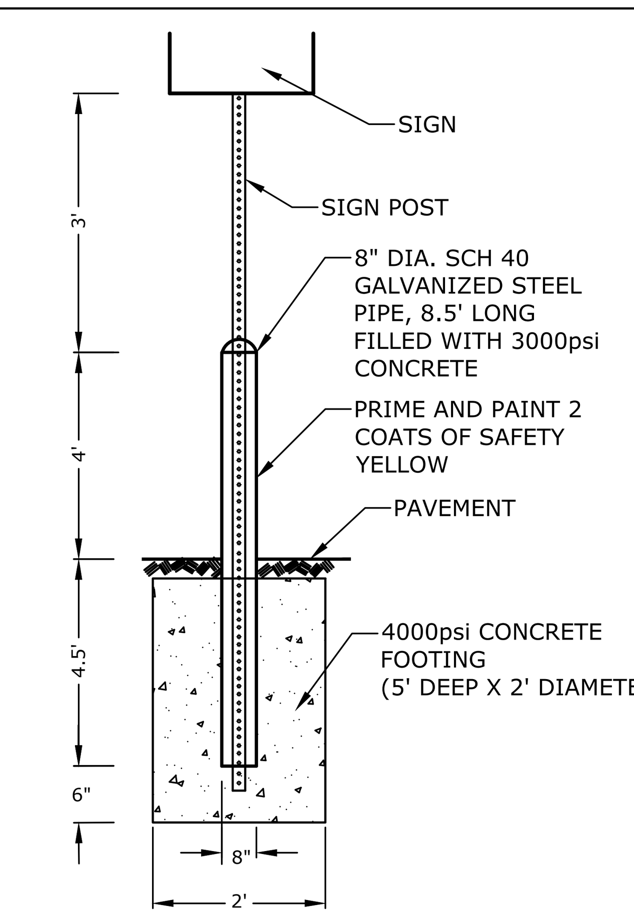
NO SCALE



NOTES:
1. RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
2. PROVIDE 6" COMPACTED CRUSHED GRAVEL BASE BENEATH RAMPS.
3. DETECTABLE WARNING STRIP SHALL BE ADA SOLUTIONS, INC. CAST IN PLACE RAMP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

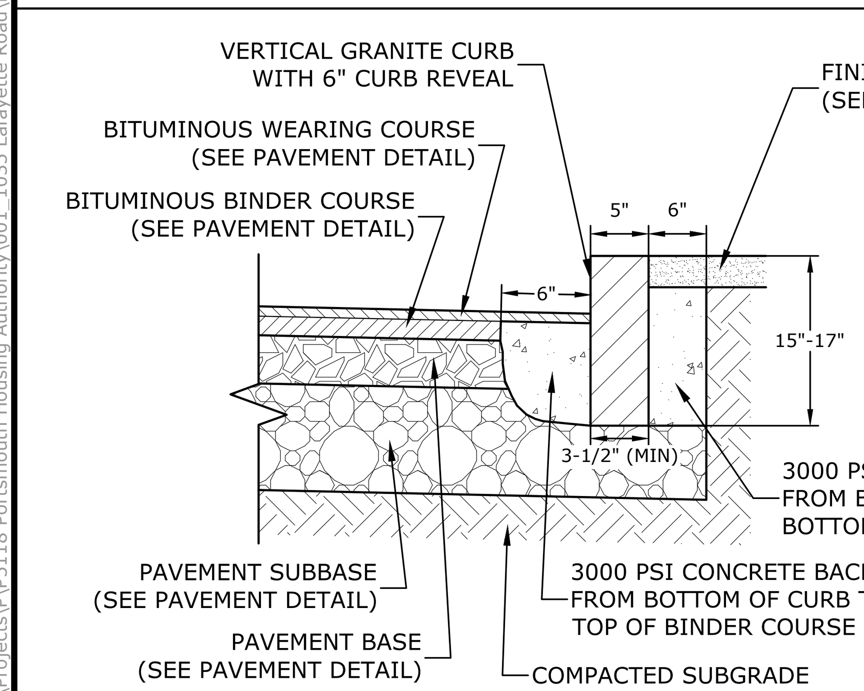
CONCRETE SIDEWALK TIP-DOWN RAMP

NO SCALE



BOLLARD MOUNTED SIGN DETAIL

NO SCALE

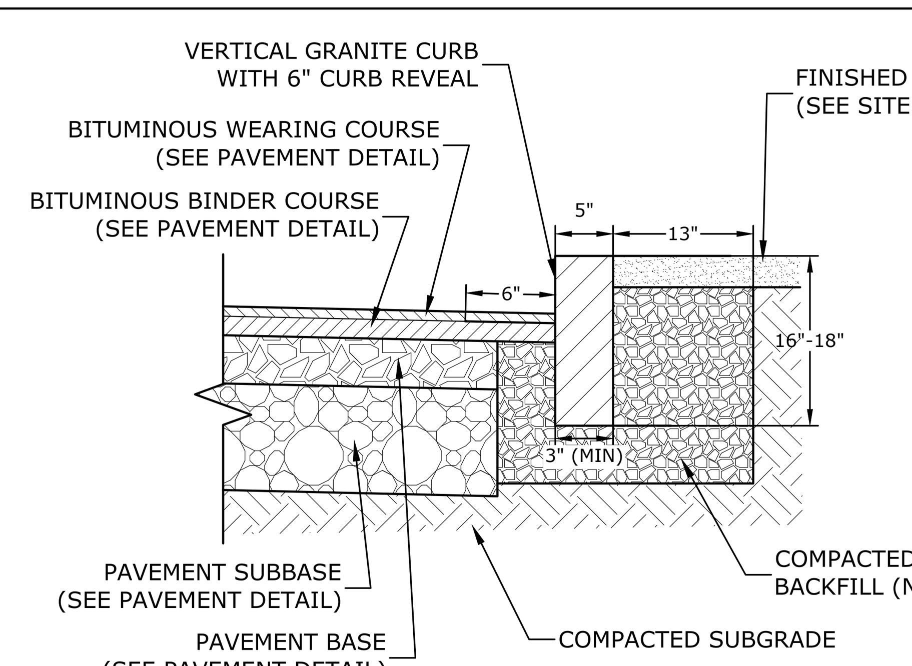


CURB RADIUS TABLE	
RADIUS	MAX LENGTH
<20'	USE CURVED CURB
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
>60'	10'

NOTES:
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
7. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

VERTICAL GRANITE CURB

NO SCALE



CURB RADIUS TABLE	
RADIUS	MAX LENGTH
<20'	USE CURVED CURB
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
>60'	10'

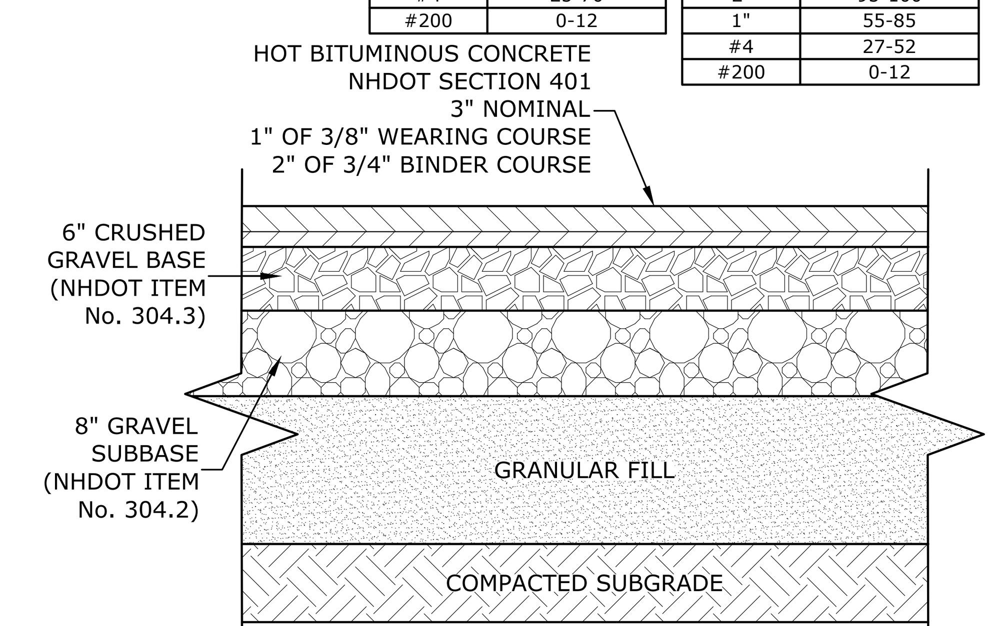
NOTES:
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
7. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

VERTICAL GRANITE CURB WITHIN DOT R.O.W.

NO SCALE

NHDOT ITEM No. 304.2 (GRAVEL)	
SIEVE SIZE	% PASSING
6"	100
#4	25-70
#200	0-12

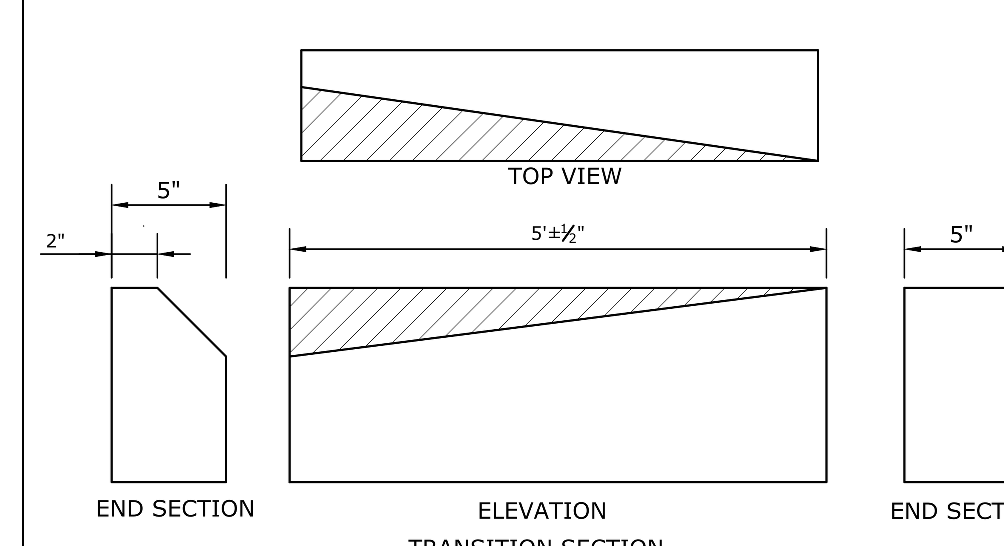
NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12



NOTES:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. A TACK COAT SHALL BE PLACED ON TOP OF BINDER COURSE PAVEMENT PRIOR TO PLACING WEARING COURSE.

TYPICAL PAVEMENT SECTION

NO SCALE



NOTES:
1. THE INTENT OF THIS ITEM IS TO PROVIDE A SMOOTH TRANSITION BETWEEN VERTICAL GRANITE CURB AND MOUNTABLE VERTICAL GRANITE CURB WITHOUT REQUIRING FIELD CHIPPING DURING INSTALLATION. THE MOUNTABLE VERTICAL GRANITE CURB MAY REQUIRE ADJUSTMENTS TO MEET THE TRANSITION PIECE HEIGHT. TRANSITION SLOPE CURB TO VERTICAL GRANITE CURB SHALL BE CONSTRUCTED TO SECURE REVEAL AS QUICKLY AS POSSIBLE TO PROVIDE FOR THIS SMOOTH TRANSITION.

CURB TRANSITION

NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 7/24/24

STATE OF NEW HAMPSHIRE NEIL A HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

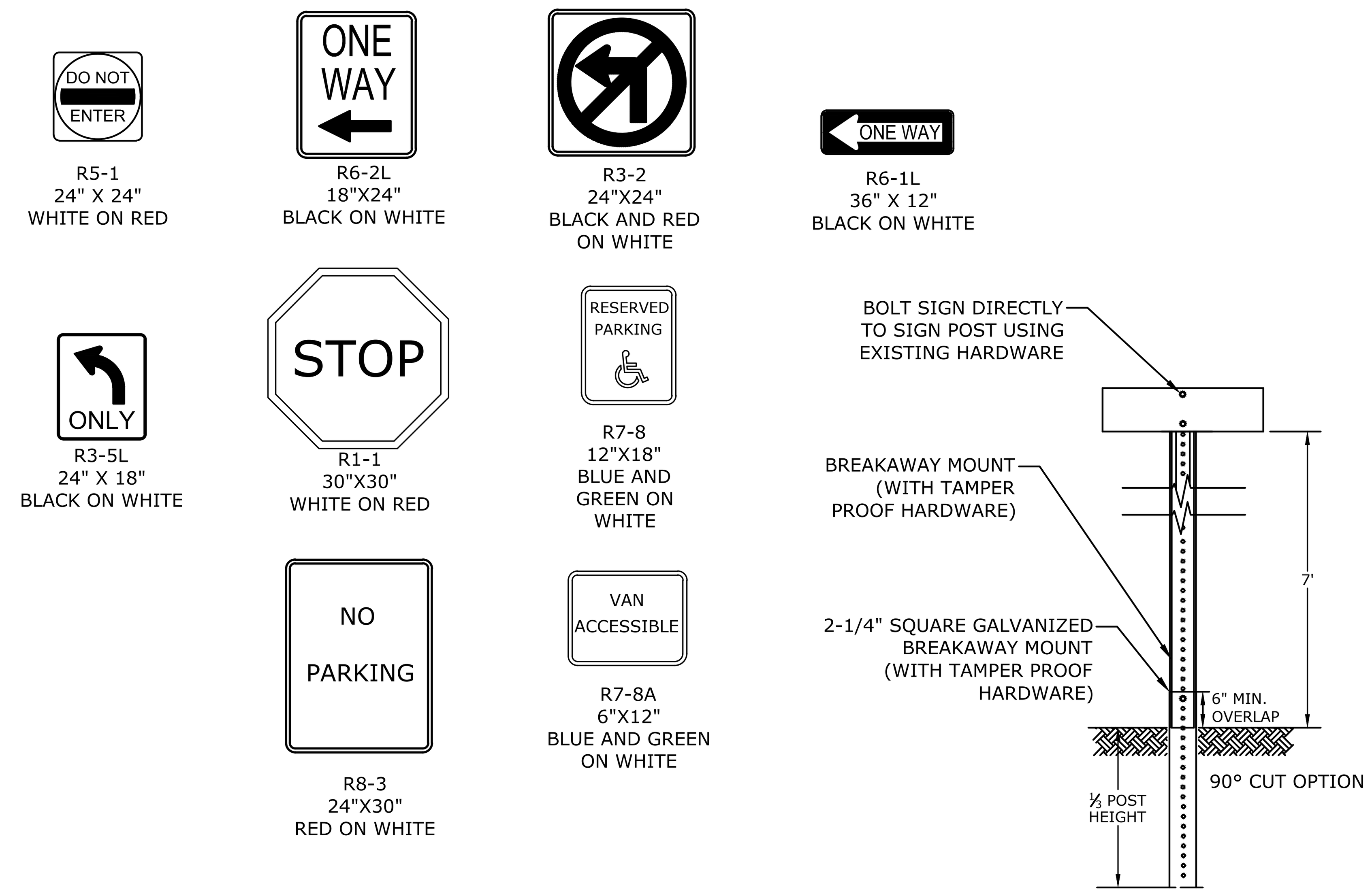
MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

SCALE: AS SHOWN

C-502



* IN LEDGE DRILL & GROUT TO A MIN OF 2'

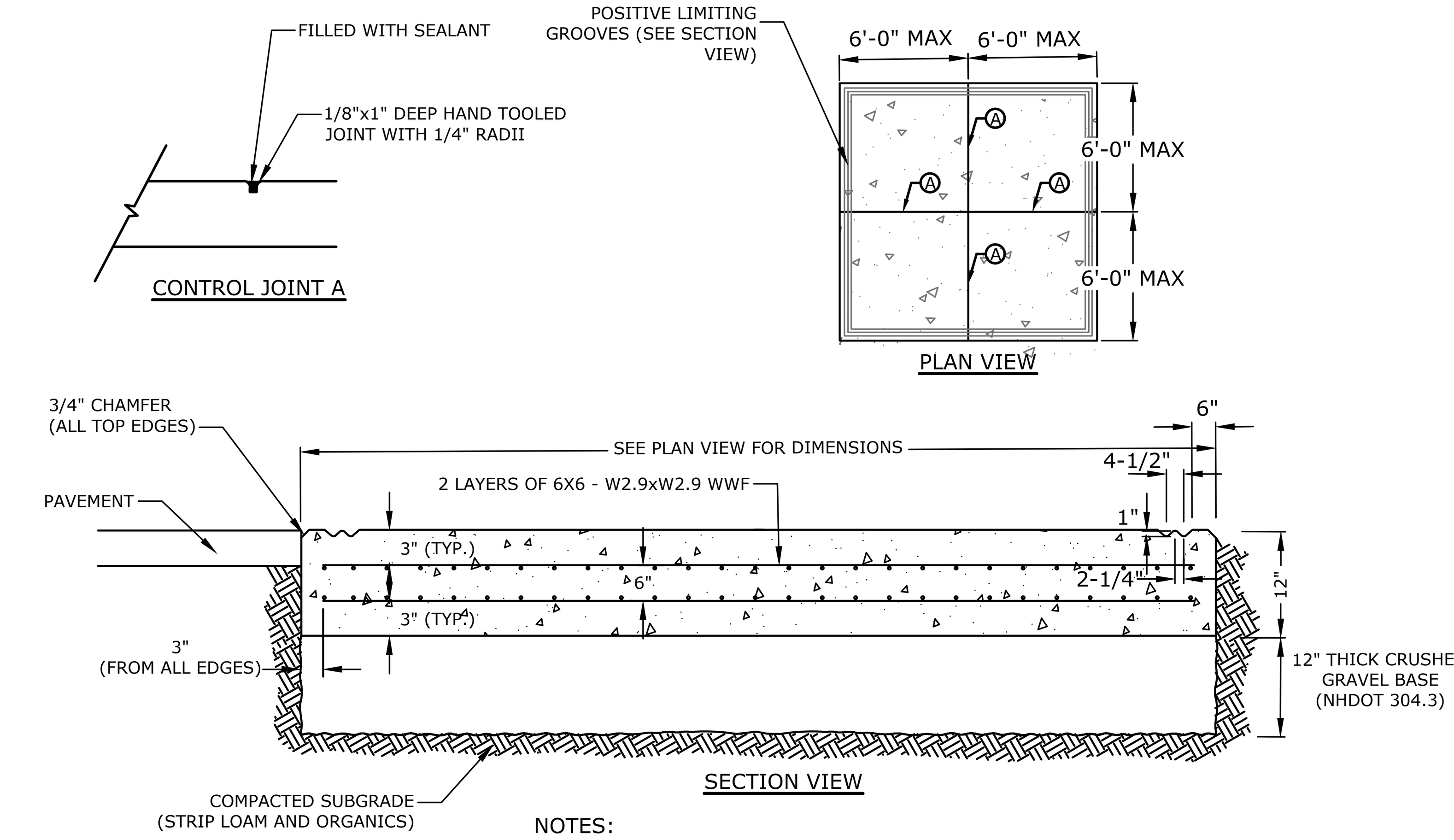
NOTES:
ALL SIGNS TO BE CONSTRUCTED PER THE LATEST EDITION OF THE FHWA STANDARD HIGHWAY SIGNS MANUAL AND INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 7/16" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 - 1080)
FINISH: STREET SIGNS - GALVANIZED STEEL
ALL OTHER - SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN BAKED ON OR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

SIGN LEGEND & SIGN POST
NO SCALE

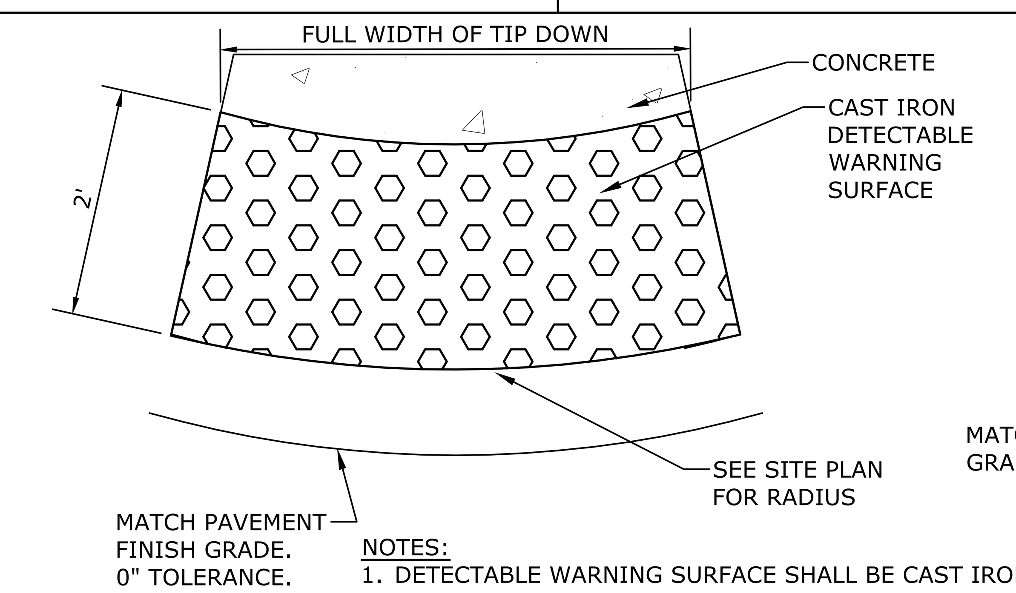
NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ELECTRIC VEHICLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST STATE AND LOCAL REQUIREMENTS.

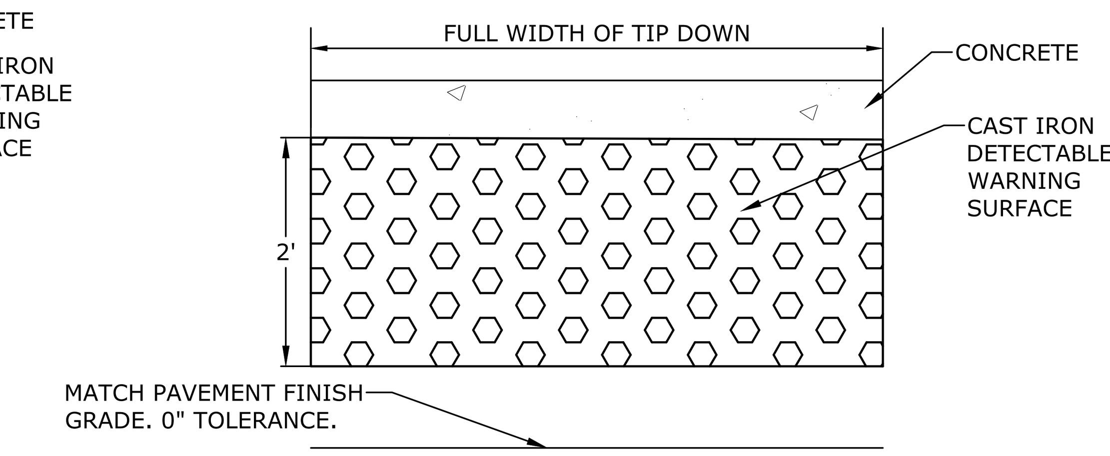
EV CHARGING SYMBOL
NO SCALE



NOTES:
1. CONCRETE TO BE 4500 PSI, 7% AIR ENTRAINED
2. STANDARD BROOM FINISH.

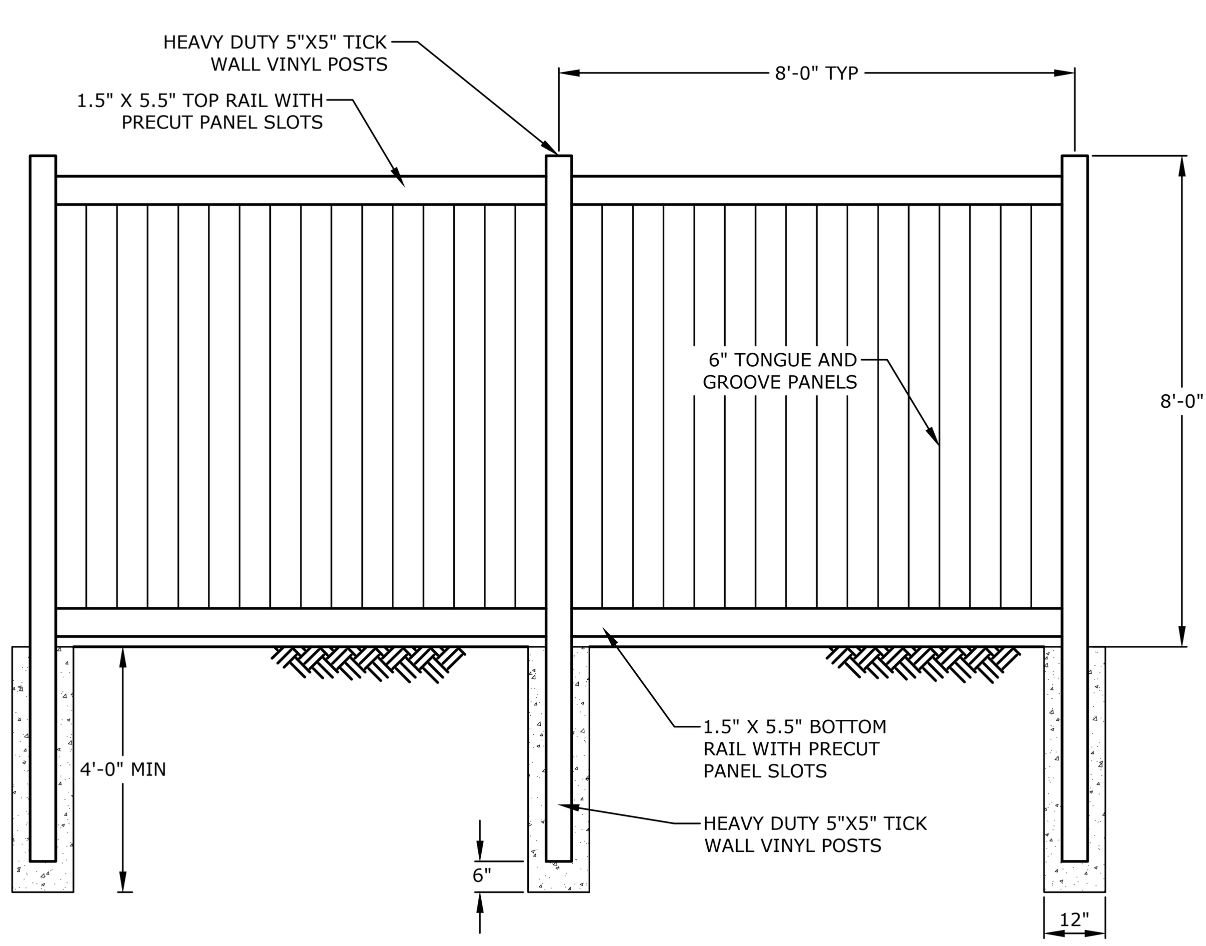
DUMPSTER PAD
NO SCALE





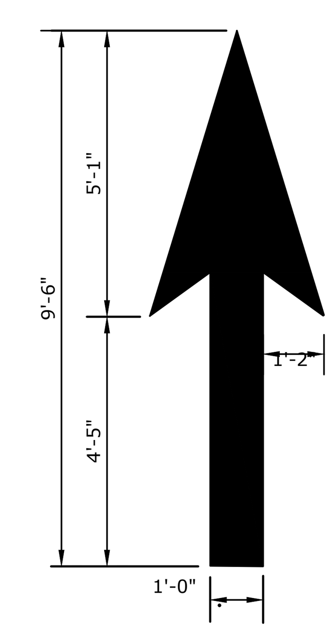
NOTES:
1. DETECTABLE WARNING SURFACE SHALL BE CAST IRON PANEL SET IN CONCRETE.
2. DETECTABLE WARNING SURFACE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

CAST IRON DETECTABLE WARNING SURFACE
NO SCALE



NOTES:
1. VINYL DUMPSTER ENCLOSE SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
2. COORDINATE FINAL COLOR AND STYLE WITH OWNER PRIOR TO CONSTRUCTION.

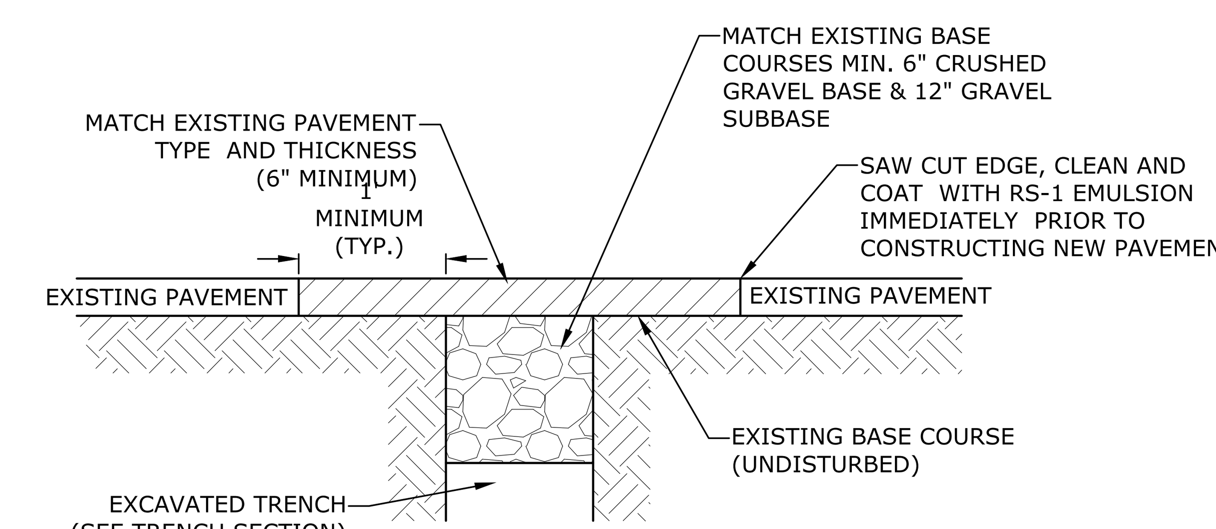
DUMPSTER PAD ENCLOSURE
NO SCALE



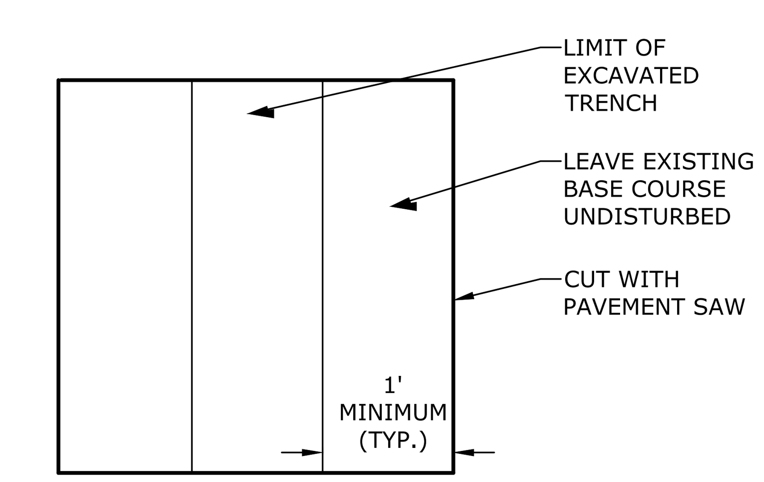
STRAIGHT ARROW

NOTES:
1. ALL WORDS AND SYMBOLS SHALL BE RETROREFLECTIVE WHITE AND SHALL CONFORM TO THE LATEST VERSION OF THE MUTCD.
2. MULTI-WORD MESSAGES SHALL READ "UP"; THAT IS, THE FIRST WORD SHALL BE NEAREST THE APPROACHING DRIVER.
3. THE WORD "ONLY" SHALL NOT BE USED WITH THROUGH OR COMBINATION ARROWS, AND SHALL NOT BE USED ADJACENT TO A BROKEN LANE LINE. A WORD/SYMBOL SHALL PRECEED THE WORD "ONLY".
4. COMBINATION ARROWS MAY BE COMPRISED OF 2 SINGLE ARROWS (e.g. TURN AND THROUGH ARROWS). HOWEVER, THE SHAFTS OF THE ARROWS SHALL COINCIDE AS SHOWN.
5. PREFORMED WORDS AND SYMBOLS SHALL BE PRE-CUT BY THE MANUFACTURER.
6. WRONG-WAY ARROWS SHALL NOT BE SUBSTITUTED FOR THROUGH ARROWS.
7. ALL STOP BARS, WORDS, SYMBOLS AND ARROW SHALL BE THERMOPLASTIC.

PAVEMENT MARKING
NO SCALE



SECTION



PLAN

NOTE:
1. COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH CITY OF PORTSMOUTH DPW PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
7/24/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
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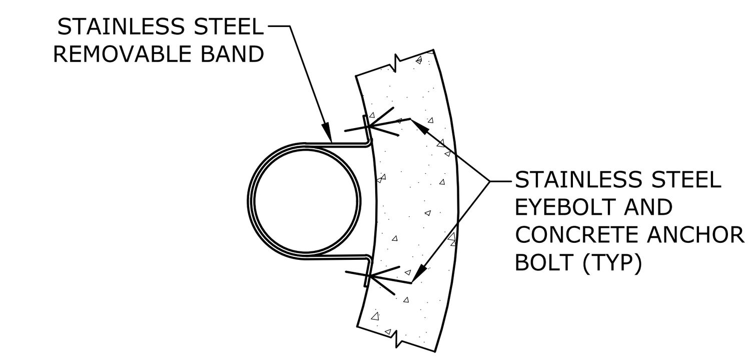
PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

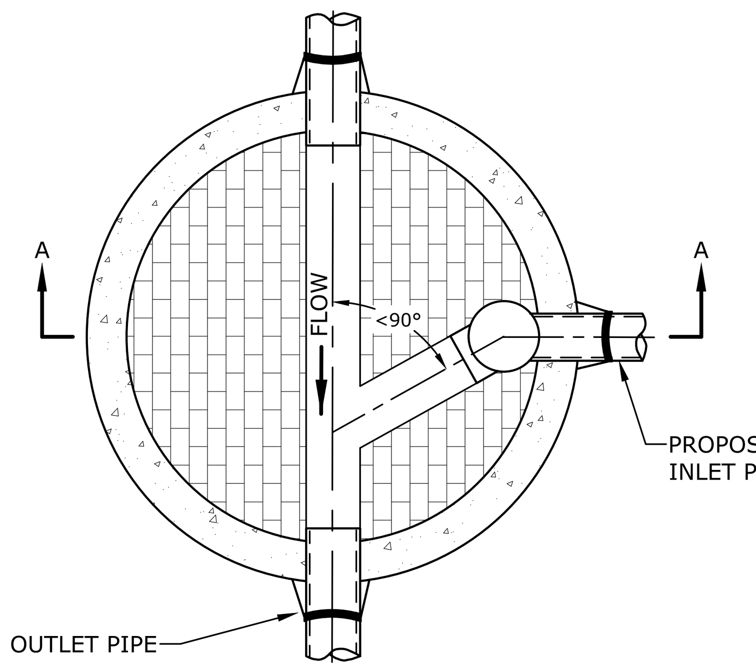
DETAILS

SCALE: AS SHOWN

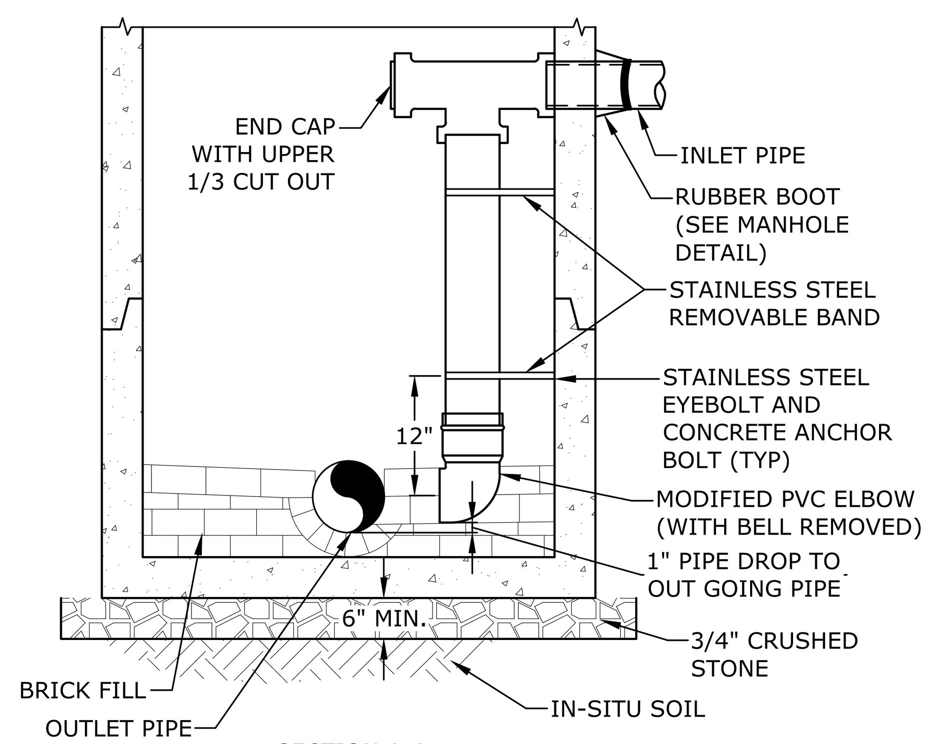
C-503



PIPE STRAP DETAIL



PLAN

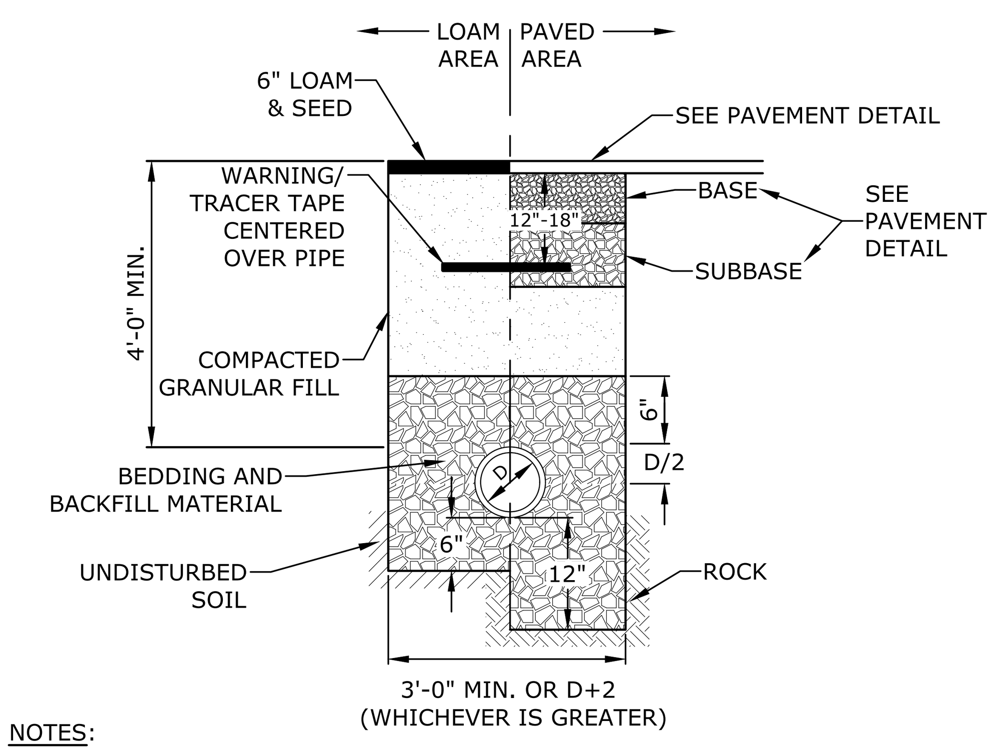


SECTION A-A

NOTES:
1. RISER PIPE AND FITTINGS SHALL BE THE SAME DIAMETER AS THE INLET PIPE AND SHALL BE CONSTRUCTED OF SDR35 PVC PIPE.
2. SANITARY SEWER SHALL BE INSTALLED PER THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS STANDARDS.
3. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

INSIDE DROP MANHOLE

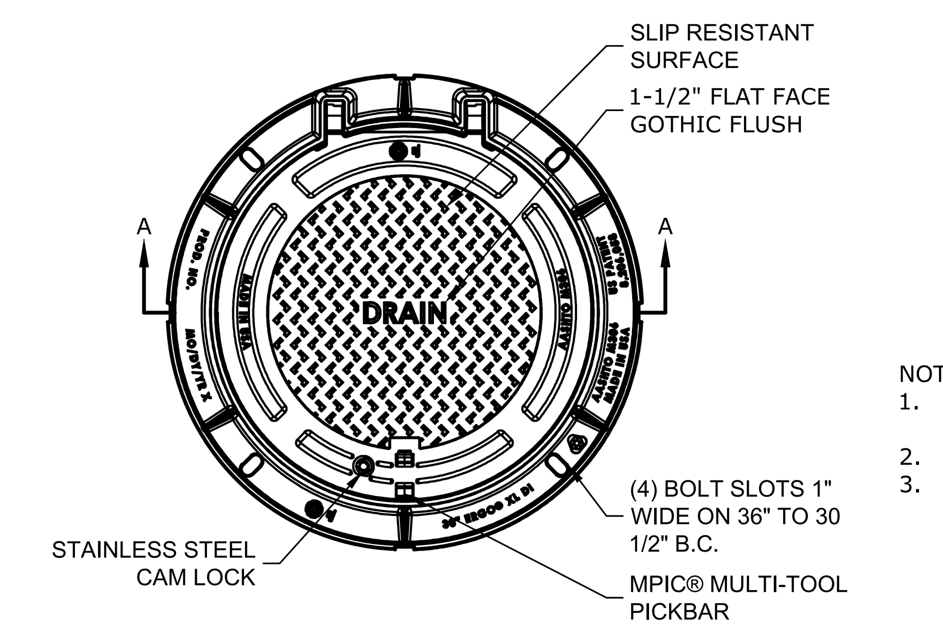
NO SCALE

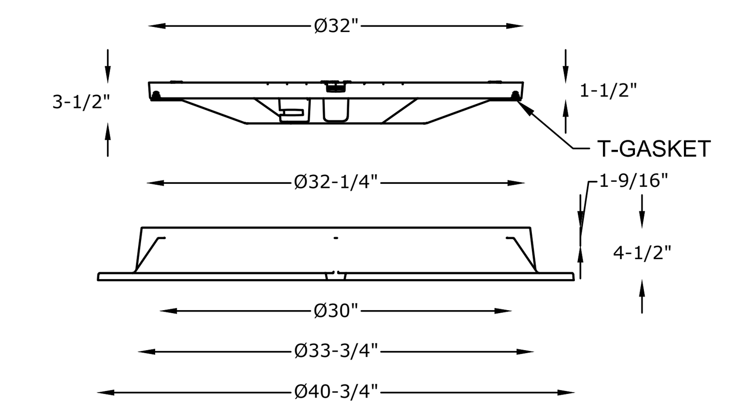


NOTES:
1. CRUSHED STONE BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 6" ABOVE TOP OF PIPE.
2. ALL UTILITIES SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.
3. DRAIN LINE SHALL BE INSULATED WHERE THERE IS LESS THAN 6' OF COVER IN PAVED AREAS AND LESS THAN 4' OF COVER IN NON-PAVED AREAS.

STORM DRAIN TRENCH

NO SCALE



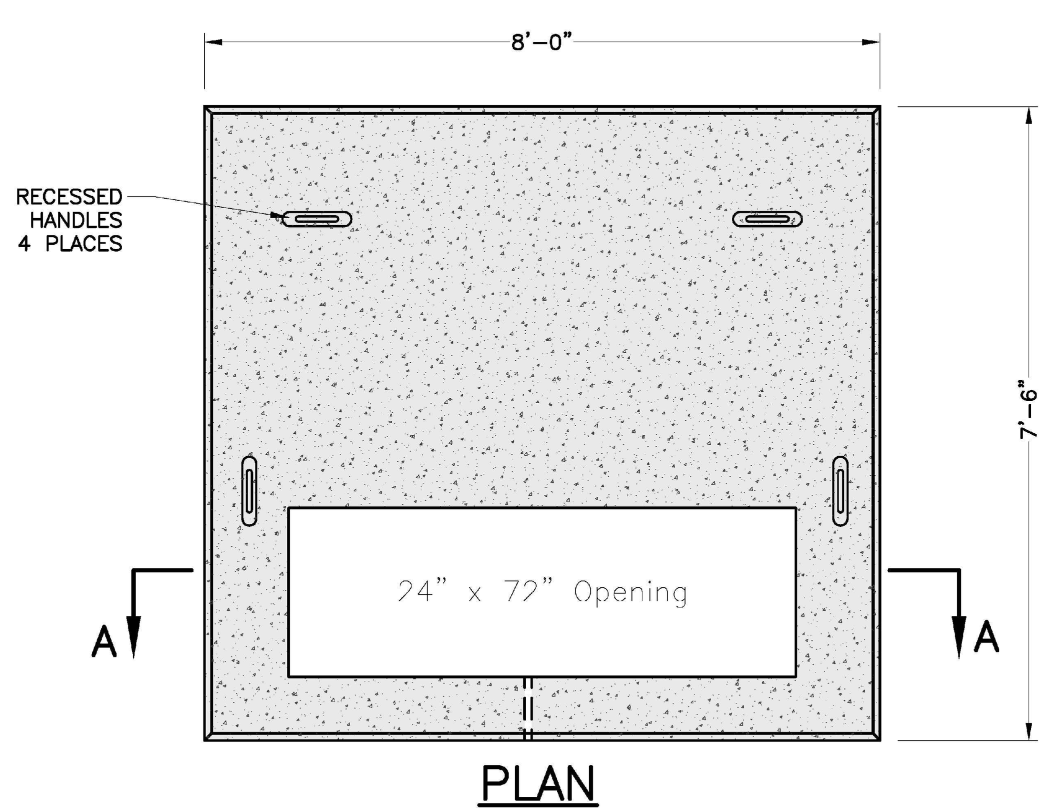


SECTION A-A

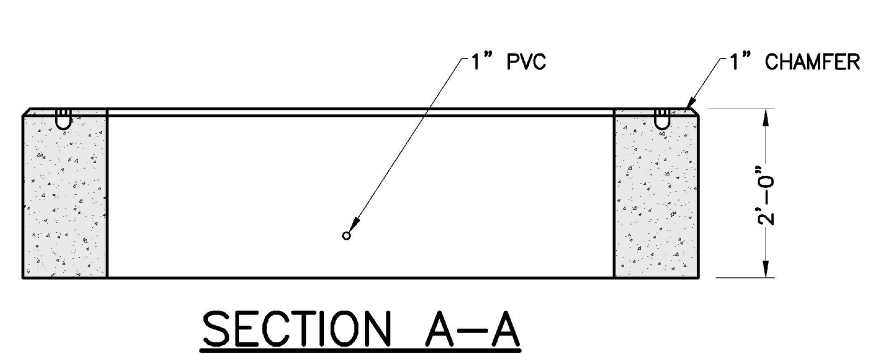
NOTES:
1. MANHOLE FRAME AND COVER SHALL BE 32" HINGED ERGO XL BY EJ CO.
2. ALL DIMENSIONS ARE NOMINAL.
3. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
   A. THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
   B. THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
   C. ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
4. LABEL TYPE OF MANHOLE WITH 3" HIGH LETTERS IN HE CENTER OF THE COVER.

DRAIN MANHOLE FRAME & COVER

NO SCALE



PLAN

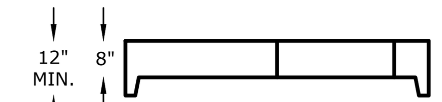


SECTION A—A

NOTES:
1. DIMENSIONS SHOWN REPRESENT TYPICAL REQUIREMENTS. MANHOLE LOCATIONS AND REQUIREMENTS SHALL BE COORDINATED WITH EVERSOURCE PRIOR TO CONSTRUCTION
2. CONCRETE MINIMUM STRENGTH - 4,000 PSI @ 28 DAYS
3. STEEL REINFORCEMENT - ASTM A615, GRADE 60
4. PAD MEETS OR EXCEEDS EVERSOURCE SPECIFICATIONS
5. TRANSFORMER PAD SHALL BE REVIEWED AND APPROVED BY EVERSOURCE PRIOR TO CONSTRUCTION.

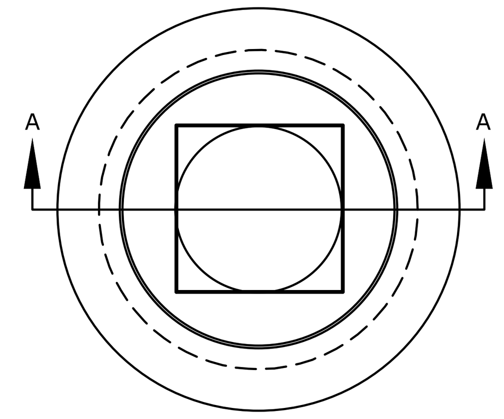
TRANSFORMER PAD DETAIL

NO SCALE

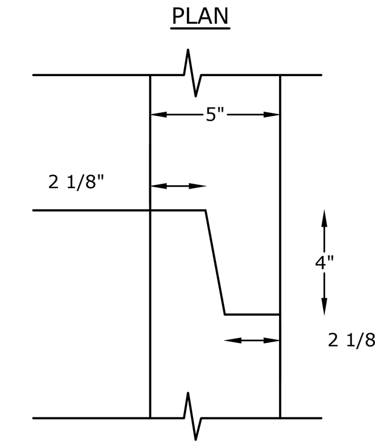


SECTION B-B

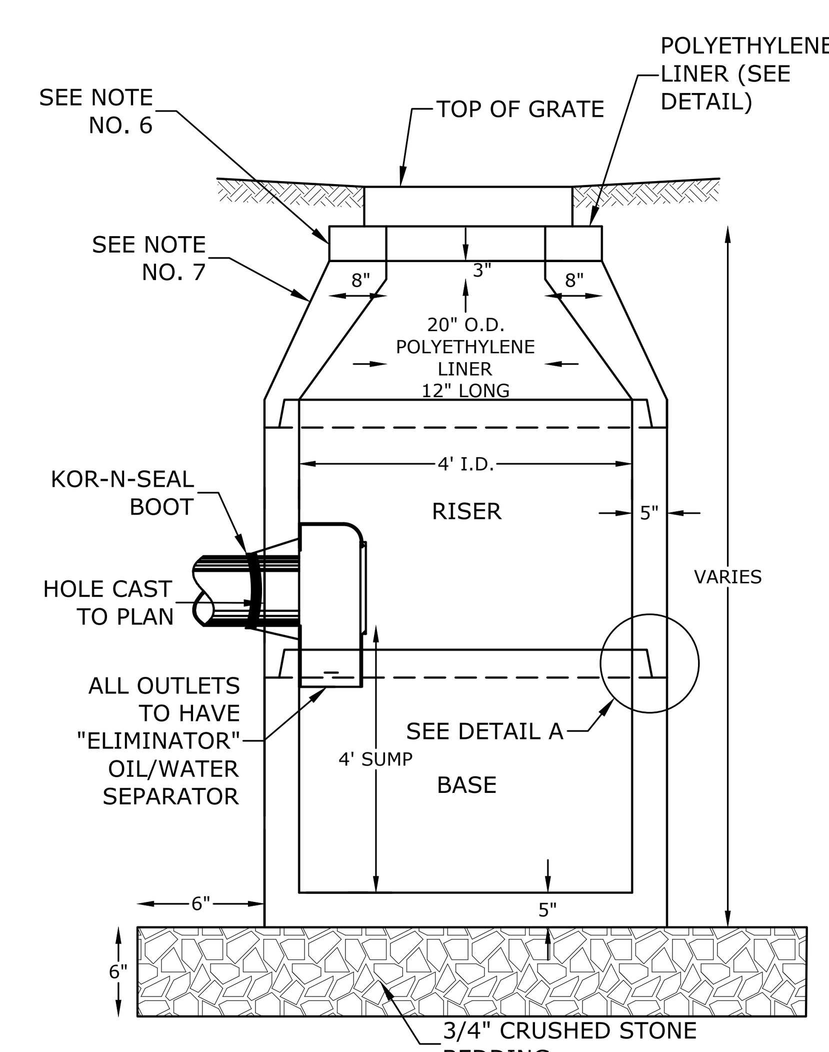
FLAT SLAB TOP



PLAN



DETAIL A
(TONGUE AND GROOVE JOINT)



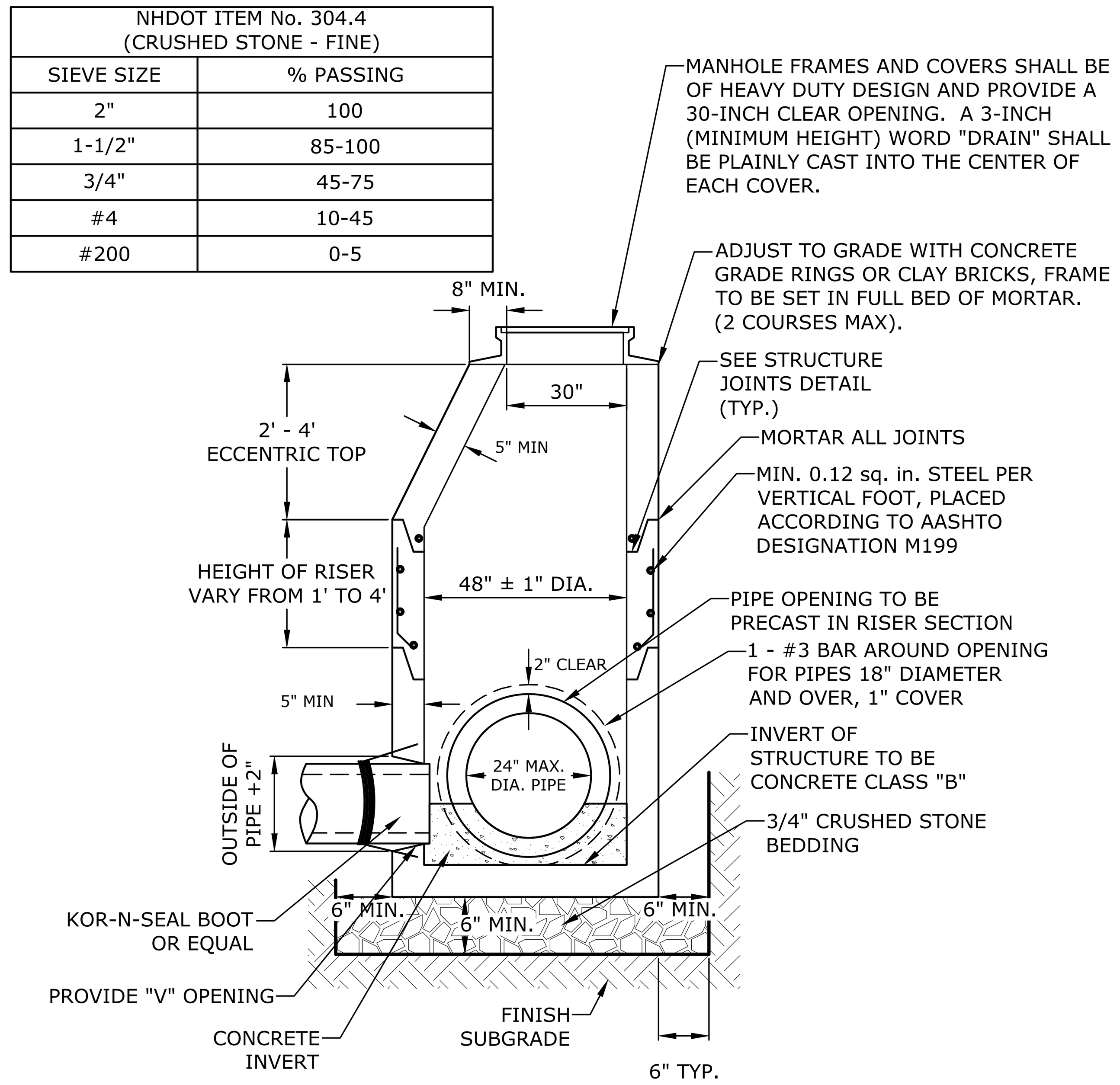
SECTION A-A

NOTES:
1. ALL SECTIONS SHALL BE CONCRETE CLASS AA(4000 psi).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ.IN. PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
4. RISERS OF 1', 2', 3' & 4' CAN BE USED TO REACH DESIRED DEPTH.
5. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
6. FITTING FRAME TO GRADE MAY BE DONE WITH PREFABRICATED ADJUSTMENT RINGS OR CLAY BRICKS (2 COURSES MAX.).
7. CONE SECTIONS MAY BE EITHER CONCENTRIC OR ECCENTRIC, OR FLAT SLAB TOPS MAY BE USED WHERE PIPE WOULD OTHERWISE ENTER INTO THE CONE SECTION OF THE STRUCTURE AND WHERE PERMITTED.
8. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
9. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
10. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
11. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
12. "ELIMINATOR" OIL/WATER SEPARATOR SHALL BE INSTALLED TIGHT TO INSIDE OF CATCHBASIN.

4' DIAMETER CATCHBASIN

NO SCALE

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5

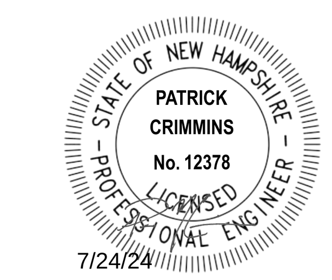


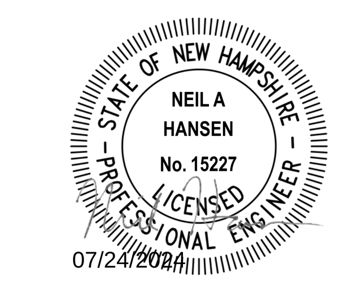
NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
6. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
7. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
8. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
9. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
10. ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES, NO MORE THAN 75% OF A HORIZNTAL CROSS SECTION SHALL BE HOLES, AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.

4' DIAMETER DRAIN MANHOLE

NO SCALE

Tighe&Bond





Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

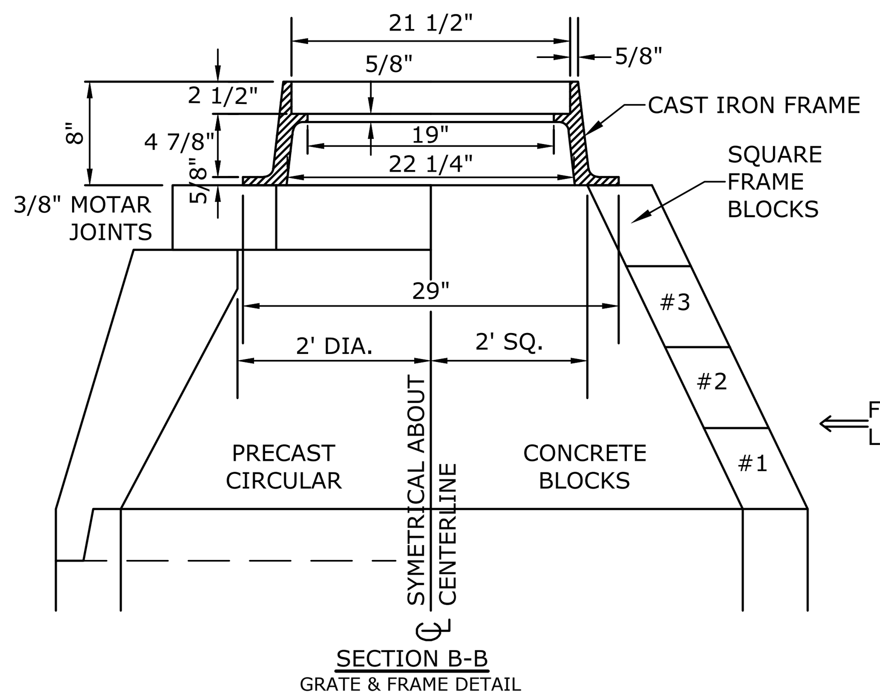
MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

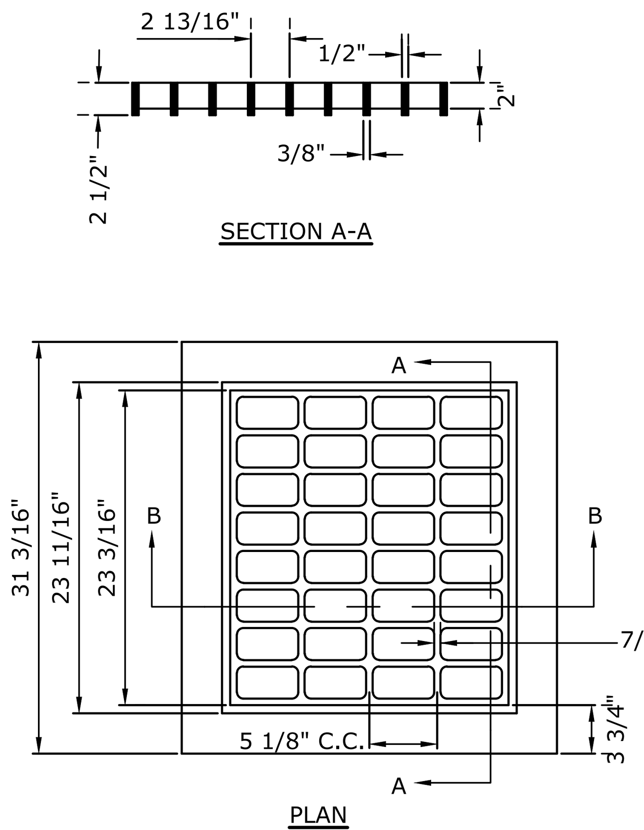
PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

SCALE: AS SHOWN

C-504

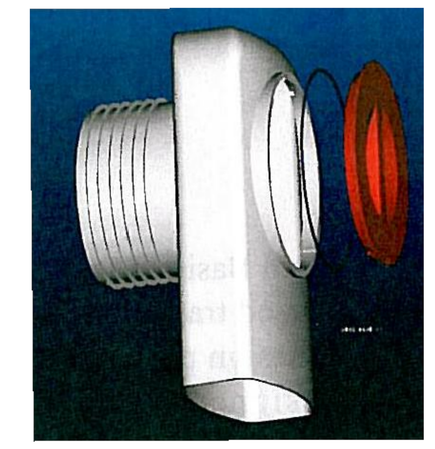




NOTES:
1. GRATE TO BE CAST IRON (NHDOT TYPE B ALTERNATE 1)
2. FRAME AND GRATE TO BE MANUFACTURED IN THE USA

CATCH BASIN FRAME & GRATE

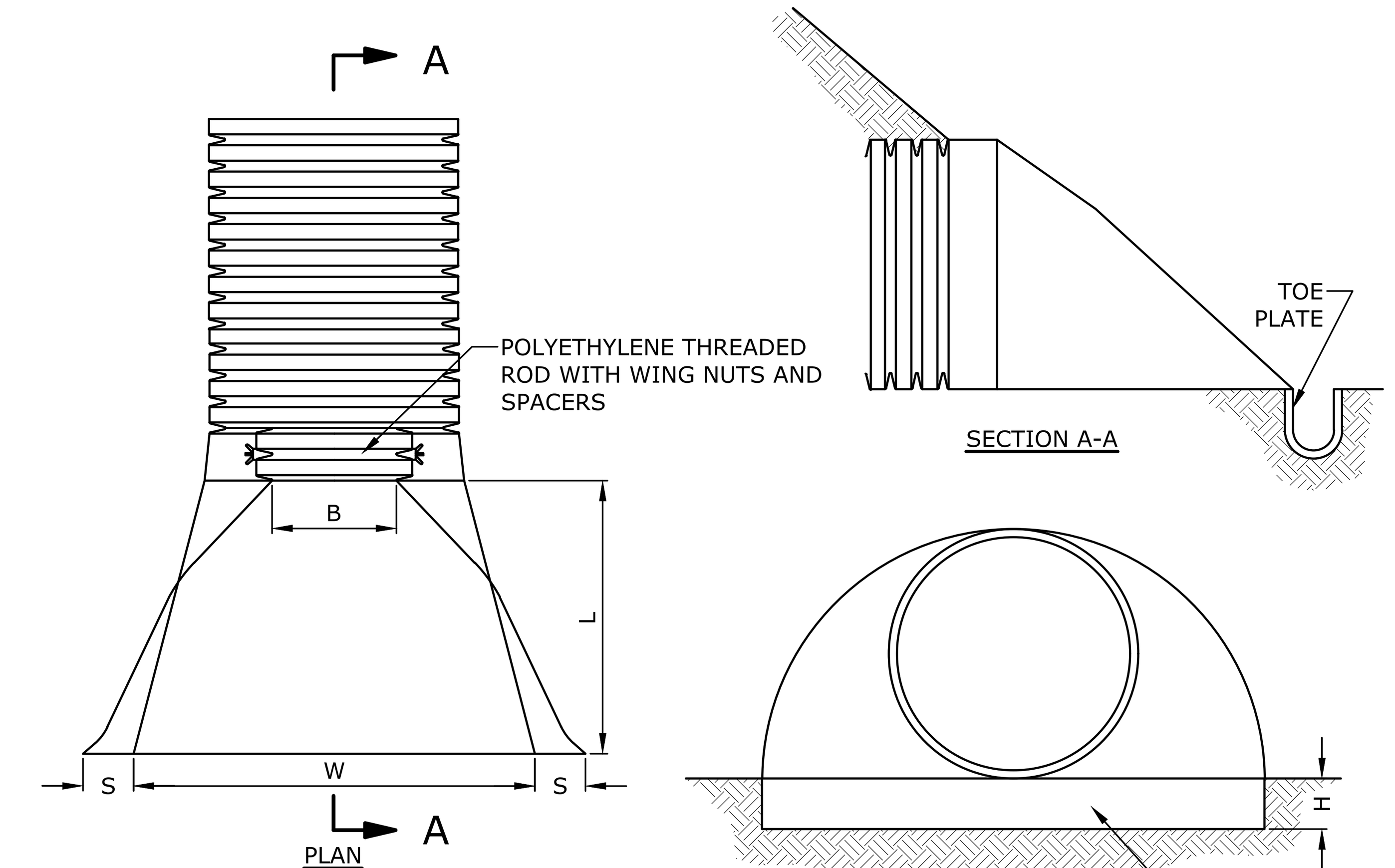
NO SCALE



NOTES:
1. ALL CATCH BASIN OUTLETS TO HAVE "ELIMINATOR" OIL AND FLOATING DEBRIS TRAP MANUFACTURED BY KLEANSTREAM (NO EQUAL)
2. INSTALL DEBRIS TRAP TIGHT TO INSIDE OF STRUCTURE.
3. 1/4" HOLE SHALL BE DRILLED IN TOP OF DEBRIS TRAP

"ELIMINATOR" OIL FLOATING DEBRIS TRAP

NO SCALE

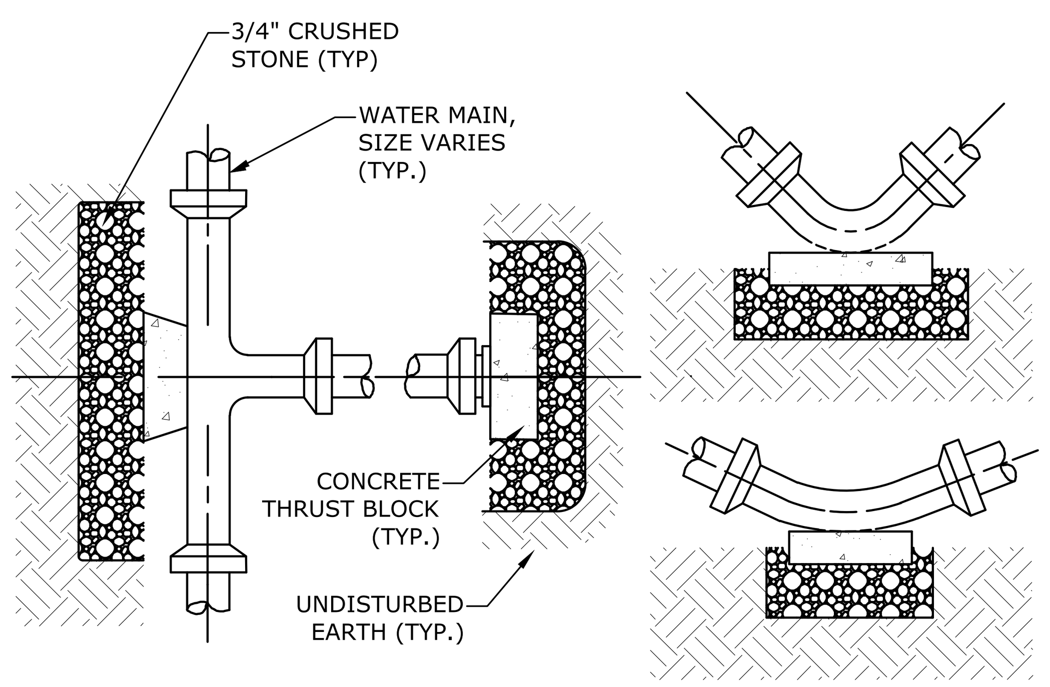


PIPE DIA.	S	B	H	L	W
12"	6.5"	10"	6.5"	25"	29"
15"	6.5"	10"	6.5"	25"	29"
18"	7.5"	15"	6.5"	32"	35"
24"	7.5"	18"	6.5"	36"	45"
30"	7.5"	12"	8.6"	58"	63"
36"	7.5"	25"	8.6"	58"	63"

NOTE:
1. END SECTIONS MANUFACTURED BY ADVANCED DRAINAGE SYSTEMS, COLUMBUS, OHIO. END SECTIONS TO BE WELDED TO PIPE AS PER MANUFACTURER'S RECOMMENDATIONS.

HDPE END SECTION

NO SCALE



SQUARE FEET OF MINIMUM BEARING AREA						
NOMINAL DIA. (in)	PIPE SIZE					
	4"	6"	8"	10"	12"	16"
PIPE FITTINGS	*	*	5.18	7.96	11.43	20.29
A 90°	*	4.11	7.33	11.26	16.17	28.69
C 45°	*	*	*	6.10	8.75	15.53
D 22-1/2°	*	*	*	*	4.46	7.92
E 11-1/4°	*	*	*	*	*	*
*SEE NOTE 2	SYSTEM PRESSURE: 125 psi SAFETY FACTOR: 1.5 SOIL BEARING CAPACITY: 2,000 psf					

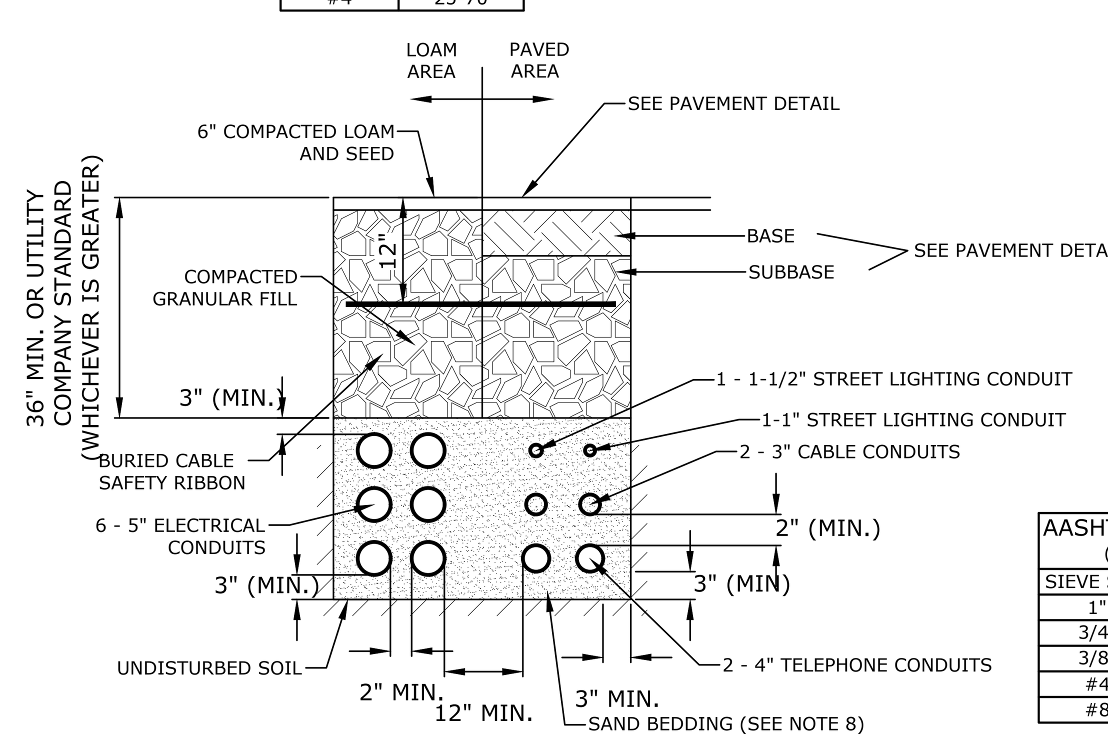
NOTES:
1. ALL THRUST BLOCKS SHALL BE PRE-CAST CONCRETE UNLESS APPROVED BY THE CITY ENGINEER.
2. 2'X2'X2' MINIMUM THRUST BLOCK REQUIRED, ANY BEARING AREA OVER 4 SF REQUIRES THRUST BLOCKS, RESTRAINED JOINTS AND CALCULATIONS ASSOCIATED WITH THE JOINT.
4. FOR MINIMUM BEARING AREAS OVER 4 SF, THE LENGTH (L) OF THE BLOCK IS APPROXIMATELY TWICE AS LONG AS THE HEIGHT (H).
5. THE MINIMUM BEARING AREAS SHOWN IN THE THRUST BLOCK SCHEDULE ARE BASED ON A SYSTEM PRESSURE OF 125 PSI. IF THE SYSTEM PRESSURE IS ABOVE 125 PSI, INCREASE THE NOTED AREAS PROPORTIONALLY TO THE ACTUAL SYSTEM PRESSURE.
6. PLACE CRUSHED STONE BEHIND THRUST BLOCK AGAINST UNDISTURBED SOIL.
7. PLACE THRUST BLOCK ALONG MAXIMUM LENGTH OF THE FITTING TO MAXIMIZE BEARING AREA.
8. CONCRETE COMPRESSIVE STRENGTH: 2,000 PSI MINIMUM.
9. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
10. INSTALLATION AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE WITH CITY OF PORTSMOUTH WATER DEPARTMENT STANDARDS.

THRUST BLOCKING DETAIL

NO SCALE

GRANULAR FILL (GRAVEL)	
SIEVE SIZE	% PASSING
3"	95-100
#4	25-70

SAND BLANKET	
SIEVE SIZE	% PASSING
1/2"	100
#200	15 MAX

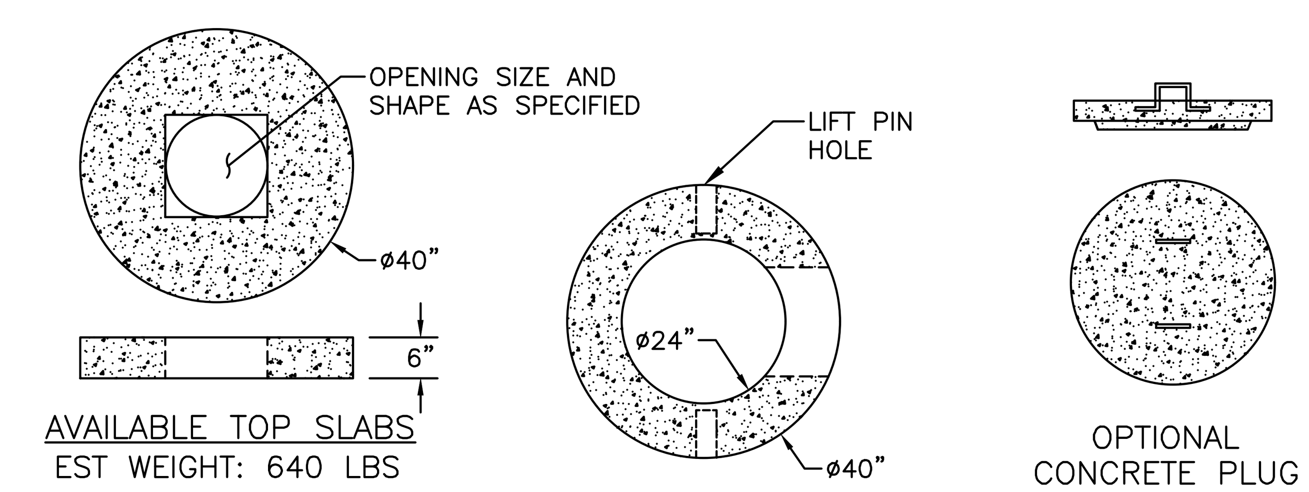


AASHTO #67 STONE (#4 to 3/4")	
SIEVE SIZE	% PASSING
1"	100
3/4"	90-100
3/8"	20-55
#4	0-10
#8	0-5

NOTES:
1. NUMBER, MATERIAL, AND SIZE OF UTILITY CONDUITS TO BE DETERMINED BY LOCAL UTILITY OR AS SHOWN ON ELECTRICAL DRAWINGS. CONTRACTOR TO PROVIDE ONE SPARE CONDUIT FOR EACH UTILITY TO BUILDING.
2. DIMENSIONS SHOWN REPRESENT OWNERS MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS MAY BE GREATER BASED ON UTILITY COMPANY STANDARDS, BUT SHALL NOT BE LESS THAN THOSE SHOWN.
3. NO CONDUIT RUN SHALL EXCEED 360 DEGREES IN TOTAL BENDS.
4. A SUITABLE PULLING STRING, CAPABLE OF 200 POUNDS OF PULL, MUST BE INSTALLED IN THE CONDUIT BEFORE UTILITY COMPANY 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.
5. UTILITY COMPANY MUST BE GIVEN THE OPPORTUNITY TO INSPECT THE CONDUIT PRIOR TO BACKFILL. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS SHOULD THE UTILITY COMPANY BE UNABLE TO INSTALL ITS CABLE IN A SUITABLE MANNER.
6. 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.
7. ALL 90° SWEEPS WILL BE MADE USING RIGID GALVANIZED STEEL. SWEEPS WITH A 36 TO 48 INCH RADIUS.
8. SAND BEDDING TO BE REPLACED WITH CONCRETE ENCASEMENT WHERE COVER IS LESS THAN 3 FEET, WHEN LOCATED BELOW PAVEMENT, OR WHERE REQUIRED BY EVERSOURCE.

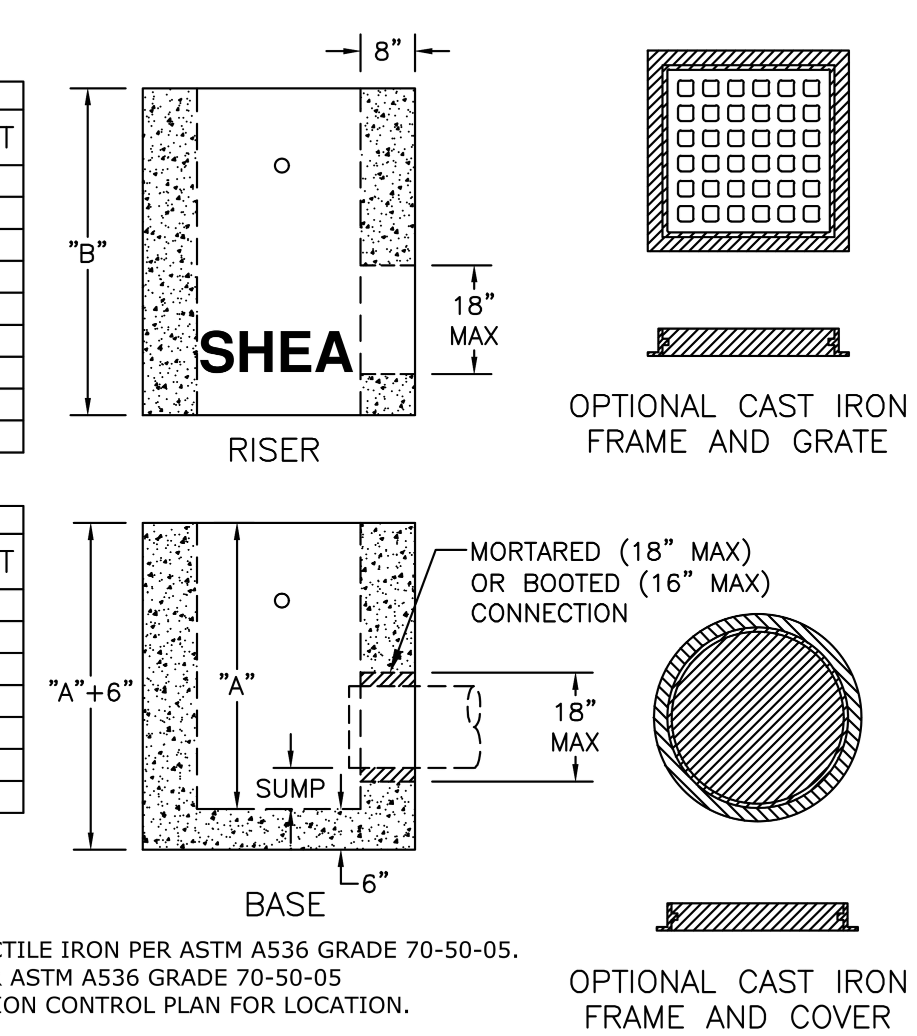
ELECTRICAL AND COMMUNICATION CONDUIT TRENCH

NO SCALE



RISER WEIGHTS		
ITEM CODE	DIM "B"	EST. WEIGHT
40X12–24	12"	825#
DIR–24X18	18"	1,235#
DIR–24X24	24"	1,645#
DIR–24X30	30"	2,055#
DIR–24X36	36"	2,470#
DIR–24X42	42"	2,880#
DIR–24X48	48"	3,290#
DIR–24X54	54"	3,700#
DIR–24X60	60"	4,115#

SUMP WEIGHTS		
ITEM CODE	DIM "A"	EST. WEIGHT
18SGI	18"	1,880#
24SGI	24"	2,290#
30SGI	30"	2,700#
36SGI	36"	3,110#
42SGI	42"	3,520#
48SGI	48"	3,930#
54SGI	54"	4,343#

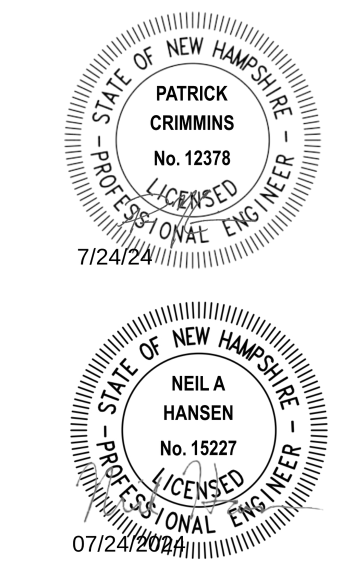


NOTES:
1. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR LOCATION.

PROPOSED YARD DRAIN DETAIL

NO SCALE

Tighe&Bond



Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

SCALE: AS SHOWN

C-505

Last Saved: 7/3/2024
Plotted On:Jul 22, 2024-4:24pm By: BCurcio
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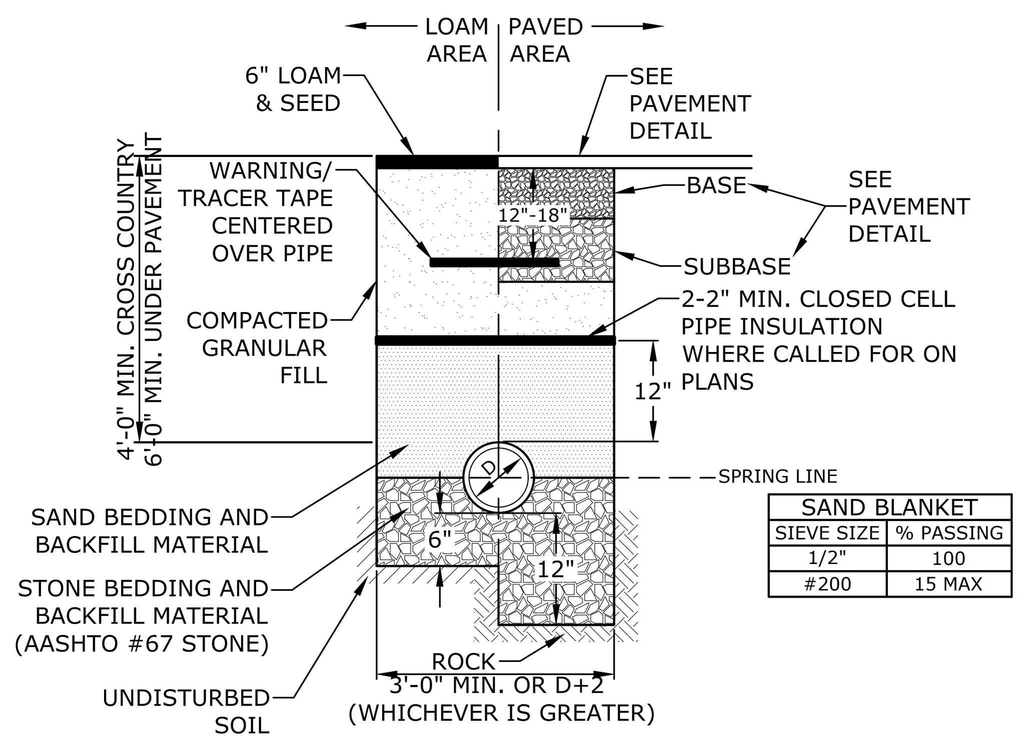
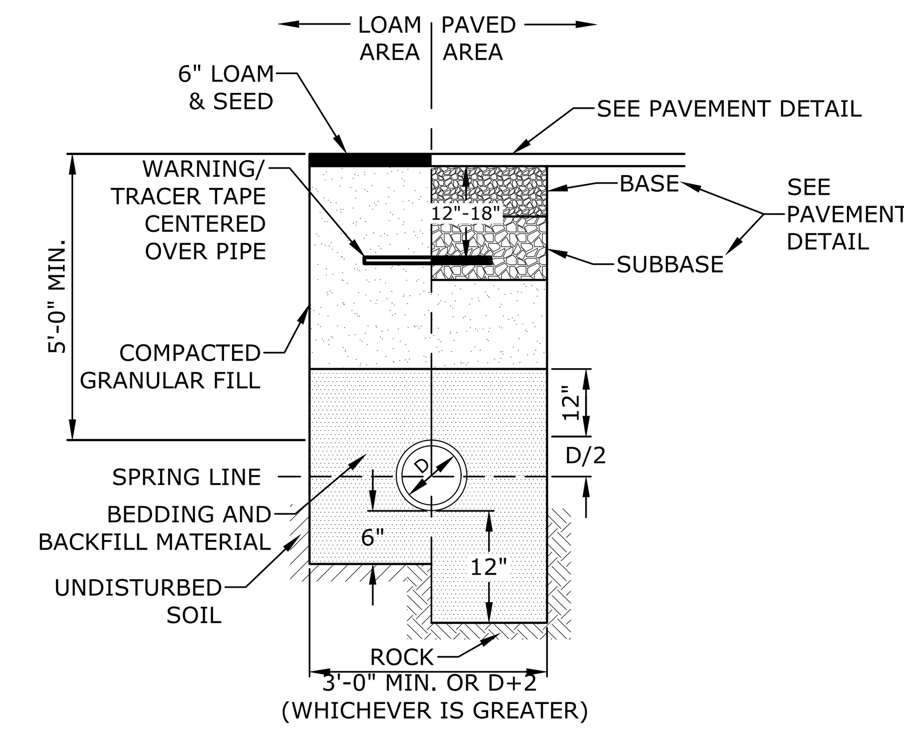


SAND BLANKET	
SIEVE SIZE	% PASSING
1/2"	100
#200	15 MAX

NOTE:
1. BEDDING FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK. BEDDING SHALL ALSO COMPLETELY ENCASE THE PIPE AND COVER THE PIPE TO A GRADE 12" OVER THE TOP OF THE PIPE FOR THE ENTIRE WIDTH OF THE TRENCH.
2. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

SEWER SERVICE TRENCH

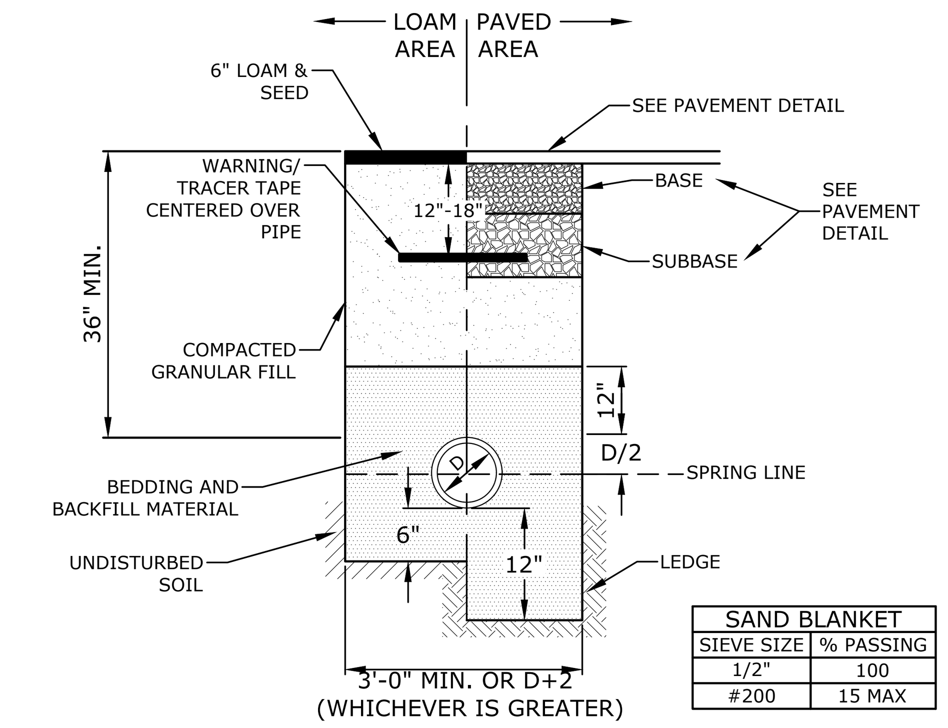
NO SCALE



NOTES:
1. SAND BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 12" ABOVE TOP OF PIPE.
2. WATER MAIN SHALL BE INSTALLED PER CITY OF PORTSMOUTH STANDARDS. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

WATER TRENCH

NO SCALE

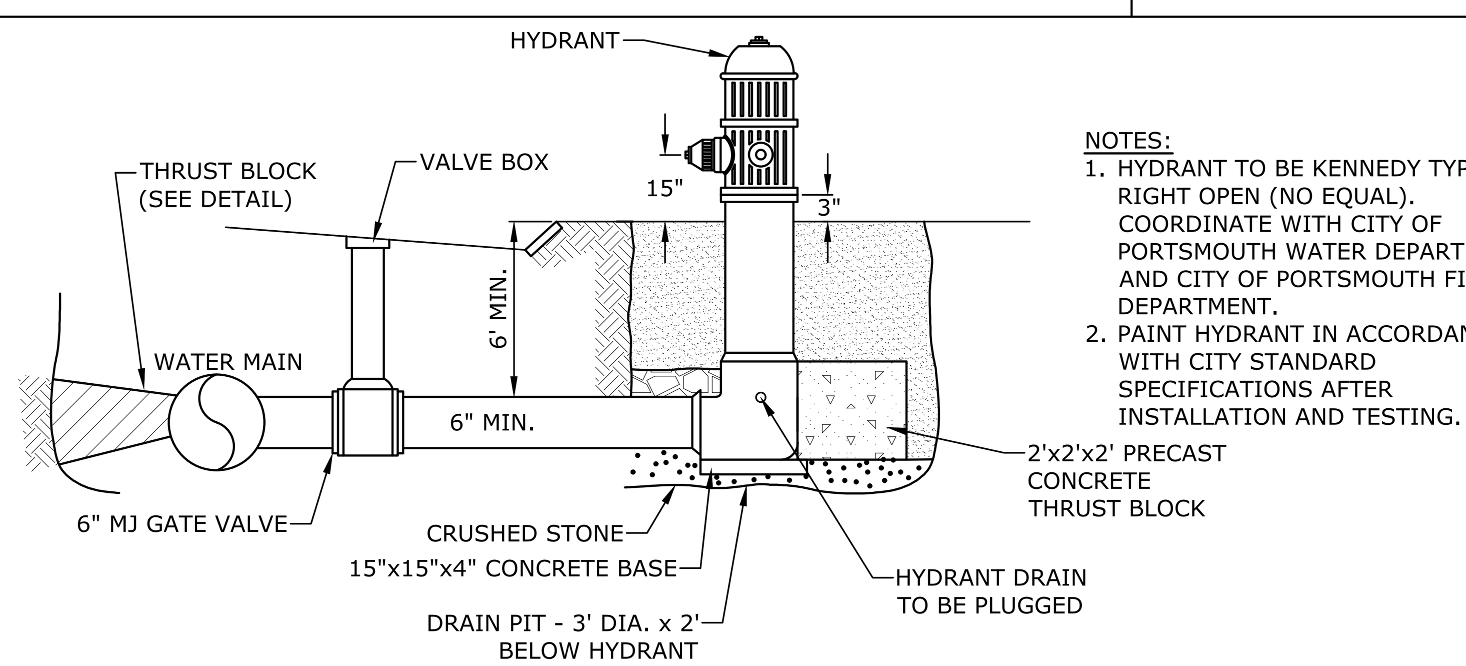


SAND BLANKET	
SIEVE SIZE	% PASSING
1/2"	100
#200	15 MAX

NOTES:
1. SAND BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 12" ABOVE TOP OF PIPE.
2. GAS LINE SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.

GAS TRENCH

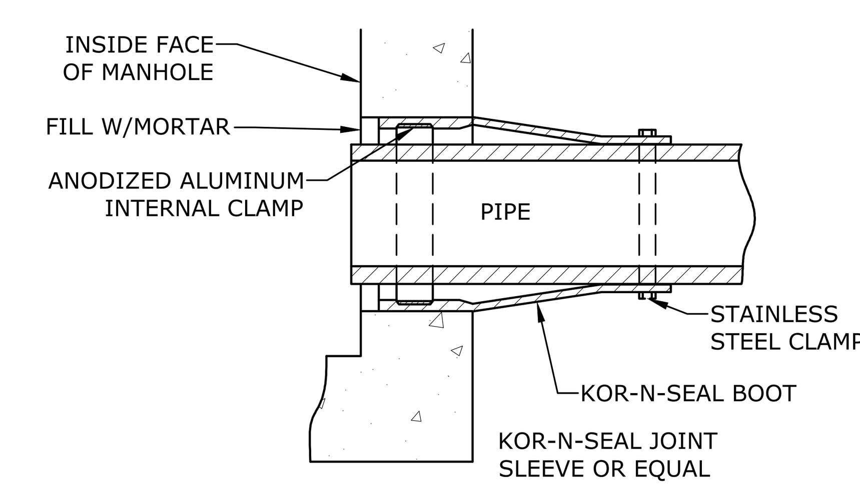
NO SCALE



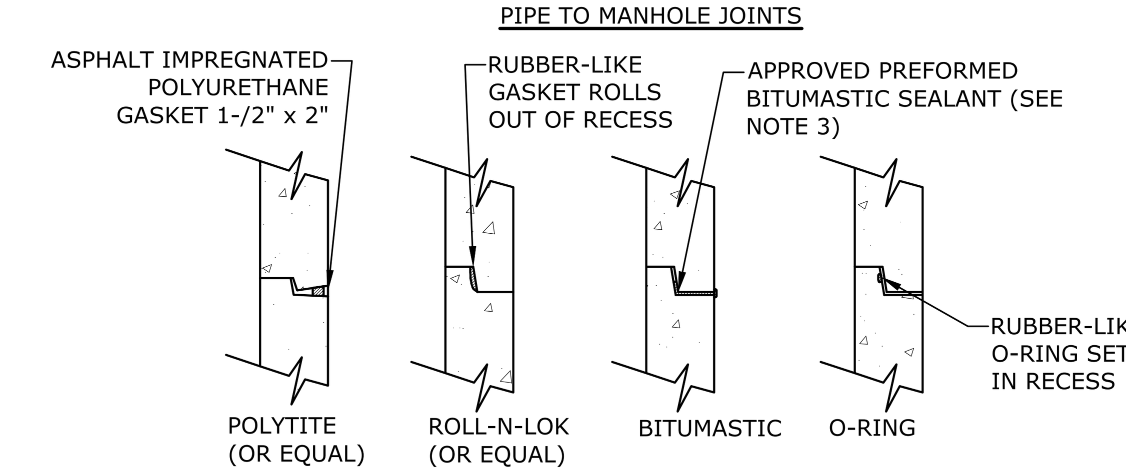
NOTES:
1. HYDRANT TO BE KENNEDY TYPE K-81, RIGHT OPEN (NO EQUAL). COORDINATE WITH CITY OF PORTSMOUTH WATER DEPARTMENT AND CITY OF PORTSMOUTH FIRE DEPARTMENT.
2. PAINT HYDRANT IN ACCORDANCE WITH CITY STANDARD SPECIFICATIONS AFTER INSTALLATION AND TESTING.

FIRE HYDRANT

NO SCALE



PIPE TO MANHOLE JOINTS

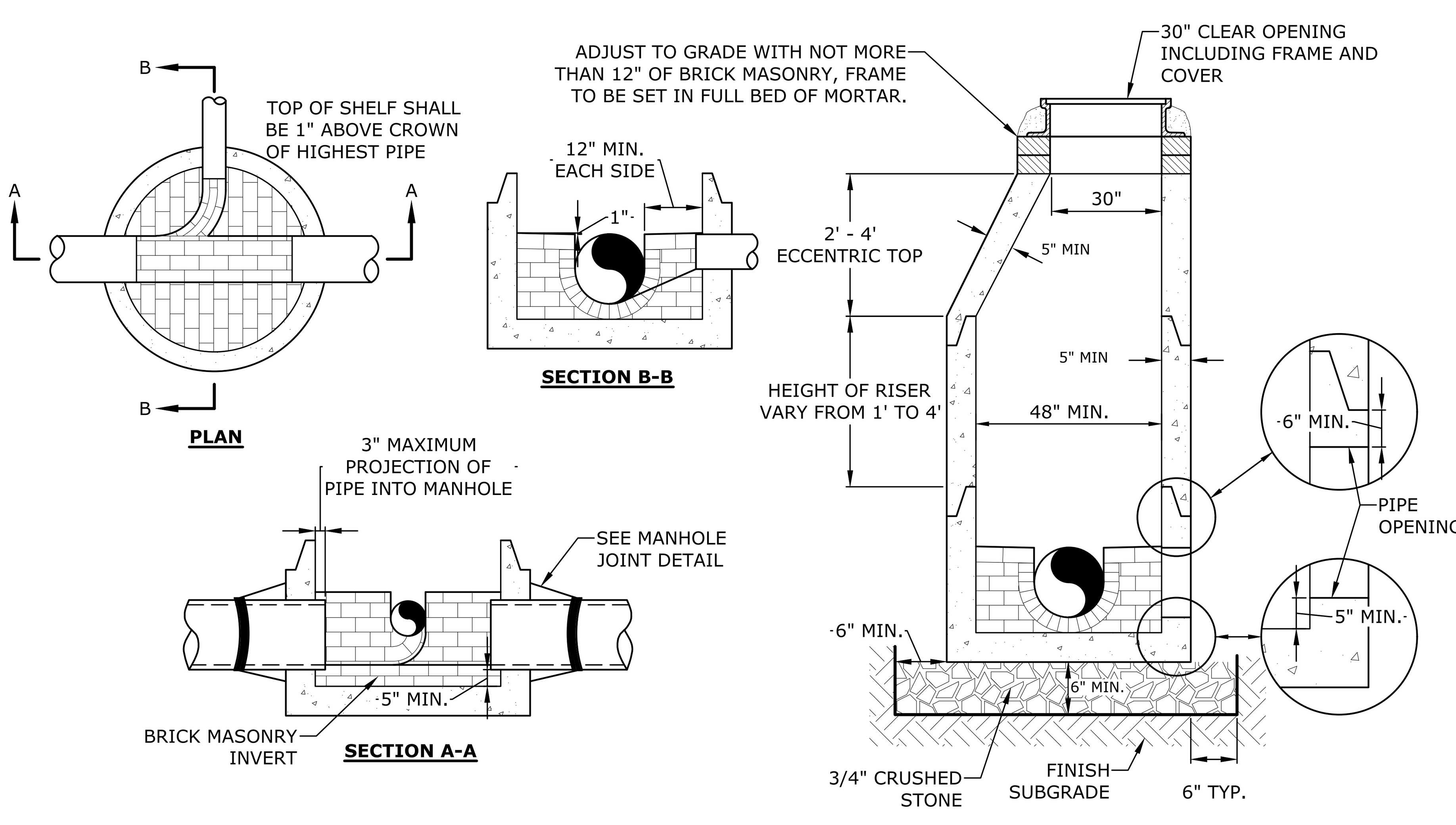


HORIZONTAL JOINTS

NOTES:
1. HORIZONTAL JOINTS BETWEEN THE SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE PER CITY OF PORTSMOUTH DPW STANDARD AND SHALL BE SEALED FOR WATERTIGHTNESS USING A DOUBLE ROW ELASTOMERIC OR MASTIC-LIKE GASKET.
2. PIPE TO MANHOLE JOINTS SHALL BE PER CITY OF PORTSMOUTH STANDARD.
3. FOR BITUMASTIC TYPE JOINTS THE AMOUNT OF SEALANT SHALL BE SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY.
4. ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

MANHOLE JOINTS

NO SCALE

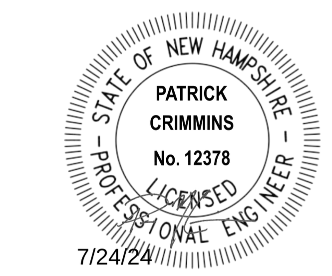


NOTES:
1. INVERT AND SHELF TO BE PLACED AFTER EACH LEAKAGE TEST.
2. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT.
3. INVERT BRICKS SHALL BE LAID ON EDGE.
4. TWO (2) COATS OF BITUMINOUS WATERPROOF COATING SHALL BE APPLIED TO ENTIRE EXTERIOR OF MANHOLE.
5. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS WITHIN CITY RIGHT OF WAY SHALL BE CITY STANDARD HINGE COVERS MANUFACTURED BY EJ. FRAMES AND COVERS WILL BE PURCHASED FROM THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS. ALL OTHER MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. A 3-INCH (MINIMUM HEIGHT) WORD "SEWER" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
6. HORIZONTAL JOINTS SHALL BE SEALED FOR WATER TIGHTNESS USING A DOUBLE ROW OF ELASTOMERIC OR MASTIC-LIKE SEALANT.
7. BARREL AND CONE SECTIONS SHALL BE PRECAST REINFORCED CONCRETE DESIGNED FOR H20 LOADING, AND CONFORMING TO ASTM C478-06.

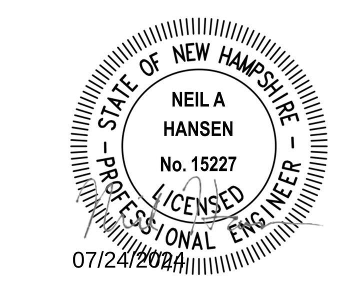
SEWER MANHOLE

NO SCALE

Tighe&Bond



7/24/24



07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
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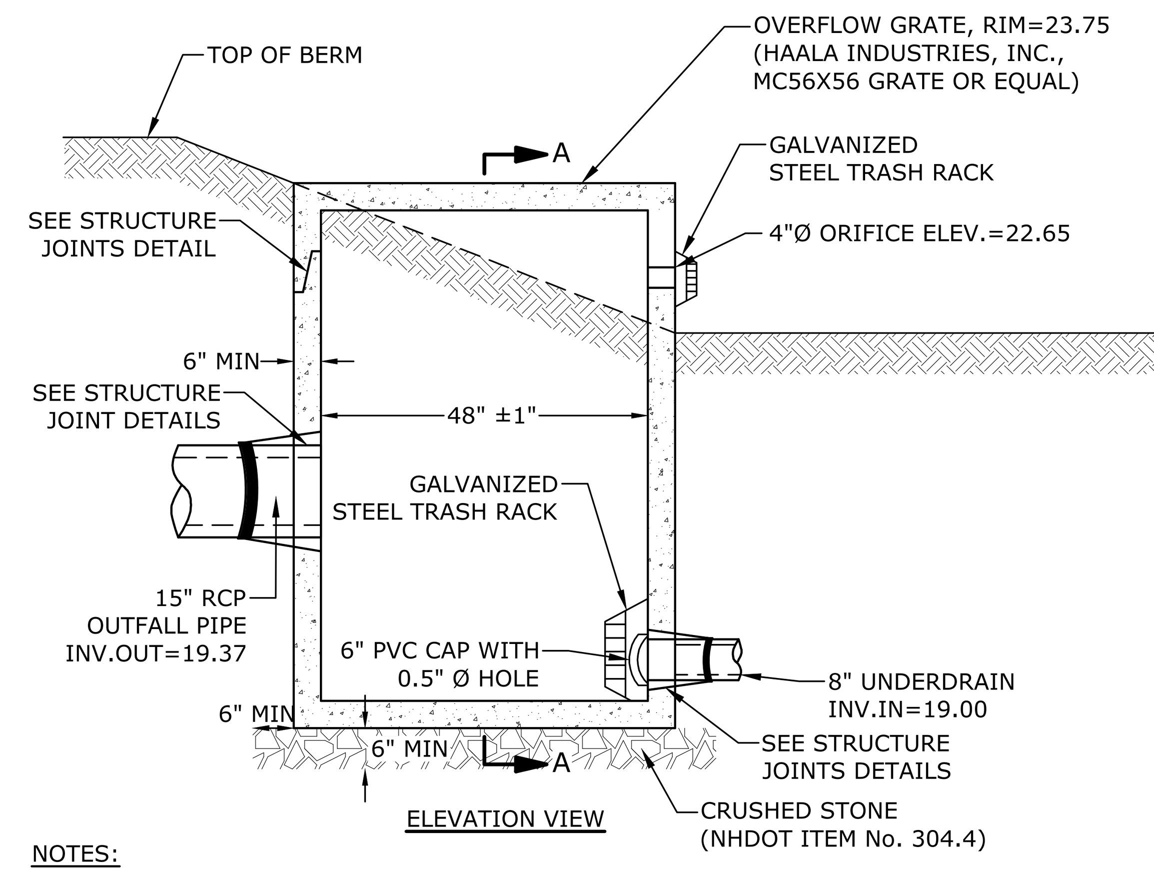
PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

SCALE: AS SHOWN

C-506



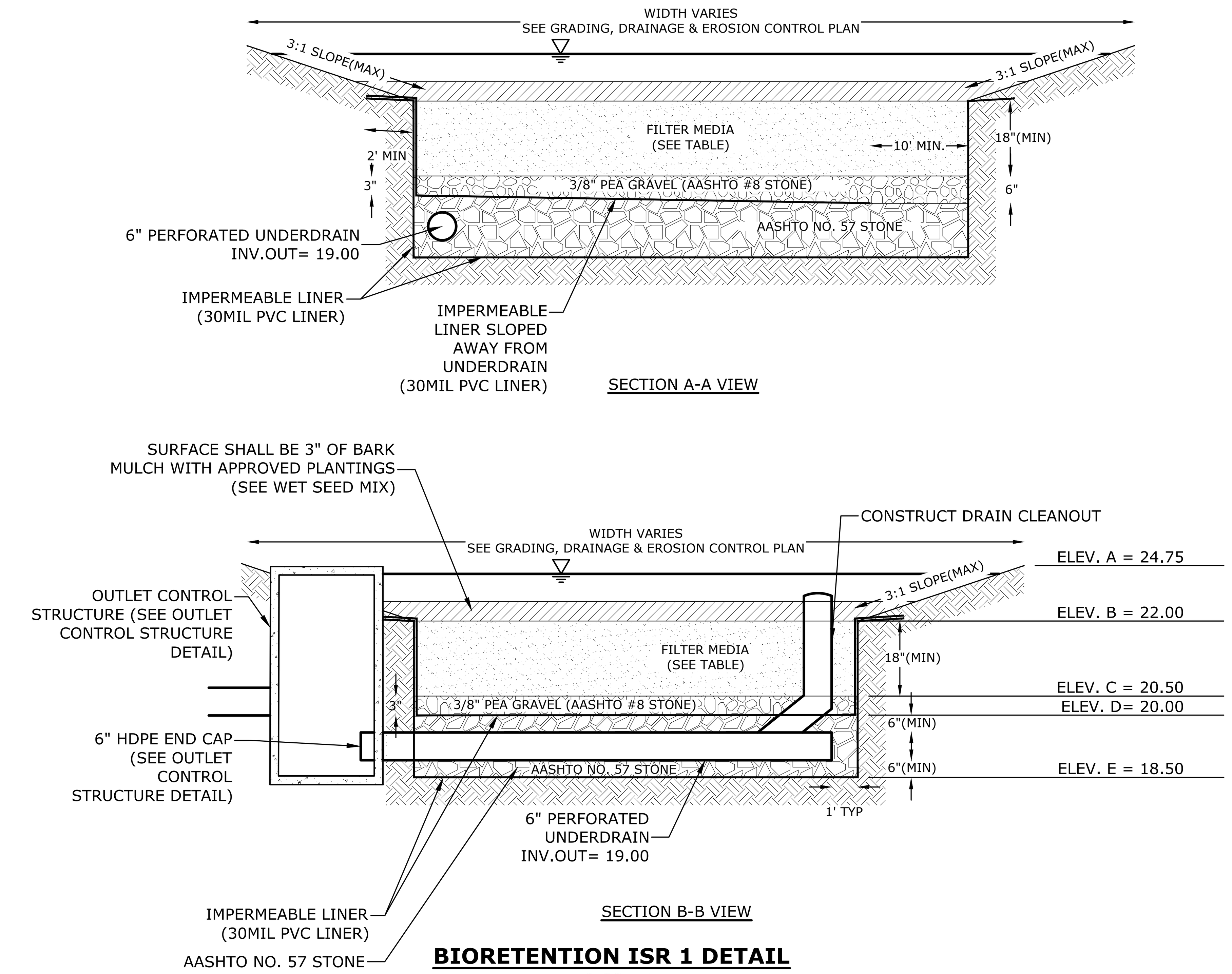
NOTES:

1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRDE WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5

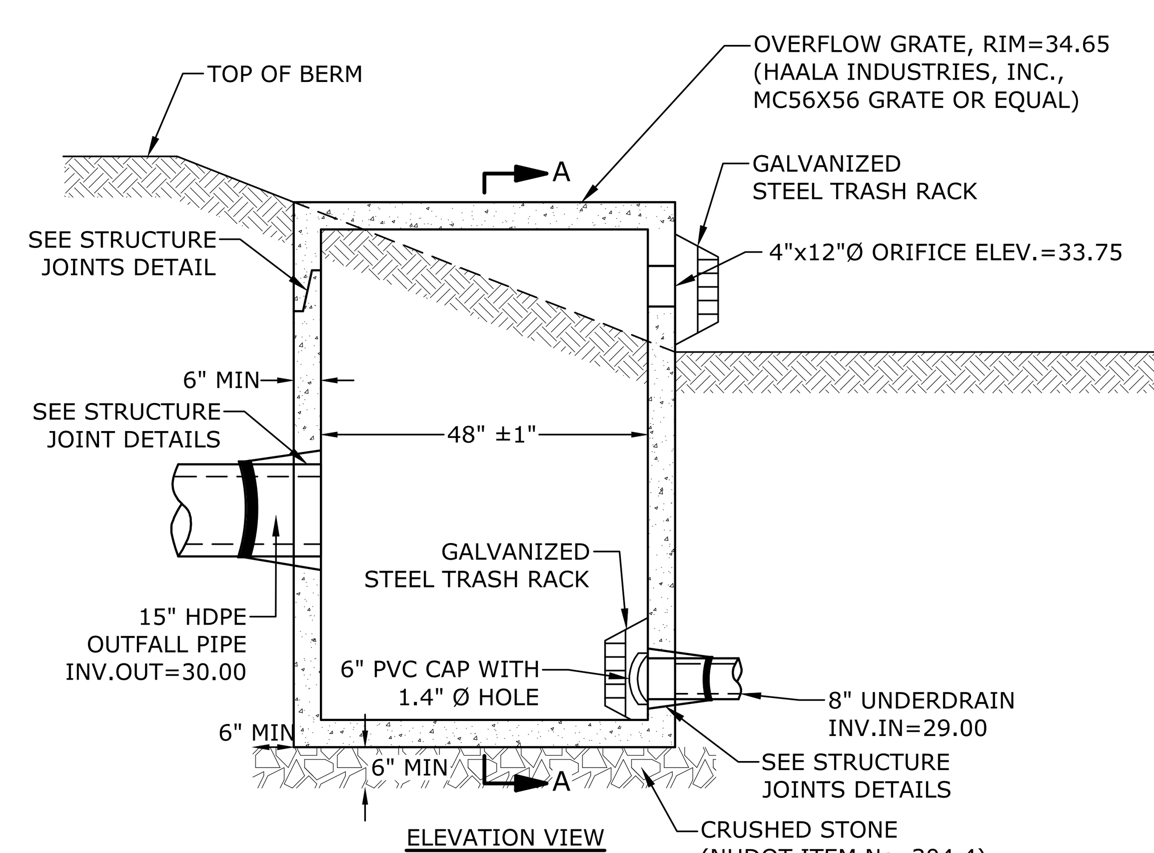
OUTLET STRUCTURE (POCS 01)

NO SCALE



BIORETENTION ISR 1 DETAIL

NO SCALE



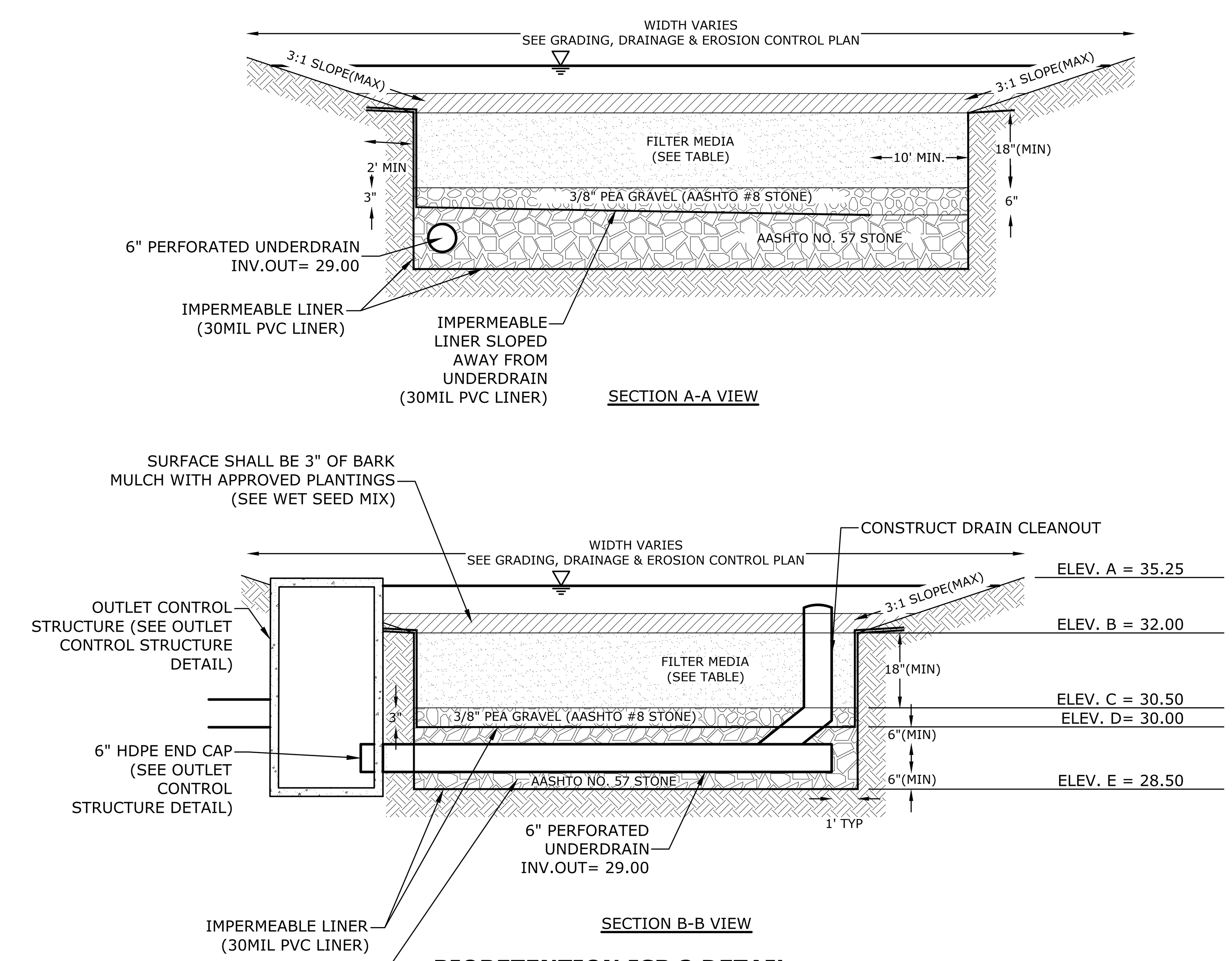
NOTES:

1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRDE WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5

OUTLET STRUCTURE (POS 02)

NO SCALE



BIORETENTION ISR 2 DETAIL

NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
7/24/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

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DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

SCALE: AS SHOWN

C-507

Last Saved: 7/3/2024
Plotted On:Jul 22, 2024-4:26pm By: BCurcio
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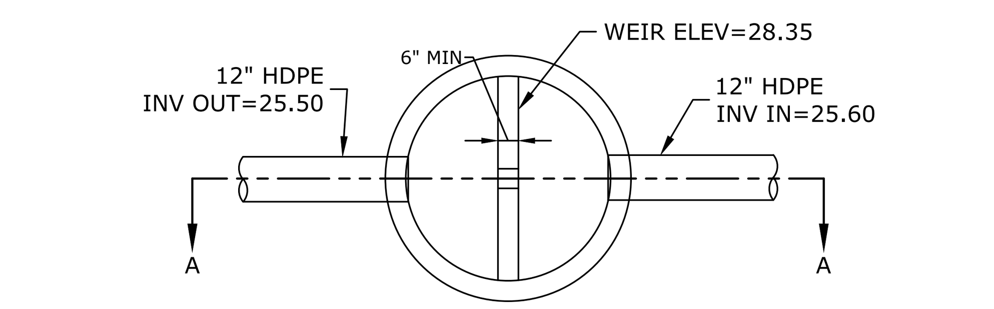
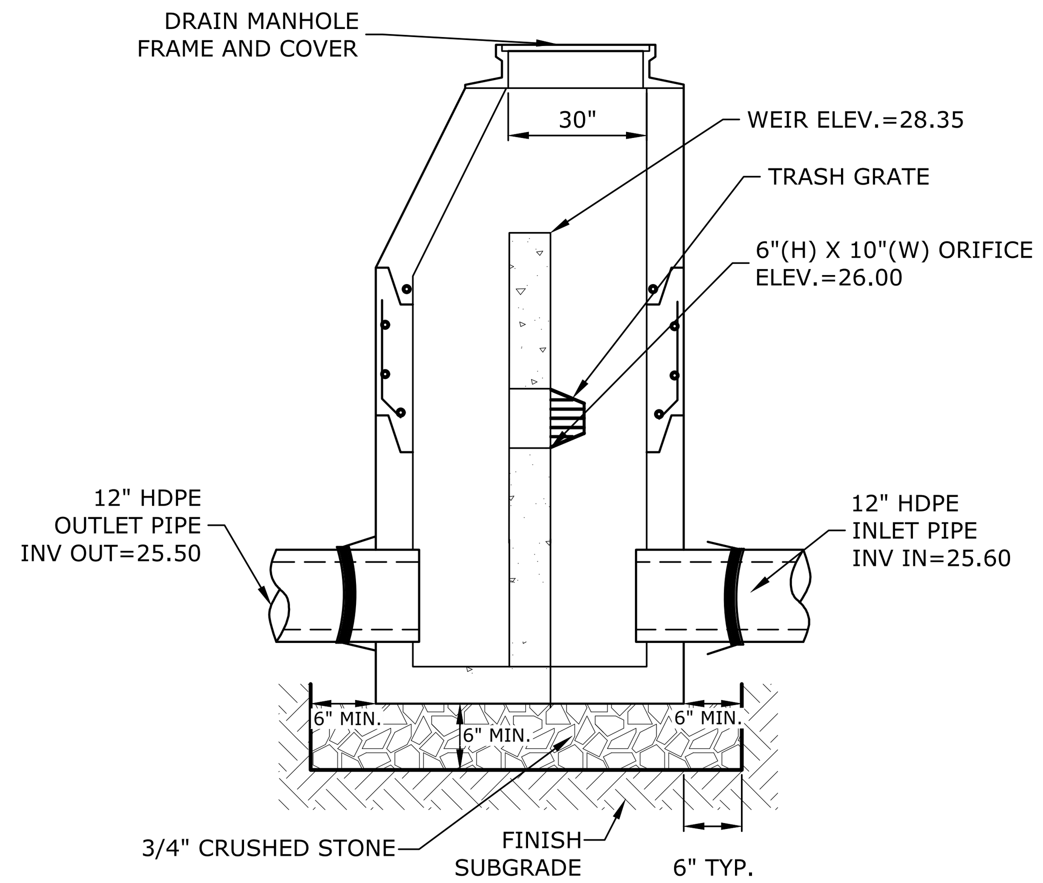


PLAN VIEW



NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRD WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

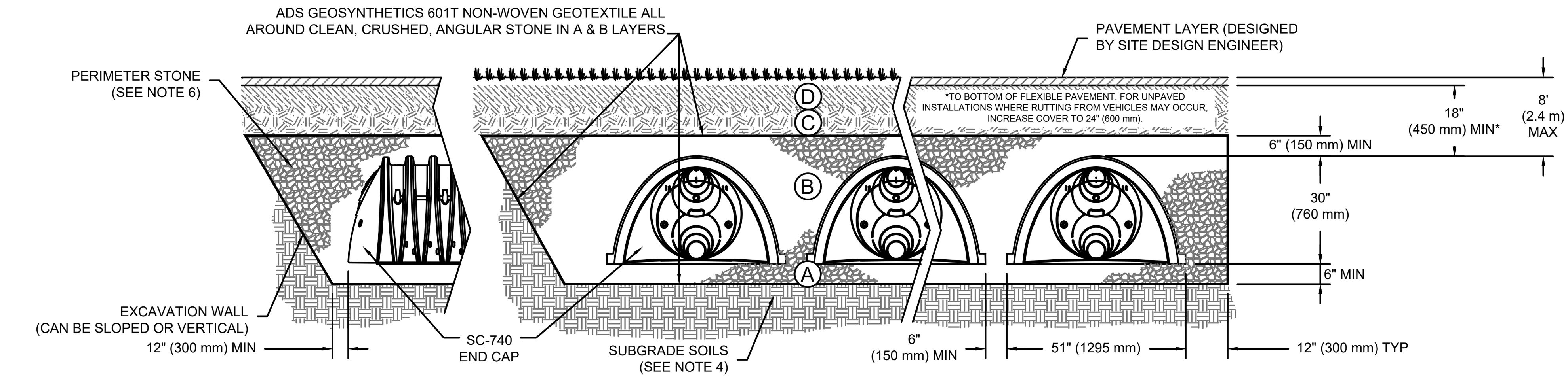
OUTLET STRUCTURE (POCS 03)

NO SCALE

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

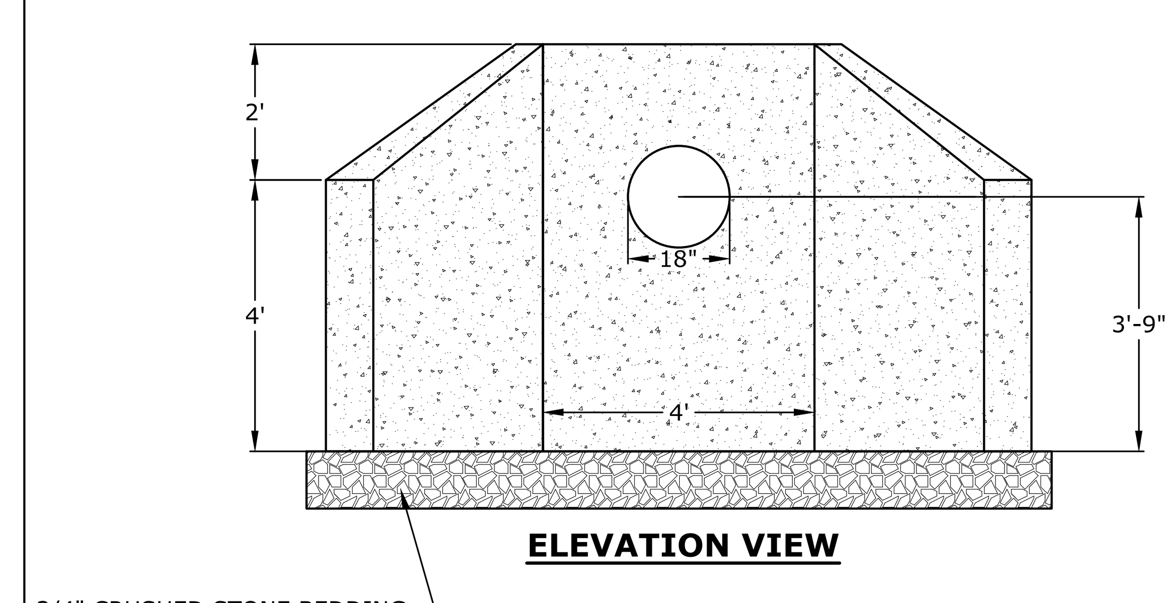
MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



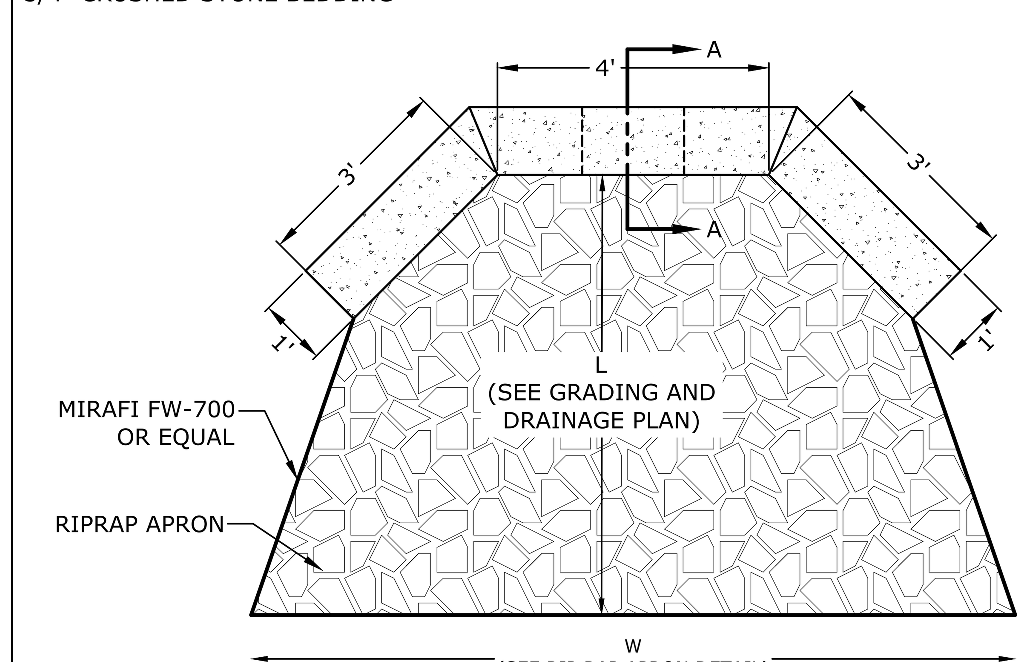
NOTES:

1. SC-740 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
5. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
6. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
7. PLACE MINIMUM 12.5' OF ADS GEOSYNTHETICS 315WTK WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

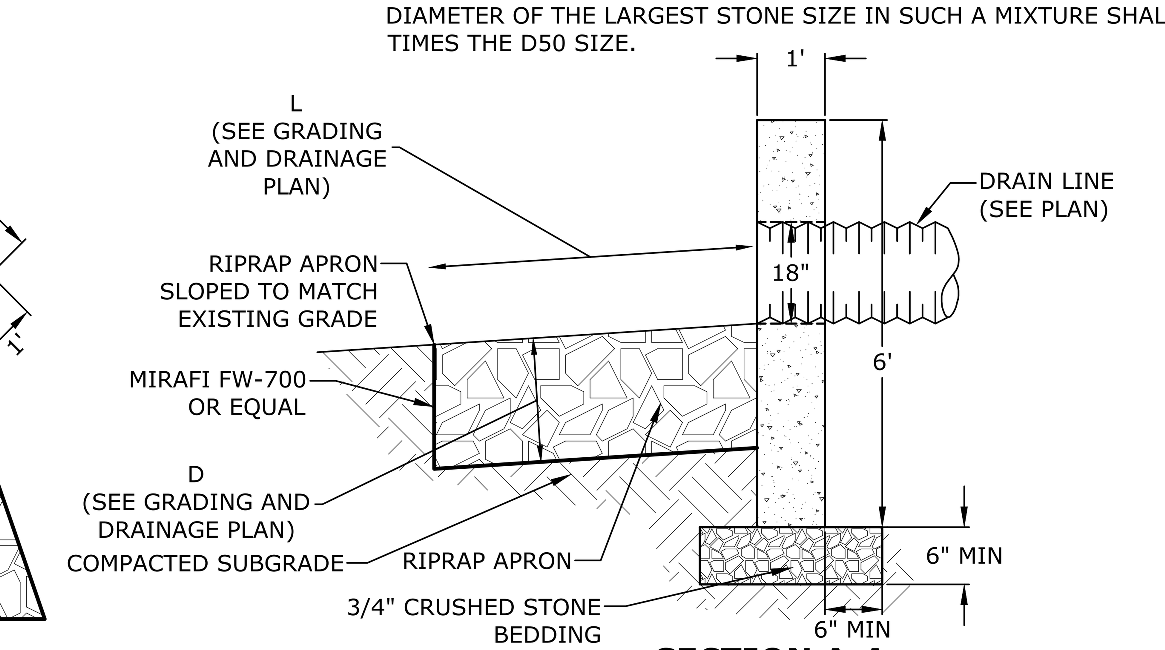


ELEVATION VIEW

NOTES:
1. HEADWALL SHALL BE 5,000 PSI CONCRETE.
2. HEADWALL REINFORCEMENT SHALL BE 0.18 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. SEE GRADING, DRAINAGE, & EROSION CONTROL PLAN FOR STONE SIZE AND APRON DIMENSIONS.
4. STONE SHALL CONSIST OF SUB-ANGULAR FIELD STONE OR ROUGH UNHEWN QUARRY STONE OF APPROXIMATELY RECTANGULAR SHAPE. FLAT OR ROUND ROCKS ARE NOT ACCEPTABLE. THE STONE SHALL BE HARD AND OF SUCH QUALITY THAT IT WILL NOT DISINTEGRATE ON EXPOSURE TO WATER OR WEATHERING, BE CHEMICALLY STABLE AND IT SHALL BE SUITABLE IN ALL OTHER RESPECTS FOR THE PURPOSE INTENDED. THE BULK SPECIFIC GRAVITY (SATURATED SURFACE-DRY BASIS) OF THE INDIVIDUAL STONES SHALL BE AT LEAST 2.5.
5. THE STONE SHALL BE COMPOSED OF A WELL-GRADED MIXTURE DOWN TO THE ONE-INCH SIZE PARTICLE SUCH THAT 50 PERCENT OF THE MIXTURE BY WEIGHT SHALL BE LARGER THAN THE D50 SIZE SPECIFIED. A WELL-GRADED MIXTURE IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF THE LARGER STONE SIZE BUT WITH A SUFFICIENT MIXTURE OF OTHER SIZES TO FILL THE PROGRESSIVELY SMALLER VOIDS BETWEEN THE STONES. THE DIAMETER OF THE LARGEST STONE SIZE IN SUCH A MIXTURE SHALL BE 1.5 TIMES THE D50 SIZE.



PLAN VIEW

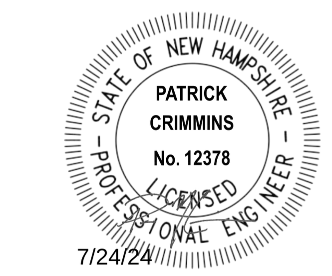


SECTION A-A

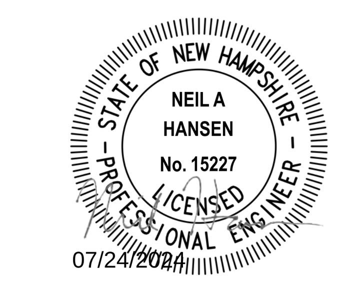
PRECAST CONCRETE HEADWALL WITH WING WALLS (HW100)

NO SCALE

Tighe&Bond



7/24/24



07/24/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

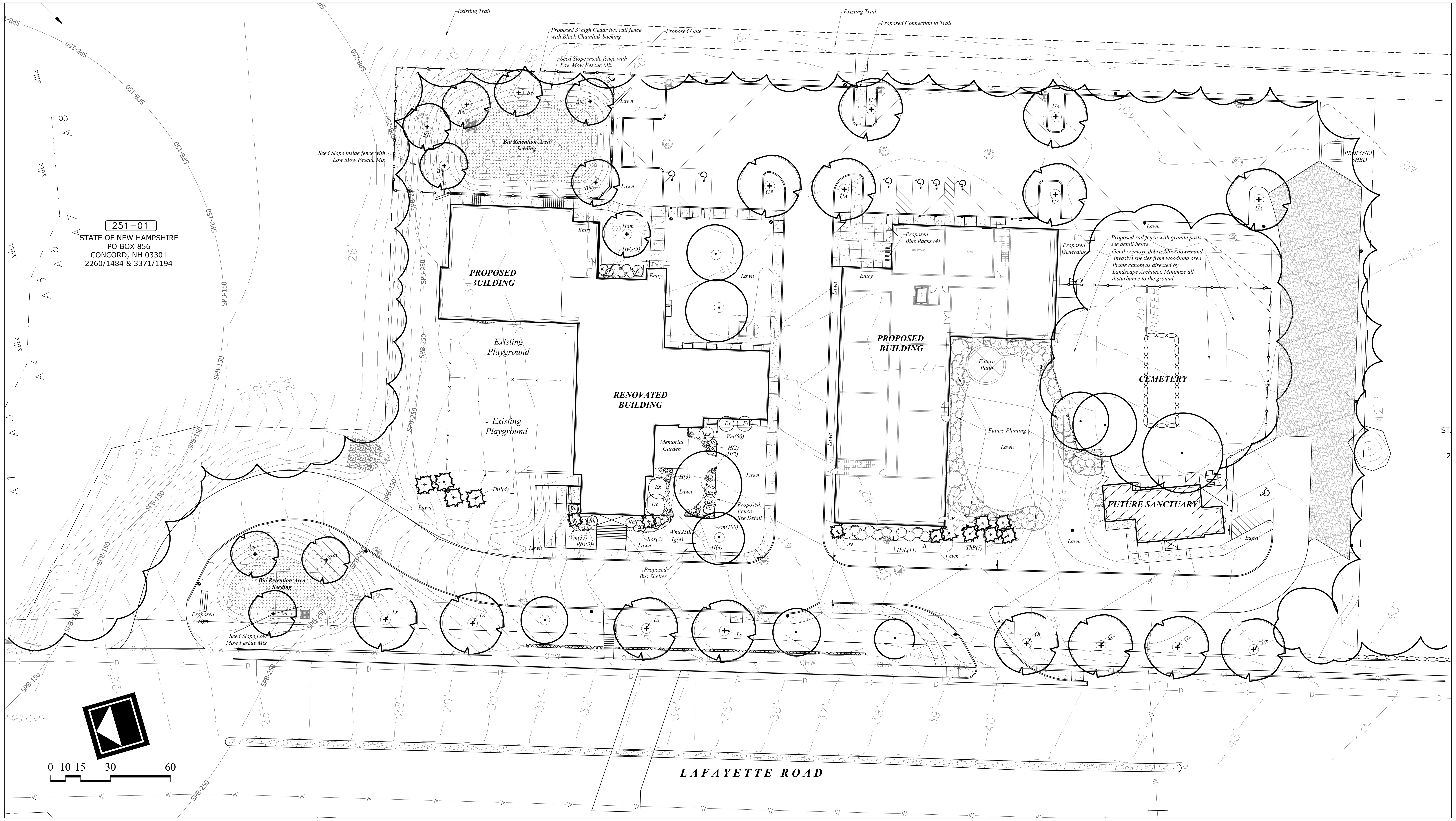
SCALE: AS SHOWN

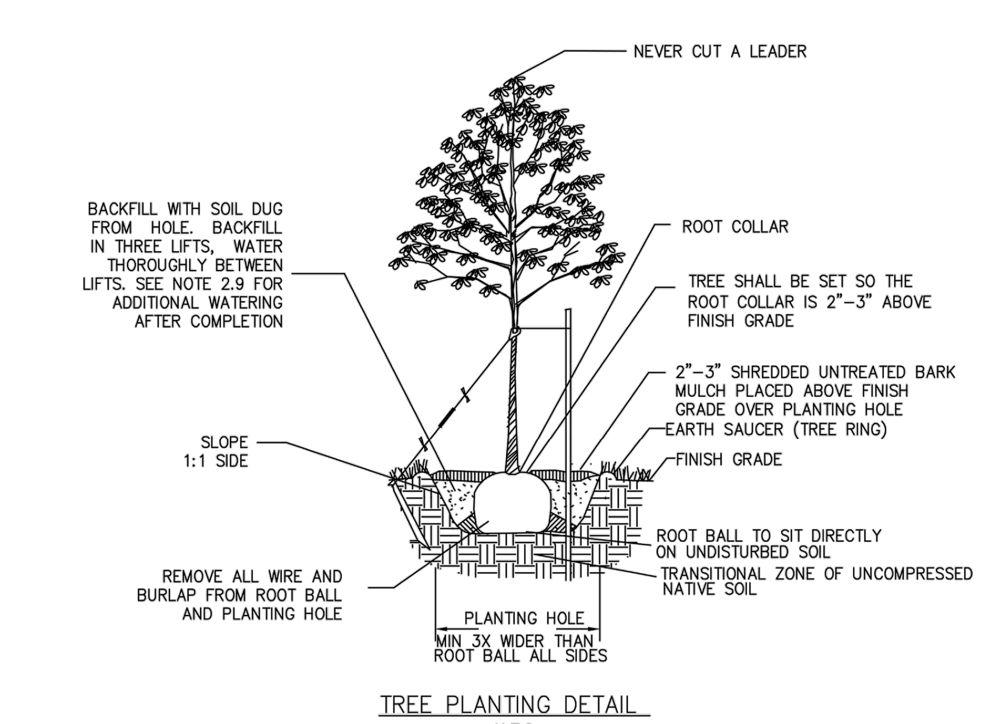
C-508

Last Saved: 7/3/2024
Plotted On:Jul 22, 2024-4:26pm By: BCurcio
Tighe & Bond:\\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001 - 1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DTLS.dwg

Landscape Notes

1. Design is based on drawings by Tighe & Bond Engineering dated 2024-05-13 and Lassel Architects dated 2024-05-14 and may require adjustment due to actual field conditions.
2. The contractor shall follow best management practices during construction and shall take all means necessary to stabilize and protect the site from erosion.
3. Erosion Control shall be in place prior to construction.
4. Erosion Control shall be as illustrated in the Engineer's drawings
5. The Contractor shall verify layout and grades and inform the Landscape Architect or Client's Representative of any discrepancies or changes in layout and/or grade relationships prior to construction.
6. It is the contractor's responsibility to verify drawings provided are to the correct scale prior to any bid, estimate or installation. A graphic scale bar has been provided on each sheet for this purpose. If it is determined that the scale of the drawing is incorrect, the landscape architect will provide a set of drawings at the correct scale, at the request of the contractor.
7. Trees to Remain within the construction zone shall be protected from damage for the duration of the project by snow fence or other suitable means of protection to be approved by Landscape Architect or Client's Representative. Snow fence shall be located at the drip line at a minimum and shall include any and all surface roots. Do not fill or mulch on the trunk flare. Do not disturb roots. In order to protect the integrity of the roots, branches, trunk and bark of the tree(s) no vehicles or construction equipment shall drive or park in or on the area within the drip line(s) of the tree(s). Do not store any refuse or construction materials or portalets within the tree protection area.
8. This plan is for review purposes only, NOT for Construction. Construction Documents will be provided upon request.
9. Location, support, protection, and restoration of all existing utilities and appurtenances shall be the responsibility of the Contractor.
10. The Contractor shall verify exact location and elevation of all utilities with the respective utility owners prior to construction. Call DIGSAFE at 811 or 888-DIG-SAFE.
11. The Contractor shall procure any required permits prior to construction.
12. Prior to any landscape construction activities Contractor shall test all existing loam and loam from off-site intended to be used for lawns and plant beds using a thorough sampling throughout the supply. Soil testing shall indicate levels of pH, nitrates, macro and micro nutrients, texture, soluble salts, and organic matter. Contractor shall provide Landscape Architect with test results and recommendations from the testing facility along with soil amendment plans as necessary for the proposed plantings to thrive. All loam to be used on site shall be amended as approved by the Landscape Architect prior to placement.
13. Contractor shall notify landscape architect or owner's representative immediately if at any point during demolition or construction a site condition is discovered which may negatively impact the completed project. This includes, but is not limited to, unforeseen drainage problems, unknown subsurface conditions, and discrepancies between the plan and the site. If a Contractor is aware of a potential issue and does not bring it to the attention of the Landscape Architect or Owner's Representative immediately, they may be responsible for the labor and materials associated with correcting the problem.
14. The Contractor shall furnish and plant all plants shown on the drawings and listed thereon. All plants shall be nursery-grown under climatic conditions similar to those in the locality of the project. Plants shall conform to the botanical names and standards of size, culture, and quality for the highest grades and standards as adopted by the American Association of Nurserymen, Inc. in the American Standard of Nursery Stock, American Standards Institute, Inc. 230 Southern Building, Washington, D.C. 20005.
15. A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern.
16. All plants shall be legibly tagged with proper botanical name.
17. The Contractor shall guarantee all plants including seeding, for not less than one year from time of acceptance.
18. Owner or Owner's Representative will inspect plants upon delivery for conformity to Specification requirements. Such approval shall not affect the right of inspection and rejection during or after the progress of the work. The Owner reserves the right to inspect and/or select all trees at the place of growth and reserves the right to approve a representative sample of each type of shrub, herbaceous perennial, annual, and ground cover at the place of growth. Such sample will serve as a minimum standard for all plants of the same species used in this work.
19. No substitutions of plants may be made without prior approval of the Owner or the Owner's Representative for any reason.
20. All landscaping shall be provided with the following:
    a. Outside hose attachments spaced a maximum of 150 feet apart, and
    b. An underground irrigation system, or
    c. A temporary irrigation system designed for a two-year period of plant establishment.
21. If an automatic irrigation system is installed, all irrigation valve boxes shall be located within planting bed areas.
22. The contractor is responsible for all plant material from the time their work commences until final acceptance. This includes but is not limited to maintaining all plants in good condition, the security of the plant material once delivered to the site, watering of plants, including seeding and weeding. Plants shall be appropriately watered prior to, during, and after planting. It is the Contractor's responsibility to provide clean water suitable for plant health from off site, should it not be available on site.
23. All disturbed areas will be dressed with 6" of loam and planted as noted on the plans or seeded except plant beds. Plant beds shall be prepared to a depth of 12" with 75% loam and 25% compost.
24. Trees, ground cover, and shrub beds shall be mulched to a depth of 2" with one-year-old, well-composted, shredded native bark not longer than 4" in length and ½" in width, free of woodchips and sawdust. Mulch for ferns and herbaceous perennials shall be no longer than 1" in length. Trees in lawn areas shall be mulched in a 5' diameter min. saucer. Color of mulch shall be dark brown.
25. Drip strip/Maintenance Strip shall extend to 6" beyond roof overhang and shall be edged with 3/16" thick black metal edger.
26. In no case shall mulch touch the stem of a plant nor shall mulch ever be more than 3" thick total (including previously applied mulch) over the root ball of any plant.
27. Secondary lateral branches of deciduous trees overhanging vehicular and pedestrian travel ways shall be pruned up to a height of 6' to allow clear and safe passage of vehicles and pedestrians under tree canopy. Within the sight distance triangles at vehicle intersections the canopies shall be raised to 8' min.
28. Snow shall be stored a minimum of 5' from shrubs and trunks of trees.
29. Landscape Architect is not responsible for the means and methods of the Contractor.





PART 1 – GENERAL:

1.1 THE BASE OF THE CITY OF PORTSMOUTH TREE PLANTING REQUIREMENTS IS THE ANSI A300 PART 6 STANDARD PRACTICES FOR PLANTING AND TRANSPLANTING. ANSI A300 PART 6 LAYS OUT TERMS AND BASIC STANDARDS AS SET FORTH BY INDUSTRY BUT IT IS NOT THE "END ALL" FOR THE CITY OF PORTSMOUTH. THE FOLLOWING ARE THE CITY OF PORTSMOUTH, NH TREE PLANTING REQUIREMENTS THAT ARE IN ADDITION TO OR THAT GO BEYOND THE ANSI A300 PART 6.

PART 2 – EXECUTION:

2.1 ALL PLANTING HOLES SHALL BE DUG BY HAND – NO MACHINES. THE ONLY EXCEPTIONS ARE NEW CONSTRUCTION WHERE NEW PLANTING PITS, PLANTING BEDS WITH GRANITE CURBING, AND PLANTING SITES WITH SILVA CELLS ARE BEING CREATED. IF A MACHINE IS USED TO DIG IN ANY OF THESE SITUATIONS AND PLANTING DEPTH NEEDS TO BE RAISED THE MATERIAL IN THE BOTTOM OF THE PLANTING HOLE MUST BE FIRMED WITH MACHINE TO PREVENT SINKING OF THE ROOT BALL.

2.2 ALL WIRE AND BURLAP SHALL BE REMOVED FROM THE ROOT BALL AND PLANTING HOLE.

2.3 THE ROOT BALL OF THE TREE SHALL BE WORKED SO THAT THE ROOT COLLAR OF THE TREE IS VISIBLE AND NO GIRDLING ROOTS ARE PRESENT.

2.4 THE ROOT COLLAR OF THE TREE SHALL BE 2"–3" ABOVE GRADE OF PLANTING HOLE FOR FINISHING DEPTH.

2.5 ALL PLANTINGS SHALL BE BACKFILLED WITH SOIL FROM THE SITE AND AMENDED NO MORE THAN 20% WITH ORGANIC COMPOST. THE ONLY EXCEPTIONS ARE NEW CONSTRUCTION WHERE ENGINEERED SOIL IS BEING USED IN CONJUNCTION WITH SILVA CELLS AND WHERE NEW PLANTING BEDS ARE BEING CREATED.

2.6 ALL PLANTINGS SHALL BE BACKFILLED IN THREE LIFTS AND ALL LIFTS SHALL BE WATERED SO THE PLANTING WILL BE SET AND FREE OF AIR POCKETS – NO EXCEPTIONS.

2.7 AN EARTH BERM SHALL BE PLACED AROUND THE PERIMETER OF THE PLANTING HOLE EXCEPT WHERE CURBED PLANTING BEDS OR PITS ARE BEING USED.

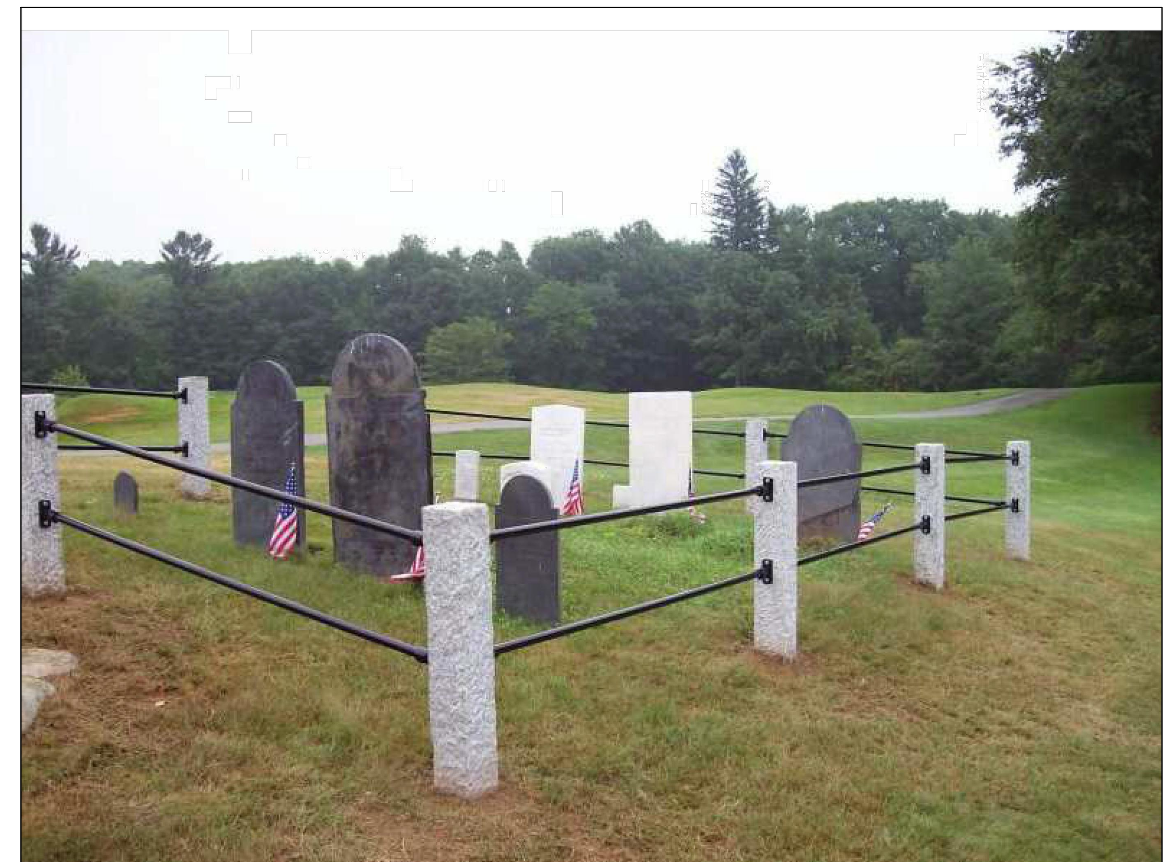
2.8 2"–3" OF MULCH SHALL BE PLACED OVER THE PLANTING AREA.

2.9 AT THE TIME OF PLANTING IS COMPLETE THE PLANTING SHALL RECEIVE ADDITIONAL WATER TO ENSURE COMPLETE HYDRATION OF THE ROOTS, BACKFILL MATERIAL AND MULCH LAYER.

2.10 STAKES AND GUYS SHALL BE USED WHERE APPROPRIATE AND/OR NECESSARY. GUY MATERIAL SHALL BE NON–DAMAGING TO THE TREE.

2.11 ALL PLANTING STOCK SHALL BE SPECIMEN QUALITY, FREE OF DEFECTS AND DISEASE OR INJURY. THE CITY OF PORTSMOUTH, NH RESERVES THE RIGHT TO REFUSE/REJECT ANY PLANT MATERIAL OR PLANTING ACTION THAT FAILS TO MEET THE STANDARDS SET FORTH IN THE ANSI A300 PART 6 STANDARD PRACTICES FOR PLANTING AND TRANSPORTATION AND/OR THE CITY OF PORTSMOUTH, NH PLANTING REQUIREMENTS.

City of Portsmouth
Standard Tree Planting Detail



Proposed Memorial and Cemetery Fence - *8x8 granite posts with 2.5"diameter metal rails.*

Plant List

TREES

Symbol	Botanical Name	Common Name	Native	Current Plan Quantity	Future Planting Quatity	Size	Comments
Am	*Amelanchier granidflora 'Autumn Brilliance'*	Autumn Brilliance Serviceberry	Y	3	2	8-10' ht.	multi-stemmed BB
Bn	*Betula nigra 'Dura Heat'*	Dura Heat River Birch	Y	6	2	10-12' ht.	multi-stemmed BB
Ham	*Hamamelis intermedia 'Arnold Promise'*	Arnold Promise Witch Hazel	Y	1	0	7-8' ht	multi-stemmed BB
Jv1	*Juniperus virginiana 'Manhattan Blue'*	Manhattan Blue Eastern Red Cedar	Y	4	0	7-8' ht.	BB
Ls	*Liquidambar styraciflua*	Sweet Gum	Y	4	0	3.5" cal.	BB
Qr	*Quercus rubra*	Northern Red Oak	Y	4	0	3.5" cal.	BB
Th	*Thuja plicata 'Green Giant'*	Green Giant Western Red Cedar		11	0	8-10' ht.	BB
Ua	*Ulmus americana 'Princeton'*	Princeton Elm	Y	6	0	3.5" cal.	BB

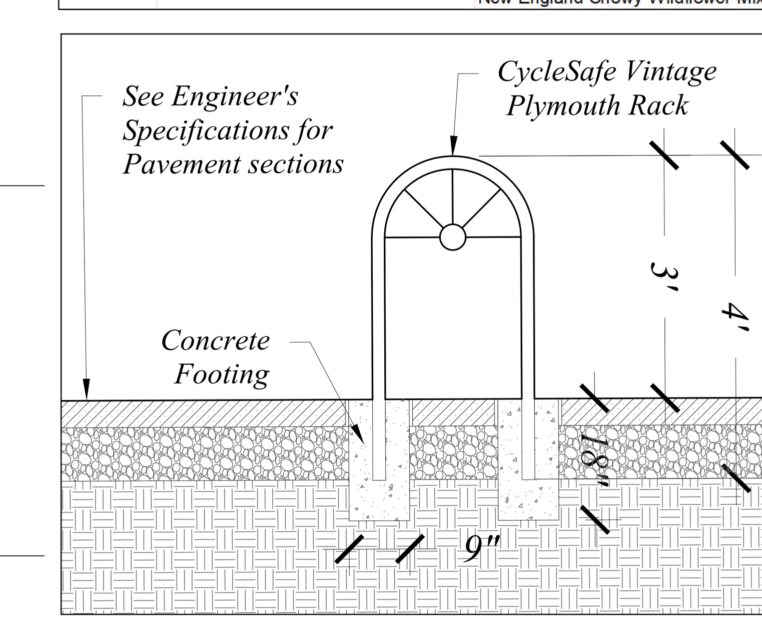
SHRUBS

Symbol	Botanical Name	Common Name	Native	Quantity		Size	Comments
Cf	*Calycanthus floridus 'Aphrodite'*	Aphrodite Sweetshrub	Y	0	2	7 gal.	
HyL	*Hydrangea paniculata 'Little Lime'*	Little Lime Hydrangea		11	11	3 gal.	
HyQ	*Hydrangea Little Quick Fire'*	Little Quick Fire Hydrangea		7	18	3 gal.	
Ig	*Ilex glabra 'Shamrock'*	Shamrock Inkberry	Y	4	20	3 gal.	
K	*Kalmia latifolia 'Olympic Fire'*	Olympic Fire Mountain Laurel	Y	2	0	2.5'3' ht	BB
Rh	*Rhododendron 'Roseum Pink'*	Roseum Pink Rhododendron		3	0	3-4' ht.	BB
Pros	*Rosa 'Apricot Drift'*	Apricot Drift Rose		6	0	3 gal.	
Rhus	*Rhus aromatica 'Grow Low'*	Grow Low Sumac	Y	0	23	3 gal.	

PERENNIALS, GROUNDCOVERS, VINES and ANNUALS

Symbol	Botanical Name	Common Name	Native	Current Plan Quantity	Future Planting Quatity	Size	Comments
H	*HOSTA VARIETIES*						
	Hosta 'Frances Williams'	Frances Williams Hosta		3	5	1 gal.	
	Hosta sieboldiana 'Elegans'	Elegans Hosta		3	5	1 gal.	
	Hosta 'Sum and Substance'	Sum and Substance Hosta		3	0	1 gal.	
	Hosta 'Guacamole'	Guacamole Hosta		0	5	1 gal.	
Vm	*Vinca minor 'Bowles'*	Bowles Periwinkle		435	380	2.5" Pots	

SEED MIXES - Prep and Install per manufacturer's installation guides.	
LAWN AREAS	Penningtons Smart Seed Sun/Shade mix or approved equal
BIORETENTION SLOPES	Prairie Nursery No Mow Fescue or approved equal
BIORETENTION BASIN	50% New England Wetland Plants Erosion Control/Restoration Mix for Detention Basins and Moist Sites
	50% New England Wetland Plants New England Showy Wildflower Mix



Bike Rack nts

woodburn & company
LANDSCAPE ARCHITECTURE
103 Kent Place Newmarket, New Hampshire Phone: 603.659.5949

Proposed Mixed Use Development

LANDSCAPE PLAN

1035 Lafayette Road Portsmouth, New Hampshire

Drawn By:	RW
Checked By:	RW
Scale:	scale
Date:	2024-05-20 TAC Submission
Revisions:	2024-06-17 TAC Submission 2024-07-24 Planning Board Submission

L-1

LASSEL ARCHITECTS

370 MAIN STREET
SOUTH BERWICK, ME 03908
207 384 2049
lasselarchitects.com

LICENSED ARCHITECT SARAH E. HOULAHANE No. 04574 THE STATE OF NEW HAMPSHIRE

OVERALL SF BREAKDOWN

FIRST FLOOR:	10,556
SECOND FLOOR:	11,413
THIRD FLOOR:	11,413
FOURTH FLOOR:	10,173
TOTAL:	43,555

OVERALL APARTMENT BREAKDOWN

FIRST FLOOR:	7
SECOND FLOOR:	14
THIRD FLOOR:	14
FOURTH FLOOR:	9
TOTAL:	44

GRAPHIC SCALE

0' 4' 8' 16' 32'

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV:	DATE:	NOTES:

PROJECT NUMBER: 23.30

DATE: JUNE 2024

SCALE: AS NOTED

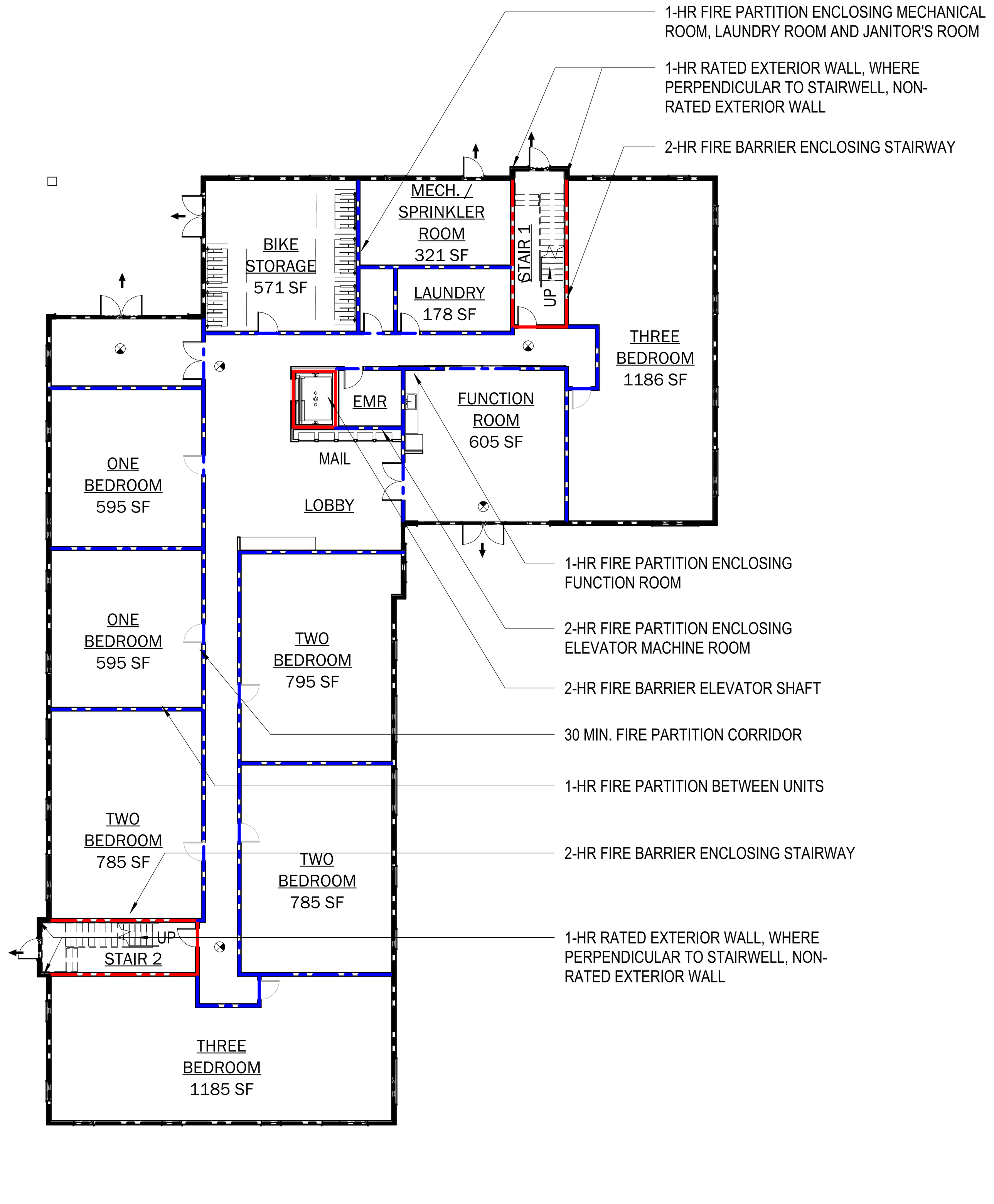
REVISION:

DRAWING NAME:
COVER SHEET

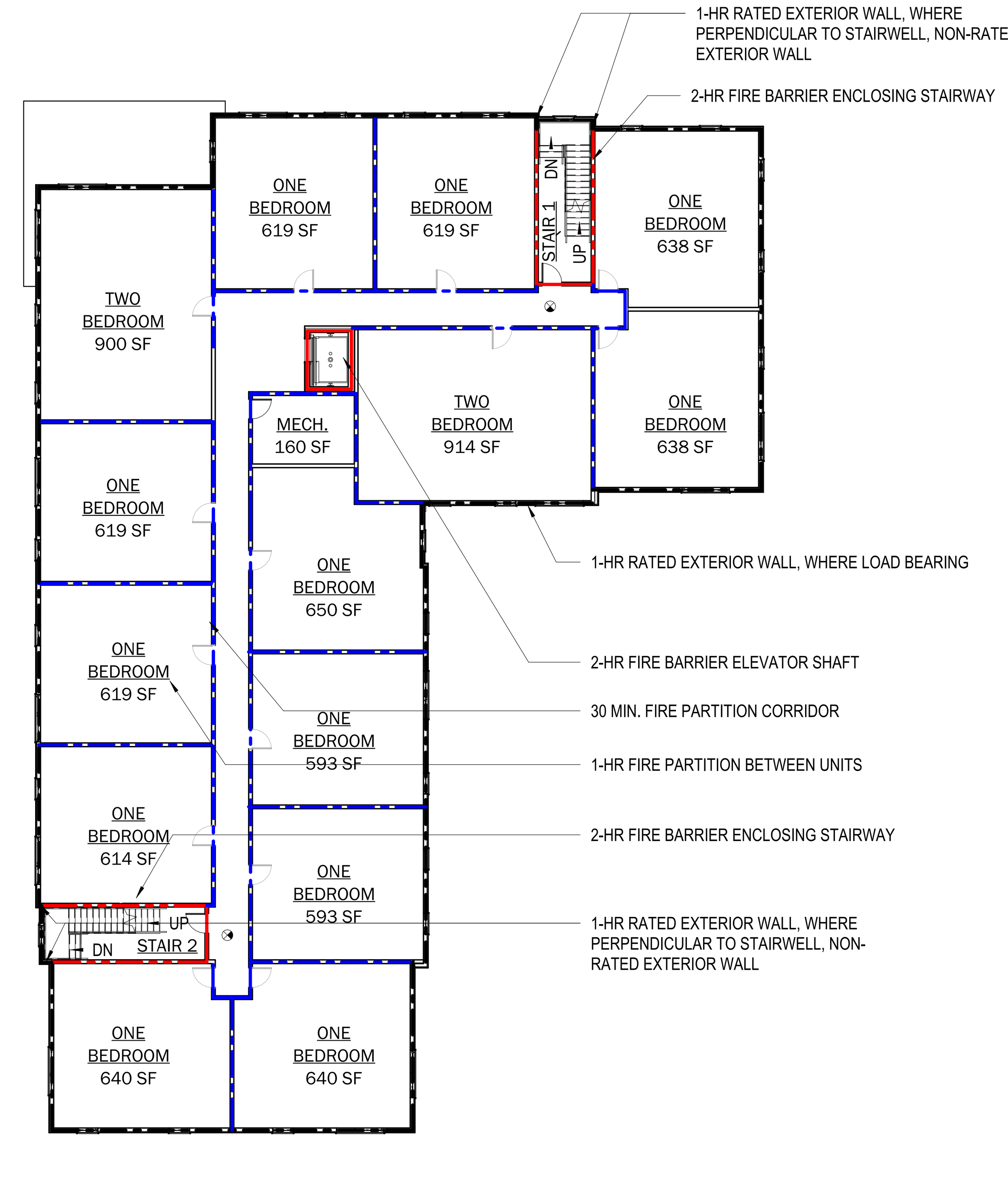
DRAWING NUMBER:
TAC - 01

LIFE SAFETY LEGEND

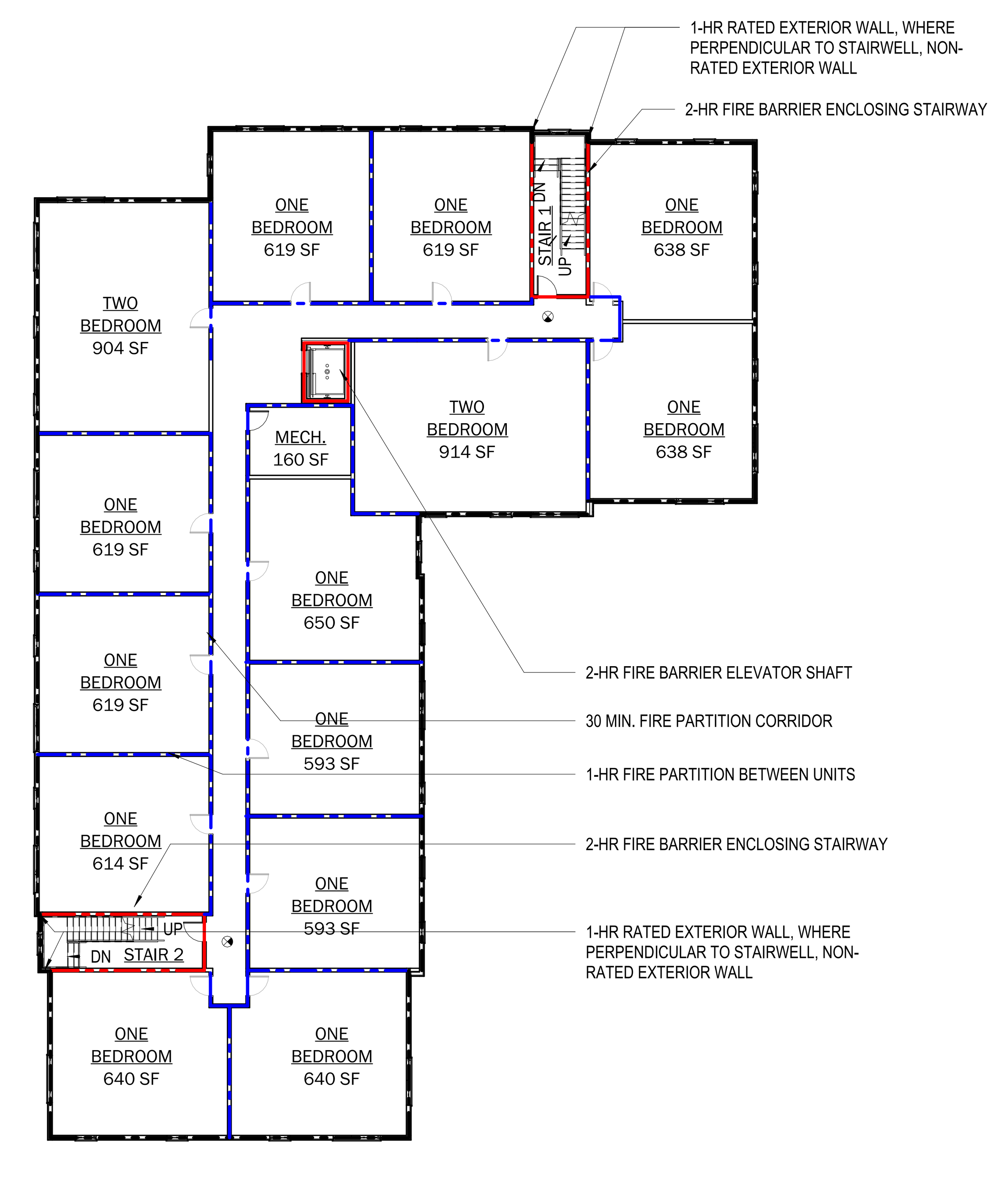
- FIRE PARTITION
- FIRE BARRIER
- SMOKE BARRIER
- BUILDING EXIT LOCATION
- FEC — FIRE EXTINGUISHER CABINET
- EXIT SIGNS
- SD — SMOKE DETECTORS
- EMERGENCY LIGHTING



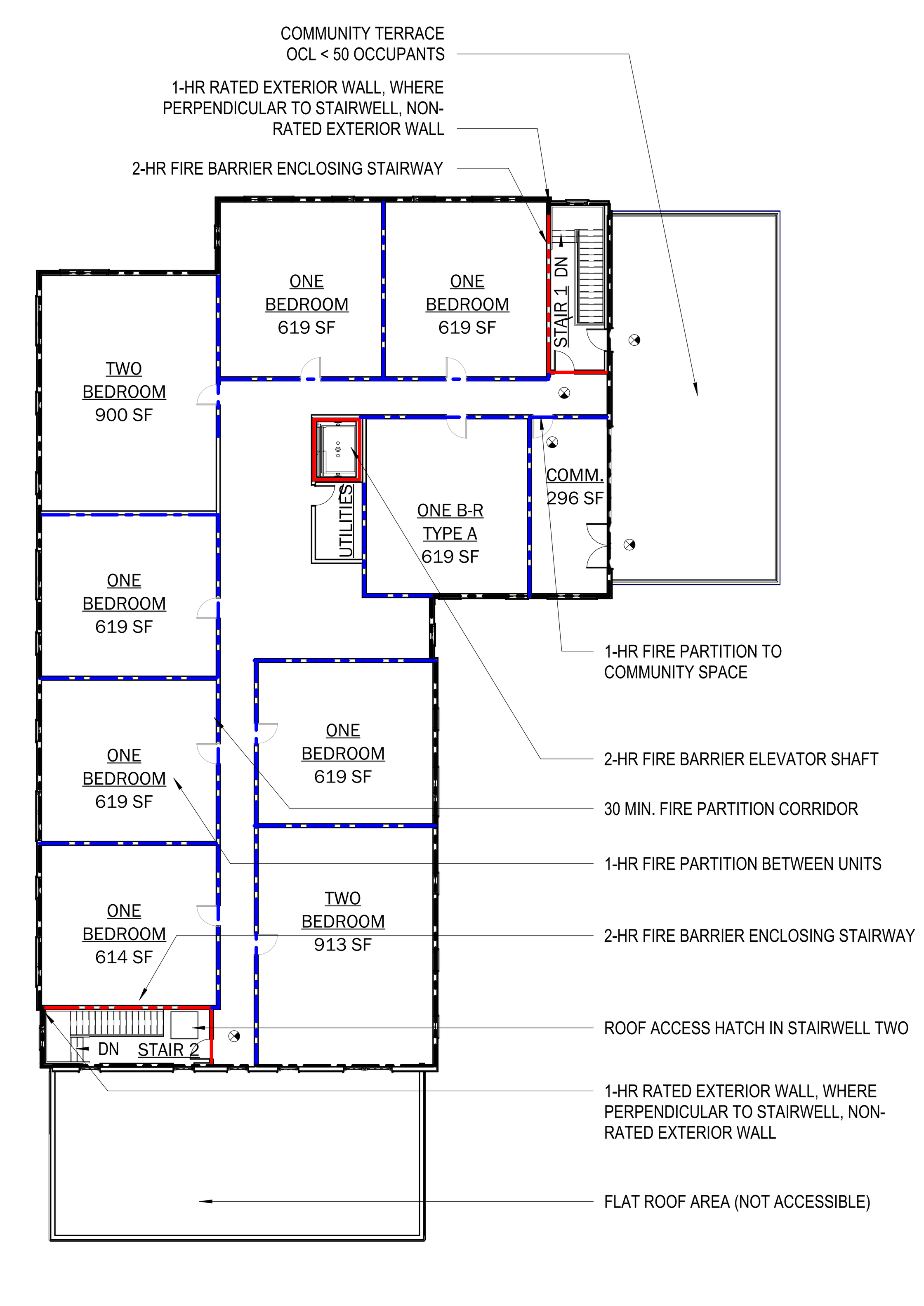
1 FIRST FLOOR - LIFE SAFETY
1" = 20'-0"



2 SECOND FLOOR - LIFE SAFETY
1" = 20'-0"



3 THIRD FLOOR PLAN - LIFE SAFETY
1" = 20'-0"



4 FOURTH FLOOR - LIFE SAFETY
1" = 20'-0"

CODE SUMMARY :

Applicable Codes

The following codes currently apply:

- City Of Portsmouth Zoning Ordinance
- International Building Code 2018
- International Energy Conservation Code 2018
- International Mechanical Code 2018
- International Plumbing Code 2018
- National Electrical Code 2020
- 2010 Americans with Disabilities Act Standards for Accessible Design (ADASAD)
- NFPA 101 - 2018

Classifications (IBC Chapter 3 / NFPA 101 chapter 6 & 30)

The building is a New Construction Residential (occupancy group R-2) uniform across all four floors

• Resulting building height	48 FT; (four stories)
• Resulting building area	
1st floor	10 546 SQ.FT.
2nd floor	11 574 SQ.FT.
3rd floor	11 574 SQ.FT.
4th floor	10 173 SQ.FT.
Total	43 875 SQ.FT.
• Sprinklers	**YES, NFPA 13 R**
• Fire Alarm	YES, A MANUAL FIRE ALARM WITH AUTOMATIC SPRINKLER SYSTEM AND SMOKE DETECTORS CONNECTED
• Construction type	**V-A**

Calculations (IBC chapter 5)
With design premise of four story building, sprinklered throughout per NFPA 13R system, and per construction type V A

• Allowable height in feet	60 FT.	-	REQ. MET
• Allowable height in stories	FOUR STORIES	-	REQ. MET
• Allowable area per floor	12 000 SQ. FT.	-	REQ. MET

Occupant Load (IBC table 1004.5 / NFPA 101 chapter 7)

Total building occupancy load, calculated per IBC table 1004.5, is **271 occupants**

• **First Floor:**		**88 occupants**
Residential	OLF: 200 gross (Residential)	8 899 s.f. / 200 = 40
community areas	OLF: 15 net (Assembly Unconsecrated)	603 s.f. / 15 = 40
utilities	OLF: 300 gross (Accessory storage and mech.)	1054 s.f. / 300 = 4
• **Seccond Floor:**		**58 occupants**
Residential	OLF: 200 gross (Residential)	11 414 s.f. / 200 = 57
utilities	OLF: 300 gross (Accessory storage and mech.)	160 s.f. / 300 = 1
• **Third Floor:**		**58 occupants**
Residential	OLF: 200 gross (Residential)	11 414 s.f. / 200 = 57
utilities	OLF: 300 gross (Accessory storage and mech.)	160 s.f. / 300 = 1
• **Fourth Floor:**		**68 occupants**
Residential	OLF: 200 gross (Residential)	9735 s.f. / 200 = 49
community areas	OLF: 15 net (Assembly Unconsecrated)	279 s.f. / 15 = 19
utilities	OLF: 300 gross (Accessory storage and mech.)	160 s.f. / 300 = 1

Egress (IBC chapter 10 / NFPA 101 chapter 7)

Stairwells, per 1005.3.1 and 1011.2:

• capacity factor	0.3	
• number of stairways	2	
• stairway's occupant load:	(Second floor + third floor + fourth floor) / 2 stairwells = (58 + 58 + 68) / 2	**92 OCCUPANTS**
• stair's width	92 x 0.3 = 27.6	
	Per requirements of 1011.2, when OCL over 50, minimum 44" required:	**44" WIDE STAIRS PROVIDED**

Maximum common path of egress travel distance 75 FT

Maximum exit access travel distance 250 FT

Barriers to Fire and Smoke Spread (IBC Table 508.4; Table 509 and Table 601 / NFPA 101 chapter 8)

- Primary structural frame (columns, floor beams and roof decking)
  Construction type V A, <u>1HR RATING REQUIRED</u>
- Exterior walls - load bearing
  Construction type V A, <u>1HR RATING REQUIRED</u>
- Exterior walls - non-load bearing
  Exterior walls have a fire separation distance of more than 20 feet therefore openings are unlimited in size.
  Fire separation distance is measured to the lot line, or to the centerline of the public way.
  Exterior walls will be rated within 10' horizontally off the corners of stairways, where required per IBC 1023.7 - where exposed by other parts of the building at an angle less than 180 degrees - **EXTERIOR WALL OF STAIRWELL SHALL BE RATED, WHERE ADJACENT TO BUILDING INSIDE CORNERS**
- Interior walls - load bearing
  Construction type V A, <u>1HR RATING REQUIRED</u>
- Floor construction and associated secondary structural members
  Construction type V A, <u>1HR RATING REQUIRED</u>
- Roof construction and associated secondary structural members
  Construction type V A, <u>1HR RATING REQUIRED</u>
- Fire Barriers per 707
  2 Hour fire barriers shall be provided for stairwell and elevator enclosure, and all shafts connecting four stories
  Fire Barriers will be continuous to underside of floor or roof decking.

Required separation of occupancies Per 420.2:

- Separation of occupancy groups R-2 and R-2
  shall be provided <u>30 minute Fire Partition</u>

Required rating of the corridor Per table 1020.1:

- Corridor in occupancy group R,
  shall be provided <u>1 hour Fire Partition</u>

INTERIOR FINISH CLASS REQUIREMENTS

- Corridors and enclosure for exit access stairways and ramps — class C
- Rooms and enclosed spaces — class C

LASSEL ARCHITECTS

370 MAIN STREET
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207 384 2049
lasselarchitects.com

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30

DATE: JUNE 2024

SCALE: AS NOTED

REVISION:

DRAWING NAME:
CODE SEARCH AND LIFE SAFETY DRAWINGS

DRAWING NUMBER:
LS - 01

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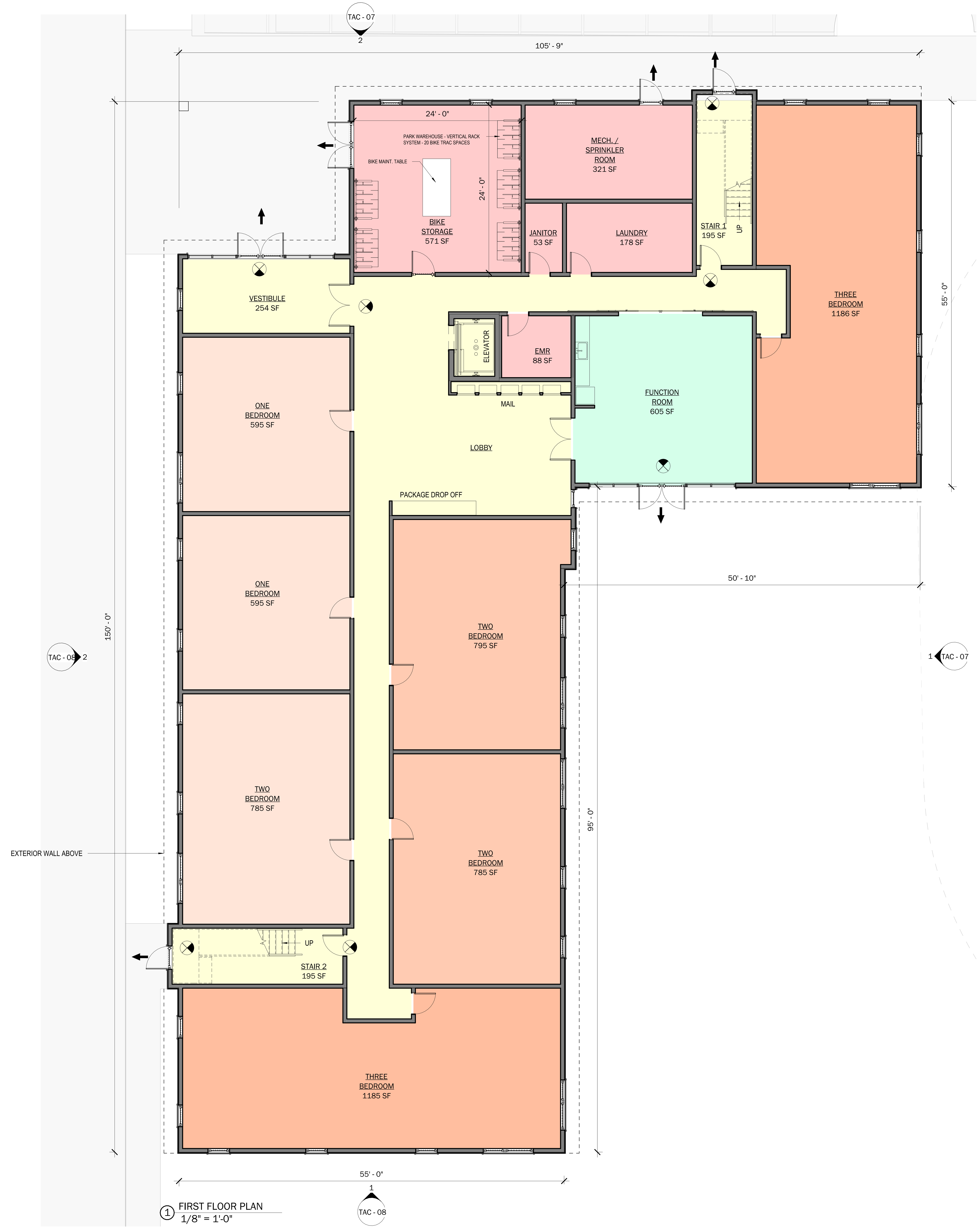

1 FIRST FLOOR PLAN
1/8" = 1'-0"

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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LICENSED ARCHITECT SARAH E HOULIHANE No. 04574 STATE OF NEW HAMPSHIRE

EXIT SIGNS

SF BREAKDOWN: FIRST FLOOR

APARTMENTS:	6,710
MECHANICAL / UTILITIES:	1,054
CIRCULATION:	2,189
COMMUNITY SPACES:	603
TOTAL:	10,556

APARTMENT BREAKDOWN: FIRST FLOOR

ONE BEDROOM:	2
TWO BEDROOM:	3
THREE BEDROOM:	2
TOTAL:	7

GRAPHIC SCALE
0' 4' 8' 16' 32'

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: JUNE 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
FIRST FLOOR PLAN

DRAWING NUMBER:
TAC - 02

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1 SECOND FLOOR PLAN
1/8" = 1'-0"

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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LICENSED ARCHITECT
SARAH E HOUGHTANE
No. 04574
STATE OF NEW HAMPSHIRE

EXIT SIGNS

SF BREAKDOWN: SECOND FLOOR

APARTMENTS:	10,012
MECHANICAL / UTILITIES:	160
CIRCULATION:	1,401
COMMUNITY SPACES:	0
TOTAL:	11,413

APARTMENT BREAKDOWN: SECOND FLOOR

ONE BEDROOM:	12
TWO BEDROOM:	2
THREE BEDROOM:	0
TOTAL:	14

GRAPHIC SCALE
0' 4' 8' 16' 32'

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: JUNE 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
SECOND FLOOR PLAN

DRAWING NUMBER:
TAC - 03

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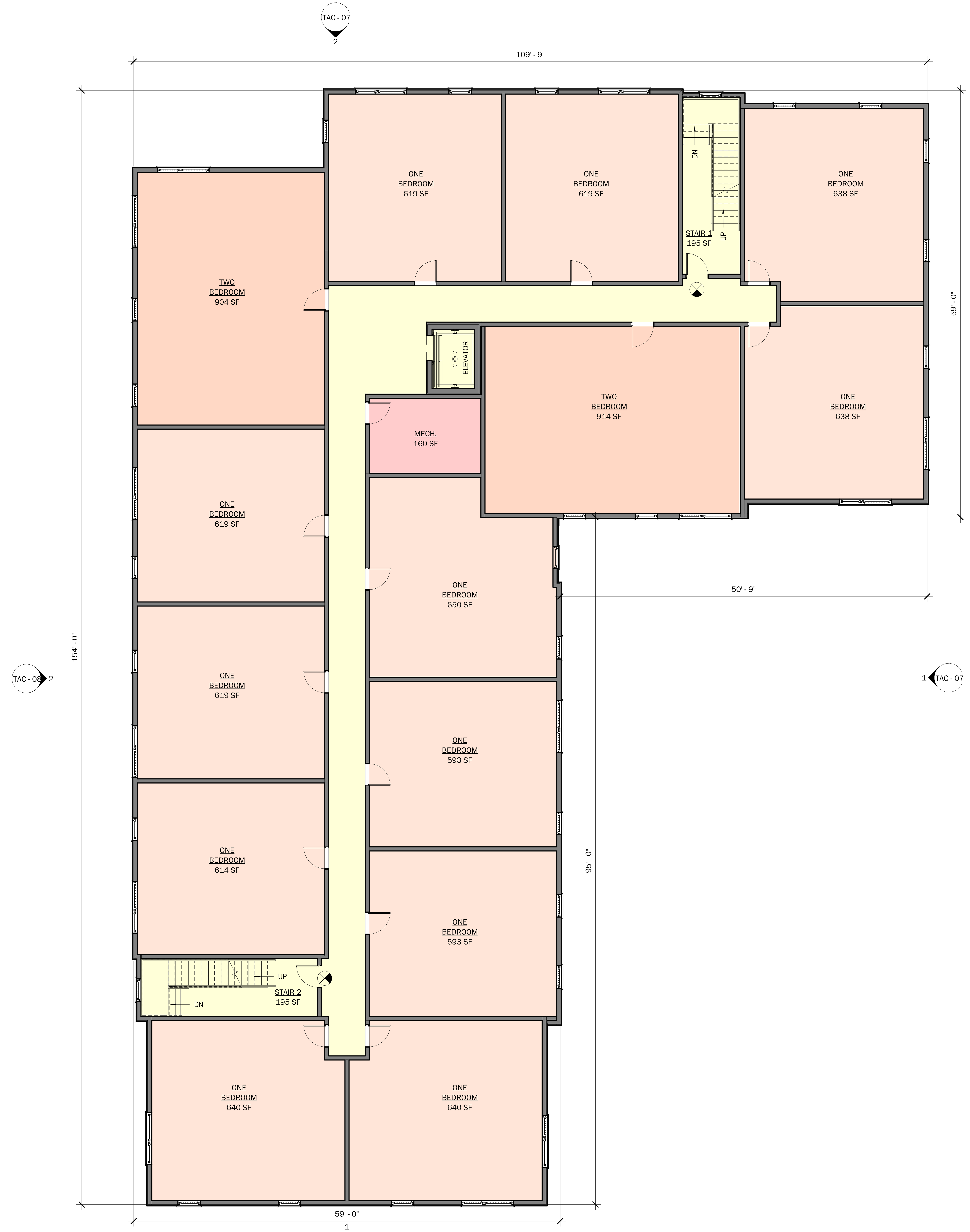

1 THIRD FLOOR PLAN
1/8" = 1'-0"

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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lasselarchitects.com

EXIT SIGNS

SF BREAKDOWN: THIRD FLOOR

APARTMENTS:	10,012
MECHANICAL / UTILITIES:	160
CIRCULATION:	1,401
COMMUNITY SPACES:	0
TOTAL:	11,413

APARTMENT BREAKDOWN: THIRD FLOOR

ONE BEDROOM:	12
TWO BEDROOM:	2
THREE BEDROOM:	0
TOTAL:	14

GRAPHIC SCALE
0' 4' 8' 16' 32'

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: JUNE 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
THIRD FLOOR PLAN

DRAWING NUMBER:
TAC - 04

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1 FOURTH FLOOR
1/8" = 1'-0"

1 TAC - 08

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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LICENSED ARCHITECT SARAH E HOUGHTALING No. 04574 THE STATE OF NEW HAMPSHIRE

EXIT SIGNS

SF BREAKDOWN: FOURTH FLOOR

APARTMENTS:	6,495
MECHANICAL / UTILITIES:	160
CIRCULATION:	1,862
COMMUNITY SPACES:	1,656
TOTAL:	10,173

APARTMENT BREAKDOWN: FOURTH FLOOR

ONE BEDROOM:	7
TWO BEDROOM:	2
THREE BEDROOM:	0
TOTAL:	9

GRAPHIC SCALE

0' 4' 8' 16' 32'

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
DATE: JUNE 2024
SCALE: AS NOTED
REVISION:
NORTH:

DRAWING NAME:
FOURTH FLOOR PLAN

DRAWING NUMBER:
TAC - 05

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1 ROOF PLAN
1/8" = 1'-0"

GRAPHIC SCALE
0' 4' 8' 16' 32'

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LICENSED ARCHITECT
SARAH E. HOUGHANE
No. 04574
STATE OF NEW HAMPSHIRE

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: JUNE 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
ROOF PLAN

DRAWING NUMBER:
TAC - 06

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1 WEST ELEVATION
1/8" = 1'-0"

2 SOUTH ELEVATION
1/8" = 1'-0"

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LICENSED ARCHITECT
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No. 04574
STATE OF NEW HAMPSHIRE

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV:	DATE:	NOTES:

PROJECT NUMBER: 23.30
DATE: JUNE 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
EXTERIOR ELEVATIONS

DRAWING NUMBER:
TAC - 07

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② EAST ELEVATION
1/8" = 1'-0"

① NORTH ELEVATION
1/8" = 1'-0"

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LICENSED ARCHITECT
SARAH
E
HOUGHANE
No. 04574
THE STATE OF NEW HAMPSHIRE

PROJECT:

PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:

1035 LAFAYETTE ROAD

CLIENT:

PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER:
23.30

DATE:
JUNE 2024

SCALE:
AS NOTED

REVISION:

DRAWING NAME:

EXTERIOR ELEVATIONS

DRAWING NUMBER:

TAC - 08

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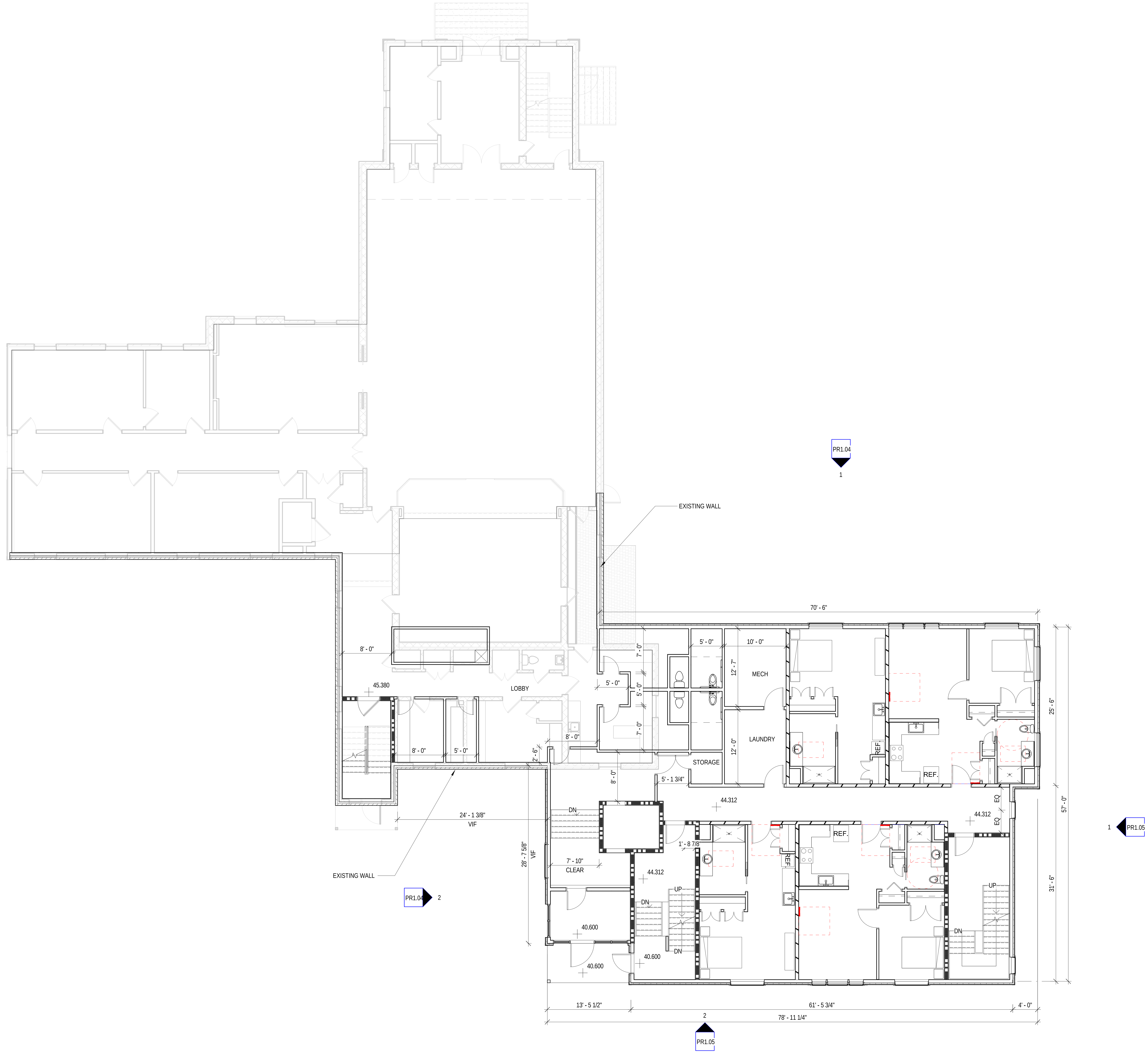

1 LEVEL 1 - Overall Plan - Presentation
1/8" = 1'-0"

JSA

ARCHITECTS
INTERIORS
PLANNERS

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(603) 433 - 8818

LANDSCAPE ARCHITECT
WOODBURN & COMPANY
130 KENT PLACE
NEWMARKET, NH 03857

STRUCTURAL ENGINEER

MECHANICAL, ELECTRICAL, PLUMBING &
FIRE PROTECTION ENGINEERS

HAVEN

273 CORPORATE DRIVE
PORTSMOUTH, NH, 03801

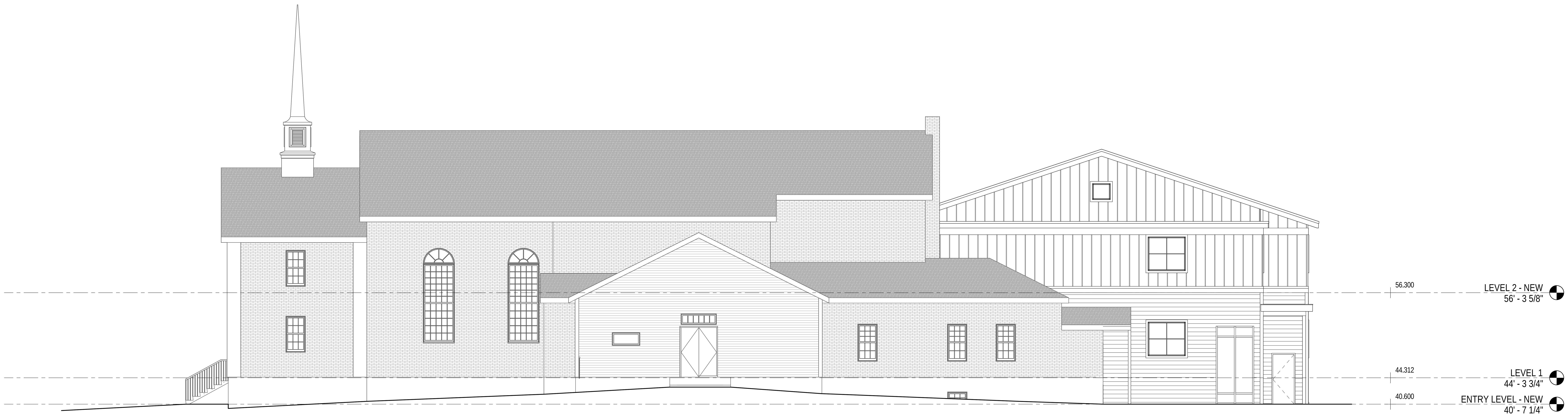
JSA DESIGN

Scale:	1/8" = 1'-0"
Date:	05/20/2024
Project Number:	24064.00

PROGRESS PRINT

LEVEL 1 FLOOR PLAN

PR1.01



2 WEST ELEVATION
1/8" = 1'-0"

1 NORTH ELEVATION
1/8" = 1'-0"

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LANDSCAPE ARCHITECT
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STRUCTURAL ENGINEER

MECHANICAL, ELECTRICAL, PLUMBING &
FIRE PROTECTION ENGINEERS

HAVEN

273 CORPORATE DRIVE
PORTSMOUTH, NH, 03801

JSA DESIGN

Scale:	1/8" = 1'-0"
Date:	05/20/2024
Project Number:	24064.00

PROGRESS PRINT

NORTH AND WEST ELEVATION

PR1.04

2 SOUTH ELEVATION
1/8" = 1'-0"

1 EAST ELEVATION
1/8" = 1'-0"

JSA

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LANDSCAPE ARCHITECT
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STRUCTURAL ENGINEER

MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION ENGINEERS

HAVEN

273 CORPORATE DRIVE
PORTSMOUTH, NH, 03801

JSA DESIGN

Scale:	1/8" = 1'-0"
Date:	05/20/2024
Project Number:	24064.00

PROGRESS PRINT

EAST AND SOUTH ELEVATION

PR1.05

Owner Letter of Authorization

This letter is to authorize Portsmouth Housing Authority (Applicant), to represent the interest of Christ Church Parish (Owner), in all site design and permitting matters for the proposed redevelopment project located at 1035 Lafayette Road in Portsmouth, New Hampshire on parcel of land identified as Map 246 Lot 1. This project includes the construction of multifamily buildings, repurposing of an existing church for office and daycare uses, and associated on-site improvements. This authorization shall relate to those activities that are required for local, state and federal permitting for the above project and include any required signatures for those applications.

Signature	Print Name	Date
	Benge Ambrogi, CFO Episcopal Diocese of NH	3/25/24

(P5118-001 (owner auth form).docx)

Agent Letter of Authorization

This letter is to authorize Tighe & Bond, Inc. (Civil Engineer), to represent and submit on behalf of Portsmouth Housing Authority (Applicant), applications and materials in all site design and permitting matters for the proposed redevelopment project located at 1035 Lafayette Road in Portsmouth, New Hampshire on parcel of land identified as Map 246 Lot 1. This project includes the construction of multifamily buildings, repurposing of an existing church for office and daycare uses, and associated on-site improvements. This authorization shall relate to those activities that are required for local, state and federal permitting for the above project and include any required signatures for those applications.

Signature	Print Name	Date
[signature]	Craig W. Welch	3/24/24

TAC Conditions (7/8/2024) RESPONSE
1035 Lafayette Road
Portsmouth, New Hampshire
July 24, 2024

Prepared by: NAH/CJK
Project # P5118-001

	TAC Conditions of Approval	**Response**	**Corresponding Plan Sheet #**
1	Applicant shall provide information on the existing and proposed water usage on site.	Existing and proposed water usages have been calculated using the NH Code of Administrative Rules Ch. Env-Wq 700. Exisitng daily flows calculated for the exisitng day care use are approximately 1,050 gallons per day (GPD). Proposed daily flows calculated for the project's program of 51 residential units (60 beds), the exisitng daycare, and office space are anticpated to be approximatley 8,705 GPD.	
2	Applicant shall update truck turning template.	The truck turning template has been updated to address Fire Deparment comments.	Fire Truck Turning Exhibit
3	Applicant shall provide a traffic study to be reviewed by DPW.	A Traffic Impact Study for the project site is enclosed and has also been submitted to NHDOT.	Traffic Impact Study
4	Applicant shall adjust the sizes of the fire and domestic service lines.	Sizes of fire and domestic service lines have been coordinated with the Architect and MEP design of the proposed structures and are reflected in the enclosed Site Plans.	C-104
5	Applicant shall identify the sewer connection location.	The exact location of the sewer connection is currently being coordinated with the City of Portmouth DPW. Utility note #22 had been added to the plans noting that the final sewer connection location and invert elevation within Lafayette Road shall be coordinated with the City of Portsmouth DPW prior to construction.	G-100
6	Applicant shall confirm stormwater outlet configuration to be reviewed by DPW.	Tighe & Bond met with DPW on-site on July 12, 2024. Stormwater outlet shown on the Site Plans refelcts the configuration that was agreed upon at this meeting.	C-103

1035 Lafayette Rd Redevelopment – Parking Demand Analysis

TO: City of Portsmouth Planning Board

FROM: Patrick M. Crimmins, PE
Neil A. Hansen, PE

COPY: Portsmouth Housing Authority

DATE: July 24, 2024

The following memorandum has been prepared to summarize a Parking Demand Analysis for a proposed redevelopment project located at 1035 Lafayette Road (Route 1) in Portsmouth, New Hampshire.

The proposed redevelopment project includes four (4) proposed uses that consist of residential, office, daycare facility, and a place of worship. The proposed multifamily building and a transitional housing addition to the existing church building consists of 51 total dwelling units that are a mix of 500-750 SF and >750 SF units. The existing Church is proposed to be converted to 6,900 SF of first-floor office space and 6,900 SF of lower-level daycare which has a max licensed enrollment capacity of 71 students. The existing single-family dwelling located in the southern portion of the lot would be converted to a chapel with an anticipated maximum occupancy of 40 people. This chapel has been calculated utilizing the place of assembly use identified as Use No. 3.10 from Portsmouth Zoning Ordinance Section 10.1112.32.

To calculate the project's requirement, parking demand was first calculated utilizing the minimum parking requirements defined in the City of Portsmouth Zoning Ordinance Section 10.1112.30.

Due to the mix of uses, a shared parking calculation was then applied as allowed by Section 10.1112.61 of the Zoning Ordinance. The parking occupancy rates utilized for each use are the rates identified in the Parking Occupancy Rate table in Section 10.1112.61 of the Zoning Ordinance with the exception of a daycare parking occupancy rate. The daycare parking occupancy rate that has been utilized is the institutional use as there is no occupancy rate outlined in section 10.1112.61 for a daycare facility. The institutional use was chosen as it best reflects the anticipated working hours of the proposed daycare of Monday through Friday 8 AM to 5PM.

Lastly, a 20% reduction was then applied to the parking requirement calculation as allowed by Section 10.5B82.10 of the Zoning Ordinance when public transportation is within a ¼-mile of the property. The public transit reduction requirement states that "*For developments located on a public transit route with year-round, 5-days-per-week, fixed-route service and where at least 50% of the building(s) are within ¼ mile of a transit stop, the minimum offstreet parking required for motor vehicles shall be reduced by 20% of the total required for all uses.*" The proposed parcel is located along the COAST route 41, Portsmouth-Lafayette Trolley, that runs along Lafayette Rd from Downtown Portsmouth to the Lafayette Road Residence Association at Bluefish Blvd. The applicant is currently working with COAST to provide a bus stop onsite along this route which would allow the project to utilize the 20% reduction.

Based on the above-described, the minimum required parking for the project is calculated at 83 spaces. The proposed project provides 83 spaces, which meets the minimum parking requirement. In addition, the project is promoting alternative modes of transportation such as walking, bicycling, and public transportation by incorporating pedestrian connections, bicycle storage, and a bus stop.

Conditional Use Permit for Off-Street Parking

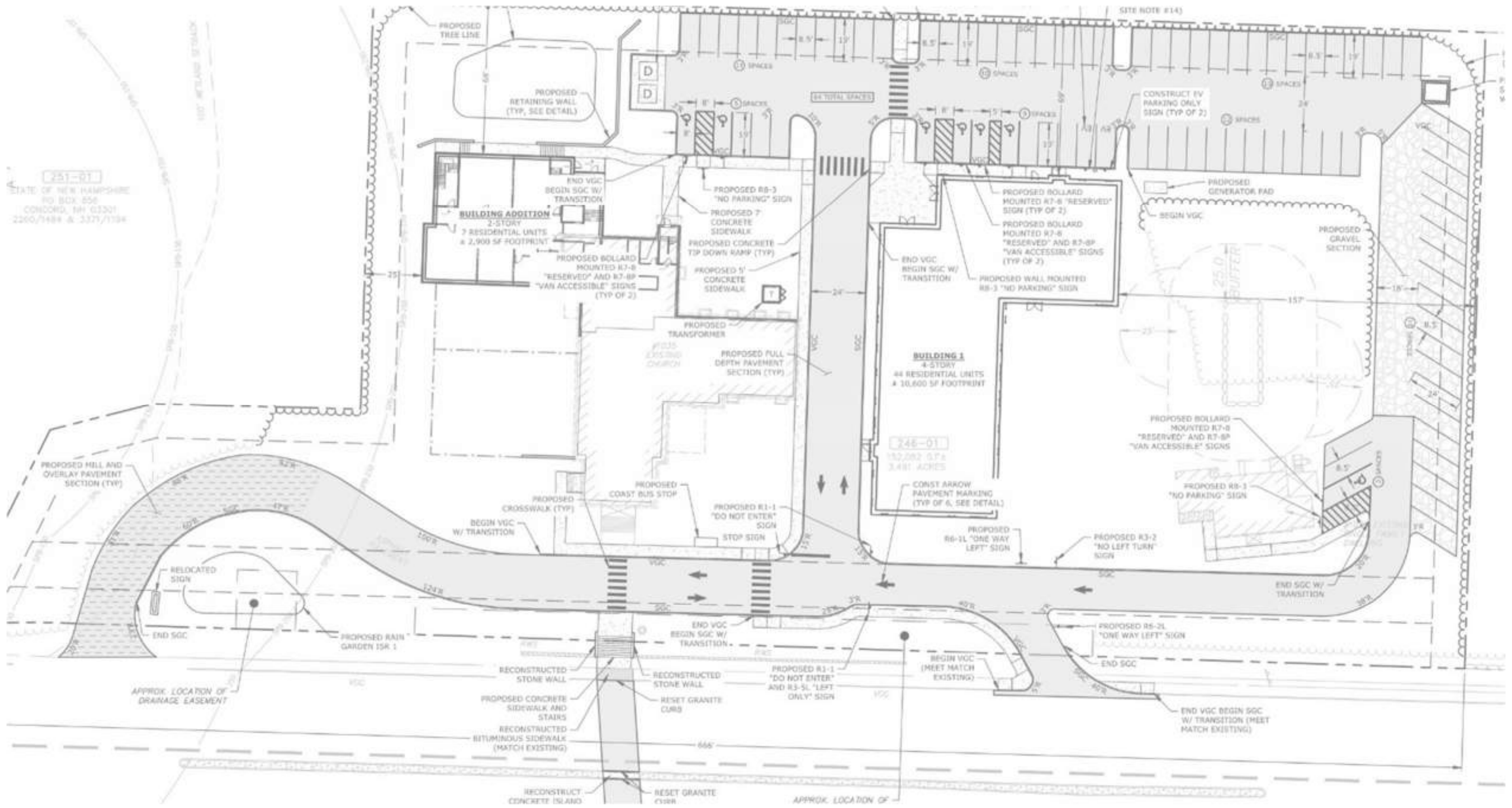
Because a use other than daycare was utilized for the shared parking calculation to more accurately reflect parking demand, the project will require Conditional Use Permit for Off-Street Parking. Under Section 10.1112.14, the applicant is respectfully requesting that a Conditional Use Permit be granted by the Planning Board to allow the Project to provide less than the minimum off-street parking spaces required by Section 10.1112.30 or Section 10.1112.61.

- Section 10.1112.141 – The enclosed Parking Demand Analysis has been provided as required by this section. The Parking Demand Analysis demonstrates the off-street parking provided by the Project is sufficient for its Uses.

- Section 10.1112.142 – This section indicates an application for a Conditional Use Permit shall identify permanent evidence-based measures to reduce parking demand. As described in the enclosed Parking Demand Analysis, the Project provides measures that promote alternative modes of transportation such as walking, bicycling, and public transportation.

	MINIMUM PARKING REQUIRED PER CITY ZONING ORDINANCE					
		Weekday		Weekend		
	Type of Use	Daytime (8:00 AM – 5:00 PM)	Evening (6:00 PM– Midnight)	Daytime (8:00 AM– 5:00 PM)	Evening (6:00 PM– Midnight)	Nighttime (Midnight– 6:00 AM)
	Residential	**60%**	**100%**	**80%**	**100%**	**100%**
	Daycare(1)	**100%**	**20%**	**10%**	**10%**	**5%**
	Office Space	**100%**	**20%**	**10%**	**5%**	**5%**
	Place of Worship	**10%**	**5%**	**100%**	**50%**	**5%**
Use	**Required Spaces per Section 10.1112.30**	**Required Shared Spaces per Section 10.1112.61**				
PROPOSED RESIDENTIAL UNITS < 500 SF	0	0	0	0	0	0
PROPOSED RESIDENTIAL UNITS 500 - 750 SF	11	7	11	9	11	11
PROPOSED RESIDENTIAL UNITS >750 SF	52	32	52	42	52	52
SPACES FOR RESIDENTIAL VISITORS	11	7	11	9	11	11
PROPOSED OFFICE	20	20	4	2	1	1
PROPOSED DAYCARE	36	36	8	4	4	2
RELOCATED EXISTING CHAPEL	10	1	1	10	5	1
	Total Required Shared Spaces:	**103**	**87**	**76**	**84**	**78**
	Public Transit 20% Reduction Spaces: (Per Section 10.5B82.10)	**83**	**70**	**61**	**68**	**63**
	Total Provided:	**83**				

(1) Daycare use has utilized institutional use as this use best aligns with the anticipated business hours of the proposed Daycare (M-F 8 am-5 pm).



1035 Lafayette Road Mixed-Use Development
Portsmouth, NH

TRAFFIC IMPACT STUDY

Portsmouth Housing Authority

July 24, 2024

Tighe&Bond

Tighe&Bond

P5118-001
July 24, 2024

Mr. Roger Appleton, P.E.
Assistant District 6 Engineer
New Hampshire Department of Transportation
271 Main Street, P.O. Box 740
Durham, New Hampshire 03824

Re: **Certification Letter**
1035 Lafayette Road Mixed-Use Development
Portsmouth, New Hampshire

Dear Roger:

This letter certifies that the Traffic Impact Study for the 1035 Lafayette Road mixed-use development located in Portsmouth, New Hampshire, dated July 24, 2024, was prepared under the oversight of a licensed Professional Engineer in the state of New Hampshire. I am a licensed Professional Engineer in the State of New Hampshire (NH PE No. 17429). I also hold Professional Traffic Operations Engineer (PTOE) (Certificate No. 2845) and Road Safety Professional 1 (RSP1) (Certificate No. 116) certifications from the Transportation Professional Certification Board (TPCB).

Sincerely,

TIGHE & BOND, INC.

Greg E Lucas

Greg Lucas, PE, PTOE, RSP1
Senior Project Manager

Copy: Peter Britz, Director of Planning & Sustainability, City of Portsmouth

J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Report_Evaluation\Reports\Traffic Impact Study\1035 Lafayette Rd Certification Letter.docx

Technical Appendices (Available Upon Request Under Separate Cover)

Section 1
Study Overview

This Traffic Impact Study (TIS) evaluates the potential traffic impact of the proposed mixed-use redevelopment located at 1035 Lafayette Road (US Route 1) in the City of Portsmouth, New Hampshire. The site is bounded by Lafayette Road (US Route 1) to the west and by Urban Forestry Center to the north, east, and south. Figure 1 shows the site location relative to the surrounding roadway network.

The project proposes to construct residential units and office space at the site of the existing Christ Church Parish and Little Blessings Day Care Center. The existing church building will be renovated to accommodate seven proposed townhouse residential units, an approximate 6,900 SF office space, and a day care facility housing up to 71 students. A new four-story apartment building with 44 units will be constructed on site, and worship services for the existing church will be relocated to the residential home on site.

On-site parking will be provided by surface parking lots. The two existing site access driveways to Lafayette Road will remain; the northern full-access driveway will remain a four-way signalized intersection with Lafayette Road opposite Mirona Road and the southern driveway located 400 feet south of Minora Road that currently provides access to and from Lafayette Road northbound will be converted to an entrance-only driveway.

Based on the analyses conducted, it is the professional opinion of Tighe & Bond that the additional traffic expected to be generated by the proposed mixed-use development is not expected to have a significant impact to traffic operations within the study area.

Section 2
Existing Conditions

The Project site is bounded by Lafayette Road (US Route 1) to the west and by Urban Forestry Center to the north, east, and south. The property is currently accessible via two driveways from Lafayette Road. The northern full-access driveway forms a signalized intersection with Lafayette Road and Mirona Road. The southern driveway is unsignalized and located approximately 400 feet south of Mirona Road. Lafayette Road is median divided at the southern driveway, prohibiting left turns entering or exiting the site from this driveway. The following sections provide details on the adjacent roadways within the study area.

2.1 Roadways

2.1.1 Lafayette Road (US Route 1)

Lafayette Road (US Route 1) is classified as a principal arterial under NHDOT District 6 jurisdiction. The roadway runs in a north-south direction, providing local and regional connectivity through southeastern New Hampshire, generally running parallel to I-95 between the Massachusetts state line and the Maine state line. Within the study area, Lafayette Road provides two travel lanes in each direction with a two-way center turn lane, and northbound and southbound left turn lanes at Mirona Road. There are driveways to retail developments along both sides of the roadway.

Sidewalks are generally provided along both sides of Lafayette Road in the study area, with a crossing located at the signalized study area intersection at Mirona Road. A varying shoulder typically one to three feet wide exists delineated by a solid white edge line. The speed limit is posted at 35 miles per hour (mph) in both directions in the vicinity of the site.

2.1.2 Mirona Road

Mirona Road is classified as a local roadway under City of Portsmouth jurisdiction. The roadway runs primarily east-west, beginning at the intersection with Peverly Hill Road and Banfield Road in the west and ending at the intersection with Lafayette Road (US Route 1) in the east. Mirona Road provides one lane of travel in each direction, with an additional turning lane provided at the Lafayette Road intersection. Sidewalks are typically not provided, except for a 200-foot section on the north side of the roadway near Lafayette Road. Marked shoulders of approximately four to five feet wide delineated by a solid white edge line are provided. Mirona Road has a posted speed limit of 30 mph.

2.2 Study Area Intersections

2.2.1 Lafayette Road (US Route 1) at South Driveway

The South Driveway intersects Lafayette Road (US Route 1) from the east to form a T-intersection with the southern driveway under stop control. Lafayette Road is median divided at the intersection, prohibiting left turns entering or exiting the driveway. The northbound approach provides two through lanes with a third lane functioning as a shared through and right turn lane. The leftmost lane is marked for left turns for the Lafayette Road and Mirona Road intersection located approximately 400 feet north. The westbound driveway approach provides a single right turn only lane. The southbound approach has two through lanes separated by a narrow raised median.

A sidewalk is provided along both sides of Lafayette Road. Marked edge lines provide approximately 8-foot outside shoulders and 2-foot inside shoulders on both the northbound and southbound approaches.

2.2.2 Lafayette Road (US Route 1) at Mirona Road/North Driveway

Mirona Road intersects Lafayette Road from the east and west to form a four-way signalized intersection. The northbound and southbound approaches provide two through lanes and one dedicated left-turn lane that is separated from opposing traffic by a narrow raised median. The northbound and southbound left-turns operate under a protected only signal phase. The eastbound approach provides a shared through/ left-turn lane and exclusive right-turn lane. The westbound approach provides a single all-purpose lane and also functions as the existing project site driveway.

Crosswalks are provided on the north, east, and west legs with an exclusive pedestrian phase provided. Marked edge lines provide narrow one-to-three-foot shoulders on all intersection approaches except the east leg.

2.3 Traffic Volumes

Turning movement counts (TMC) were collected at the study area intersections on Thursday, April 18, 2024 during the weekday morning (7:00 AM to 9:00 AM) and weekday afternoon peak periods (3:00 PM to 6:00 PM) and on Saturday, April 20, 2024, during the weekend afternoon peak period (11:00 AM to 1:00 PM). Automatic Traffic Recorder (ATR) counts were collected along Lafayette Road between the two study intersections during a 48-hour period from Tuesday, April 30, 2024 through Wednesday, May 1, 2024.

Based on current NHDOT guidance, 2024 traffic volumes were compared to 2019 traffic volumes to determine if adjustments to the collected traffic volumes should be made to account for pandemic-related impacts to peak hour traffic volumes. Traffic volumes from NHDOT continuous count station No. 2125090 on Spauling Turnpike (Route 16) between Exits 6 and 7 in Dover as well as City of Portsmouth continuous count station data at the intersection of Lafayette Road and South Street from the same week in April 2019 and April 2024 were reviewed. Based on concurrence from NHDOT received on June 17, 2024, NHDOT count station data was used as a basis for comparison for consistency with the previously approved methodology from the approved 815 Lafayette Road residential development (IA-000000022) study. In addition, the NHDOT count station may be more representative of regional commuter trends as compared to the City data.

The average traffic volumes from Tuesday to Thursday during the same week in April 2019 and April 2024 were used as a basis for comparison for weekday morning and weekday afternoon peak periods. The traffic volume from Saturday during the same week in April 2019 and April 2024 was used as a basis of comparison for the Saturday midday peak period. The review indicates the 2024 peak hour traffic volumes were 0.5% higher in the weekday morning peak hour, 14% higher in the weekday afternoon peak hour, and 7% higher in the Saturday midday peak hour as compared to April 2019. Given the overall increases in traffic volumes for all peak hour scenarios, no pandemic-related adjustments were made to the weekday morning, weekday afternoon, or weekend afternoon peak periods.

The ATR data from Lafayette Road indicates average daily traffic (ADT) of approximately 13,400 vehicles per day northbound and 11,800 vehicles per day southbound. The measured 85th percentile speeds, also known as the operating speed of the roadway, was approximately 39 mph in both the northbound and southbound directions.

The weekday morning, weekday afternoon, and Saturday midday peak hour turning movement counts were each seasonally adjusted to the peak month. The adjusted 2024 existing traffic volumes for the weekday morning, weekday afternoon, and Saturday midday peak hours are shown in Figure 2. The raw TMC data and ATR data are provided in Appendix A. Seasonal adjustment factors and historical growth rates are enclosed in Appendix B. NHDOT count station data, traffic volume adjustment factor calculation, and supporting data is provided in Appendix C.

2.4 Capacity and Queue Analyses - Existing Condition

Capacity and queue analyses were performed for the study intersections for the 2024 Existing Conditions during the weekday morning, weekday afternoon, and weekend peak hours. Analyses were conducted using Trafficware Synchro Studio 11 software, which conducts the analysis based on *Highway Capacity Manual (HCM)* methodology. Consistent with NHDOT guidelines, analyses for signalized intersections were conducted using methods of the 2000 HCM, while analysis for unsignalized intersections utilized the HCM 6th Edition methodology. The analysis results are categorized in terms of Level of Service (LOS), which describes the qualitative intersection operational conditions based on the calculated average delay per vehicle. A summary of the HCM capacity analysis methodology and a detailed definition of LOS is provided in Appendix D. The queue analysis results are summarized based upon the length of vehicle queueing on an intersection approach. For unsignalized intersections, queues are quantified for 95th percentile (design queues). For signalized intersections, queues are quantified by 95th percentile (design) and 50th percentile (average) queues. Tables 1 and 2 in Section 7 summarize the capacity and queue analyses results, respectively. Capacity analysis worksheets with full inputs, settings, and results are provided in Appendix E.

As shown in Table 1, both intersections and all individual intersection approaches are predicted to operate acceptably at LOS D or better during the peak hours with the exception of the Lafayette Road (US Route 1) southbound left turn movement at the north site driveway which operates at LOS E during the weekday morning and Saturday midday peak hours.

A review of the queuing results in Table 2 shows both average and design queues are accommodated within the available storage at turn lanes and between intersections. The following queue extends past available storage:

2.5 Collision History

Vehicle collision data for the study intersections was provided by the Portsmouth Police Department (PPD). Traffic accident data for the area around Lafayette Road at Mirona Road for a three-year period between January 2021 and December 2023 was reviewed. Table 3 provides a summary of the collisions within the study area including type, severity, day and time, and location. Appendix J includes detailed collision summaries.

As shown in Table 3, there were seven motor vehicle collisions reported in the study area during the three-year period analyzed. All reported collisions occurred at the intersection of Lafayette Road and Mirona Road.

The most frequent type of collision was angle, accounting for about 57% of the total collisions within the study area. The second most frequent collision type was rear-end which made up about 29% of the total collisions. The one remaining collision was head-on.

About 86% of the collisions occurred on weekdays, spread throughout the day. Weather and roadway conditions at the time of the collisions were not able to be determined from the police reports.

The collision data indicates no reported fatalities and four collisions with injuries recorded: three minor injuries and one incapacitating injury. The remaining collisions resulted in property damage only.

TABLE 3

Study Area Collision History Summary

COLLISION TYPE

	2021	2022	2023	Total	Percent
Angle	0	3	1	**4**	**57.1%**
Head-on	1	0	0	**1**	**14.3%**
Rear-End	1	0	1	**2**	**28.6%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

SEVERITY

	2021	2022	2023	Total	Percent
Personal Injury	1	2	1	**4**	**57.1%**
Property Damage Only (PDO)	1	1	1	**3**	**42.9%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

DAY & TIME

	2021	2022	2023	Total	Percent
Weekday 6-9 A.M.	0	1	0	**1**	**14.3%**
Weekday 3-6 P.M.	2	0	1	**3**	**42.9%**
Weekday Off-Peak	0	1	1	**2**	**28.6%**
Weekend Off-Peak	0	1	0	**1**	**14.3%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

2.6 Alternative Travel Modes

The project site is located in a moderately densely developed setting in the City of Portsmouth where several multimodal travel options are readily available. The following summarizes the details of various alternative travel modes supported within the study area.

Pedestrian facilities are present throughout the study area. There are existing sidewalks along both sides of Lafayette Road throughout the entire study area. Marked crosswalks with an exclusive pedestrian phase are present at the signalized study intersection of Lafayette Road at Mirona Road.

The Cooperative Alliance for Seacoast Transportation (COAST) provides transit service within the study area. Bus Route 41 is the primary bus route in the study area with stops along Lafayette Road between Hanover Station to the north and Hillcrest Estates to the south. An existing bus stop is located approximately one third mile south of the site, just west of the intersection of Lafayette Road (US Route 1) and Wilson Road. Another existing bus stop is located approximately a third mile north of the side, just north of the intersection of Lafayette Road and Greenleaf Woods Drive. The route operates from 6:00 AM to 8:49 PM Monday through Saturday. The Route 41 map and schedule are included in Appendix F.

Section 3
No-Build Conditions

The No-Build Condition represents the projection of traffic volumes and operating conditions without the anticipated additional site generated traffic. Consistent with NHDOT guidelines, the study area is analyzed for an Opening Year (2026) and Design Year (2036). This section describes the growth and development considerations included in the 2026 and 2036 No-Build traffic volumes.

3.1 Traffic Growth

To develop the traffic volumes for the 2026 and 2036 No-Build Conditions, the 2024 existing traffic volumes were grown by one percent per year to represent the general growth of traffic on the study area roadways. This growth rate is consistent with the average growth rate in NHDOT Region E - Southeast, the region in which Portsmouth is located as well as previous traffic studies for developments located along Lafayette Road. Background NHDOT growth data is included in Appendix B.

NHDOT and the City of Portsmouth were contacted about other planned/approved developments in the area that may add new traffic to the study area prior to 2026. The following developments were identified:

- **815 Lafayette Road – Residential Development:** The project proposes 72 residential units. The project has been approved and is anticipated to be occupied in 2025. Estimated site traffic volumes were reviewed from the project's Traffic Impact Assessment and included in the development of the 2026 and 2036 No-Build traffic volumes.

- **105 Bartlett Street – North Mill Pond Residential Development:** The project proposes to construct 152 residential units. The project has been approved and construction is anticipated to begin in Spring 2024. Based on a review of the previous analyses, it was determined that the estimated project trips will not add traffic to the study intersections based on anticipated travel patterns, and therefore was not added to the No-Build traffic volumes.

- **581 Lafayette Road –** The project proposes 72 residential units. The project has been approved and is anticipated to be occupied in 2025. Estimated site traffic volumes were reviewed from the project's Traffic Impact Assessment and included in the development of the 2026 and 2036 No-Build traffic volumes.

It is assumed that other smaller developments or small vacancies in existing developments are also captured by the background traffic growth rate. The 2026 and 2036 No-Build traffic volumes for the weekday morning, weekday afternoon, and Saturday midday peak hours are shown in Figures 3 and 4, respectively.

3.2 Capacity and Queue Analyses – No-Build Conditions

Capacity and queue analyses were conducted for the 2026 and 2036 No-Build Conditions traffic volumes for all peak periods using the methodology described in Section 2.4. Tables 1 and 2 in Section 7 summarize the capacity and queue results, respectively.

Capacity analysis worksheets with full inputs, settings, and results are provided in Appendix E.

The increase in expected future traffic based on the one percent per year compounded growth rate and background development traffic volumes that were added to the existing 2024 traffic volumes showed no degradations in the future 2026 No-Build Conditions when compared to existing. The 2036 No-Build Conditions analysis shows the southbound left turn movement from Lafayette Road to the north site driveway degrading from LOS D to LOS E in the weekday afternoon peak hour when compared to the existing condition.

Design queues are shown to increase by two vehicle lengths or less at all intersection approaches or will remain within existing available storage between the existing and 2026 No-Build conditions and 2036 No-Build conditions.

Section 4
Proposed Conditions

The proposed development will include redevelopment of the existing church building to accommodate a seven-unit townhouse, a 6,900 SF two-story office building, and an existing daycare with an occupancy of up to 71 students, and construction of a new four-story apartment building consisting of 44 units. Parking will be accommodated by surface parking lots on site. The existing residential home on the site will be repurposed for existing church services. The proposed development is expected to be complete and occupied in 2026. The Site Plan is presented in Appendix H.

4.1 Site Access

Access to the site is currently provided via two driveways on Lafayette Road (US Route 1). The northern driveway forms an existing signalized intersection with Lafayette Road opposite of Mirona Road. The southern driveway is located approximately 400 feet south of Mirona Road; Lafayette Road is divided by a raised concrete median at the southern driveway, so access is only provided to Lafayette Road northbound. The northern driveway will be maintained as existing for the project. The southern driveway will be converted to an entrance-only driveway under the proposed condition.

4.2 Trip Generation

Trips expected to be generated by the proposed development were estimated using the Institute of Transportation Engineers (ITE) Trip Generation, 11th Edition, 2021. Multifamily Housing (Low-Rise) (LUC-220) was used to estimate the residential vehicle trips based on the current development program, which proposes a four-story apartment building with 44 units and a proposed seven-unit townhouse for a total of 51 apartment units. General Office Building (LUC-710) was used to estimate office vehicle trips based on the proposed 6,900 SF office use. The proposed daycare trips were estimated based on a site-specific rate established using the existing traffic counts from the existing 40-student daycare facility and factored up based on a maximum licensed enrollment of 71 students.

Since the allowable daycare enrollment will be expanded under the proposed condition, a credit was applied to account for the existing daycare trips and was subtracted from the proposed site trips to determine the total proposed net trips for the daycare use. The existing daycare trips were determined based on actual trips counted during TMC data collection. The credit for the existing daycare trips was only applied to the weekday morning and afternoon peak hour trips as the daycare is closed on the weekend. ITE LUC 565 – Day Care Center was considered to estimate proposed day care trips; however, it was determined that the existing day care trip patterns will be more representative of proposed daycare travel patterns. The proposed day care trips are based on the existing day care trip rate determined based on the existing traffic counts and an approved capacity of 71 students. The existing and proposed church trips were assumed to be negligible since the church is only in session on Sunday, outside of the analysis time periods.

Based on the ITE data and after applying the existing daycare trip credit, the proposed development is estimated to generate 78 trips (38 entering, 40 exiting) during the weekday morning peak hour, 91 trips (41 entering, 50 exiting) during the weekday afternoon peak hour, and 21 trips (11 entering, 10 exiting) during the Saturday midday peak hour.

4.3 Arrival and Departure Distribution

The distribution of the proposed traffic entering and exiting the site expected to be generated by the mixed-use development was reviewed based on U.S. Census journey-to-work data for people residing in Portsmouth for the residential uses and based on existing travel patterns and anticipated travel patterns for the office and daycare uses. The trip distribution methodology was previously approved by NHDOT at the traffic study scoping meeting on April 10, 2024. The following arrival/departure distributions are anticipated for the residential uses:

- 30% to/ from the North to Portsmouth Center via US Route 1
- 25% to/ from the South via US Route 1 (Lafayette Road)
- 20% to/ from the West to US Route 4 (Spaulding Turnpike) via US Route 1 Bypass
- 15% to/ from the South to I-95 South via Route 33
- 5% to/ from the West via Route 33
- 5% to/ from the North to I-95 North via US Route 1 Bypass

Based on the residential regional distribution, it is estimated that 55% will access the site to/ from the north via US Route 1, 25% will access the site to/ from the south via US Route 1, and 20% will access the site to/ from the west via Mirona Road.

The following arrival/ departure distribution is anticipated for the office and daycare uses:

- 40% to/ from the North to Portsmouth Center via US Route 1
- 25% to/ from the South via US Route 1 (Lafayette Road)
- 20% to/ from the West to US Route 4 (Spaulding Turnpike) via US Route 1 Bypass
- 5% to/ from the South to I-95 South via Route 33
- 5% to/ from the West via Route 33
- 5% to/ from the North to I-95 North via US Route 1 Bypass

Based on the office/ daycare regional distribution, it is estimated that 65% will access the site to/ from the north via US Route 1, 25% will access the site to/ from the south via US Route 1, and 10% will access the site to/ from the west via Mirona Road.

Figures 5 and 6 present the arrival and departure distributions of the traffic through the study area by intersection movement for residential and commercial traffic, respectively. Figure 7 shows the regional trip distributions for both residential and commercial traffic. Figure 8 and Figure 9 show the proposed site generated traffic distributed to the study area roadways for the weekday morning, weekday afternoon peak periods, and Saturday midday peak periods for the residential and commercial trip distribution, respectively.

4.4 Multimodal Accommodations

Multimodal improvements are proposed on site as part of the proposed development. Internal sidewalks and crosswalks are proposed to connect proposed buildings on site to the existing sidewalk network along Lafayette Road. An accessible sidewalk route is proposed to connect to the existing Lafayette Road sidewalk at the south site driveway. An additional non-accessible connection to the sidewalk network is provided via the existing stairs located approximately 150 feet north of the south site driveway. A COAST bus stop is proposed on the internal site driveway parallel to Lafayette Road. The proposed connections to the existing sidewalk network and internal bus stop are indicated on the Site Plan enclosed in Appendix H.

Section 5
Build Conditions

The anticipated site generated traffic volumes associated with the proposed development were added to the 2026 and 2036 No-Build Conditions traffic volumes to develop the 2026 and 2036 Build Conditions traffic volumes, which are presented in Figures 10 and 11, respectively.

5.1 Capacity and Queue Analyses - Build Condition

Capacity and queue analyses were conducted for the 2026 and 2036 Build Conditions for the peak hours using the methodology described in Section 2.4. Tables 1 and 2 in Section 7 summarize the capacity and queue results, respectively. Capacity analysis worksheets with full inputs, settings, and results are provided in Appendix E.

All study area intersections and a majority of the individual intersection approaches continue to operate at acceptable LOS D or better during the peak hours in the 2026 and 2036 Build Conditions. Study area intersections that were identified in Section 2.4 and 3.2 to operate at LOS E in the 2026 No-Build Conditions continue to operate at the same LOS under 2026 Build Conditions, with the exception of the Lafayette Road southbound left turn movement to the north site driveway, which is predicted to degrade from LOS E to LOS F during the Saturday midday peak hour.

All study area intersection approaches that were identified in Section 2.4 and 3.2 to operate at LOS E or LOS F in the 2036 No-Build Conditions continue to operate at the same LOS under the 2036 Build Conditions, with the exception of the Lafayette Road at southbound left turn movement to the north site driveway, which improves from LOS E to LOS D in the weekday morning, weekday afternoon, and Saturday peak hours.

In both the 2026 and 2036 Build condition, it is important to note that while operations are predicted to improve on the southbound left movement, the overall intersection operations and operations on other approaches are predicted to degrade slightly, while still operating at acceptable levels of LOS D or better.

Design queues on all intersection approaches increased by less than two vehicle lengths or experience increases in design queues that are accommodated within available storage when compared to 2026 and 2036 No-Build Conditions.

Section 6
Conclusions & Recommendations

1. The project proposes to construct a mixed-use development that includes 44 apartment units, seven townhouse units, a daycare with a maximum allowable enrollment of 71 students, and 6,900 SF of office space. The existing residential home on-site will be repurposed to accommodate church services. Surface parking lots will be provided on site. The development is expected to be complete and occupied in 2026.

2. Access to the site will continue to be provided via two driveways to Lafayette Road (US Route 1). The northern driveway is signalized at the intersection with Lafayette Road and Mirona Road. The southern driveway will be converted to an entrance-only driveway.

3. Based on the ITE data, the project is expected to generate 78 trips during the weekday morning peak hour (38 entering, 40 exiting), 91 trips during the weekday afternoon peak hour (41 entering, 50 exiting), and 21 trips during the Saturday midday peak hour (11 entering, 10 exiting).

4. The project proposes internal sidewalk and crosswalk connections to the existing sidewalk network along Lafayette Road, promoting connections to the existing sidewalk network along study area roadways

5. The project proposes to add a COAST bus stop to the proposed site, promoting connections to the local public transit system.

6. Vehicle collision history, compiled from local police reports, do not indicate a significant or notable pattern of collisions in the study area.

7. Consistent with NHDOT guidelines, existing traffic volumes have been seasonally adjusted to the peak month condition. A review of 2024 and 2019 data from the NHDOT continuous count station on Spaulding Turnpike (Route 16) revealed higher or stagnant volumes in 2024; therefore, no adjustment to a pre-pandemic condition was necessary.

8. The capacity analyses show that the study area intersections will continue to operate at the same LOS under Build Conditions as compared to the No-Build Conditions for both the 2026 opening year and 2036 design year, except for the Lafayette Road at Mirona Road/ north site driveway intersection which experiences a minor increase in delay and degradation from LOS E to LOS F in the Saturday midday peak hour in the 2026 Build Condition. Because the intersection is predicted to have adequate capacity under the Build condition in both 2026 and 2036, it is recommended that NHDOT continue to evaluate timing improvements as necessary to provide optimal operations.

9. A review of design queues indicates minor increases of two vehicles or less in the 2026 and 2036 Build Conditions compared to the corresponding No Build Conditions or increases which are accommodated within available storage.

10. Based on the results of the foregoing analysis, it is the professional opinion of Tighe & Bond that the addition of site-generated traffic is expected to have a negligible effect on traffic operations within the study area.

Section 7
Tables

TABLE 1
Intersection Operation Summary - Capacity

	Lane Use	2024 Existing LOS	Delay	V/C	2026 No-Build LOS	Delay	V/C	2026 Build LOS	Delay	V/C	2036 No-Build LOS	Delay	V/C	2036 Build LOS	Delay	V/C
Weekday Morning Peak Hour																
Traffic Signal - Lafayette Rd (US Route 1) at Mirona Rd/ N. Site Driveway																
Overall		**C**	**21.5**	**0.74**	**C**	**21.9**	**0.76**	**C**	**28.2**	**0.79**	**C**	**24.1**	**0.81**	**C**	**32.8**	**0.89**
Mirona Road	EBTL	D	46.6	0.74	D	48.1	0.76	D	48.3	0.76	D	54.8	0.81	D	51.9	0.79
	EBR	C	20.2	0.02	C	20.6	0.02	C	20.8	0.02	C	21.8	0.02	C	21.0	0.02
N. Site Driveway	WB	C	30.0	0.02	C	30.2	0.02	C	32.5	0.28	C	31.4	0.02	C	32.9	0.28
Lafayette Road	NBL	D	41.2	0.35	D	42.1	0.37	D	44.4	0.39	D	45.5	0.43	D	46.8	0.44
(US Route 1)	NBTR	B	17.3	0.67	B	17.7	0.68	C	26.3	0.79	B	19.6	0.74	C	32.7	0.89
Lafayette Road	SBL	E	56.5	0.41	E	58.6	0.43	D	48.0	0.43	E	66.0	0.50	D	49.7	0.44
(US Route 1)	SBTR	C	20.5	0.65	C	20.8	0.66	C	25.1	0.71	C	22.4	0.71	C	28.7	0.79
Unsignalized TWSC - Lafayette Rd (US Route 1) at S. Site Driveway																
S. Site Driveway	WB	A	0.0	--	A	0.0	--	--	--	--	A	0.0	--	--	--	--

TABLE 1 (CONTINUED)
Intersection Operation Summary - Capacity

	Lane Use	2024 Existing LOS	Delay	V/C	2026 No-Build LOS	Delay	V/C	2026 Build LOS	Delay	V/C	2036 No-Build LOS	Delay	V/C	2036 Build LOS	Delay	V/C
Weekday Afternoon Peak Hour																
Traffic Signal - Lafayette Rd (US Route 1) at Mirona Rd/ N. Site Driveway																
Overall		**B**	**19.7**	**0.68**	**B**	**19.8**	**0.68**	**C**	**22.7**	**0.70**	**C**	**20.9**	**0.72**	**C**	**25.4**	**0.77**
Mirona Road	EBTL	D	40.6	0.61	D	42.5	0.63	D	42.8	0.65	D	53.2	0.72	D	51.5	0.73
	EBR	C	21.7	0.02	C	22.5	0.02	C	21.5	0.02	C	26.0	0.02	C	23.7	0.02
N. Site Driveway	WB	C	31.7	0.01	C	32.6	0.01	C	33.2	0.24	D	36.3	0.01	D	35.7	0.24
Lafayette Road	NBL	D	41.8	0.30	D	43.0	0.32	D	43.0	0.32	D	48.1	0.37	D	47.3	0.37
(US Route 1)	NBTR	B	15.9	0.64	B	15.8	0.65	B	19.0	0.70	B	16.3	0.68	C	22.3	0.77
Lafayette Road	SBL	D	49.8	0.15	D	51.3	0.16	D	53.0	0.48	E	55.8	0.16	D	49.5	0.33
(US Route 1)	SBTR	C	20.2	0.68	C	20.1	0.68	C	21.5	0.70	C	20.5	0.70	C	23.0	0.74
Unsignalized TWSC - Lafayette Rd (US Route 1) at S. Site Driveway																
S. Site Driveway	WB	A	0.0	--	A	0.0	--	--	--	--	A	0.0	--	--	--	--

TABLE 1 (CONTINUED)
Intersection Operation Summary - Capacity

	Lane Use	2024 Existing LOS	Delay	V/C	2026 No-Build LOS	Delay	V/C	2026 Build LOS	Delay	V/C	2036 No-Build LOS	Delay	V/C	2036 Build LOS	Delay	V/C
Saturday Peak Hour																
Traffic Signal - Lafayette Rd (US Route 1) at Mirona Rd/ N. Site Driveway																
Overall		**B**	**19.2**	**0.69**	**B**	**19.6**	**0.70**	**C**	**20.5**	**0.70**	**C**	**21.1**	**0.76**	**C**	**22.8**	**0.79**
Mirona Road	EBTL	D	41.5	0.58	D	42.2	0.59	D	43.7	0.62	D	47.0	0.66	D	48.3	0.68
	EBR	C	23.1	0.03	C	23.3	0.03	C	23.2	0.03	C	24.9	0.04	C	24.2	0.04
N. Site Driveway	WB	A	0.0	0.00	A	0.0	0.00	C	34.0	0.04	A	0.0	0.00	D	35.0	0.04
Lafayette Road	NBL	D	43.3	0.38	D	43.7	0.38	D	44.2	0.39	D	47.0	0.45	D	46.6	0.44
(US Route 1)	NBTR	B	16.1	0.69	B	16.4	0.70	B	16.9	0.70	B	18.1	0.76	C	20.6	0.79
Lafayette Road	SBL	E	67.8	0.48	E	68.3	0.48	F	115.0	0.70	E	71.4	0.50	D	52.3	0.33
(US Route 1)	SBTR	B	18.6	0.62	B	18.9	0.63	B	19.2	0.63	B	19.8	0.68	C	20.6	0.69
Unsignalized TWSC - Lafayette Rd (US Route 1) at S. Site Driveway																
S. Site Driveway	WB	A	0.0	--	A	0.0	--	--	--	--	A	0.0	--	--	--	--

Legend
LOS - Level of Service
Delay - average delay per vehicle in seconds
V/C - volume to capacity ratio

TABLE 2
Intersection Operation Summary - Queues (In Feet)

	Lane Use	Available Storage	Weekday Morning Peak Hour									
			2024 Existing		2026 No Build		2026 Build		2036 No Build		2036 Build	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Traffic Signal - Lafayette Rd (US Route 1) at Mirona Rd/ N. Site Driveway												
Mirona Road	EBTL	350	71	181	75	193	89	212	96	225	100	245
	EBR	120	0	0	0	0	0	0	0	0	0	0
N. Site Driveway	WB	250	0	0	0	0	31	37	0	0	32	38
Lafayette Road (US	NBL	475	20	70	21	72	25	72	27	77	27	77
Route 1)	NBTR	1300	148	556	155	576	273	607	205	674	320	706
Lafayette Road (US	SBL	225	4	23	4	23	18	58	5	25	19	60
Route 1)	SBTR	800	188	448	196	483	217	483	246	576	252	576
Unsignalized TWSC - Lafayette Rd (US Route 1) at S. Site Driveway												
S. Site Driveway	WB	75	0	0	0	0	--	--	0	0	--	--

TABLE 2 (CONTINUED)
Intersection Operation Summary - Queues (In Feet)

	Lane Use	Available Storage	Weekday Afternoon Peak Hour									
			2024 Existing		2026 No Build		2026 Build		2036 No Build		2036 Build	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Traffic Signal - Lafayette Rd (US Route 1) at Mirona Rd/ N. Site Driveway												
Mirona Road	EBTL	350	60	169	64	172	69	183	80	189	86	213
	EBR	120	0	3	0	4	0	4	0	6	0	6
N. Site Driveway	WB	250	2	7	2	7	25	27	2	7	28	27
Lafayette Road (US	NBL	475	18	68	19	69	20	69	24	74	25	74
Route 1)	NBTR	1300	140	555	146	581	161	640	179	715	315	751
Lafayette Road (US	SBL	225	1	12	1	12	14	53	2	12	15	53
Route 1)	SBTR	800	212	534	220	576	234	576	266	686	288	686
Unsignalized TWSC - Lafayette Rd (US Route 1) at S. Site Driveway												
S. Site Driveway	WB	75	0	0	0	0	--	--	0	0	--	--

TABLE 2 (CONTINUED)
Intersection Operation Summary - Queues (In Feet)

	Lane Use	Available Storage	Saturday Peak Hour									
			2024 Existing		2026 No Build		2026 Build		2036 No Build		2036 Build	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Traffic Signal - Lafayette Rd (US Route 1) at Mirona Rd/ N. Site Driveway												
Mirona Road	EBTL	350	52	124	54	127	57	130	70	139	73	143
	EBR	120	0	7	0	7	0	7	0	12	0	12
N. Site Driveway	WB	250	0	0	0	0	4	13	0	0	4	13
Lafayette Road (US	NBL	475	23	82	24	83	24	83	30	91	31	91
Route 1)	NBTR	1300	158	662	165	688	171	702	205	816	214	826
Lafayette Road (US	SBL	225	4	26	4	26	7	36	5	28	8	38
Route 1)	SBTR	800	195	490	203	506	207	510	244	628	250	628
Unsignalized TWSC - Lafayette Rd (US Route 1) at S. Site Driveway												
S. Site Driveway	WB	75	0	0	0	0	--	--	0	0	--	--

Legend

50th & 95th - 50th and 95th percentile queue lengths in feet

TABLE 4
Site-Generated Traffic Summary

Existing Daycare - 40 Students			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	18	10	28
Weekday Afternoon	15	25	40
Satruday Midday	NO DATA	NO DATA	NO DATA
Weekday	NO DATA	NO DATA	NO DATA
Saturday	NO DATA	NO DATA	NO DATA

Proposed - 51 Units Apartment			**LUC 220**
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	9	30	39
Weekday Afternoon	26	16	42
Saturday Midday	11	10	21
Weekday	201	201	402
Saturday	116	116	232

Proposed Daycare - 71 Students			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	32	18	50
Weekday Afternoon	27	44	71
Saturday Midday	NO DATA	NO DATA	NO DATA
Weekday	NO DATA	NO DATA	NO DATA
Saturday	NO DATA	NO DATA	NO DATA

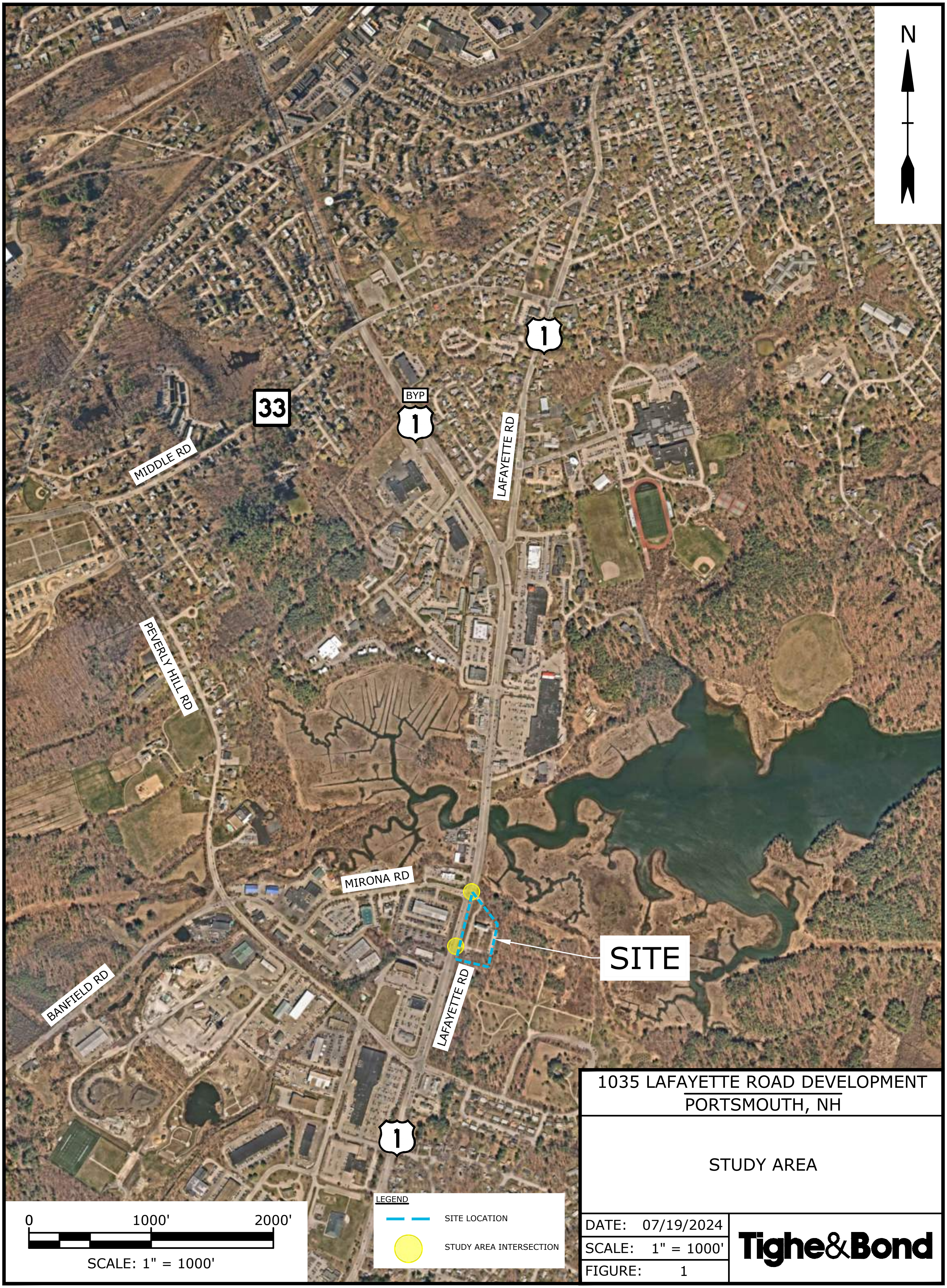
Proposed - 6,900 SF Office Building			**LUC 710**
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	15	2	17
Weekday Afternoon	3	15	18
Saturday Midday	NO DATA	NO DATA	NO DATA
Weekday	57	56	113
Saturday	NO DATA	NO DATA	NO DATA

Proposed Total Trips			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	**56**	**50**	**106**
Weekday Afternoon	**56**	**75**	**131**
Saturday Midday	**11**	**10**	**21**
Weekday	**258**	**257**	**515**
Saturday	**116**	**116**	**232**

Net Vehicular Trips (Proposed minus Existing Daycare Trips)			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	**38**	**40**	**78**
Weekday Afternoon	**41**	**50**	**91**
Saturday Midday	**11**	**10**	**21**
Weekday	**258**	**257**	**515**
Saturday	**116**	**116**	**232**

Source: Institute of Transportation Engineers, Trip Generation, 11th Edition, 2021
Land Use - 220 [Multifamily Housing (Low-Rise)]
710 [General Office Building]

Section 8
Figures



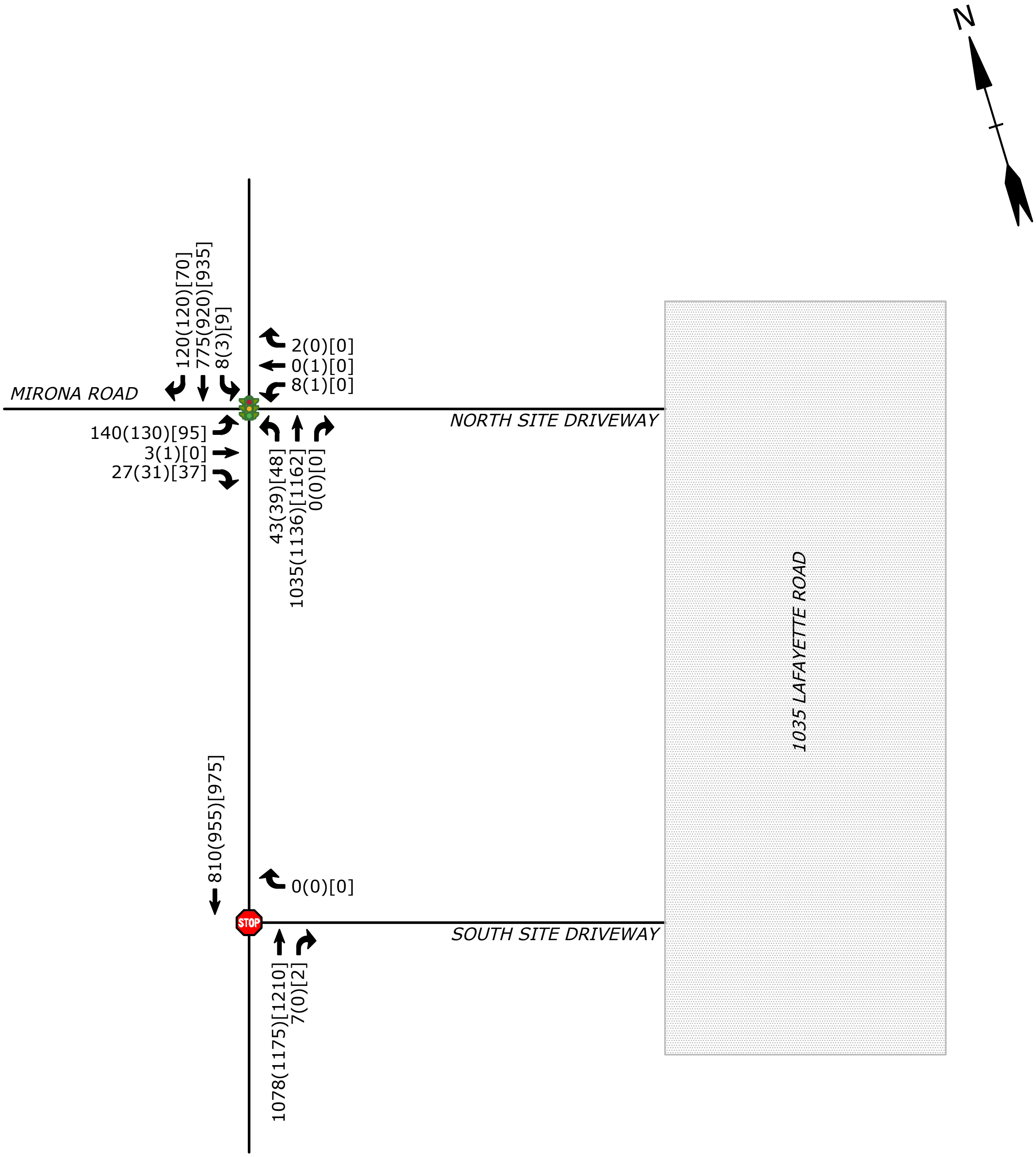
1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

STUDY AREA

DATE:	07/19/2024
SCALE:	1" = 1000'
FIGURE:	1

Tighe&Bond

Jul 18, 2024-12:48pm Plotted By: MBlair
Tighe & Bond, Inc. J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\Figures\P5118-001 Traffic Study Area Figure.dwg



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

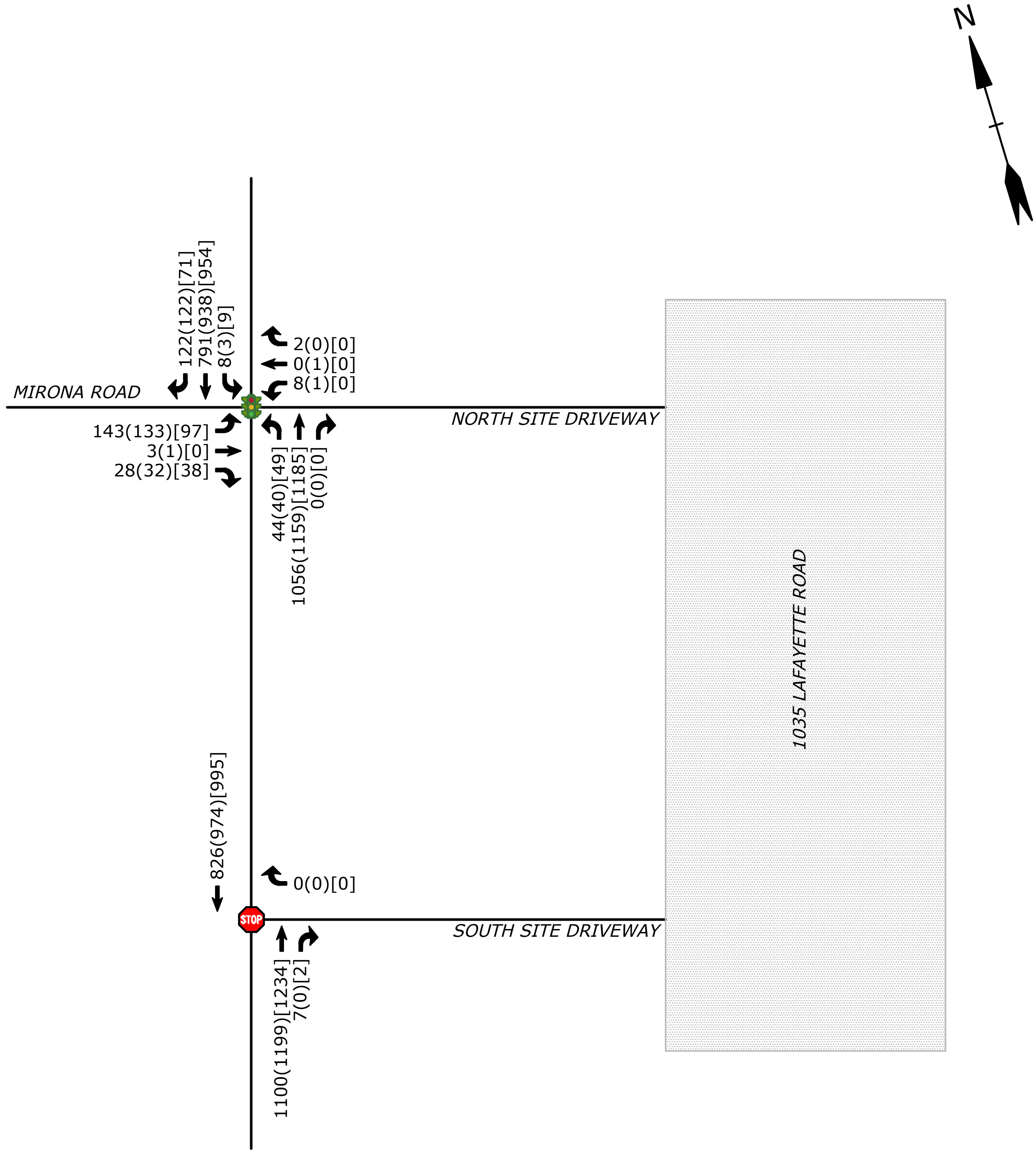
STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

2024 EXISTING
TRAFFIC VOLUMES

DATE: 07/19/2024
SCALE: NTS
FIGURE 2

Tighe&Bond



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

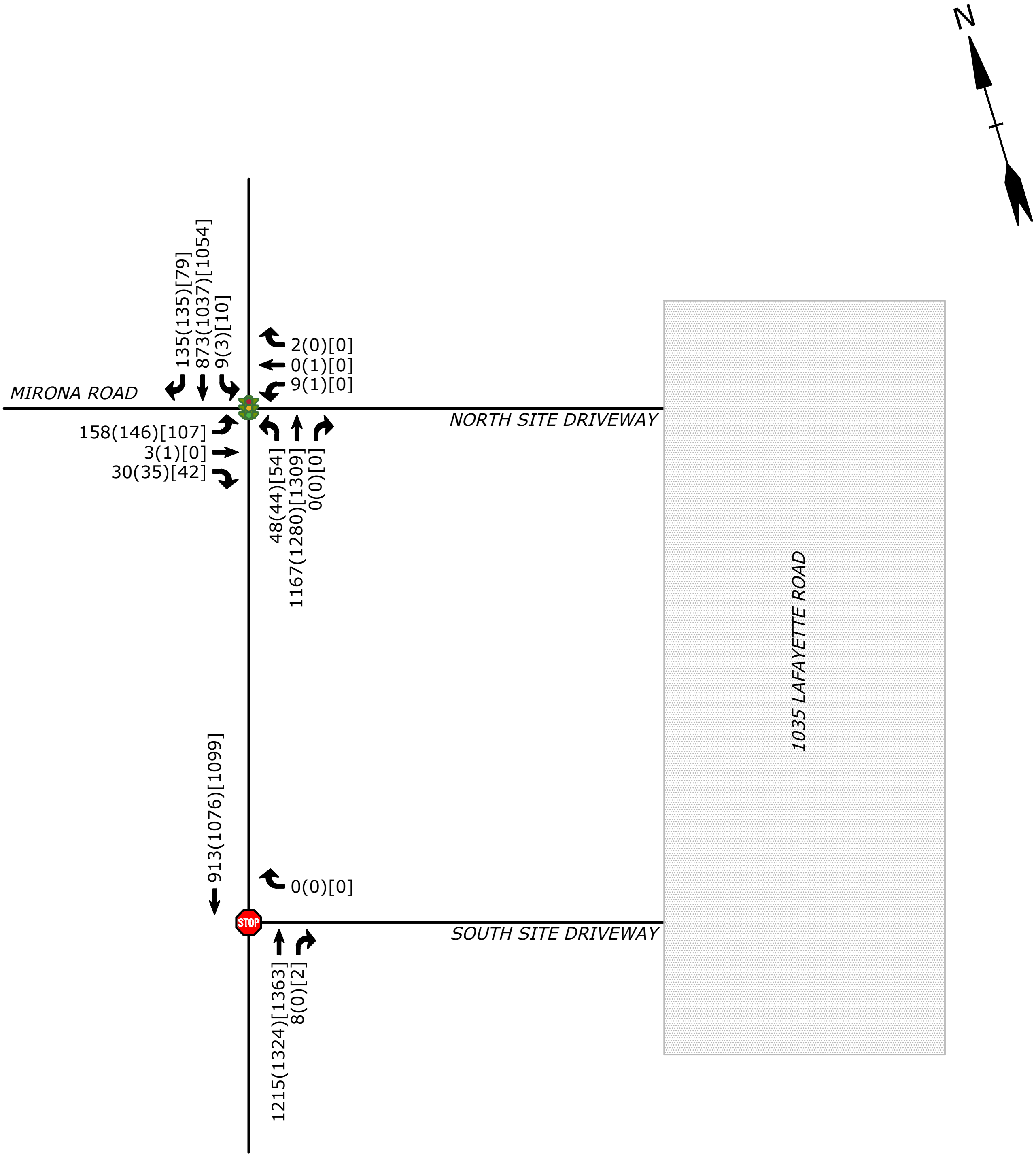
STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

2026 NO BUILD
TRAFFIC VOLUMES

DATE: 07/19/2024
SCALE: NTS
FIGURE 3

Tighe&Bond



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

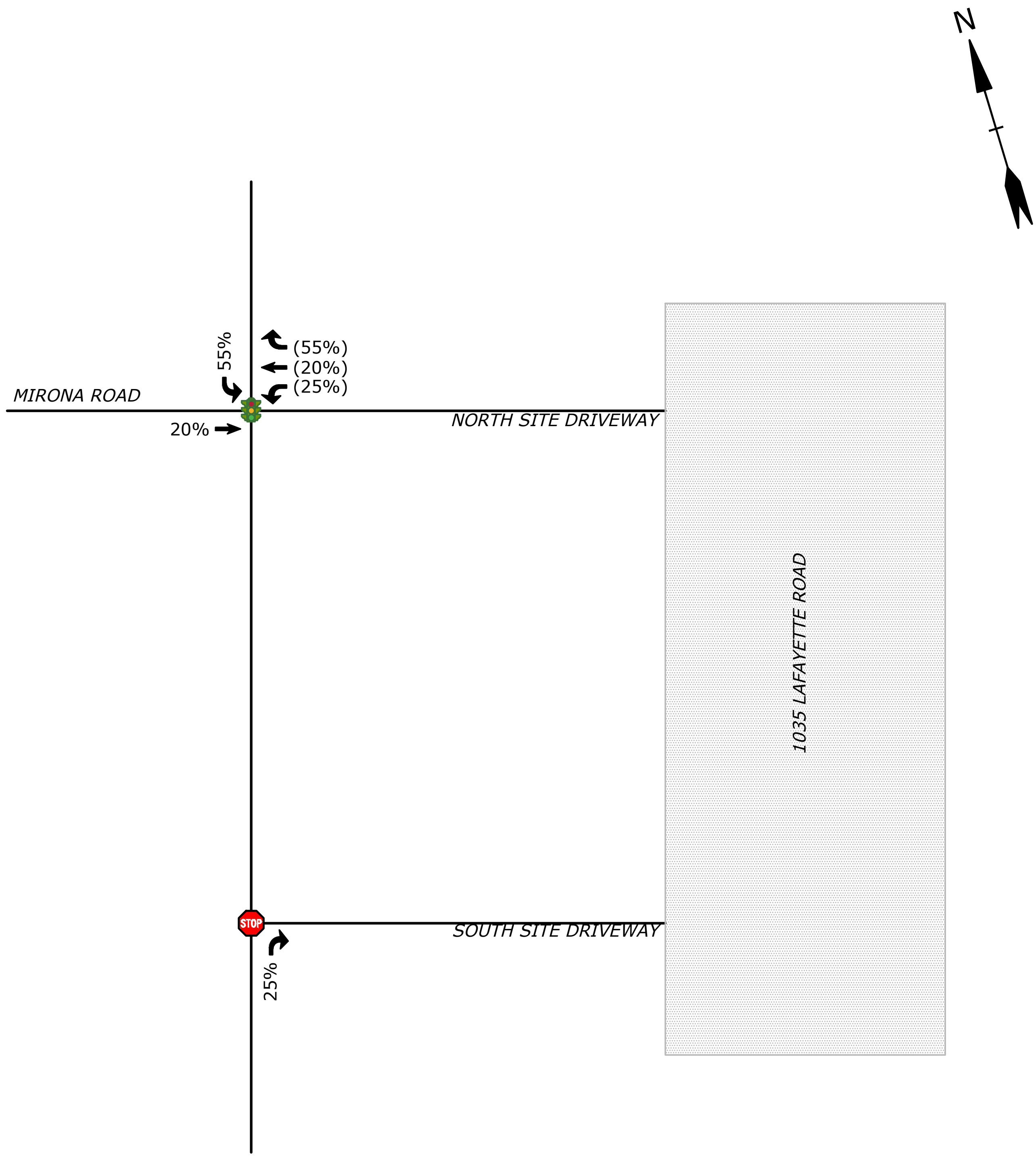
STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

2036 NO BUILD
TRAFFIC VOLUMES

DATE: 07/19/2024
SCALE: NTS
FIGURE 4

Tighe&Bond



LEGEND

VOLUMES: ENTERING (EXITING)

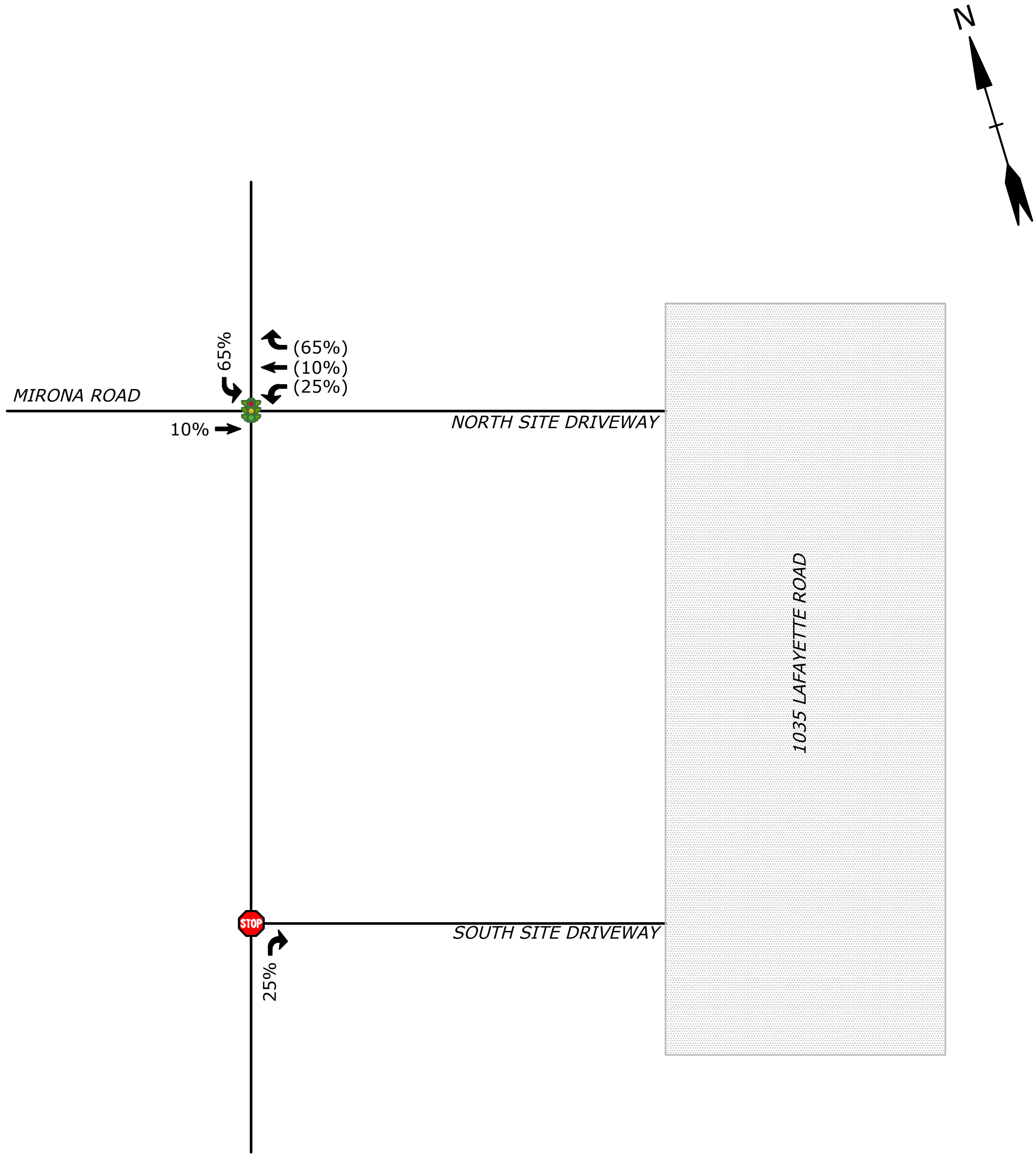
TRAFFIC SIGNAL

STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

RESIDENTIAL ARRIVAL & DEPARTURE TRIP DISTRIBUTION

DATE: 07/19/2024	Tighe&Bond
SCALE: NTS	
FIGURE 5	



LEGEND

VOLUMES: ENTERING (EXITING)

TRAFFIC SIGNAL

STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

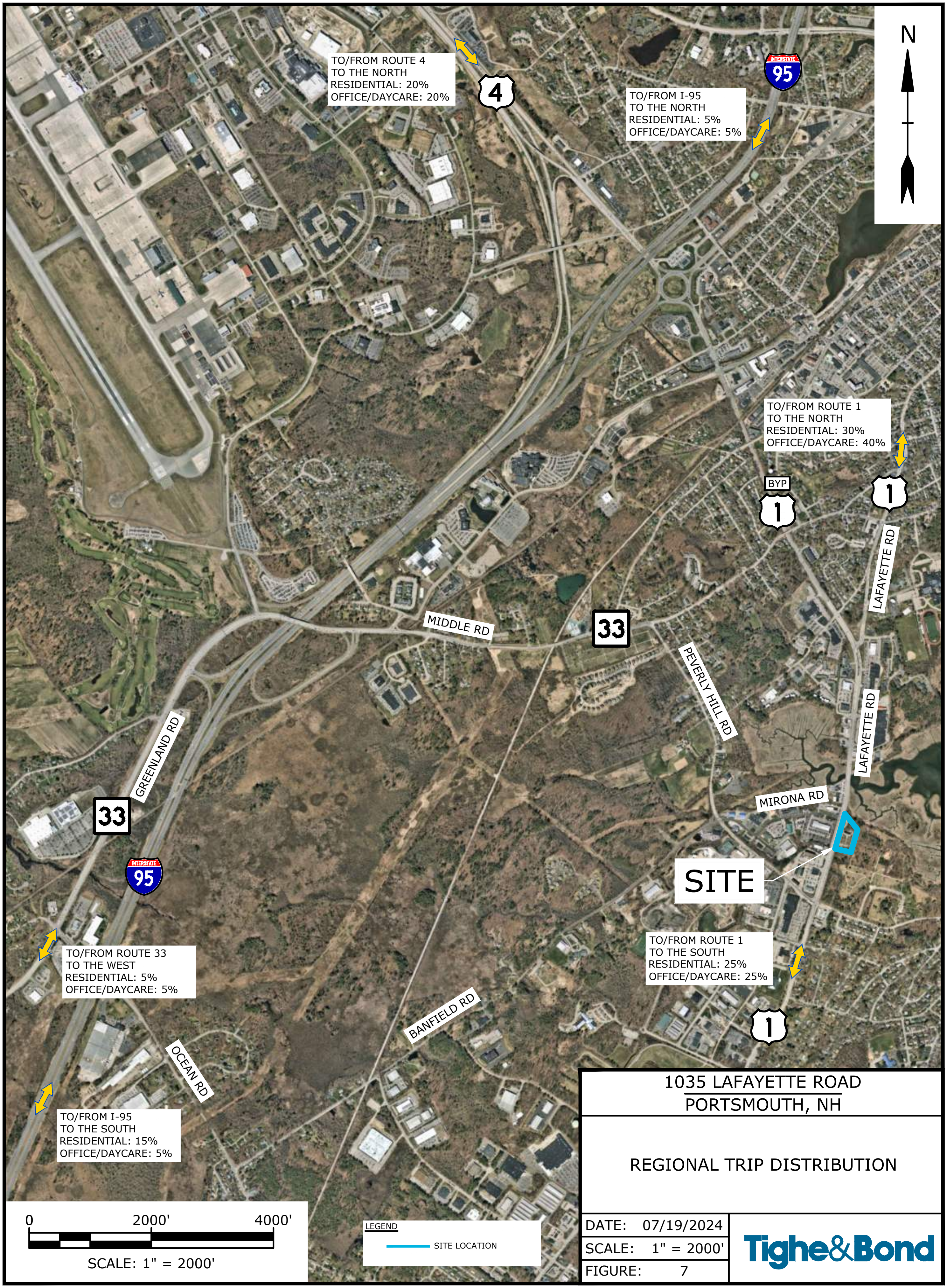
COMMERCIAL ARRIVAL & DEPARTURE TRIP DISTRIBUTION

DATE: 07/19/2024

SCALE: NTS

FIGURE 6

Tighe&Bond



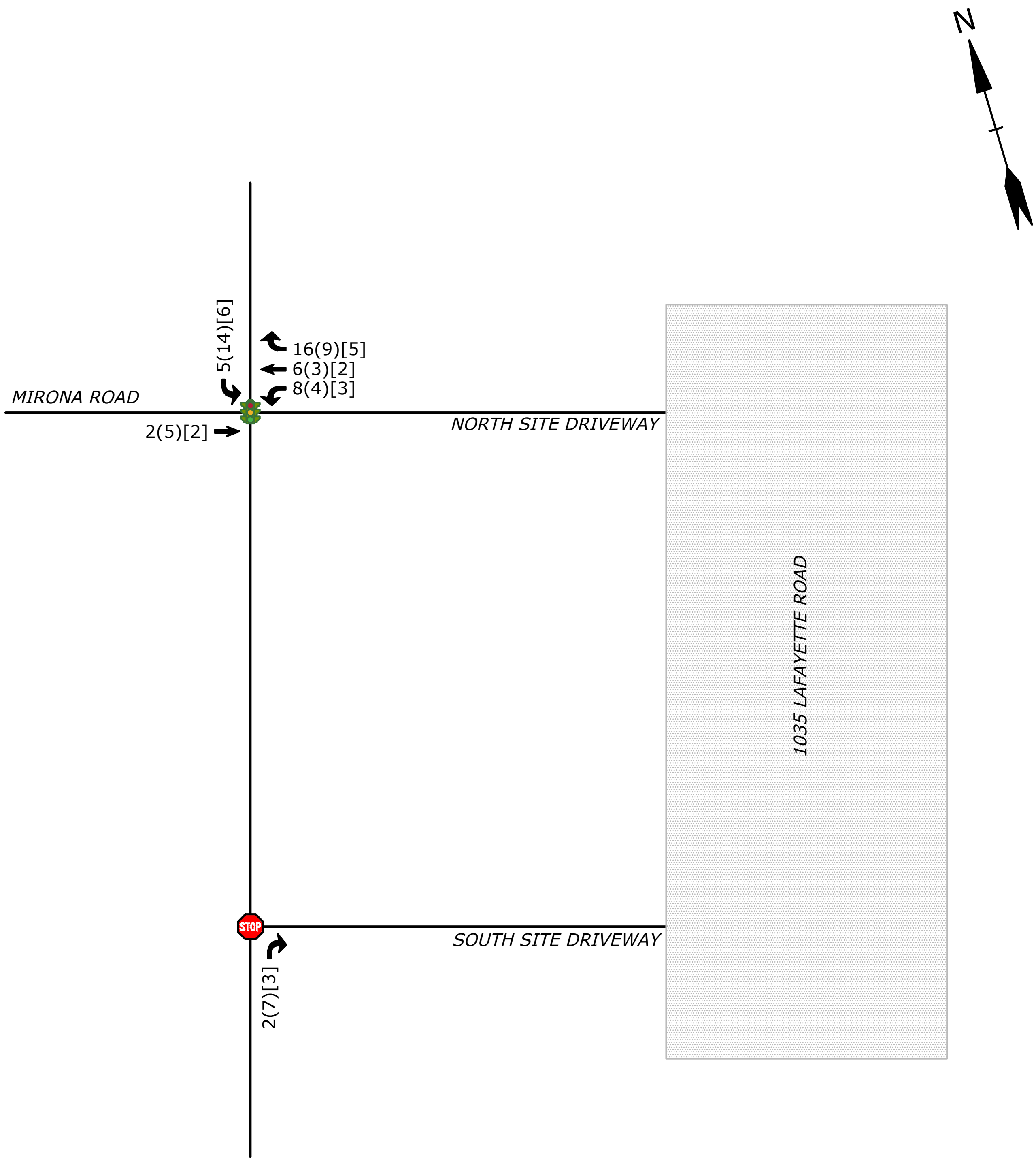
1035 LAFAYETTE ROAD
PORTSMOUTH, NH

REGIONAL TRIP DISTRIBUTION

DATE: 07/19/2024
SCALE: 1" = 2000'
FIGURE: 7

Tighe&Bond

Jul 19, 2024-11:47am Plotted By: MFoley
Tighe & Bond, Inc. J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\Figures\P5118-001 Volume Figures.dwg



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

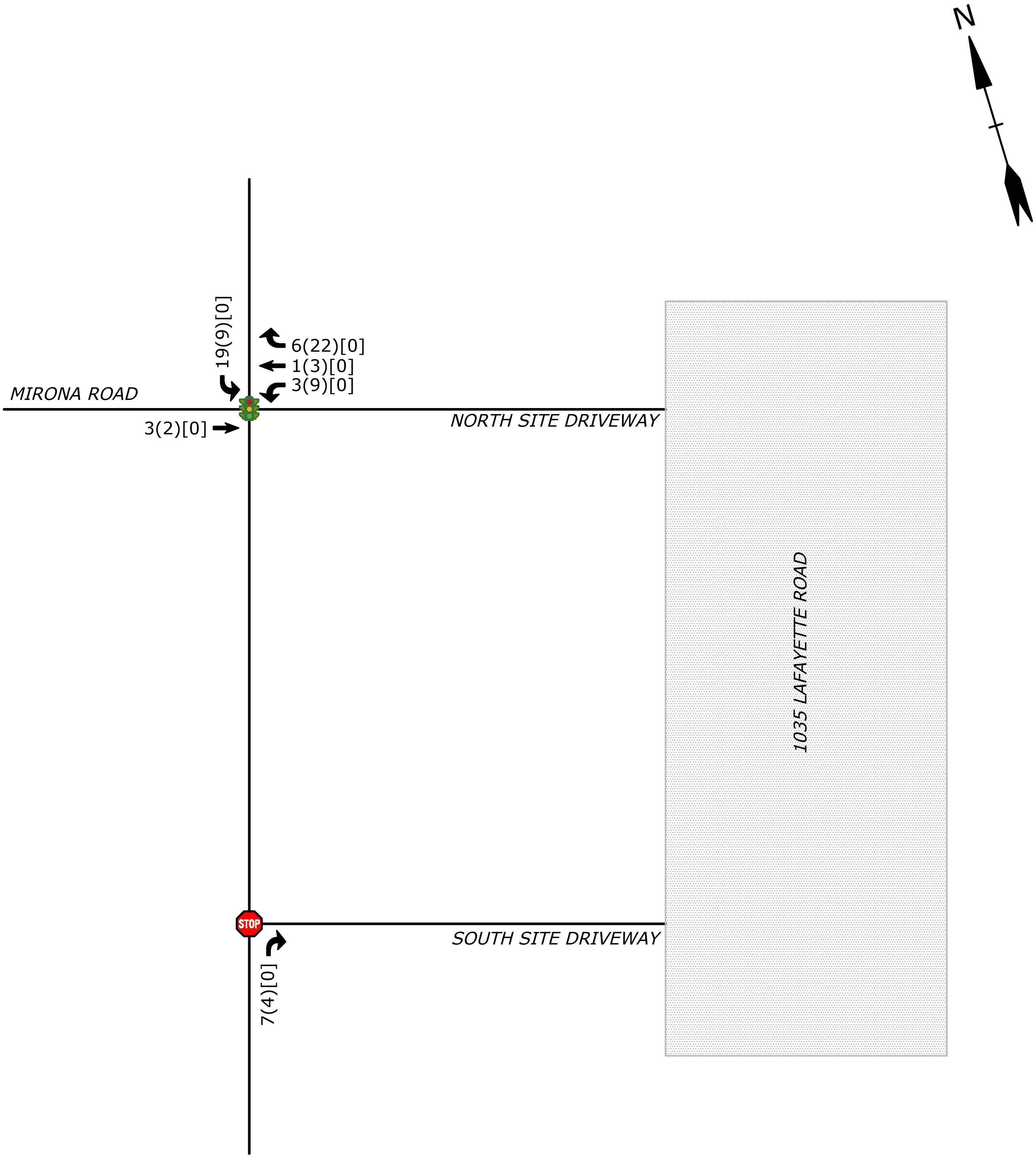
RESIDENTIAL SITE GENERATED
TRAFFIC VOLUMES

DATE: 07/19/2024

SCALE: NTS

FIGURE 8

Tighe&Bond



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

STOP SIGN

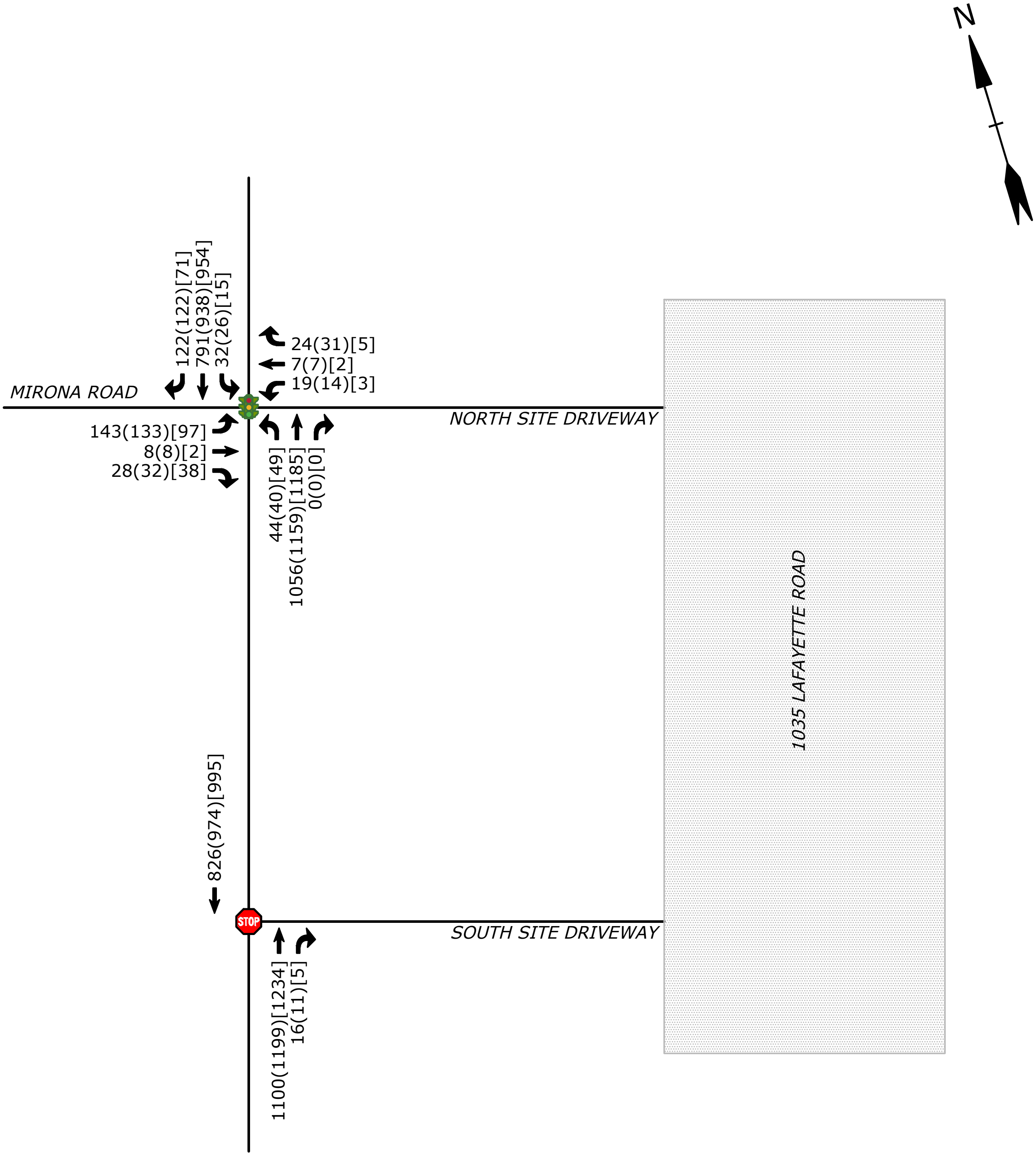
1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

COMMERCIAL SITE GENERATED
TRAFFIC VOLUMES

DATE: 07/19/2024
SCALE: NTS
FIGURE 9

Tighe&Bond

Jul 19, 2024-11:47am Plotted By: MFoley
Tighe & Bond, Inc. J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\Figures\P5118-001 Volume Figures.dwg



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

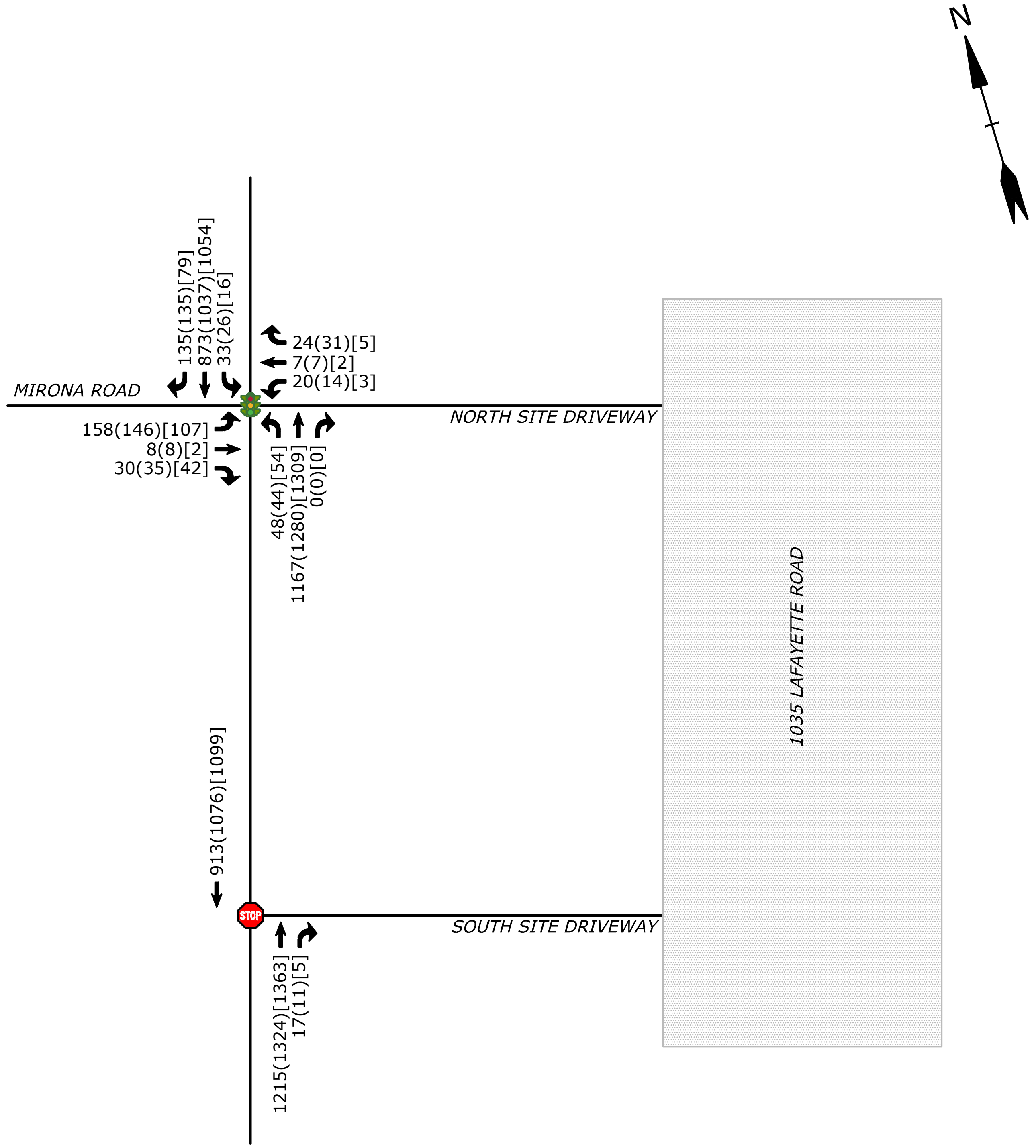
2026 BUILD
TRAFFIC VOLUMES

DATE: 07/19/2024

SCALE: NTS

FIGURE 10

Tighe&Bond



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

STOP SIGN

1035 LAFAYETTE ROAD DEVELOPMENT
PORTSMOUTH, NH

2036 BUILD
TRAFFIC VOLUMES

DATE: 07/19/2024
SCALE: NTS
FIGURE 11

Tighe&Bond

APPENDIX A

Traffic Count Data

BOSTON TRAFFIC DATA	BTD ID: 1501_1_TB	Portsmouth, NH	# of TMC's: 02	Client: Tighe & Bond
		Collected on April 17-18 & 20, 2024	# of ATR's: 02	Contact: Matthew Stoutz, PE, PTOE, RSP1

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 1
Location:	Portsmouth, NH
Street 1:	Lafayette Road (US Route 1)
Street 2:	Christ Episcopal Church South Drive
Count Date:	4/18/2024
Day of Week:	Thursday
Weather:	Cloudy, 50°F

PASSENGER CARS & HEAVY VEHICLES COMBINED

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	145	0	0	0	107	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	177	2	0	0	139	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	180	1	0	0	155	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	249	5	0	0	170	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	261	1	0	0	194	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	273	0	0	0	202	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	202	0	0	0	177	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	204	2	0	0	218	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	280	0	0	0	191	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	275	0	0	0	228	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	264	0	0	0	238	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	257	0	0	0	217	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	269	3	0	0	202	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	243	0	0	0	206	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	257	3	0	0	203	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	250	3	0	0	219	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	217	1	0	0	236	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	246	0	0	0	228	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	230	0	0	0	233	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	187	0	0	0	170	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**985**	**6**	**0**	**0**	**743**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.91**				**0.92**				**0.00**				**0.00**			
HV %	**0.0%**	**0.0%**	**4.8%**	**0.0%**	**0.0%**	**0.0%**	**4.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 3:15 PM to 4:15 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**1065**	**3**	**0**	**0**	**885**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.97**				**0.93**				**0.00**				**0.00**			
HV %	**0.0%**	**0.0%**	**1.7%**	**0.0%**	**0.0%**	**0.0%**	**2.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 1
Location:	Portsmouth, NH
Street 1:	Lafayette Road (US Route 1)
Street 2:	Christ Episcopal Church South Drive
Count Date:	4/18/2024
Day of Week:	Thursday
Weather:	Cloudy, 50°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

HEAVY VEHICLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	11	0	0	0	7	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	15	0	0	0	8	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	24	0	0	0	4	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	13	0	0	0	10	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	12	0	0	0	10	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	9	0	0	0	8	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	13	0	0	0	8	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	11	0	0	0	10	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	6	0	0	0	7	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	6	0	0	0	9	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	2	0	0	0	5	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:15 AM to 8:15 AM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**64**	**0**	**0**	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.67**				**0.80**				**0.00**				**0.00**			

PM PEAK HOUR 3:00 PM to 4:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**22**	**0**	**0**	**0**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.92**				**0.61**				**0.00**				**0.00**			

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 1501_1_TB
BTD #: Location 1
Location: Portsmouth, NH
Street 1: Lafayette Road (US Route 1)
Street 2: Christ Episcopal Church South Drive
Count Date: 4/18/2024
Day of Week: Thursday
Weather: Cloudy, 50°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1

AM PEAK HOUR 7:45 AM to 8:45 AM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2

PM PEAK HOUR 3:15 PM to 4:15 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 1
Location:	Portsmouth, NH
Street 1:	Lafayette Road (US Route 1)
Street 2:	Christ Episcopal Church South Drive
Count Date:	4/20/2024
Day of Week:	Saturday
Weather:	Cloudy, 50°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
11:00 AM	0	0	275	0	0	0	208	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	250	1	0	0	201	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	254	0	0	0	210	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	253	1	0	0	198	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	272	0	0	0	212	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	257	0	0	0	212	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	317	2	0	0	240	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	263	0	0	0	232	0	0	0	0	0	0	0	0	1

MID PEAK HOUR	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
12:00 PM to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
1:00 PM	**0**	**0**	**1109**	**2**	**0**	**0**	**896**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
PHF	**0.87**				**0.93**				**0.00**				**0.25**			
HV %	**0.0%**	**0.0%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**	**0.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 1501_1_TB
BTD #: Location 1
Location: Portsmouth, NH
Street 1: Lafayette Road (US Route 1)
Street 2: Christ Episcopal Church South Drive
Count Date: 4/20/2024
Day of Week: Saturday
Weather: Cloudy, 50°F

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HEAVY VEHICLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
11:00 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0

MID PEAK HOUR 11:30 AM to 12:30 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**4**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.75**				**0.00**				**0.00**			

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 1501_1_TB
BTD #: Location 1
Location: Portsmouth, NH
Street 1: Lafayette Road (US Route 1)
Street 2: Christ Episcopal Church South Drive
Count Date: 4/20/2024
Day of Week: Saturday
Weather: Cloudy, 50°F

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PEDESTRIANS & BICYCLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MID PEAK HOUR 12:00 PM to 1:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Eastbound				Christ Episcopal Church South Driveway Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 2
Location:	Portsmouth, NH
Street 1:	Lafayette Road & Mirona Road
Street 2:	Christ Episcopal Church North Drive
Count Date:	4/18/2024
Day of Week:	Thursday
Weather:	Cloudy, 50°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	9	136	0	2	2	108	12	0	7	0	1	0	0	0	1
7:15 AM	0	11	169	0	0	1	143	18	0	12	0	4	0	0	0	0
7:30 AM	0	9	166	0	0	1	138	27	0	27	0	8	0	0	0	2
7:45 AM	0	12	236	0	0	3	166	30	0	29	1	1	0	2	0	0
8:00 AM	0	10	254	0	0	1	187	20	0	40	2	6	0	3	0	2
8:15 AM	0	9	264	0	1	1	191	36	0	32	0	9	0	1	0	0
8:30 AM	0	8	195	0	0	1	167	26	0	26	0	9	0	1	0	0
8:45 AM	0	14	191	0	0	0	210	31	0	23	0	6	0	1	0	1
3:00 PM	1	11	264	0	1	0	187	30	0	36	0	3	0	1	0	0
3:15 PM	1	7	273	0	1	0	218	22	0	25	0	9	0	0	0	0
3:30 PM	0	9	255	0	1	0	228	27	0	29	1	9	0	0	0	0
3:45 PM	1	6	250	0	0	0	212	30	0	31	0	7	0	0	1	0
4:00 PM	0	4	265	0	2	0	194	24	0	35	0	5	0	0	0	0
4:15 PM	0	13	220	0	2	1	194	20	0	42	1	9	0	3	0	0
4:30 PM	0	10	258	0	2	3	195	26	0	41	1	7	0	1	3	5
4:45 PM	0	9	238	0	0	1	207	22	0	40	0	13	0	1	0	3
5:00 PM	0	4	216	0	0	0	221	26	0	33	0	12	0	1	3	6
5:15 PM	0	11	235	0	0	0	221	30	0	26	0	8	0	0	0	0
5:30 PM	0	6	224	0	0	0	223	13	0	32	0	9	0	0	0	0
5:45 PM	0	7	182	0	1	0	162	13	0	26	0	9	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**39**	**949**	**0**	**1**	**6**	**711**	**112**	**0**	**127**	**3**	**25**	**0**	**7**	**0**	**2**
PHF	**0.90**				**0.91**				**0.81**				**0.45**			
HV %	**0.0%**	**0.0%**	**5.1%**	**0.0%**	**0.0%**	**0.0%**	**4.8%**	**2.7%**	**0.0%**	**3.9%**	**0.0%**	**12.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 3:00 PM to 4:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	3	**33**	**1042**	**0**	**3**	**0**	**845**	**109**	**0**	**121**	**1**	**28**	**0**	**1**	**1**	**0**
PHF	**0.96**				**0.93**				**0.96**				**0.50**			
HV %	**0.0%**	**3.0%**	**2.0%**	**0.0%**	**0.0%**	**0.0%**	**2.5%**	**0.9%**	**0.0%**	**0.0%**	**0.0%**	**3.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 1501_1_TB
BTD #: Location 2
Location: Portsmouth, NH
Street 1: Lafayette Road & Mirona Road
Street 2: Christ Episcopal Church North Drive
Count Date: 4/18/2024
Day of Week: Thursday
Weather: Cloudy, 50°F

BOSTON TRAFFIC DATA
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HEAVY VEHICLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	10	0	0	0	7	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	16	0	0	0	7	1	0	1	0	1	0	0	0	0
7:30 AM	0	1	22	0	0	0	4	0	0	1	0	0	0	0	0	0
7:45 AM	0	0	14	0	0	0	10	0	0	2	0	0	0	0	0	0
8:00 AM	0	0	12	0	0	0	10	3	0	1	0	0	0	0	0	0
8:15 AM	0	0	9	0	0	0	8	0	0	0	0	1	0	0	0	0
8:30 AM	0	0	13	0	0	0	6	0	0	2	0	2	0	0	0	0
8:45 AM	0	0	11	0	0	0	9	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	6	0	0	0	7	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0
3:30 PM	0	1	5	0	0	0	8	1	0	0	0	1	0	0	0	0
3:45 PM	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	1	0	0	0	5	1	0	1	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	2	0	0	1	0	0	0	0	0	0
4:30 PM	0	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	2	0	0	0	3	1	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:15 AM to 8:15 AM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**64**	**0**	**0**	**0**	**31**	**4**	**0**	**5**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.71**				**0.67**				**0.75**				**0.00**			

PM PEAK HOUR 3:00 PM to 4:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**21**	**0**	**0**	**0**	**21**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.92**				**0.61**				**0.25**				**0.00**			

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 2
Location:	Portsmouth, NH
Street 1:	Lafayette Road & Mirona Road
Street 2:	Christ Episcopal Church North Drive
Count Date:	4/18/2024
Day of Week:	Thursday
Weather:	Cloudy, 50°F

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PEDESTRIANS & BICYCLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3

PM PEAK HOUR 3:00 PM to 4:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 2
Location:	Portsmouth, NH
Street 1:	Lafayette Road & Mirona Road
Street 2:	Christ Episcopal Church North Drive
Count Date:	4/20/2024
Day of Week:	Saturday
Weather:	Cloudy, 50°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
11:00 AM	1	12	262	0	0	0	201	12	0	20	0	9	0	0	0	0
11:15 AM	0	10	240	0	1	0	191	8	0	21	0	6	0	0	0	0
11:30 AM	0	9	242	0	2	0	201	22	0	30	0	9	0	0	0	0
11:45 AM	0	9	249	0	0	0	195	17	0	22	0	5	0	0	0	0
12:00 PM	0	13	253	0	0	0	200	17	0	12	0	10	0	0	0	0
12:15 PM	0	11	252	0	1	0	208	16	0	27	0	4	0	0	0	0
12:30 PM	0	13	304	0	2	0	230	15	0	17	0	10	0	0	0	0
12:45 PM	0	7	257	0	4	1	222	17	0	31	0	10	0	0	0	0

MID PEAK HOUR 12:00 PM to 1:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**44**	**1066**	**0**	**7**	**1**	**860**	**65**	**0**	**87**	**0**	**34**	**0**	**0**	**0**	**0**
PHF	**0.88**				**0.94**				**0.74**				**0.00**			
HV %	**0.0%**	**0.0%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**	**0.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 1501_1_TB
BTD #: Location 2
Location: Portsmouth, NH
Street 1: Lafayette Road & Mirona Road
Street 2: Christ Episcopal Church North Drive
Count Date: 4/20/2024
Day of Week: Saturday
Weather: Cloudy, 50°F

BOSTON TRAFFIC DATA
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HEAVY VEHICLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
11:00 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
11:30 AM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0

MID PEAK HOUR 11:00 AM to 12:00 PM	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**5**	**0**	**0**	**0**	**4**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.63**				**0.63**				**0.25**				**0.00**			

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	1501_1_TB
BTD #:	Location 2
Location:	Portsmouth, NH
Street 1:	Lafayette Road & Mirona Road
Street 2:	Christ Episcopal Church North Drive
Count Date:	4/20/2024
Day of Week:	Saturday
Weather:	Cloudy, 50°F

BOSTON
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PEDESTRIANS & BICYCLES

	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MID PEAK HOUR	Lafayette Road (US Route 1) Northbound				Lafayette Road (US Route 1) Southbound				Mirona Road Eastbound				Christ Episcopal Church North Driveway Westbound			
12:00 PM to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Volume Report

Job 1501_1_TB_ATR 1 & 2
Area Portsmouth, NH
Location Lafayette Road, south of Mirona Road

BOSTON TRAFFIC DATA

Tuesday, April 30, 2024

Time	NB Bike	NB Motorcycle	NB Automobile	NB Bus	NB Single-Unit Truck	NB Multi-Unit Truck	NB Total Volume	SB Bike	SB Motorcycle	SB Automobile	SB Bus	SB Single-Unit Truck	SB Multi-Unit Truck	SB Total Volume
0000	0	0	4	0	1	0	5	0	0	8	0	2	0	10
0015	0	0	8	0	4	0	12	0	0	9	0	3	1	13
0030	0	0	9	0	4	0	13	0	0	8	0	4	0	12
0045	0	0	7	0	7	1	15	0	0	7	0	6	0	13
0100	0	0	1	0	5	0	6	0	0	8	0	4	2	14
0115	0	0	4	0	3	1	8	0	1	8	0	8	0	17
0130	0	0	3	0	6	0	9	0	0	7	0	4	0	11
0145	0	0	5	0	0	1	6	0	0	5	0	2	1	8
0200	0	0	7	0	4	0	11	0	0	1	0	3	1	5
0215	0	0	4	0	4	2	10	0	0	7	0	4	1	12
0230	0	0	5	0	7	1	13	0	0	2	0	4	1	7
0245	0	0	3	0	3	1	7	0	0	3	0	4	0	7
0300	0	0	16	0	0	1	17	0	0	4	0	3	0	7
0315	0	0	8	0	1	0	9	0	0	2	0	1	0	3
0330	0	0	13	0	5	0	18	0	0	3	0	2	1	6
0345	0	0	12	0	1	0	13	0	0	8	0	2	0	10
0400	0	0	9	0	1	0	10	0	0	4	0	1	0	5
0415	0	0	13	0	1	0	14	0	0	5	0	2	0	7
0430	0	0	33	0	1	0	34	0	0	15	0	1	0	16
0445	0	0	16	0	0	1	17	0	0	19	0	2	1	22
0500	0	2	43	0	2	0	47	0	1	37	0	1	3	42
0515	0	0	55	0	0	0	55	0	0	44	0	1	0	45
0530	0	0	61	0	2	0	63	0	0	39	0	1	1	41
0545	1	1	53	0	3	0	58	0	0	63	0	0	0	63
0600	0	0	61	0	6	0	67	0	0	53	0	1	0	54
0615	0	1	84	0	2	1	88	0	0	63	1	3	2	69
0630	2	0	100	1	3	1	107	0	1	76	0	1	2	80
0645	0	0	115	0	4	0	119	0	0	124	1	3	0	128
0700	0	1	123	2	1	1	128	0	0	116	3	5	2	126
0715	0	0	157	2	16	1	176	0	0	154	2	5	1	162
0730	0	1	193	2	12	2	210	0	0	153	0	6	2	161
0745	0	0	225	0	12	2	239	0	1	171	1	4	3	180
0800	0	0	245	3	7	4	259	0	0	173	2	3	1	179
0815	0	0	306	3	4	1	314	0	0	194	3	1	1	199
0830	0	0	209	3	2	3	217	0	0	177	5	8	3	193
0845	0	0	211	1	10	1	223	0	0	184	0	5	4	193
0900	0	0	178	0	12	1	191	0	0	168	1	4	2	175
0915	0	0	190	0	4	4	198	0	0	188	0	7	0	195
0930	0	0	199	3	8	2	212	0	0	142	0	4	1	147
0945	0	0	204	0	10	3	217	0	0	184	1	4	0	189
1000	0	1	184	1	5	2	193	0	0	156	2	3	4	165
1015	1	0	214	0	7	3	225	0	0	178	2	9	6	195
1030	0	0	199	2	10	1	212	0	1	197	0	4	2	204
1045	0	0	231	0	6	3	240	0	0	192	0	3	7	202
1100	0	0	212	1	9	1	223	0	0	181	0	7	2	190
1115	0	0	223	1	11	6	241	0	0	193	0	8	3	204
1130	0	0	226	1	7	2	236	0	0	184	1	4	2	191
1145	0	0	221	0	3	3	227	0	0	203	1	2	2	208
1200	0	0	202	1	8	2	213	0	0	200	1	8	1	210
1215	0	0	238	4	5	4	251	0	0	202	0	9	2	213
1230	0	0	210	2	10	1	223	0	1	233	0	3	4	241
1245	0	0	242	0	4	5	251	0	0	224	2	5	1	232
1300	0	0	244	0	5	0	249	0	0	200	1	5	3	209
1315	0	0	238	1	4	4	247	0	1	190	1	3	2	197
1330	0	0	232	1	5	1	239	0	1	184	0	4	4	193
1345	1	0	216	1	9	1	228	0	0	208	0	2	2	212
1400	0	0	214	1	4	3	222	0	0	225	5	5	3	238
1415	0	0	222	1	2	0	225	0	0	201	2	4	0	207
1430	0	0	227	2	5	3	237	0	0	216	2	3	2	223
1445	0	1	265	3	2	3	274	0	0	214	0	8	1	223
1500	0	0	235	2	2	0	239	0	0	221	2	1	0	224
1515	0	0	248	3	3	1	255	0	0	224	1	5	2	232
1530	0	0	260	2	4	0	266	0	0	265	3	6	1	275
1545	0	0	249	1	3	2	255	0	0	250	0	1	2	253
1600	0	0	288	2	1	0	291	1	0	214	1	1	1	218
1615	0	0	257	0	3	0	260	0	1	235	1	1	0	238
1630	2	1	255	3	1	1	263	0	0	246	0	0	1	247
1645	2	3	267	1	0	1	274	0	0	243	0	0	0	243
1700	0	0	294	0	2	0	296	0	1	281	1	1	3	287
1715	1	0	278	0	0	1	280	0	0	249	0	4	0	253
1730	0	1	242	1	2	2	248	0	0	231	0	1	0	232
1745	0	1	189	0	0	2	192	0	0	180	0	0	0	180
1800	0	1	216	1	0	0	218	0	0	184	1	0	0	185
1815	0	2	182	0	3	0	187	0	1	171	0	0	1	173
1830	0	0	200	1	0	0	201	0	1	142	0	0	0	143
1845	0	0	149	0	0	0	149	0	0	149	0	0	0	149
1900	0	0	153	0	0	1	154	0	0	128	1	0	0	129
1915	0	0	138	0	0	1	139	0	0	103	0	0	0	103
1930	0	0	121	1	0	0	122	0	0	113	0	0	0	113
1945	0	1	123	0	0	0	124	0	0	100	0	1	0	101
2000	0	0	103	0	0	0	103	0	0	123	1	0	1	125
2015	0	0	102	0	0	0	102	0	0	78	0	0	1	79
2030	0	1	60	1	0	3	65	0	0	82	0	0	0	82
2045	0	0	58	0	0	0	58	0	0	49	0	0	0	49
2100	0	0	64	0	0	0	64	0	0	60	0	1	0	61
2115	0	0	59	0	0	0	59	0	0	46	0	0	0	46
2130	0	0	67	0	0	0	67	0	0	46	0	1	0	47
2145	0	0	45	0	0	0	45	0	0	52	0	0	0	52
2200	0	0	41	0	0	0	41	0	0	36	0	0	0	36
2215	0	0	34	0	0	1	35	0	0	30	0	0	0	30
2230	0	0	25	0	1	0	26	0	0	24	0	0	0	24
2245	0	0	19	0	0	0	19	0	0	21	0	0	0	21
2300	0	0	13	0	0	0	13	0	0	22	0	0	0	22
2315	0	0	18	0	0	0	18	0	0	14	0	0	1	15
2330	0	0	13	0	0	0	13	0	0	9	0	1	0	10
2345	0	0	12	0	0	1	13	0	0	11	0	0	0	11
Total	**10**	**19**	**12729**	**62**	**324**	**101**	**13245**	**1**	**12**	**11249**	**52**	**253**	**104**	**11671**

Volume Report

Job 1501_1_TB_ATR 1 & 2
Area Portsmouth, NH
Location Lafayette Road, south of Mirona Road

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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Wednesday, May 1, 2024

Time	NB Bike	NB Motorcycle	NB Automobile	NB Bus	NB Single-Unit Truck	NB Multi-Unit Truck	NB Total Volume	SB Bike	SB Motorcycle	SB Automobile	SB Bus	SB Single-Unit Truck	SB Multi-Unit Truck	SB Total Volume
0000	0	0	9	0	0	0	9	0	0	8	0	0	0	8
0015	0	0	8	0	0	0	8	0	0	8	0	0	0	8
0030	0	0	8	0	0	0	8	0	0	14	0	0	0	14
0045	0	0	5	0	0	0	5	0	0	3	0	0	1	4
0100	0	0	3	0	0	1	4	0	0	4	0	0	0	4
0115	0	0	2	0	0	0	2	0	0	4	0	1	1	6
0130	0	0	7	0	0	0	7	0	0	5	0	0	0	5
0145	0	0	0	0	1	1	2	0	0	5	0	0	1	6
0200	0	0	4	0	0	0	4	0	0	6	0	0	0	6
0215	0	0	11	0	1	1	13	0	0	5	0	1	0	6
0230	0	0	4	0	1	0	5	0	0	1	0	0	0	1
0245	0	0	3	0	0	0	3	0	0	5	0	1	0	6
0300	0	0	13	0	0	1	14	0	0	3	0	1	0	4
0315	0	0	8	0	0	0	8	0	0	6	0	0	2	8
0330	0	0	16	0	1	0	17	0	0	2	0	0	0	2
0345	0	0	14	0	0	0	14	0	0	4	0	1	0	5
0400	0	0	18	1	1	0	20	0	0	2	0	2	0	4
0415	0	0	13	0	0	1	14	0	0	5	0	0	0	5
0430	0	0	19	0	0	0	19	0	0	18	0	0	1	19
0445	0	0	25	0	0	1	26	0	0	24	0	0	0	24
0500	0	1	48	0	3	0	52	0	0	33	0	0	0	33
0515	0	0	49	0	0	0	49	0	0	43	0	2	0	45
0530	0	0	55	0	0	0	55	0	0	33	0	3	0	36
0545	0	0	58	0	3	0	61	0	0	57	0	0	0	57
0600	0	1	56	0	2	0	59	0	0	56	1	3	1	61
0615	0	0	80	0	2	2	84	0	1	75	0	1	1	78
0630	1	0	82	1	4	1	89	0	0	79	0	1	1	81
0645	0	0	118	0	4	0	122	0	0	116	1	1	0	118
0700	0	0	134	1	6	0	141	0	0	126	2	0	2	130
0715	0	0	150	1	17	2	170	0	0	138	1	3	0	142
0730	0	0	205	2	8	1	216	0	0	153	1	3	4	161
0745	0	0	218	0	7	4	229	0	1	173	0	4	3	181
0800	0	0	266	3	4	2	275	0	0	151	3	6	4	164
0815	0	0	309	2	4	5	320	0	0	194	2	3	3	202
0830	0	0	211	2	8	0	221	0	0	199	2	8	2	211
0845	0	0	221	2	6	3	232	0	0	179	0	6	2	187
0900	0	0	197	0	4	4	205	0	1	154	1	4	1	161
0915	0	0	155	0	3	1	159	0	0	154	0	8	1	163
0930	0	0	176	2	4	3	185	0	0	175	3	5	1	184
0945	0	0	197	1	4	3	205	0	2	196	0	5	1	204
1000	0	1	214	0	10	4	229	0	0	157	1	1	0	159
1015	1	0	205	0	4	3	213	0	0	165	1	6	1	173
1030	1	0	193	1	5	2	202	0	1	184	0	5	1	191
1045	0	0	204	1	7	1	213	0	0	192	0	6	3	201
1100	0	0	189	0	5	4	198	0	0	202	1	8	2	213
1115	0	0	237	0	11	5	253	0	0	216	0	6	1	223
1130	0	0	222	1	6	4	233	0	1	228	0	4	2	235
1145	0	1	227	3	4	5	240	0	0	231	0	3	1	235
1200	0	1	245	0	4	5	255	0	0	244	1	2	1	248
1215	0	0	265	0	4	4	273	0	1	206	0	7	0	214
1230	0	1	238	1	4	2	246	0	0	207	0	5	0	212
1245	0	0	235	1	7	1	244	1	1	235	1	5	2	245
1300	0	0	220	0	6	3	229	0	0	217	2	3	1	223
1315	0	1	238	3	5	2	249	0	0	239	0	4	2	245
1330	0	1	258	1	2	1	263	0	1	207	0	8	2	218
1345	1	0	225	1	4	1	232	0	0	203	0	2	3	208
1400	0	0	238	0	3	3	244	0	0	202	5	7	3	217
1415	0	0	232	1	4	2	239	0	0	203	0	2	3	208
1430	0	0	232	2	4	3	241	0	0	208	2	3	0	213
1445	0	0	258	3	3	3	267	0	0	182	1	4	1	188
1500	0	0	274	2	2	0	278	0	1	197	1	3	1	203
1515	0	0	251	2	3	3	259	0	0	181	1	2	1	185
1530	1	0	252	2	2	1	258	1	2	266	4	3	2	278
1545	0	0	255	3	1	1	260	0	0	222	0	6	1	229
1600	1	0	266	0	2	1	270	0	0	205	1	0	1	207
1615	0	0	270	0	2	0	272	0	1	223	1	4	0	229
1630	0	1	272	2	3	1	279	0	1	276	0	2	0	279
1645	0	0	280	0	2	0	282	0	0	270	0	0	0	270
1700	0	0	286	0	1	0	287	0	2	258	1	2	1	264
1715	0	0	279	0	0	0	279	0	0	246	0	0	0	246
1730	0	1	279	1	0	1	282	0	0	189	0	1	0	190
1745	0	0	206	2	0	0	208	1	0	183	0	2	0	186
1800	1	0	202	1	1	0	205	0	0	209	1	1	1	212
1815	0	0	186	0	1	0	187	0	0	182	0	1	0	183
1830	0	0	217	1	1	0	219	0	0	159	0	2	0	161
1845	0	0	155	0	1	1	157	0	0	166	0	1	0	167
1900	0	0	179	0	0	0	179	0	0	124	1	0	1	126
1915	1	0	126	0	2	1	130	1	0	125	0	0	0	126
1930	0	1	162	1	2	3	169	0	0	134	0	0	0	134
1945	0	0	95	0	0	1	96	0	1	113	1	0	1	116
2000	0	2	122	0	0	1	125	0	1	125	0	1	0	127
2015	0	0	94	0	0	0	94	0	0	112	0	0	0	112
2030	0	0	97	1	3	1	102	0	0	82	0	6	1	89
2045	0	0	82	0	4	0	86	0	0	82	0	4	0	86
2100	0	0	68	0	3	0	71	0	0	71	0	1	0	72
2115	0	0	86	0	8	1	95	0	0	51	0	4	0	55
2130	0	0	65	0	6	0	71	0	0	48	0	4	0	52
2145	0	0	38	0	5	0	43	0	0	43	0	1	0	44
2200	0	0	33	0	3	0	36	0	1	48	0	4	1	54
2215	0	0	58	0	4	0	62	0	2	35	0	8	0	45
2230	0	0	33	0	7	1	41	0	0	25	0	4	0	29
2245	0	0	30	0	4	1	35	0	0	24	0	4	0	28
2300	0	0	19	0	3	0	22	0	0	23	0	1	0	24
2315	0	0	9	0	3	0	12	0	0	10	0	5	0	15
2330	0	0	12	0	5	0	17	0	0	22	0	3	0	25
2345	0	0	11	0	4	0	15	0	0	14	0	4	0	18
Total	**8**	**13**	**13099**	**55**	**288**	**114**	**13577**	**4**	**22**	**11487**	**44**	**248**	**74**	**11879**

APPENDIX B

NHDOT Traffic Data

Year 2019 Monthly Data

Group 4 Averages: Urban Highways

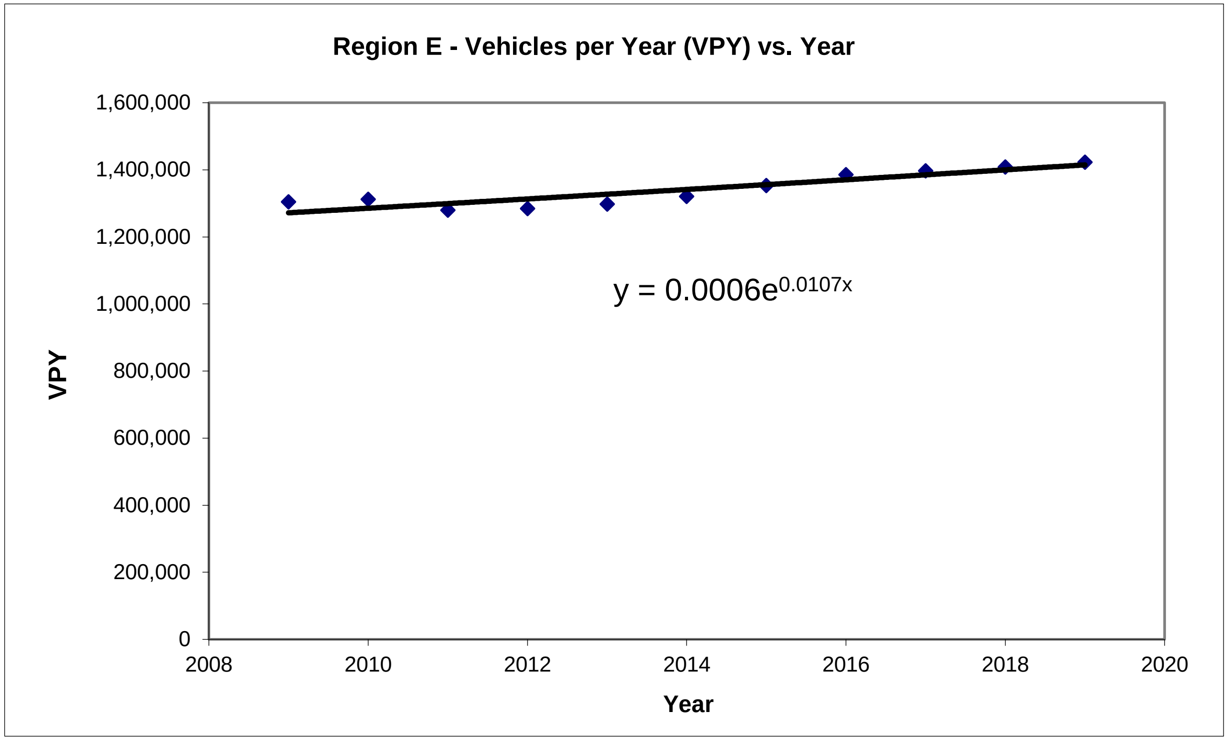
Month	ADT	Adjustment to Average	Adjustment to Peak
January	11,431	1.12	1.23
February	11,848	1.08	1.18
March	12,141	1.06	1.15
April	12,860	1.00	1.09
May	13,551	0.95	1.03
June	13,785	0.93	1.02
July	13,942	0.92	1.01
August	14,016	0.92	1.00
September	13,379	0.96	1.05
October	13,339	0.96	1.05
November	12,265	1.05	1.14
December	11,496	1.12	1.22

Average ADT: 12,838
Peak ADT: 14,016

GROUP	COUNTER	TOWN	LOCATION
04	02051003	BOW	NH 3A south of Robinson Rd
04	02089001	CHICHESTER	NH 28 (Suncook Valley Rd) north of Bear Hill Rd
04	02091001	CLAREMONT	NH 12/103 east of Vermont SL
04	62099056	CONCORD	NH 106 (Sheep Davis Rd) at Loudon TL (north of Ashby Rd)
04	72099278	CONCORD	US 3 (Fisherville Rd) north of Sewalls Falls Rd
04	02125001	DOVER	Dover Point Rd south of Thornwood Ln
04	02133021	DURHAM	US 4 east of NH 108
04	82197076	HAMPTON	US 1 (Lafayette Rd) south of Ramp to NH 101
04	*02229022*	*HUDSON**	*Circumferential Hwy east of Nashua TL*
04	02253025	LEBANON	NH 120 1 mile south of Hanover TL (south of Lahaye Dr)
04	02255001	LEE	NH 125 (Calef Hwy) north of Pinkham Rd
04	02287001	MARLBOROUGH	NH 12 at Swanzey TL
04	02297001	MERRIMACK	US 3 (Daniel Webster Hwy) north of Hilton Dr
04	*02303001*	*MILFORD**	*NH 101A at Amherst TL (west of Overlook Dr)*
04	*02315051*	*NASHUA**	*NH 111 (Bridge / Ferry St) at Hudson TL*
04	02339001	NEWPORT	NH 10 1 mile south of Croydon TL (north of Corbin Rd)
04	02345001	NORTH HAMPTON	US 1 (Lafayette Rd) north of North Rd
04	*62387052*	*RINDGE**	*US 202 at Jaffrey TL (north of County Rd)*
04	02445001	TEMPLE	NH 101 at Wilton TL (west of Old County Farm Rd)
04	02489001	WINDHAM	NH 28 at Derry TL (north of Northland Rd)

** denotes counter that is not included in calculation*

Year	Total
2009	1303948
2010	1312251
2011	1279824
2012	1284314
2013	1298171
2014	1320862
2015	1353486
2016	1385361
2017	1396932
2018	1408237
2019	1422176
CAGR	0.87%
Exp	1.07%
Avg	0.97%



APPENDIX C

Traffic Volume Adjustment Calculation

Traffic Volume Adjustment Check

NHDOT Count Station Data (Loc ID 2125090) - Spaulding Turnpike

	2019 Traffic Volumes					2024 Traffic Volumes					Comparison	
Time Period	Tues 4/16/2019	Wed 4/17/2019	Thurs 4/18/2019	Sat 4/20/2019	Average (Tues-Thurs)	Tues 4/16/2024	Wed 4/17/2024	Thurs 4/18/2024	Sat 4/20/2024	Average (Tues-Thurs)	Tues-Thurs Avg Comparison	Saturday Comparison
Daily	45,146	45,780	45,763	33,141	45,563	46,657	47,919	47,729	35,143	44,362	***-2.6%***	**6.0%**
Weekday AM Peak	3,401	3,378	3,351	--	3,377	3,287	3,467	3,430	--	3,395	***0.5%***	--
Weekday PM Peak	3,554	3,650	3,794		3,666	3,964	3,863	4,037	--	3,955	***8%***	--
Sat Midday Peak	--	--	--	2,702	--	--	--	--	2,902	--	**--**	**7%**

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/16/2019
End Date	4/17/2019
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_201904_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins	
Time	**Hourly Count**
00:00 - 01:00	330
01:00 - 02:00	137
02:00 - 03:00	164
03:00 - 04:00	219
04:00 - 05:00	636
05:00 - 06:00	1528
06:00 - 07:00	2975
07:00 - 08:00	4131
08:00 - 09:00	3401
09:00 - 10:00	2270
10:00 - 11:00	2070
11:00 - 12:00	2110
12:00 - 13:00	2231
13:00 - 14:00	2263
14:00 - 15:00	2757
15:00 - 16:00	3554
16:00 - 17:00	3858
17:00 - 18:00	3852
18:00 - 19:00	2343
19:00 - 20:00	1478
20:00 - 21:00	1061
21:00 - 22:00	827
22:00 - 23:00	528
23:00 - 24:00	423
TOTAL	45146

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/17/2019
End Date	4/18/2019
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_201904_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins	
Time	Hourly Count
00:00 - 01:00	342
01:00 - 02:00	149
02:00 - 03:00	153
03:00 - 04:00	185
04:00 - 05:00	662
05:00 - 06:00	1478
06:00 - 07:00	2895
07:00 - 08:00	4149
08:00 - 09:00	3378
09:00 - 10:00	2388
10:00 - 11:00	2034
11:00 - 12:00	2171
12:00 - 13:00	2319
13:00 - 14:00	2247
14:00 - 15:00	2846
15:00 - 16:00	3650
16:00 - 17:00	3379
17:00 - 18:00	3629
18:00 - 19:00	2844
19:00 - 20:00	1738
20:00 - 21:00	1285
21:00 - 22:00	823
22:00 - 23:00	599
23:00 - 24:00	437
TOTAL	45780

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/18/2019
End Date	4/19/2019
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_201904_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins	
Time	**Hourly Count**
00:00 - 01:00	332
01:00 - 02:00	140
02:00 - 03:00	155
03:00 - 04:00	228
04:00 - 05:00	635
05:00 - 06:00	1490
06:00 - 07:00	2887
07:00 - 08:00	4110
08:00 - 09:00	3351
09:00 - 10:00	2243
10:00 - 11:00	2111
11:00 - 12:00	2201
12:00 - 13:00	2358
13:00 - 14:00	2383
14:00 - 15:00	2937
15:00 - 16:00	3794
16:00 - 17:00	3816
17:00 - 18:00	2720
18:00 - 19:00	3079
19:00 - 20:00	1601
20:00 - 21:00	1184
21:00 - 22:00	982
22:00 - 23:00	577
23:00 - 24:00	449
TOTAL	45763

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/20/2019
End Date	4/21/2019
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_201904_CDC.
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins

Time	Hourly Count
00:00 - 01:00	469
01:00 - 02:00	233
02:00 - 03:00	162
03:00 - 04:00	174
04:00 - 05:00	264
05:00 - 06:00	485
06:00 - 07:00	851
07:00 - 08:00	1163
08:00 - 09:00	1443
09:00 - 10:00	1815
10:00 - 11:00	2284
11:00 - 12:00	2553
12:00 - 13:00	2702
13:00 - 14:00	2585
14:00 - 15:00	2505
15:00 - 16:00	2530
16:00 - 17:00	2323
17:00 - 18:00	2133
18:00 - 19:00	1779
19:00 - 20:00	1467
20:00 - 21:00	1170
21:00 - 22:00	940
22:00 - 23:00	634
23:00 - 24:00	477
TOTAL	33141

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/16/2024
End Date	4/17/2024
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_202404_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins	
Time	Hourly Count
00:00 - 01:00	234
01:00 - 02:00	155
02:00 - 03:00	149
03:00 - 04:00	305
04:00 - 05:00	792
05:00 - 06:00	1657
06:00 - 07:00	2786
07:00 - 08:00	4033
08:00 - 09:00	3287
09:00 - 10:00	2396
10:00 - 11:00	2138
11:00 - 12:00	2257
12:00 - 13:00	2361
13:00 - 14:00	2487
14:00 - 15:00	3226
15:00 - 16:00	3964
16:00 - 17:00	4119
17:00 - 18:00	3833
18:00 - 19:00	2285
19:00 - 20:00	1512
20:00 - 21:00	1076
21:00 - 22:00	720
22:00 - 23:00	466
23:00 - 24:00	419
TOTAL	46657

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/17/2024
End Date	4/18/2024
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_202404_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins

Time	Hourly Count
00:00 - 01:00	281
01:00 - 02:00	165
02:00 - 03:00	163
03:00 - 04:00	280
04:00 - 05:00	822
05:00 - 06:00	1692
06:00 - 07:00	2860
07:00 - 08:00	3902
08:00 - 09:00	3467
09:00 - 10:00	2305
10:00 - 11:00	2317
11:00 - 12:00	2365
12:00 - 13:00	2392
13:00 - 14:00	2557
14:00 - 15:00	3451
15:00 - 16:00	3863
16:00 - 17:00	4322
17:00 - 18:00	4033
18:00 - 19:00	2381
19:00 - 20:00	1511
20:00 - 21:00	1134
21:00 - 22:00	791
22:00 - 23:00	511
23:00 - 24:00	354
TOTAL	47919

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/18/2024
End Date	4/19/2024
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_202404_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins	
Time	Hourly Count
00:00 - 01:00	283
01:00 - 02:00	187
02:00 - 03:00	188
03:00 - 04:00	274
04:00 - 05:00	784
05:00 - 06:00	1615
06:00 - 07:00	2756
07:00 - 08:00	3808
08:00 - 09:00	3430
09:00 - 10:00	2324
10:00 - 11:00	2218
11:00 - 12:00	2291
12:00 - 13:00	2479
13:00 - 14:00	2642
14:00 - 15:00	3417
15:00 - 16:00	4037
16:00 - 17:00	4199
17:00 - 18:00	3701
18:00 - 19:00	2394
19:00 - 20:00	1629
20:00 - 21:00	1184
21:00 - 22:00	857
22:00 - 23:00	587
23:00 - 24:00	445
TOTAL	47729

Location Info	
Location ID	2125090
Type	I-SECTION
Functional Class	2
Located On	Spaulding Tpke N
Direction	2-WAY
Community	DOVER
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info	
Start Date	4/20/2024
End Date	4/21/2024
Start Time	12:00 AM
End Time	12:00 AM
Direction	2-WAY
Notes	
Count Source	1125201
File Name	TRV70_RPT21_202404_CDC.txt
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins	
Time	Hourly Count
00:00 - 01:00	336
01:00 - 02:00	201
02:00 - 03:00	156
03:00 - 04:00	173
04:00 - 05:00	325
05:00 - 06:00	499
06:00 - 07:00	879
07:00 - 08:00	1244
08:00 - 09:00	1628
09:00 - 10:00	2015
10:00 - 11:00	2426
11:00 - 12:00	2774
12:00 - 13:00	2902
13:00 - 14:00	2720
14:00 - 15:00	2727
15:00 - 16:00	2571
16:00 - 17:00	2393
17:00 - 18:00	2306
18:00 - 19:00	1987
19:00 - 20:00	1529
20:00 - 21:00	1218
21:00 - 22:00	924
22:00 - 23:00	739
23:00 - 24:00	471
TOTAL	35143

APPENDIX D
Capacity Analysis Methodology

CAPACITY ANALYSIS METHODOLOGY

A primary result of capacity analysis is the assignment of levels of service to traffic facilities under various traffic flow conditions. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual* (HCM).[1] The concept of level of service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year. A description of the operating condition under each level of service is provided below:

- *LOS A* describes conditions with little to no delay to motorists.
- *LOS B* represents a desirable level with relatively low delay to motorists.
- *LOS C* describes conditions with average delays to motorists.
- *LOS D* describes operations where the influence of congestion becomes more noticeable. Delays are still within an acceptable range.
- *LOS E* represents operating conditions with high delay values. This level is considered by many agencies to be the limit of acceptable delay.
- *LOS F* is considered to be unacceptable to most drivers with high delay values that often occur, when arrival flow rates exceed the capacity of the intersection.

Signalized Intersections

Levels of service for signalized intersections are also calculated using the operational analysis methodology of the HCM. The methodology for signalized intersections assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on average *control* delay. Control delay is used to establish the operating characteristics for an intersection or an approach to an intersection. Volume-to-capacity (v/c) ratios are also used to help signify the utilization of a lane group's capacity at an intersection. A v/c ratio of ≥1.00 represents conditions when the traffic signal cycle capacity is fully utilized and indicates a capacity failure. The level-of-service criteria for signalized intersections are shown in Table A-1.

[1] *Highway Capacity Manual, 6TH Edition: A Guide for Multimodal Mobility Analysis.* Washington, D.C.: Transportation Research Board, 2016.

Unsignalized Intersections

Levels of service for unsignalized intersections are calculated using the operational analysis methodology of the HCM. The procedure accounts for lane configuration on both the minor and major street approaches, conflicting traffic stream volumes, and the type of intersection control (STOP, YIELD, or all-way STOP control). The definition of level of service for unsignalized intersections is a function of average *control* delay. Control delay at an unsignalized intersection is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

Volume-to-capacity (v/c) ratios are also used to help signify the utilization of a movement's capacity at an intersection. A v/c ratio of ≥1.00 represents conditions when the movement is fully utilized and indicates a capacity failure. The capacity of the movements is based on the distribution of gaps in the major street traffic stream, the selection of gaps to complete the desired movement, and the follow-up headways for each driver in the queue. When an unsignalized intersection is located within 0.25 miles of a signalized intersection, traffic flows may not be random and some platoon structure may exist, thereby affecting the minor street operations. The level-of-service criteria for unsignalized intersections are shown in Table A-1.

TABLE A-1
Level-of-Service Criteria for Intersections

Level of Service	**Signalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**Unsignalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**V/C Ratio >1.00[a]**
A	≤10	≤10	F
B	>10 and ≤20	>10 and ≤15	F
C	>20 and ≤35	>15 and ≤25	F
D	>35 and ≤55	>25 and ≤35	F
E	>55 and ≤80	>35 and ≤50	F
F	>80	>50	F

Note: [a]For approach-based and intersection-wide assessments, LOS is defined solely by control delay.

Source: *Highway Capacity Manual, 6th Edition: A Guide for Multimodal Mobility Analysis.* Washington, D.C.: Transportation Research Board, 2016. Exhibit 19-8, Pg. 19-16.

For signalized intersections, this delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to the entire intersection. For unsignalized intersections, this delay criterion may be applied in assigning level-of-service designations to individual lane groups on the minor street approaches or to the left turns from the major street approaches.

APPENDIX E

Capacity Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	3	27	8	0	2	43	1035	0	8	775	120
Future Volume (vph)	140	3	27	8	0	2	43	1035	0	8	775	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1668	1538		1779		1662	3323		1678	3401	
Flt Permitted		0.72	1.00		0.74		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1252	1538		1373		1662	3323		1678	3401	
Peak-hour factor, PHF	0.81	0.81	0.81	0.46	0.46	0.46	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	173	4	33	17	0	4	47	1137	0	9	861	133
RTOR Reduction (vph)	0	0	22	0	17	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	177	11	0	4	0	47	1137	0	9	985	0
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		17.3	30.6		17.3		7.3	46.8		1.2	40.7	
Effective Green, g (s)		17.3	30.6		17.3		7.3	46.8		1.2	40.7	
Actuated g/C Ratio		0.19	0.34		0.19		0.08	0.51		0.01	0.45	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		238	517		261		133	1708		22	1521	
v/s Ratio Prot			0.01				c0.03	c0.34		0.01	0.29	
v/s Ratio Perm		c0.14			0.00							
v/c Ratio		0.74	0.02		0.02		0.35	0.67		0.41	0.65	
Uniform Delay, d1		34.8	20.2		29.9		39.6	16.3		44.5	19.6	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		11.9	0.0		0.0		1.6	1.0		11.9	1.0	
Delay (s)		46.6	20.2		30.0		41.2	17.3		56.5	20.5	
Level of Service		D	C		C		D	B		E	C	
Approach Delay (s)		42.5			30.0			18.3			20.9	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1078	7	0	810
Future Vol, veh/h	0	0	1078	7	0	810
Conflicting Peds, #/hr	0	0	0	2	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	91	91	92	92
Heavy Vehicles, %	0	0	4	4	4	4
Mvmt Flow	0	0	1185	8	0	880

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	599	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	385	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	384	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1	31	1	1	0	39	1136	0	3	920	120
Future Volume (vph)	130	1	31	1	1	0	39	1136	0	3	920	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732	1599		1854		1711	3421		1711	3470	
Flt Permitted		0.73	1.00		0.89		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1319	1599		1682		1711	3421		1711	3470	
Peak-hour factor, PHF	0.95	0.95	0.95	0.46	0.46	0.46	0.96	0.96	0.96	0.93	0.93	0.93
Adj. Flow (vph)	137	1	33	2	2	0	41	1183	0	3	989	129
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	138	10	0	4	0	41	1183	0	3	1111	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		15.9	29.2		15.9		7.3	49.7		1.1	43.5	
Effective Green, g (s)		15.9	29.2		15.9		7.3	49.7		1.1	43.5	
Actuated g/C Ratio		0.17	0.32		0.17		0.08	0.54		0.01	0.47	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		227	505		289		135	1842		20	1635	
v/s Ratio Prot			0.01				c0.02	c0.35		0.00	c0.32	
v/s Ratio Perm		c0.10			0.00							
v/c Ratio		0.61	0.02		0.01		0.30	0.64		0.15	0.68	
Uniform Delay, d1		35.3	21.7		31.7		40.1	15.0		45.1	19.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.3	0.0		0.0		1.7	0.9		4.7	1.2	
Delay (s)		40.6	21.7		31.7		41.8	15.9		49.8	20.2	
Level of Service		D	C		C		D	B		D	C	
Approach Delay (s)		36.9			31.7			16.8			20.3	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	92.3	Sum of lost time (s)	23.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1175	0	0	955
Future Vol, veh/h	0	0	1175	0	0	955
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	94	94	94	94
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1250	0	0	1016

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	625	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	370	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	370	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	0	37	0	0	0	48	1162	0	9	935	70
Future Volume (vph)	95	0	37	0	0	0	48	1162	0	9	935	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0				6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00				1.00	0.95		1.00	0.95	
Frt		1.00	0.85				1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00				0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1745	1615				1745	3490		1728	3537	
Flt Permitted		0.76	1.00				0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1391	1615				1745	3490		1728	3537	
Peak-hour factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50	0.87	0.87	0.87	0.94	0.94	0.94
Adj. Flow (vph)	128	0	50	0	0	0	55	1336	0	10	995	74
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	128	15	0	0	0	55	1336	0	10	1065	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm	NA	pt+ov				Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		15.0	28.9				7.9	52.8		1.2	46.1	
Effective Green, g (s)		15.0	28.9				7.9	52.8		1.2	46.1	
Actuated g/C Ratio		0.16	0.31				0.08	0.56		0.01	0.49	
Clearance Time (s)		6.0					6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0					4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		220	493				145	1947		21	1723	
v/s Ratio Prot			0.01				c0.03	c0.38		0.01	0.30	
v/s Ratio Perm		c0.09										
v/c Ratio		0.58	0.03				0.38	0.69		0.48	0.62	
Uniform Delay, d1		36.9	23.0				41.0	15.0		46.4	17.8	
Progression Factor		1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.6	0.0				2.3	1.1		21.4	0.8	
Delay (s)		41.5	23.1				43.3	16.1		67.8	18.6	
Level of Service		D	C				D	B		E	B	
Approach Delay (s)		36.3			0.0			17.2			19.0	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	94.6	Sum of lost time (s)	23.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1210	2	0	975
Future Vol, veh/h	0	0	1210	2	0	975
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	87	87	93	93
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1391	2	0	1048

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	698	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	332	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	332	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	3	28	8	0	2	44	1056	0	8	791	122
Future Volume (vph)	143	3	28	8	0	2	44	1056	0	8	791	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1668	1538		1779		1662	3323		1678	3401	
Flt Permitted		0.72	1.00		0.74		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1252	1538		1372		1662	3323		1678	3401	
Peak-hour factor, PHF	0.81	0.81	0.81	0.46	0.46	0.46	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	177	4	35	17	0	4	48	1160	0	9	879	136
RTOR Reduction (vph)	0	0	23	0	17	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	181	12	0	4	0	48	1160	0	9	1006	0
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		17.6	30.8		17.6		7.2	47.5		1.2	41.5	
Effective Green, g (s)		17.6	30.8		17.6		7.2	47.5		1.2	41.5	
Actuated g/C Ratio		0.19	0.33		0.19		0.08	0.52		0.01	0.45	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		239	514		262		129	1713		21	1532	
v/s Ratio Prot			0.01				c0.03	c0.35		0.01	0.30	
v/s Ratio Perm		c0.14			0.00							
v/c Ratio		0.76	0.02		0.02		0.37	0.68		0.43	0.66	
Uniform Delay, d1		35.2	20.6		30.2		40.3	16.6		45.1	19.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		12.8	0.0		0.0		1.8	1.1		13.4	1.0	
Delay (s)		48.1	20.6		30.2		42.1	17.7		58.6	20.8	
Level of Service		D	C		C		D	B		E	C	
Approach Delay (s)		43.6			30.2			18.6			21.1	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1100	7	0	826
Future Vol, veh/h	0	0	1100	7	0	826
Conflicting Peds, #/hr	0	0	0	2	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	91	91	92	92
Heavy Vehicles, %	0	0	4	4	4	4
Mvmt Flow	0	0	1209	8	0	898

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	611	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	378	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	377	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	1	32	1	1	0	40	1159	0	3	938	122
Future Volume (vph)	133	1	32	1	1	0	40	1159	0	3	938	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732	1599		1854		1711	3421		1711	3478	
Flt Permitted		0.73	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1319	1599		1681		1711	3421		1711	3478	
Peak-hour factor, PHF	0.95	0.95	0.95	0.46	0.46	0.46	0.96	0.96	0.96	0.93	0.93	0.93
Adj. Flow (vph)	140	1	34	2	2	0	42	1207	0	3	1009	131
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	141	11	0	4	0	42	1207	0	3	1133	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		16.0	29.3		16.0		7.3	51.4		1.1	45.2	
Effective Green, g (s)		16.0	29.3		16.0		7.3	51.4		1.1	45.2	
Actuated g/C Ratio		0.17	0.31		0.17		0.08	0.55		0.01	0.48	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		224	497		285		132	1868		20	1670	
v/s Ratio Prot			0.01				c0.02	c0.35		0.00	0.33	
v/s Ratio Perm		c0.11			0.00							
v/c Ratio		0.63	0.02		0.01		0.32	0.65		0.15	0.68	
Uniform Delay, d1		36.3	22.5		32.5		41.0	15.0		46.0	18.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.2	0.0		0.0		1.9	0.9		4.7	1.2	
Delay (s)		42.5	22.5		32.5		42.9	15.8		50.7	20.1	
Level of Service		D	C		C		D	B		D	C	
Approach Delay (s)		38.6			32.5			16.8			20.1	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	1	32	1	1	0	40	1159	0	3	938	122
Future Volume (vph)	133	1	32	1	1	0	40	1159	0	3	938	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732	1599		1854		1711	3421		1711	3478	
Flt Permitted		0.73	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1319	1599		1681		1711	3421		1711	3478	
Peak-hour factor, PHF	0.95	0.95	0.95	0.46	0.46	0.46	0.96	0.96	0.96	0.93	0.93	0.93
Adj. Flow (vph)	140	1	34	2	2	0	42	1207	0	3	1009	131
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	141	11	0	4	0	42	1207	0	3	1133	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		16.0	29.3		16.0		7.3	51.4		1.1	45.2	
Effective Green, g (s)		16.0	29.3		16.0		7.3	51.4		1.1	45.2	
Actuated g/C Ratio		0.17	0.31		0.17		0.08	0.55		0.01	0.48	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		224	497		285		132	1868		20	1670	
v/s Ratio Prot			0.01				c0.02	c0.35		0.00	0.33	
v/s Ratio Perm		c0.11			0.00							
v/c Ratio		0.63	0.02		0.01		0.32	0.65		0.15	0.68	
Uniform Delay, d1		36.3	22.5		32.5		41.0	15.0		46.0	18.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.2	0.0		0.0		1.9	0.9		4.7	1.2	
Delay (s)		42.5	22.5		32.5		42.9	15.8		50.7	20.1	
Level of Service		D	C		C		D	B		D	C	
Approach Delay (s)		38.6			32.5			16.8			20.1	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	38	0	0	0	49	1185	0	9	954	71
Future Volume (vph)	97	0	38	0	0	0	49	1185	0	9	954	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0				6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00				1.00	0.95		1.00	0.95	
Frt		1.00	0.85				1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00				0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1745	1615				1745	3490		1728	3537	
Flt Permitted		0.76	1.00				0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1391	1615				1745	3490		1728	3537	
Peak-hour factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50	0.87	0.87	0.87	0.94	0.94	0.94
Adj. Flow (vph)	131	0	51	0	0	0	56	1362	0	10	1015	76
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	131	16	0	0	0	56	1362	0	10	1087	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm	NA	pt+ov				Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		15.2	29.2				8.0	53.4		1.2	46.6	
Effective Green, g (s)		15.2	29.2				8.0	53.4		1.2	46.6	
Actuated g/C Ratio		0.16	0.31				0.08	0.56		0.01	0.49	
Clearance Time (s)		6.0					6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0					4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		221	493				146	1951		21	1725	
v/s Ratio Prot			0.01				c0.03	c0.39		0.01	0.31	
v/s Ratio Perm		c0.09										
v/c Ratio		0.59	0.03				0.38	0.70		0.48	0.63	
Uniform Delay, d1		37.3	23.2				41.4	15.2		46.8	18.1	
Progression Factor		1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.9	0.0				2.3	1.2		21.4	0.9	
Delay (s)		42.2	23.3				43.7	16.4		68.3	18.9	
Level of Service		D	C				D	B		E	B	
Approach Delay (s)		36.9			0.0			17.5			19.4	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	95.5	Sum of lost time (s)	23.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1234	2	0	995
Future Vol, veh/h	0	0	1234	2	0	995
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	87	87	93	93
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1418	2	0	1070

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	711	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	326	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	326	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

101: Lafayette Rd (US Route 1) & Mirona Rd
2026 Build Weekday AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	8	28	19	7	24	44	1056	0	32	791	122
Future Volume (vph)	143	8	28	19	7	24	44	1056	0	32	791	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1670	1538		1743		1662	3323		1678	3401	
Flt Permitted		0.68	1.00		0.79		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1192	1538		1395		1662	3323		1678	3401	
Peak-hour factor, PHF	0.81	0.81	0.81	0.46	0.46	0.46	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	177	10	35	41	15	52	48	1160	0	36	879	136
RTOR Reduction (vph)	0	0	23	0	28	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	187	12	0	80	0	48	1160	0	36	1006	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		20.0	33.2		20.0		7.2	42.3		4.8	39.9	
Effective Green, g (s)		20.0	33.2		20.0		7.2	42.3		4.8	39.9	
Actuated g/C Ratio		0.21	0.35		0.21		0.07	0.44		0.05	0.41	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		247	530		290		124	1461		83	1410	
v/s Ratio Prot			0.01				c0.03	c0.35		0.02	0.30	
v/s Ratio Perm		c0.16			0.06							
v/c Ratio		0.76	0.02		0.28		0.39	0.79		0.43	0.71	
Uniform Delay, d1		35.8	20.8		32.0		42.4	23.2		44.4	23.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		12.4	0.0		0.5		2.0	3.1		3.6	1.7	
Delay (s)		48.3	20.8		32.5		44.4	26.3		48.0	25.1	
Level of Service		D	C		C		D	C		D	C	
Approach Delay (s)		43.9			32.5			27.0			25.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	96.2	Sum of lost time (s)	23.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1100	16	0	826
Future Vol, veh/h	0	0	1100	16	0	826
Conflicting Peds, #/hr	0	0	0	2	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	91	91	92	92
Heavy Vehicles, %	0	0	4	4	4	4
Mvmt Flow	0	0	1209	18	0	898

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	616	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	375	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	374	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	8	32	14	7	31	40	1159	0	26	938	122
Future Volume (vph)	133	8	32	14	7	31	40	1159	0	26	938	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1736	1599		1723		1711	3421		1711	3470	
Flt Permitted		0.67	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1219	1599		1535		1711	3421		1711	3470	
Peak-hour factor, PHF	0.95	0.95	0.95	0.46	0.46	0.46	0.96	0.96	0.96	0.93	0.93	0.93
Adj. Flow (vph)	140	8	34	30	15	67	42	1207	0	28	1009	131
RTOR Reduction (vph)	0	0	23	0	44	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	148	11	0	68	0	42	1207	0	28	1133	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		17.5	30.7		17.5		7.2	47.7		3.2	43.7	
Effective Green, g (s)		17.5	30.7		17.5		7.2	47.7		3.2	43.7	
Actuated g/C Ratio		0.19	0.33		0.19		0.08	0.51		0.03	0.46	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		226	522		285		131	1735		58	1613	
v/s Ratio Prot			0.01				c0.02	c0.35		0.02	0.33	
v/s Ratio Perm		c0.12			0.04							
v/c Ratio		0.65	0.02		0.24		0.32	0.70		0.48	0.70	
Uniform Delay, d1		35.5	21.5		32.6		41.1	17.6		44.6	20.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.4	0.0		0.6		1.9	1.3		8.4	1.5	
Delay (s)		42.8	21.5		33.2		43.0	19.0		53.0	21.5	
Level of Service		D	C		C		D	B		D	C	
Approach Delay (s)		38.8			33.2			19.8			22.2	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1199	11	0	974
Future Vol, veh/h	0	0	1199	11	0	974
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	94	94	94	94
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1276	12	0	1036

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	644	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	360	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	360	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	2	38	3	2	5	49	1185	0	15	954	71
Future Volume (vph)	97	2	38	3	2	5	49	1185	0	15	954	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1751	1615		1746		1745	3490		1728	3537	
Flt Permitted		0.72	1.00		0.91		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1316	1615		1608		1745	3490		1728	3537	
Peak-hour factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50	0.87	0.87	0.87	0.94	0.94	0.94
Adj. Flow (vph)	131	3	51	6	4	10	56	1362	0	16	1015	76
RTOR Reduction (vph)	0	0	35	0	8	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	134	16	0	12	0	56	1362	0	16	1087	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		15.8	29.8		15.8		8.0	53.5		1.3	46.8	
Effective Green, g (s)		15.8	29.8		15.8		8.0	53.5		1.3	46.8	
Actuated g/C Ratio		0.16	0.31		0.16		0.08	0.56		0.01	0.49	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		215	499		263		144	1938		23	1718	
v/s Ratio Prot			0.01				c0.03	c0.39		0.01	0.31	
v/s Ratio Perm		c0.10			0.01							
v/c Ratio		0.62	0.03		0.04		0.39	0.70		0.70	0.63	
Uniform Delay, d1		37.5	23.2		33.9		41.8	15.6		47.3	18.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.3	0.0		0.1		2.4	1.3		67.7	0.9	
Delay (s)		43.7	23.2		34.0		44.2	16.9		115.0	19.2	
Level of Service		D	C		C		D	B		F	B	
Approach Delay (s)		38.1			34.0			17.9			20.6	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	96.3	Sum of lost time (s)	23.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1234	5	0	995
Future Vol, veh/h	0	0	1234	5	0	995
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	87	87	93	93
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1418	6	0	1070

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	713	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	325	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	325	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

101: Lafayette Rd (US Route 1) & Mirona Rd
2036 No-Build Weekday AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	3	30	9	0	2	48	1167	0	9	873	135
Future Volume (vph)	158	3	30	9	0	2	48	1167	0	9	873	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1668	1538		1783		1662	3323		1678	3401	
Flt Permitted		0.71	1.00		0.72		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1247	1538		1343		1662	3323		1678	3401	
Peak-hour factor, PHF	0.81	0.81	0.81	0.46	0.46	0.46	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	195	4	37	20	0	4	53	1282	0	10	970	150
RTOR Reduction (vph)	0	0	25	0	19	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	199	12	0	5	0	53	1282	0	10	1111	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		19.2	32.4		19.2		7.2	50.9		1.2	44.9	
Effective Green, g (s)		19.2	32.4		19.2		7.2	50.9		1.2	44.9	
Actuated g/C Ratio		0.20	0.33		0.20		0.07	0.52		0.01	0.46	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		246	512		265		123	1740		20	1571	
v/s Ratio Prot			0.01				c0.03	c0.39		0.01	0.33	
v/s Ratio Perm		c0.16			0.00							
v/c Ratio		0.81	0.02		0.02		0.43	0.74		0.50	0.71	
Uniform Delay, d1		37.2	21.8		31.4		43.0	18.0		47.7	20.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		17.5	0.0		0.0		2.4	1.7		18.3	1.5	
Delay (s)		54.8	21.8		31.4		45.5	19.6		66.0	22.4	
Level of Service		D	C		C		D	B		E	C	
Approach Delay (s)		49.6			31.4			20.6			22.8	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	97.2	Sum of lost time (s)	23.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1215	8	0	913
Future Vol, veh/h	0	0	1215	8	0	913
Conflicting Peds, #/hr	0	0	0	2	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	91	91	92	92
Heavy Vehicles, %	0	0	4	4	4	4
Mvmt Flow	0	0	1335	9	0	992

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	674	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	344	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	343	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	1	35	1	1	0	44	1280	0	3	1037	135
Future Volume (vph)	146	1	35	1	1	0	44	1280	0	3	1037	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732	1599		1854		1711	3421		1711	3470	
Flt Permitted		0.73	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1319	1599		1680		1711	3421		1711	3470	
Peak-hour factor, PHF	0.95	0.95	0.95	0.46	0.46	0.46	0.96	0.96	0.96	0.93	0.93	0.93
Adj. Flow (vph)	154	1	37	2	2	0	46	1333	0	3	1115	145
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	155	11	0	4	0	46	1333	0	3	1254	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		16.8	30.3		16.8		7.5	59.3		1.2	53.0	
Effective Green, g (s)		16.8	30.3		16.8		7.5	59.3		1.2	53.0	
Actuated g/C Ratio		0.16	0.29		0.16		0.07	0.57		0.01	0.51	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		214	469		273		124	1965		19	1782	
v/s Ratio Prot			0.01				c0.03	c0.39		0.00	0.36	
v/s Ratio Perm		c0.12			0.00							
v/c Ratio		0.72	0.02		0.01		0.37	0.68		0.16	0.70	
Uniform Delay, d1		41.0	25.9		36.3		45.6	15.3		50.5	19.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		12.2	0.0		0.0		2.5	1.0		5.3	1.4	
Delay (s)		53.2	26.0		36.3		48.1	16.3		55.8	20.5	
Level of Service		D	C		D		D	B		E	C	
Approach Delay (s)		48.0			36.3			17.4			20.6	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	23.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1324	0	0	1076
Future Vol, veh/h	0	0	1324	0	0	1076
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	94	94	94	94
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1409	0	0	1145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	705	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	329	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	329	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	0	42	0	0	0	54	1309	0	10	1054	79
Future Volume (vph)	107	0	42	0	0	0	54	1309	0	10	1054	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0				6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00				1.00	0.95		1.00	0.95	
Frt		1.00	0.85				1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00				0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1745	1615				1745	3490		1728	3537	
Flt Permitted		0.76	1.00				0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1391	1615				1745	3490		1728	3537	
Peak-hour factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50	0.87	0.87	0.87	0.94	0.94	0.94
Adj. Flow (vph)	145	0	57	0	0	0	62	1505	0	11	1121	84
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	145	17	0	0	0	62	1505	0	11	1202	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm	NA	pt+ov				Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		15.9	29.9				8.0	57.0		1.3	50.3	
Effective Green, g (s)		15.9	29.9				8.0	57.0		1.3	50.3	
Actuated g/C Ratio		0.16	0.30				0.08	0.57		0.01	0.50	
Clearance Time (s)		6.0					6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0					4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		221	482				139	1989		22	1779	
v/s Ratio Prot			0.01				c0.04	c0.43		0.01	0.34	
v/s Ratio Perm		c0.10										
v/c Ratio		0.66	0.04				0.45	0.76		0.50	0.68	
Uniform Delay, d1		39.5	24.8				43.9	16.3		49.0	18.7	
Progression Factor		1.00	1.00				1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.6	0.0				3.1	1.8		22.3	1.1	
Delay (s)		47.0	24.9				47.0	18.1		71.4	19.8	
Level of Service		D	C				D	B		E	B	
Approach Delay (s)		40.8			0.0			19.2			20.3	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1363	2	0	1099
Future Vol, veh/h	0	0	1363	2	0	1099
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	87	87	93	93
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1567	2	0	1182

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	786	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	291	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	291	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	8	30	20	7	24	48	1167	0	33	873	135
Future Volume (vph)	158	8	30	20	7	24	48	1167	0	33	873	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1670	1538		1745		1662	3323		1678	3401	
Flt Permitted		0.67	1.00		0.75		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1178	1538		1336		1662	3323		1678	3401	
Peak-hour factor, PHF	0.81	0.81	0.81	0.46	0.46	0.46	0.91	0.91	0.91	0.90	0.90	0.90
Adj. Flow (vph)	195	10	37	43	15	52	53	1282	0	37	970	150
RTOR Reduction (vph)	0	0	24	0	27	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	205	13	0	83	0	53	1282	0	37	1111	0
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		22.0	35.3		22.0		7.3	43.5		5.0	41.2	
Effective Green, g (s)		22.0	35.3		22.0		7.3	43.5		5.0	41.2	
Actuated g/C Ratio		0.22	0.35		0.22		0.07	0.44		0.05	0.41	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		259	544		294		121	1448		84	1404	
v/s Ratio Prot			0.01				c0.03	c0.39		0.02	0.33	
v/s Ratio Perm		c0.17			0.06							
v/c Ratio		0.79	0.02		0.28		0.44	0.89		0.44	0.79	
Uniform Delay, d1		36.7	21.0		32.4		44.3	25.9		46.0	25.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		15.1	0.0		0.5		2.5	6.8		3.7	3.1	
Delay (s)		51.9	21.0		32.9		46.8	32.7		49.7	28.7	
Level of Service		D	C		C		D	C		D	C	
Approach Delay (s)		47.2			32.9			33.3			29.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	23.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1215	17	0	913
Future Vol, veh/h	0	0	1215	17	0	913
Conflicting Peds, #/hr	0	0	0	2	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	91	91	92	92
Heavy Vehicles, %	0	0	4	4	4	4
Mvmt Flow	0	0	1335	19	0	992

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	679	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	342	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	341	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	8	35	14	7	31	44	1280	0	26	1037	135
Future Volume (vph)	146	8	35	14	7	31	44	1280	0	26	1037	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1736	1599		1723		1711	3421		1711	3470	
Flt Permitted		0.65	1.00		0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1190	1599		1530		1711	3421		1711	3470	
Peak-hour factor, PHF	0.95	0.95	0.95	0.46	0.46	0.46	0.96	0.96	0.96	0.93	0.93	0.93
Adj. Flow (vph)	154	8	37	30	15	67	46	1333	0	28	1115	145
RTOR Reduction (vph)	0	0	25	0	44	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	162	12	0	68	0	46	1333	0	28	1253	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		18.9	32.3		18.9		7.4	51.5		5.1	49.2	
Effective Green, g (s)		18.9	32.3		18.9		7.4	51.5		5.1	49.2	
Actuated g/C Ratio		0.19	0.32		0.19		0.07	0.51		0.05	0.49	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		221	509		285		124	1737		86	1683	
v/s Ratio Prot			0.01				c0.03	c0.39		0.02	0.36	
v/s Ratio Perm		c0.14			0.04							
v/c Ratio		0.73	0.02		0.24		0.37	0.77		0.33	0.74	
Uniform Delay, d1		38.9	23.7		35.1		44.8	20.1		46.5	21.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		12.6	0.0		0.6		2.5	2.2		3.0	2.0	
Delay (s)		51.5	23.7		35.7		47.3	22.3		49.5	23.0	
Level of Service		D	C		D		D	C		D	C	
Approach Delay (s)		46.3			35.7			23.2			23.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	101.4	Sum of lost time (s)	23.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1324	11	0	1076
Future Vol, veh/h	0	0	1324	11	0	1076
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	94	94	94	94
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1409	12	0	1145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	711	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	326	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	326	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

101: Lafayette Rd (US Route 1) & Mirona Rd
2036 Build Weekend Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	2	42	3	2	5	54	1309	0	16	1054	79
Future Volume (vph)	107	2	42	3	2	5	54	1309	0	16	1054	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	11	11	11	12	12
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1751	1615		1746		1745	3490		1728	3537	
Flt Permitted		0.72	1.00		0.91		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1315	1615		1606		1745	3490		1728	3537	
Peak-hour factor, PHF	0.74	0.74	0.74	0.50	0.50	0.50	0.87	0.87	0.87	0.94	0.94	0.94
Adj. Flow (vph)	145	3	57	6	4	10	62	1505	0	17	1121	84
RTOR Reduction (vph)	0	0	39	0	8	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	148	18	0	12	0	62	1505	0	17	1201	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm	NA	pt+ov	D.Pm	NA		Prot	NA		Prot	NA	
Protected Phases		4	4 5		8		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		16.5	30.6		16.5		8.1	54.3		3.0	49.2	
Effective Green, g (s)		16.5	30.6		16.5		8.1	54.3		3.0	49.2	
Actuated g/C Ratio		0.17	0.31		0.17		0.08	0.55		0.03	0.49	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		217	496		266		141	1902		52	1747	
v/s Ratio Prot			0.01				c0.04	c0.43		0.01	0.34	
v/s Ratio Perm		c0.11			0.01							
v/c Ratio		0.68	0.04		0.04		0.44	0.79		0.33	0.69	
Uniform Delay, d1		39.1	24.2		34.9		43.6	18.1		47.3	19.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.2	0.0		0.1		3.0	2.5		5.0	1.2	
Delay (s)		48.3	24.2		35.0		46.6	20.6		52.3	20.6	
Level of Service		D	C		D		D	C		D	C	
Approach Delay (s)		41.6			35.0			21.6			21.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	23.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1363	5	0	1099
Future Vol, veh/h	0	0	1363	5	0	1099
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	87	87	93	93
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	0	1567	6	0	1182

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	788	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	290	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	290	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

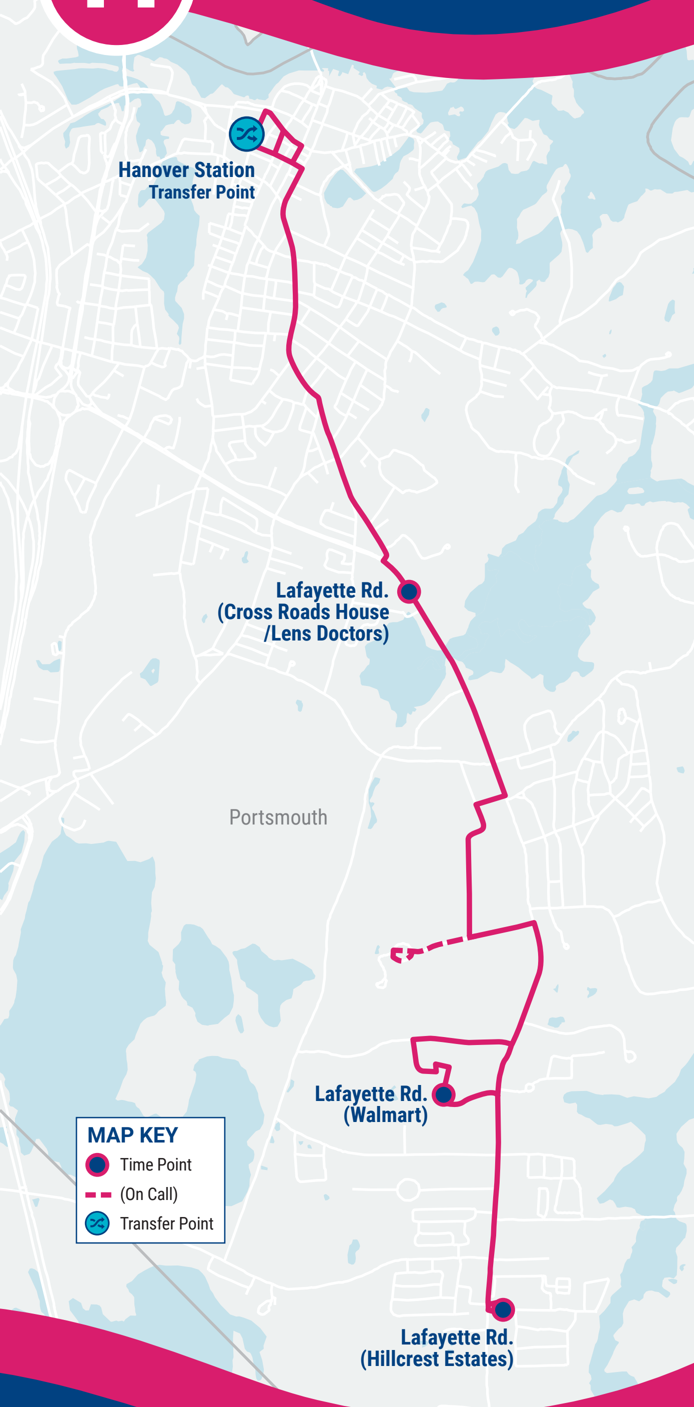
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

APPENDIX F

COAST Bus Schedule & Map

Route 41 Map

Portsmouth • Lafayette Road



Ride Information

COAST BUS FARES

Base Cash Fare **$1.50**

All passengers ages 5 and up are required to pay this fare each time they board a COAST bus.

Half-Fare **$ 0.75**

Passengers 65 and older, or passengers with a disability are entitled to pay half the cash fare. Proof of eligibility is required by showing a Medicare card, photo ID with birth date, COAST ADA Paratransit Card, or COAST Half-Fare Card. Please contact COAST to apply for a Half-Fare Card.

Multi-Ride Tickets and Passes

*Available at **www.coastbus.org** or call 603-743-5777, TTY 711.*

Unlimited Monthly Pass **$ 52**

Unlimited rides on COAST Routes for the month.

YOUR RIGHTS

COAST adheres to all Federal regulations regarding Civil Rights. If you need to request an ADA Reasonable Modification/ Accommodation, or if you believe you have been discriminated against or would like to file a complaint under the ADA or Title VI, please contact COAST's Civil Rights Officer at 603-516-0788, TTY 711 or email CivilRights@coastbus.org.

NO SERVICE DAYS

COAST does not operate on the following holidays:

- New Year's Day
- Martin Luther King Jr./ Civil Rights Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Christmas Eve Day
- Christmas Day

COAST

42 Sumner Drive • Dover, NH 03820
603-743-5777 • TTY 711 • **www.coastbus.org**

This brochure is available in alternative formats upon request.

Bus Schedule & Map 41

COAST

Effective 09.17.22

ROUTE 41

Portsmouth • Lafayette Road

Find all of the full COAST schedules online at **coastbus.org**

MAP OUT
YOUR GAME PLAN

Planning your trip has never been easier!

www.coastbus.org

COAST SYSTEM MAP

OUTBOUND • INBOUND

Route 41 Portsmouth • Lafayette Road

How to Read the Schedule

Printed bus schedules only show the timepoints ● (major bus stops where the bus will hold until the scheduled departure time). In between those timepoints are many other stops that you can use. For a full listing of bus stops, visit **www.coastbus.org**, or use the Passio GO! App.

The times shown represent the number of minutes after the hour that the bus will depart from that stop. Last stop times are arrivals. Any exceptions will be noted.

OUTBOUND (M-Sat)	Service On Every Hour		
Hanover Station - Lafayette Rd. (Hillcrest Estates)	First Bus	Minutes Past Hour	Last Bus
● Hanover Station	6:00am	:00	8:00pm
● Lafayette Rd. (Cross Roads House)	6:10am	:10	8:10pm
● Lafayette Rd. (Walmart)	6:20am	:20	8:20pm
● Lafayette Rd. (Hillcrest Estates)	6:29am	:29	8:29pm

INBOUND (M-Sat)	Service On Every Hour		
Lafayette Rd. (Hillcrest Estates) - Hanover Station	First Bus	Minutes Past Hour	Last Bus
● Lafayette Rd. (Hillcrest Estates)	6:30am	:30	8:30pm
● Lafayette Rd. (Lens Doctors)	6:38am	:38	8:38pm
● Hanover Station	6:49am	:49	8:49pm

MAP IT!

For a full listing of bus stops, visit
www.coastbus.org
or use the Passio GO! App.

Passio GO! App

Download the Passio GO! App for real-time information at the Google Play or App store.

Making Connections

Please tell your driver if you are trying to make a connection to another Route.

TRANSFER POINTS

Hanover Station	13 14 40 41 42 43 44
Dover Transportation Center	1 12 13 33 M-F 33 SAT 34
Dover NHDOT Park & Ride (Exit 9)	1 14
Rochester City Hall	6 12 14

14 33 SAT Temporarily suspended part of route due to driver shortage.

Hanover Station, Portsmouth

APPENDIX G

US Census Journey-to-Work Data

Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Ric

For more information on sampling and estimation methods, confidentiality protection, and sampling and nonsampling errors, see

Universe: Workers 16 years and over.

Commuting flows are sorted by residence state, residence county, and residence minor civil division.

Residence		Place of Work		Commuting Flow	TO / FROM						
State Name	**Minor Civil Division Name**	**State Name**	**Minor Civil Division Name**	**Workers in Commuting Flow**	I-95 NB via Route 1 Bypass	I-95 SB via NH 33	Spaulding Tpke via Route 1 Bypass	South via Route 1	Portsmouth Center via Lafayette Rd	West via Route 33	
New Hampshire	Portsmouth city	New Hampshire	Portsmouth city	6,310	315.5		315.5	1893	3470.5	315.5	
New Hampshire	Portsmouth city	New Hampshire	Dover city	643			643				
New Hampshire	Portsmouth city	New Hampshire	Durham town	470			376			117.5	
New Hampshire	Portsmouth city	New Hampshire	Exeter town	437		327.75				109.25	
New Hampshire	Portsmouth city	Maine	Kittery town	379	151.6				227.4		
New Hampshire	Portsmouth city	New Hampshire	Newington town	360			324			36	
New Hampshire	Portsmouth city	New Hampshire	Hampton town	354		106.2		247.8			
New Hampshire	Portsmouth city	Massachusetts	Boston city	164		82		82			
New Hampshire	Portsmouth city	New Hampshire	North Hampton town	162		48.6		113.4			
New Hampshire	Portsmouth city	New Hampshire	Salem town	159		159					
New Hampshire	Portsmouth city	Maine	York town	142	71				71		
New Hampshire	Portsmouth city	New Hampshire	New Castle town	134					134		
New Hampshire	Portsmouth city	New Hampshire	Manchester city	129		51.6	38.7			38.7	
New Hampshire	Portsmouth city	New Hampshire	Somersworth city	125			125				
New Hampshire	Portsmouth city	New Hampshire	Rye town	123				123			
New Hampshire	Portsmouth city	New Hampshire	Stratham town	123				92.25		30.75	
New Hampshire	Portsmouth city	New Hampshire	Greenland town	112				84		28	
New Hampshire	Portsmouth city	New Hampshire	Londonderry town	92		92					
New Hampshire	Portsmouth city	New Hampshire	Concord city	89			89				
New Hampshire	Portsmouth city	Massachusetts	Newburyport city	86		43		43			
New Hampshire	Portsmouth city	New Hampshire	Seabrook town	85		42.5		42.5			
New Hampshire	Portsmouth city	New Hampshire	Rochester city	80			80				
New Hampshire	Portsmouth city	Massachusetts	Peabody city	78		39		39			
New Hampshire	Portsmouth city	New Hampshire	Brentwood town	77		57.75				19.25	
New Hampshire	Portsmouth city	New Hampshire	Raymond town	75		37.5				37.5	
New Hampshire	Portsmouth city	Maine	North Berwick town	72	36		36				
New Hampshire	Portsmouth city	New Hampshire	Bedford town	69		69					
New Hampshire	Portsmouth city	New Hampshire	Barrington town	56			56				
New Hampshire	Portsmouth city	New Hampshire	Hampton Falls town	53		26.5		26.5			
New Hampshire	Portsmouth city	New Hampshire	Plymouth town	51		45.9	5.1				
New Hampshire	Portsmouth city	Massachusetts	North Andover town	49		36.75		12.25			
New Hampshire	Portsmouth city	New Hampshire	Wolfeboro town	49			49				
New Hampshire	Portsmouth city	Maine	Eliot town	48	24				24		
New Hampshire	Portsmouth city	Massachusetts	Amesbury Town city	48		24		24			
New Hampshire	Portsmouth city	Massachusetts	Quincy city	43		21.5		21.5			
New Hampshire	Portsmouth city	Massachusetts	Andover town	41		20.5		20.5			
New Hampshire	Portsmouth city	Massachusetts	Methuen Town city	40		20		20			
New Hampshire	Portsmouth city	Massachusetts	Stoneham town	39		19.5		19.5			
New Hampshire	Portsmouth city	New Hampshire	Plaistow town	39		39					
New Hampshire	Portsmouth city	New Hampshire	Nashua city	38		38					
New Hampshire	Portsmouth city	Massachusetts	Burlington town	37		18.5		18.5			
New Hampshire	Portsmouth city	New Hampshire	Hooksett town	37		33.3	3.7				
New Hampshire	Portsmouth city	New Hampshire	Rollinsford town	37			37				
New Hampshire	Portsmouth city	New Hampshire	Newmarket town	33						33	
New Hampshire	Portsmouth city	Massachusetts	Haverhill city	32		16		16			
New Hampshire	Portsmouth city	Maine	South Portland city	25	25						
New Hampshire	Portsmouth city	Massachusetts	Groveland town	25		12.5		12.5			
New Hampshire	Portsmouth city	Massachusetts	Cambridge city	25		12.5		12.5			
New Hampshire	Portsmouth city	Massachusetts	Chelmsford town	24		12		12			
New Hampshire	Portsmouth city	Maine	South Berwick town	23	17.25		5.75				
New Hampshire	Portsmouth city	New Hampshire	Hampstead town	22		22					
New Hampshire	Portsmouth city	Maine	Portland city	21	21						
New Hampshire	Portsmouth city	Massachusetts	Boxborough town	21		10.5		10.5			
New Hampshire	Portsmouth city	Massachusetts	Billerica town	20		10		10			
			TOTAL	12,105	661	1,595	2,184	2,996	3,927	765	0
					5%	**15%**	**20%**	**25%**	**30%**	**5%**	

APPENDIX H
Site Development Plan

SITE DATA:

LOCATION: TAX MAP 273, LOT 3

OWNER: THE PARISH OF CHIRST CHURCH IN PORTSMOUTH
1035 LAFAYETT RD
PORTSMOUTH, NH 03801

ZONING DISTRICT: GATEWAY CORRIDOR (G2)
PROPOSED USE: MIXED USE
MULTIFAMILY
PROPOSED LOT SIZE: ±3.491 ACRES (±152,082 SF)

BUILDING PLACEMENT & LOT STANDARDS

APARTMENT BUILDING STANDARDS:	REQUIRED	PROPOSED
MINIMUM LOT DEPTH:	100 FT	±208 FT
MINIMUM STREET FRONTAGE:	50 FT	±666 FT
FRONT YARD SETBACK:		
LAFAYETTE ROAD SETBACK	70-90 FT	± 110 FT(1)
MINIMUM SIDE BUILDING SETBACK:	15 FT	± 25 FT
MINIMUM REAR BUILDING SETBACK:	20 FT	± 68 FT
MINIMUM OPEN SPACE COVERAGE:	20%	±72%
FRONT LOT LINE BUILDOUT:	75%	48%(1)
BUILDING DESIGN STANDARDS:		
MAXIMUM BUILDING HEIGHT:	4 STORIES	4 STORIES
	50 FT	<50 FT
MINIMUM STREET FACING FACADE HEIGHT:	24 FT	>24 FT
MAXIMUM FINISHED FLOOR SURFACE OF GROUND FLOOR ABOVE SIDEWALK GRADE:	36 IN	<36 IN
MAXIMUM BUILDING FOOTPRINT:	20,000 SF	10,900 SF
MAXIMUM FACADE MODULATION LENGTH:	50 FT	<50 FT
MINIMUM STREET FACING FACADE GLAZING:	20% GROUND FLOOR	>20%
DEVELOPMENT SITE STANDARDS:(3)		
MINIMUM DEVELOPMENT SITE AREA:	20,000 SF	±152,082 SF
MINIMUM SITE WIDTH:	100 FT	±666 FT
MINIMUM SITE DEPTH:	100 FT	±280 FT
MINIMUM PERIMETER BUFFER FROM RESIDENTIAL, MIXED RESIDENTIAL, OR CD4-L1 DISTRICTS:	75 FT	N/A
MAXIMUM DEVELOPMENT BLOCK DIMENSIONS:		
BLOCK LENGTH:	800 FT	N/A
ERIMETER:	200 FT	N/A
MAXIMUM BUILDING COVERAGE:	70%	14
MINIMUM OPEN SPACE COVERAGE:	20%	±72
FRONT LOT LINE BUILDOUT:	75%	48%(1)
DENSITY THRESHOLDS AND BONUSES:		
DWELLING UNITS PER ACRE:	16 UNITS	14.6 UNITS
DWELLING UNITS PER BUILDING:	36 UNITS	44 UNITS(2)(3)

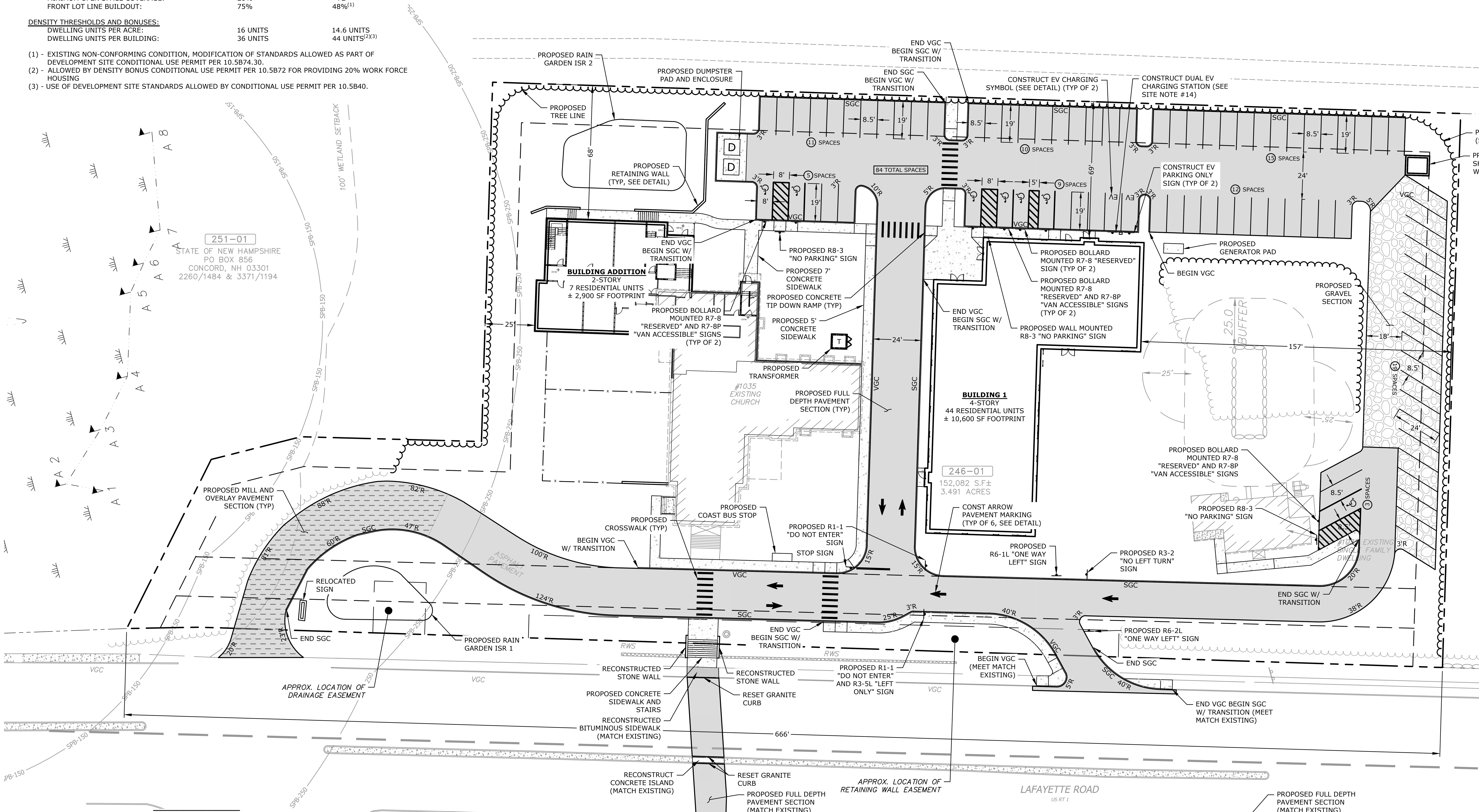
(1) - EXISTING NON-CONFORMING CONDITION, MODIFICATION OF STANDARDS ALLOWED AS PART OF DEVELOPMENT SITE CONDITIONAL USE PERMIT PER 10.5B74.30.
(2) - ALLOWED BY DENSITY BONUS CONDITIONAL USE PERMIT PER 10.5B72 FOR PROVIDING 20% WORK FORCE HOUSING
(3) - USE OF DEVELOPMENT SITE STANDARDS ALLOWED BY CONDITIONAL USE PERMIT PER 10.5B40.

PARKING CALCULATIONS:

PARKING SPACE REQUIREMENTS:	
ZONING REQUIRED PARKING SPACES	
OFFICE:	
1 PER 350 SF GFA x 6,900 SF	= 20 SPACES
RESIDENTIAL:	
1.0 SPACES PER UNIT (500-750 SF) x 11UNITS	= 11 SPACES
1.3 SPACES PER UNIT (>750 SF) x 40 UNITS	= 52 SPACES
+1 VISITOR PER 5 UNITS X 51 UNITS	= 11 SPACES
GROUP DAY CARE:	
0.5 PER STUDENT x 71 STUDENTS	= 36 SPACES
PLACE OF WORSHIP:	
1 PER 4 PERSON MAX CAPACITY (40 PERSON)	= 10 SPACES
TOTAL REQUIRED PARKING	= 140 SPACES
TOTAL REQUIRED PER SHARED PARKING(4)	= 103 SPACES
REQUIRED PARKING SPACES ON A PUBLIC TRANSIT(5) ZONING REQUIREMENTS x 80%	**= 83 SPACES**
PROVIDED PARKING SPACES	
TOTAL PROVIDED SPACES:	**= 84 SPACES**

	REQUIRED	PROPOSED
ACCESSIBLE PARKING SPACES:	4	6
DIMENSIONAL REQUIREMENTS:		
STANDARD 90° PARKING STALL :		
WIDTH	8.5 FT	8.5 FT
LENGTH	19 FT MIN	19 FT
DRIVE AISLE WIDTH:		
90° (2-WAY TRAFFIC)	24 FT	24 FT

(4) - SHARED PARKING ALLOWED PER SECTION 10.1112.61. SEE PARKING CONFORMANCE MEMO.
(5) - PUBLIC TRANSIT 20% REDUCTION IN SPACES ALLOWED PER SECTION 10.5B82.10.



SITE RECORDING 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.
3. THIS IS NOT A BOUNDARY SURVEY AND SHALL NOT BE USED AS SUCH.

SEE SHEET G-100 FOR SITE NOTES AND LEGEND

Last Saved: 6/17/2024
Plotted On:Jun 17, 2024-9:43am By: CKrzcuik
Tighe & Bond:J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DSGN.dwg

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE NEIL A HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
06/17/2024

GRAPHIC SCALE 0 30' 60'

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DSGN.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

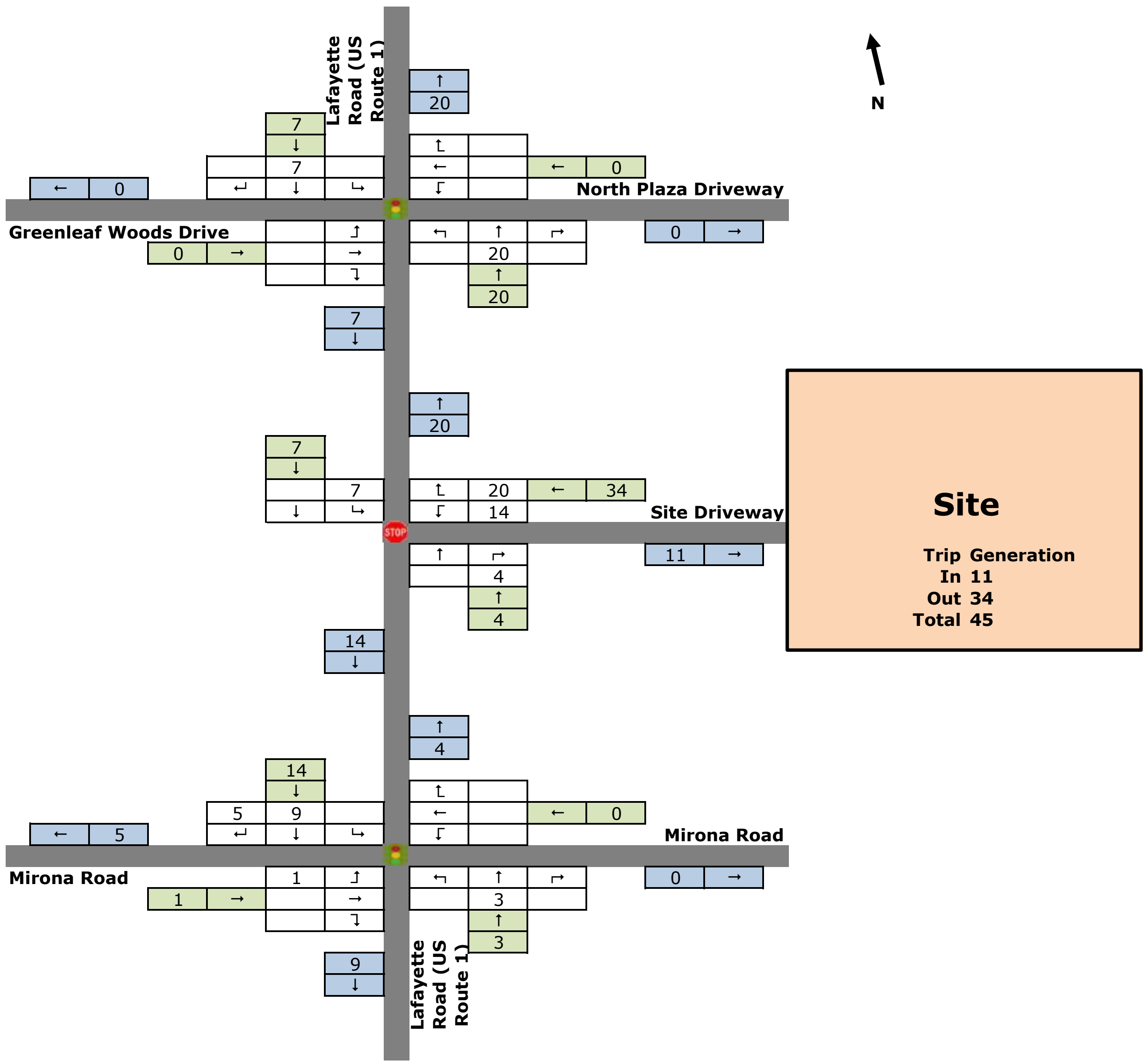
SITE PLAN

SCALE: AS SHOWN

C-102

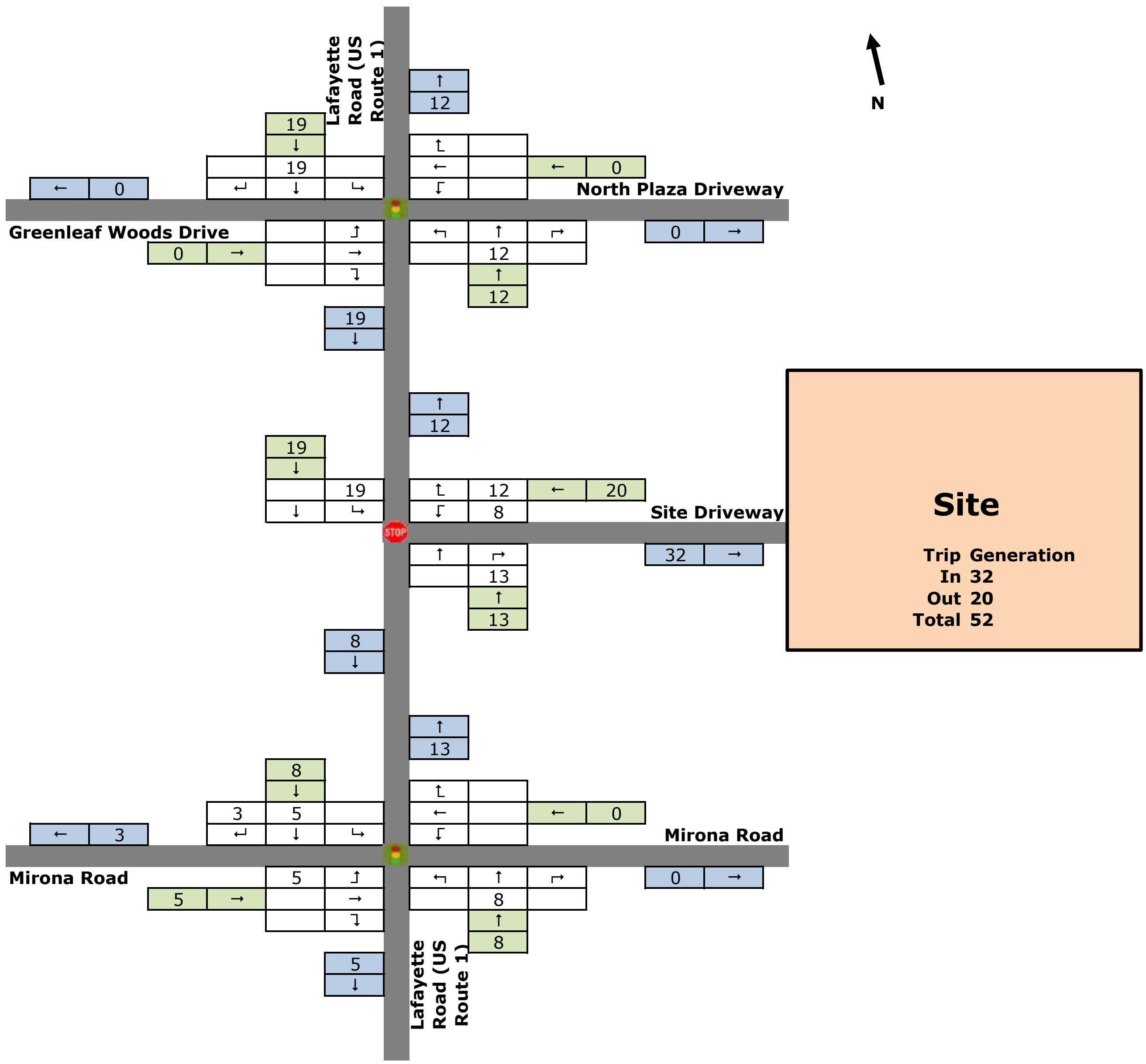
APPENDIX I

Background Development Traffic Volumes



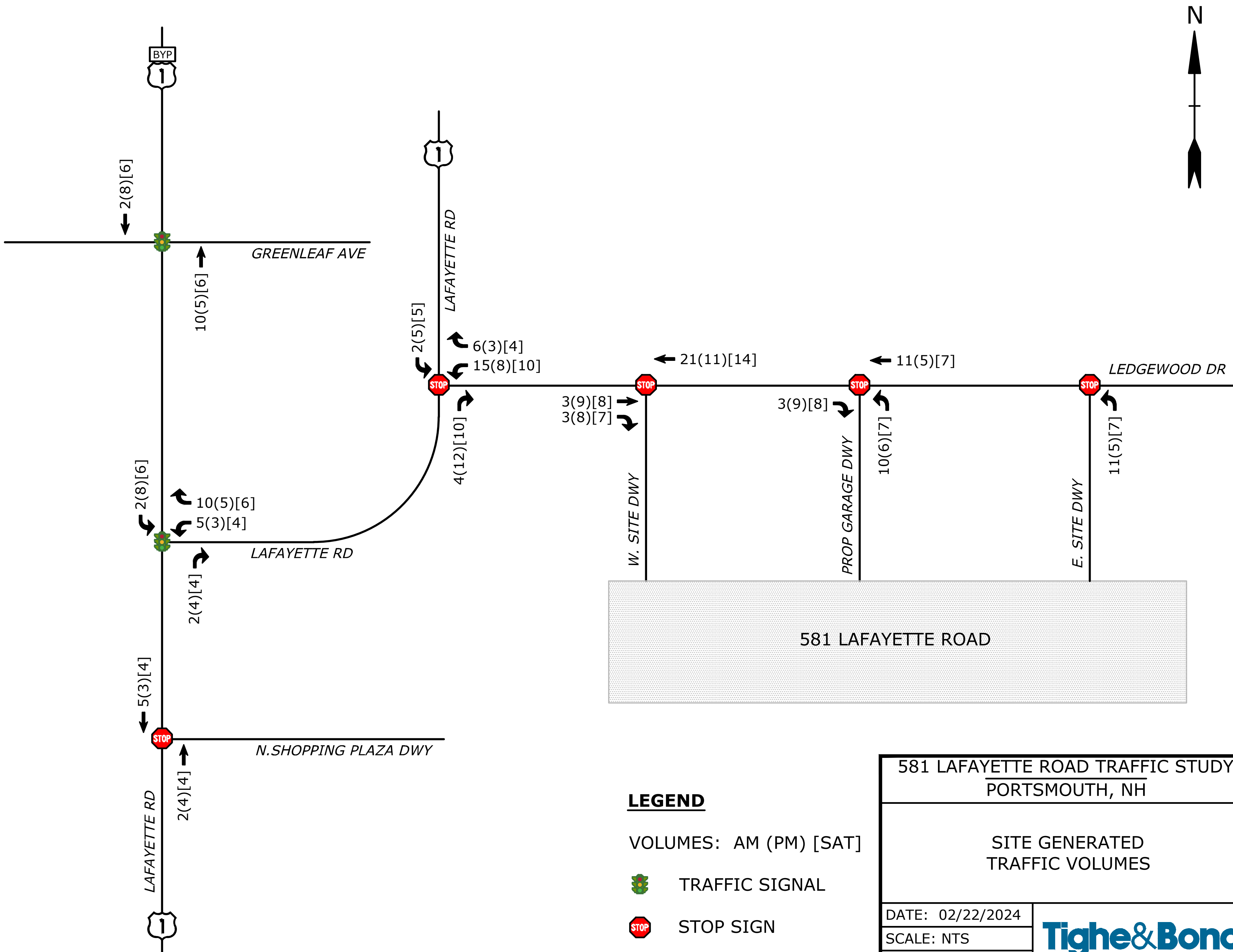
Site Generated Traffic Volumes
Weekday AM Peak
815 Lafayette Road Development

Figure 9



Site Generated Traffic Volumes
Weekday PM Peak
815 Lafayette Road Development

Figure 10



LEGEND

VOLUMES: AM (PM) [SAT]

TRAFFIC SIGNAL

STOP SIGN

581 LAFAYETTE ROAD TRAFFIC STUDY
PORTSMOUTH, NH

SITE GENERATED
TRAFFIC VOLUMES

DATE: 02/22/2024
SCALE: NTS
FIGURE 6

Tighe&Bond

APPENDIX J

Collision History Summary

Intersection Collision History Summary

Intersection: **Lafayette Road** **at** **Mirona Road**

COLLISION TYPE

	2021	2022	2023	Total	Percent
Angle	0	3	1	**4**	**57.1%**
Head-On	1	0	0	**1**	**14.3%**
Rear-End	1	0	1	**2**	**28.6%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

COLLISION EVENT

	2021	2022	2023	Total	Percent
Motor Vehicle	1	3	2	**6**	**85.7%**
Pedestrian / Cyclist	1	0	0	**1**	**14.3%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

SEVERITY

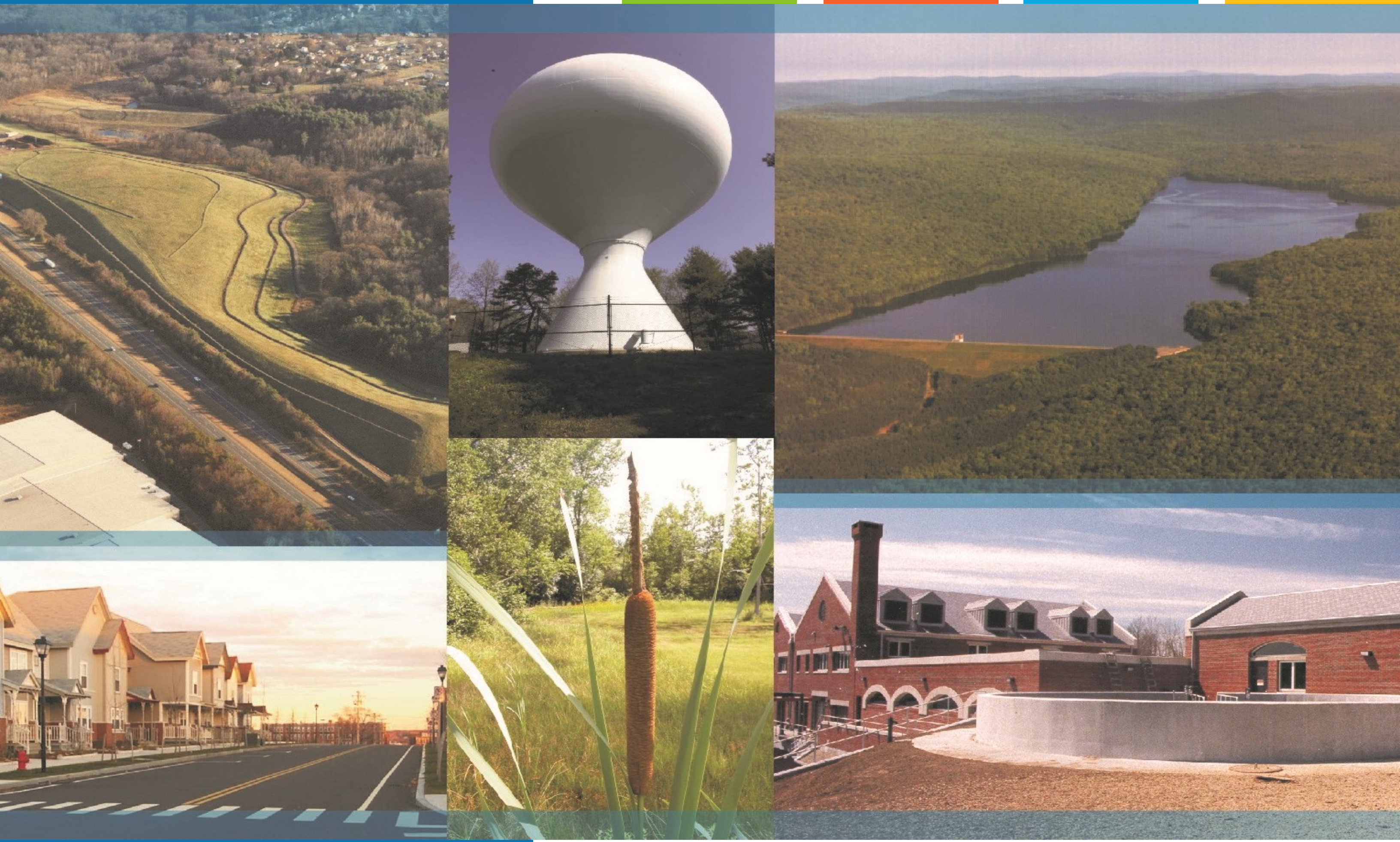
	2021	2022	2023	Total	Percent
Personal Injury	1	2	1	**4**	**57.1%**
Property Damage Only (PDO)	1	1	1	**3**	**42.9%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

DAY & TIME

	2021	2022	2023	Total	Percent
Weekday 6-9 A.M.	0	1	0	**1**	**14.3%**
Weekday 3-6 P.M.	2	0	1	**3**	**42.9%**
Weekday Off-Peak	0	1	1	**2**	**28.6%**
Weekend Off-Peak	0	1	0	**1**	**14.3%**
TOTAL	**2**	**3**	**2**	**7**	**100%**

www.tighebond.com

100% Recyclable



Proposed Multi-Family Development
1035 Lafayette Road
Portsmouth, NH

Drainage Analysis

Portsmouth Housing Authority

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
7/24/24

May 20, 2024
Last Revised July 24, 2024

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
07/24/2024

Tighe&Bond

Section 1
Project Description

The project is located at 1035 Lafayette Road identified as Map 246 Lot 1 on the City of Portsmouth Tax Maps. The existing property is approximately 3.5 acres in size and is bound to the west by Route 1, the north by Sagamore Creek, and east & south by conservation land.

The proposed project consists of converting the existing church on site to office/day care space, converting an existing single family dwelling unit to a chapel and constructing two (2) additional buildings on site. The first proposed building (Building 1) will be a 4-story, 44-unit residential building. The second proposed building on site (Building 2) will be a 2-story, 7-unit residential building that will be connected to the existing church. The project will include associated site improvements such as parking, pedestrian access, utilities, stormwater management, lighting, and landscaping.

1.1 On-Site Soil Description

The project site consists of terrain that is sloping in all directions due to the center of the site consisting of the higher elevations. The site has an approximate high point of elevation 45 located at the location of the existing single family dwelling unit.

A site specific soils survey was conducted by Joseph W. Noel CSS and can be found in Appendix A of this Report. Based on the soil survey, the runoff analyzed within these studies has been modeled using Hydrologic Soil Group A soils, as much of the site is comprised of Hoosic Soils. There are small portions of existing impervious areas that has been identified as Hydrologic Soil Group D soils which for this report has assumed to be A soils where the impervious areas are to be converted to pervious areas in the post-development conditions.

1.2 Pre- and Post-Development Comparison

The pre-development and post-development watershed areas have been analyzed using four (4) distinct points of analysis (PA-1, PA-2, PA-2.1 & PA-3.) While the points of analysis have remained unchanged, the contributing sub-catchment areas varied between pre-development and post-development conditions. These adjustments were made to reflect the differences in drainage patterns between the existing and proposed conditions. The overall area analyzed as part of this drainage analysis was held constant. PA-1 is located just off site to the south of the development. This area is undisturbed conservation land and will remain undisturbed throughout construction. PA-2 is also located just off site to the west of the development at Lafayette Road - US-Route 1. PA-2.1 is located just off site and is defined as the point where the existing catch basin between the sites northern most entrance and US-Route 1 discharges into the closed drainage system under Lafayette Road - US-Route 1. The last point of analysis, PA-3, is located off site to the north of the development at the Sagamore Creek, which is a tidal body of water.

The peak discharge rates at these points of analysis were determined by analyzing Type III, 24-hour storm events. The rainfall data for these storm events were obtained from the data published by the Northeast Regional Climate Center at Cornell University, which can be found in Appendix B.

Furthermore, the site is located within a Coastal and Great Bay Community, therefore an added factor of safety of 15% was included as required by Env-Wq 1503.08(l).

1.3 Calculation Methods

The design storms analyzed in this study are the 2-year, 10-year, 25-year and 50-year 24-hour duration storm events. The stormwater modeling system, HydroCAD 10.0 was utilized to predict the peak runoff rates from these storm events. The peak discharge rates were determined by analyzing Type III 24-hour storm events. The rainfall data for these storm events were obtained from the data published by the Northeast Regional Climate Center at Cornell University, with an additional 15% added factor of safety as required by Env-Wq 1503.08(l).

The time of concentration was computed using the TR-55 Method, which provides a means of determining the time for an entire watershed to contribute runoff to a specific location via sheet flows, shallow concentrated flow, and channel flow. Runoff curve numbers were calculated by estimating the coverage areas and then summing the curve number for the coverage area as a percent of the entire watershed.

References:

1. HydroCAD Stormwater Modeling System, by HydroCAD Software Solutions LLC, Chocorua, New Hampshire.
2. New Hampshire Stormwater Management Manual, Volume 2, Post-Construction Best Management Practices Selection and Design, December 2008.
3. "Extreme Precipitation in New York & New England." Extreme Precipitation in New York & New England by Northeast Regional Climate Center (NRCC), 26 June 2012.

Section 2
Pre-Development Conditions

To analyze the pre-development condition, the site has been modeled utilizing (4) distinct points of analysis (PA-1, PA-2, PA-2.1 & PA-3.) These points of analysis and watershed areas are depicted on the plan entitled "Pre-Development Watershed Plan", Sheet C-801.

The points of analysis and their contributing watershed areas are described below:

Point of Analysis (PA-1)

Point of analysis 1 (PA-1) is comprised of one subcatchment area (PRE 1.0). This subcatchment is comprised of mostly impervious surfaces, grass, and woods with a small portion of roof area made up by an existing shed and existing single-family dwelling. Runoff from this subcatchment sheet flows untreated stormwater directly into the conservation lands abutting the southern and eastern portions of the site.

Point of Analysis (PA-2)

Point of analysis 2 (PA-2) is also comprised of one subcatchment area (PRE 2.0). This subcatchment is comprised of mostly impervious surfaces, grass, and a small portion of roof area made up by a small portion of both the existing single-family dwelling and church on site. Runoff from this watershed sheet flows untreated stormwater directly onto Lafayette Road - US-Route 1.

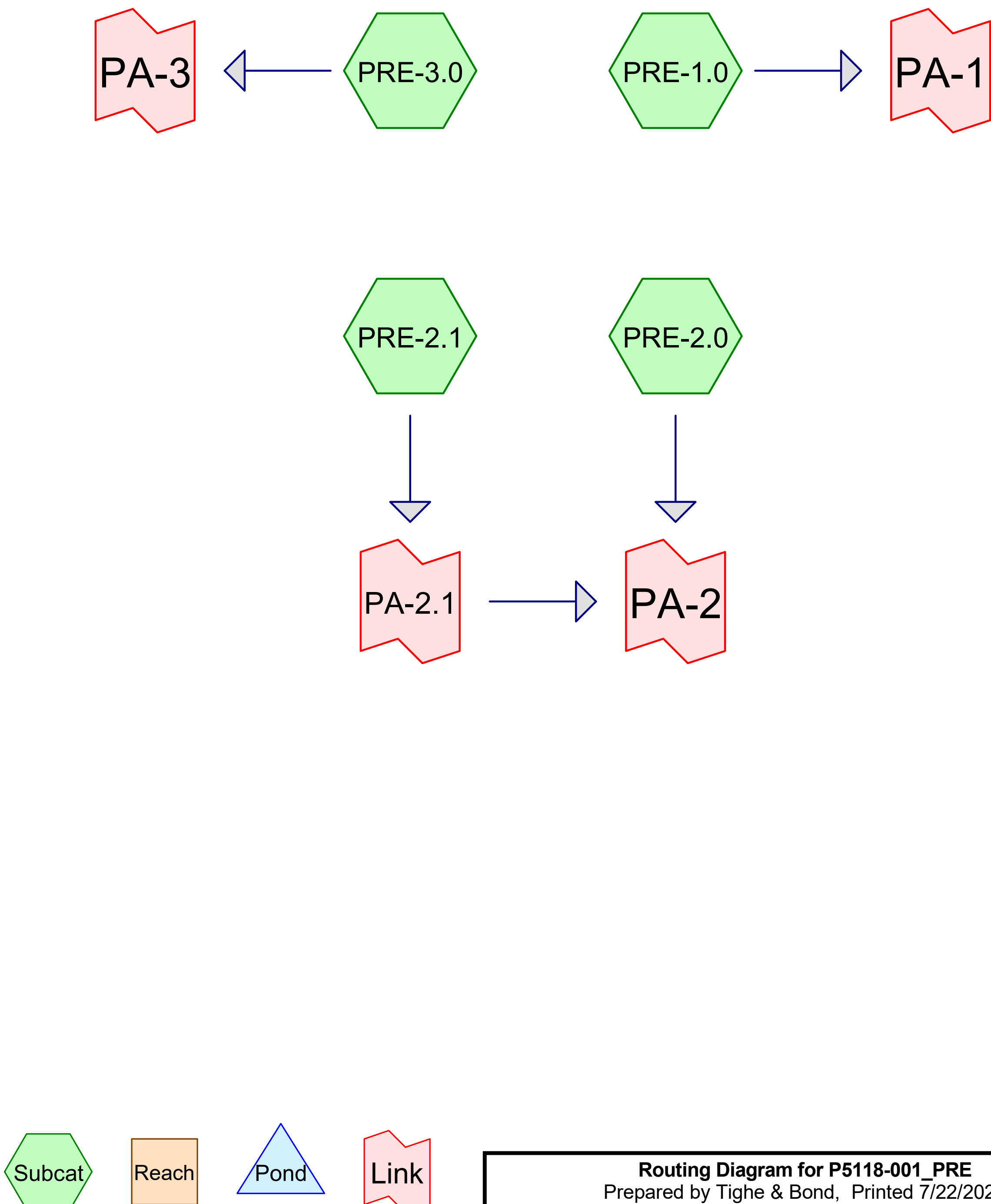
Point of Analysis (PA-2.1)

Point of analysis 2.1 (PA-2.1) is also comprised of one subcatchment area (PRE 2.1). This subcatchment is comprised of mostly grass with a small portion of impervious surface. Runoff from this watershed sheet flows stormwater directly into an existing catch basin on site, which ties into a closed drainage system along US-Route 1. The point at which the pipe connected to the catch basin on site discharges into the closed drainage system under Lafayette Road - US-Route 1 is depicted on the plans as PA-2.1. This catch basin has an existing DOT Drainage Easement that will remain.

Point of Analysis (PA-3)

Point of analysis 3 (PA-3) is the last point of analysis and is also comprised of one subcatchment area (PRE 3.0). This subcatchment is comprised of mostly impervious surfaces, grass, woods, and roof made up by an existing shed and the majority of the existing Church on site. Runoff from this watershed sheet flows untreated stormwater directly into Sagamore Creek and ultimately to the Piscataqua River.

2.1 Pre-Development Calculations



Routing Diagram for P5118-001_PRE
Prepared by Tighe & Bond, Printed 7/22/2024
HydroCAD® 10.20-4b s/n 03436 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
63,435	39	>75% Grass cover, Good, HSG A (PRE-1.0, PRE-2.0, PRE-2.1, PRE-3.0)
32,277	98	Paved parking, HSG A (PRE-1.0, PRE-2.0, PRE-2.1, PRE-3.0)
9,187	98	Unconnected roofs, HSG A (PRE-1.0, PRE-2.0, PRE-3.0)
47,183	30	Woods, Good, HSG A (PRE-1.0, PRE-2.0, PRE-3.0)
152,082	**52**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
152,082	HSG A	PRE-1.0, PRE-2.0, PRE-2.1, PRE-3.0
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
152,082		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 PRE-1.0: Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>0.12"
Flow Length=218' Tc=8.6 min CN=45 Runoff=0.02 cfs 598 cf

Subcatchment PRE-2.0: Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>0.71"
Flow Length=266' Tc=7.3 min CN=62 Runoff=0.34 cfs 1,438 cf

Subcatchment PRE-2.1: Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>0.31"
Flow Length=213' Tc=5.0 min CN=52 Runoff=0.02 cfs 183 cf

Subcatchment PRE-3.0: Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>0.45"
Flow Length=237' Tc=7.3 min CN=56 Runoff=0.38 cfs 2,228 cf

Link PA-1: Inflow=0.02 cfs 598 cf
Primary=0.02 cfs 598 cf

Link PA-2: Inflow=0.36 cfs 1,620 cf
Primary=0.36 cfs 1,620 cf

Link PA-2.1: Inflow=0.02 cfs 183 cf
Primary=0.02 cfs 183 cf

Link PA-3: Inflow=0.38 cfs 2,228 cf
Primary=0.38 cfs 2,228 cf

Total Runoff Area = 152,082 sf Runoff Volume = 4,446 cf Average Runoff Depth = 0.35"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 PRE-1.0: Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>0.65"
Flow Length=218' Tc=8.6 min CN=45 Runoff=0.51 cfs 3,355 cf

Subcatchment PRE-2.0: Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>1.83"
Flow Length=266' Tc=7.3 min CN=62 Runoff=1.07 cfs 3,708 cf

Subcatchment PRE-2.1: Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>1.09"
Flow Length=213' Tc=5.0 min CN=52 Runoff=0.17 cfs 645 cf

Subcatchment PRE-3.0: Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>1.37"
Flow Length=237' Tc=7.3 min CN=56 Runoff=1.81 cfs 6,764 cf

Link PA-1: Inflow=0.51 cfs 3,355 cf
Primary=0.51 cfs 3,355 cf

Link PA-2: Inflow=1.24 cfs 4,354 cf
Primary=1.24 cfs 4,354 cf

Link PA-2.1: Inflow=0.17 cfs 645 cf
Primary=0.17 cfs 645 cf

Link PA-3: Inflow=1.81 cfs 6,764 cf
Primary=1.81 cfs 6,764 cf

Total Runoff Area = 152,082 sf Runoff Volume = 14,473 cf Average Runoff Depth = 1.14"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

Summary for Subcatchment PRE-1.0:

Runoff = 0.51 cfs @ 12.21 hrs, Volume= 3,355 cf, Depth> 0.65"
Routed to Link PA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
1,523	98	Unconnected roofs, HSG A
9,504	98	Paved parking, HSG A
29,181	30	Woods, Good, HSG A
21,441	39	>75% Grass cover, Good, HSG A
61,649	45	Weighted Average
50,622		82.11% Pervious Area
11,027		17.89% Impervious Area
1,523		13.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0300	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.3	15	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.8	153	0.0180	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	218	Total			

Summary for Subcatchment PRE-2.0:

Runoff = 1.07 cfs @ 12.12 hrs, Volume= 3,708 cf, Depth> 1.83"
Routed to Link PA-2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
2,697	98	Unconnected roofs, HSG A
6,996	98	Paved parking, HSG A
933	30	Woods, Good, HSG A
13,664	39	>75% Grass cover, Good, HSG A
24,290	62	Weighted Average
14,597		60.09% Pervious Area
9,693		39.91% Impervious Area
2,697		27.82% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.7	103	0.0220	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	50	0.1150	2.37		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	266	Total			

Summary for Subcatchment PRE-2.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 645 cf, Depth> 1.09"
Routed to Link PA-2.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
0	98	Unconnected roofs, HSG A
1,616	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
5,465	39	>75% Grass cover, Good, HSG A
7,081	52	Weighted Average
5,465		77.18% Pervious Area
1,616		22.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	97	0.0618	2.30		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.6	83	0.1200	2.42		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	33	0.0150	7.62	9.35	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
1.4	213	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment PRE-3.0:

Runoff = 1.81 cfs @ 12.12 hrs, Volume= 6,764 cf, Depth> 1.37"
Routed to Link PA-3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
4,967	98	Unconnected roofs, HSG A
14,161	98	Paved parking, HSG A
17,069	30	Woods, Good, HSG A
22,865	39	>75% Grass cover, Good, HSG A
59,062	56	Weighted Average
39,934		67.61% Pervious Area
19,128		32.39% Impervious Area
4,967		25.97% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0220	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.2	89	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	60	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	38	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.3	237	Total			

Summary for Link PA-1:

Inflow Area = 61,649 sf, 17.89% Impervious, Inflow Depth > 0.65" for 10-Yr event
Inflow = 0.51 cfs @ 12.21 hrs, Volume= 3,355 cf
Primary = 0.51 cfs @ 12.21 hrs, Volume= 3,355 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 31,371 sf, 36.05% Impervious, Inflow Depth > 1.67" for 10-Yr event
Inflow = 1.24 cfs @ 12.11 hrs, Volume= 4,354 cf
Primary = 1.24 cfs @ 12.11 hrs, Volume= 4,354 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2.1:

Inflow Area = 7,081 sf, 22.82% Impervious, Inflow Depth > 1.09" for 10-Yr event
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 645 cf
Primary = 0.17 cfs @ 12.10 hrs, Volume= 645 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PA-2 :

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-3:

Inflow Area =	59,062 sf,	32.39% Impervious,	Inflow Depth > 1.37"	for 10-Yr event
Inflow =	1.81 cfs @	12.12 hrs, Volume=	6,764 cf	
Primary =	1.81 cfs @	12.12 hrs, Volume=	6,764 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 PRE-1.0: Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>1.30"
Flow Length=218' Tc=8.6 min CN=45 Runoff=1.48 cfs 6,655 cf

Subcatchment PRE-2.0: Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>2.89"
Flow Length=266' Tc=7.3 min CN=62 Runoff=1.75 cfs 5,856 cf

Subcatchment PRE-2.1: Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>1.92"
Flow Length=213' Tc=5.0 min CN=52 Runoff=0.34 cfs 1,134 cf

Subcatchment PRE-3.0: Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>2.30"
Flow Length=237' Tc=7.3 min CN=56 Runoff=3.27 cfs 11,318 cf

Link PA-1: Inflow=1.48 cfs 6,655 cf
Primary=1.48 cfs 6,655 cf

Link PA-2: Inflow=2.08 cfs 6,990 cf
Primary=2.08 cfs 6,990 cf

Link PA-2.1: Inflow=0.34 cfs 1,134 cf
Primary=0.34 cfs 1,134 cf

Link PA-3: Inflow=3.27 cfs 11,318 cf
Primary=3.27 cfs 11,318 cf

Total Runoff Area = 152,082 sf Runoff Volume = 24,963 cf Average Runoff Depth = 1.97"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 PRE-1.0: Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>2.02"
Flow Length=218' Tc=8.6 min CN=45 Runoff=2.61 cfs 10,370 cf

Subcatchment PRE-2.0: Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>3.97"
Flow Length=266' Tc=7.3 min CN=62 Runoff=2.44 cfs 8,029 cf

Subcatchment PRE-2.1: Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>2.80"
Flow Length=213' Tc=5.0 min CN=52 Runoff=0.51 cfs 1,655 cf

Subcatchment PRE-3.0: Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>3.26"
Flow Length=237' Tc=7.3 min CN=56 Runoff=4.78 cfs 16,063 cf

Link PA-1: Inflow=2.61 cfs 10,370 cf
Primary=2.61 cfs 10,370 cf

Link PA-2: Inflow=2.94 cfs 9,684 cf
Primary=2.94 cfs 9,684 cf

Link PA-2.1: Inflow=0.51 cfs 1,655 cf
Primary=0.51 cfs 1,655 cf

Link PA-3: Inflow=4.78 cfs 16,063 cf
Primary=4.78 cfs 16,063 cf

Total Runoff Area = 152,082 sf Runoff Volume = 36,117 cf Average Runoff Depth = 2.85"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

2.2 Pre-Development Watershed Plan

SITE SPECIFIC SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND

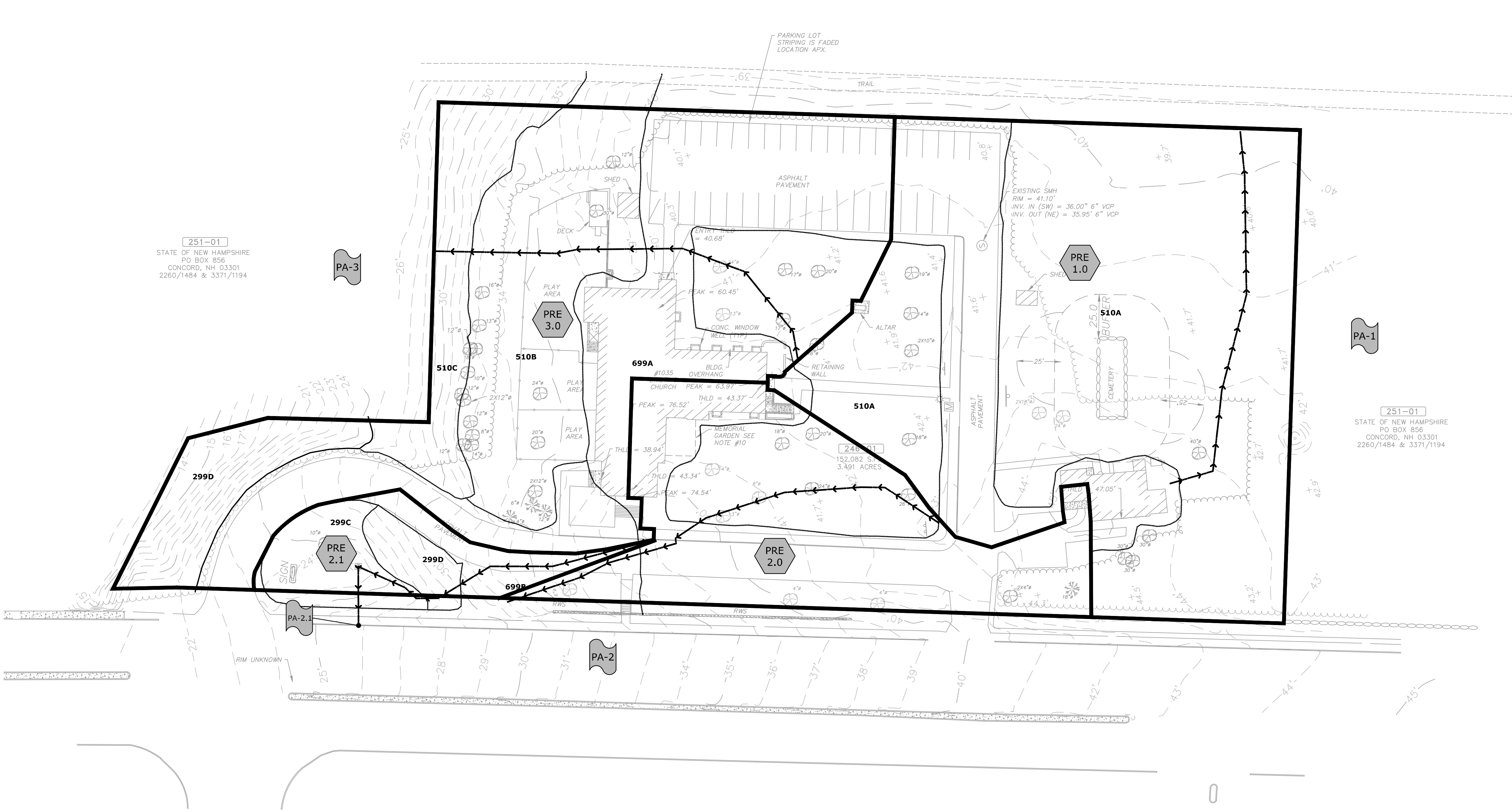
SYMBOL	SOIL TYPE, SLOPE RATING	HSG
299C	UDORTHENTS, SMOOTHED, 8 TO 15 PERCENT SLOPES	A
299D	UDORTHENTS, SMOOTHED, 15 TO 25 PERCENT SLOPES	A
510A	HOOSIC, 0 TO 3 PERCENT SLOPES	A
510B	HOOSIC, 3 TO 8 PERCENT SLOPES	A
510C	HOOSIC, 8 TO 15 PERCENT SLOPES	A
699A	URBAN LAND, 0 TO 3 PERCENT SLOPES	D
699B	URBAN LAND, 3 TO 8 PERCENT SLOPES	D

NOTES:

1. SSSS PREPARED BY JOSEPHW. NOEL, NH CERTIFIED SOIL SCIENTIST #017, DATED 05/20/2024.
2. HYDROLOGIC SOIL GROUPS FOR DISTURBED SOILS WERE BASED ON MOST SIMILAR SOIL SERIES LISTED IN KSAT VALUES FOR NH SOILS, SSSNNE SPECIAL PUBLICATION NO. 5, 2009.
3. THIS DETAILED SITE SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, SITE SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT.
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENS OF RSA 485 A:17 AND NHDES ENV-WQ, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

LEGEND

- PRE-DEVELOPMENT WATERSHED BOUNDARY
- LONGEST FLOW PATH
- SITE SPECIFIC SOIL SURVEY BOUNDARIES
- PRE 1.0 — PRE DEVELOPMENT WATERSHED AREA DESIGNATION
- PA-1 — POINT OF ANALYSIS



Tighe&Bond

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-HYDRO.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-801

Last Saved: 7/3/2024
Plotted On:Jul 22, 2024-2:28pm By: BCurcio
Tighe & Bond:\\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-HYDRO.dwg

Section 3
Post-Development Conditions

The post-development condition was analyzed by using the same points of analysis (PA-1, PA-2, PA-2.1 & PA-3.) In the post-development conditions, the total watersheds increased with five (5) total watershed areas. Stormwater runoff from these sub-catchment areas flow via sheet flow to Lafayette Road - US-Route 1, the conservation lands, Sagamore Creek or through the subsurface drainage systems prior to discharging into the proposed surface stormwater systems before ultimately discharging off site.

The point of analysis and its sub-catchment areas are depicted on the plan entitled "Post-Development Watershed Plan," Sheet C-802. The point of analysis and it's contributing watershed areas are described below:

Point of Analysis (PA-1)

Point of analysis 1 (PA-1) includes one (1) Post-Development Watershed Area (POST 1.0). The POST 1.0 area has significantly decreased and is only comprised of a small strip of land to the south of the proposed pavement section. The area is composed of grass areas.

Point of Analysis (PA-2)

Point of analysis 2 (PA-2) includes two (2) Post-Development Watershed Areas, both depicted as POST 2.0 on the plans. The first POST 2.0 area is abutting Lafayette Road - US-Route 1 and comprised of a small strip of land. This area is mainly composed of grass and wooded area with a small section of pavement.

The second POST 2.0 area is comprised of an area of land located centrally on site. This area is composed of grassed area along with a roof section from the existing church building on site.

Point of Analysis (PA-2.1)

Point of analysis 2.1 (PA-2.1) includes one (1) Post-Development Watershed Area (POST 2.1). POST 2.1 is mainly composed of impervious and grass areas.

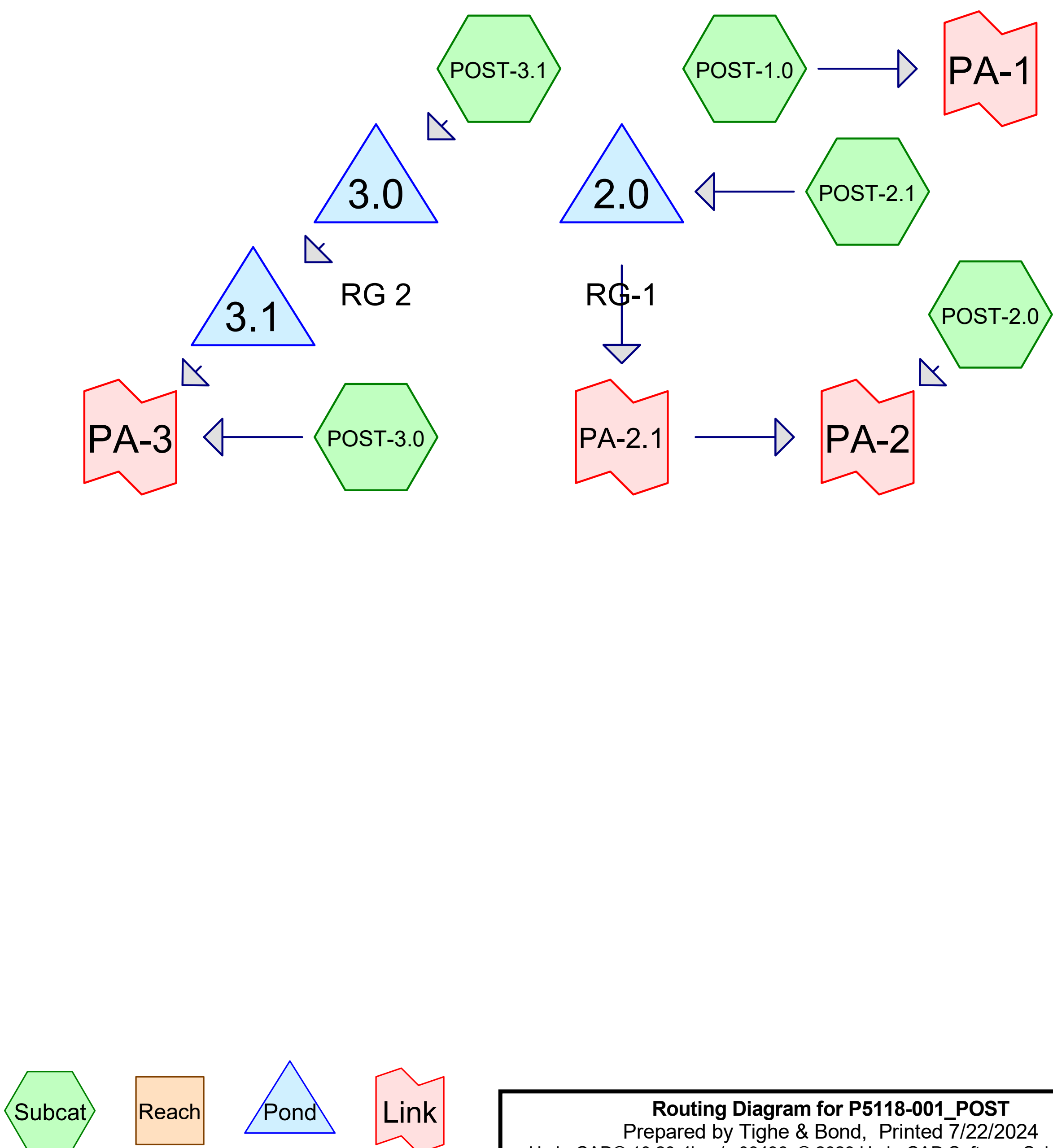
This proposed subcatchment discharges stormwater to a proposed Bioretention ISR surface stormwater treatment system (POND 2.0). This system was sized to treat the associated water quality volumes. BMP calculation spreadsheets can be found in Section 6 of this Drainage Report. Peak flows have been mitigated through the surface stormwater treatment unit to reduce flows discharging to the NHDOT closed drainage system.

Point of Analysis (PA-3)

Point of analysis 3 (PA-3) includes two (2) Post-Development Watershed Areas (POST 3.0 & POST 3.1). POST 3.0 is primarily grass and woods area with small sections of existing pavement and roof from the existing Church building. The majority of this subcatchment area will remain undisturbed with no additional impervious surfaces being added. Runoff from this watershed sheet flows stormwater directly into Sagamore Creek and ultimately into the Piscataqua River.

POST 3.1 is the last and largest subcatchment on site and is composed of the proposed building and addition to the existing church as well as a section of the existing church building. In addition to the proposed buildings, the remainder of the area is comprised of impervious pavement, concrete, and grassed area. All stormwater will sheet flow into the closed drainage system where it will be discharged into the Bioretention ISR (POND 3.0) located within the subcatchment, on the Northeastern corner of the development. The Bioretention ISR system has been sized to treat the associated Water Quality Volume and calculations can be found in Section 6. This system discharges to an underground infiltration system (POND 3.1) which consists of ADS Stormtech SC-740 chambers and was sized to mitigate peak flows to the abutting property as well as provide Groundwater Recharge Volumes (GRV) as required by NHDES. The design infiltration rate (Ksat) through this system was determined by soil infiltration tests completed by qualified Tighe & Bond personnel on July 2, 2024 and calculated in accordance with the methods outlined under Env-Wq 1504.14. This subcatchment ultimately discharges to Sagamore Creek, defined as PA-3.

3.1 Post-Development Calculations



Routing Diagram for P5118-001_POST
Prepared by Tighe & Bond, Printed 7/22/2024

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
71,166	39	>75% Grass cover, Good, HSG A (POST-1.0, POST-2.0, POST-2.1, POST-3.0, POST-3.1)
51,734	98	Paved parking, HSG A (POST-2.0, POST-2.1, POST-3.0, POST-3.1)
23,467	98	Unconnected roofs, HSG A (POST-2.0, POST-3.0, POST-3.1)
5,715	30	Woods, Good, HSG A (POST-3.0)
152,082	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
152,082	HSG A	POST-1.0, POST-2.0, POST-2.1, POST-3.0, POST-3.1
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
152,082		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 POST-1.0: Runoff Area=2,696 sf 0.00% Impervious Runoff Depth>0.02"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=39 Runoff=0.00 cfs 4 cf

Subcatchment POST-2.0: Runoff Area=12,247 sf 30.79% Impervious Runoff Depth>0.49"
Flow Length=20' Slope=0.0050 '/' Tc=5.0 min CN=57 Runoff=0.10 cfs 503 cf

Subcatchment POST-2.1: Runoff Area=24,862 sf 36.42% Impervious Runoff Depth>0.62"
Flow Length=162' Tc=10.7 min CN=60 Runoff=0.25 cfs 1,280 cf

Subcatchment POST-3.0: Runoff Area=31,894 sf 32.36% Impervious Runoff Depth>0.45"
Flow Length=194' Tc=9.2 min CN=56 Runoff=0.19 cfs 1,202 cf

Subcatchment POST-3.1: Runoff Area=80,383 sf 64.76% Impervious Runoff Depth>1.58"
Flow Length=546' Tc=6.7 min CN=77 Runoff=3.25 cfs 10,576 cf

Pond 2.0: RG-1 Peak Elev=22.11' Storage=1,009 cf Inflow=0.25 cfs 1,280 cf
Outflow=0.01 cfs 282 cf

Pond 3.0: RG 2 Peak Elev=33.86' Storage=6,275 cf Inflow=3.25 cfs 10,576 cf
Outflow=0.22 cfs 5,374 cf

Pond 3.1: Peak Elev=25.00' Storage=0 cf Inflow=0.22 cfs 5,374 cf
Discarded=0.22 cfs 5,374 cf Primary=0.00 cfs 0 cf Outflow=0.22 cfs 5,374 cf

Link PA-1: Inflow=0.00 cfs 4 cf
Primary=0.00 cfs 4 cf

Link PA-2: Inflow=0.10 cfs 785 cf
Primary=0.10 cfs 785 cf

Link PA-2.1: Inflow=0.01 cfs 282 cf
Primary=0.01 cfs 282 cf

Link PA-3: Inflow=0.19 cfs 1,202 cf
Primary=0.19 cfs 1,202 cf

Total Runoff Area = 152,082 sf Runoff Volume = 13,566 cf Average Runoff Depth = 1.07"
50.55% Pervious = 76,881 sf 49.45% Impervious = 75,201 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 POST-1.0: Runoff Area=2,696 sf 0.00% Impervious Runoff Depth>0.34"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=39 Runoff=0.01 cfs 77 cf

Subcatchment POST-2.0: Runoff Area=12,247 sf 30.79% Impervious Runoff Depth>1.45"
Flow Length=20' Slope=0.0050 '/' Tc=5.0 min CN=57 Runoff=0.43 cfs 1,479 cf

Subcatchment POST-2.1: Runoff Area=24,862 sf 36.42% Impervious Runoff Depth>1.67"
Flow Length=162' Tc=10.7 min CN=60 Runoff=0.88 cfs 3,467 cf

Subcatchment POST-3.0: Runoff Area=31,894 sf 32.36% Impervious Runoff Depth>1.37"
Flow Length=194' Tc=9.2 min CN=56 Runoff=0.91 cfs 3,651 cf

Subcatchment POST-3.1: Runoff Area=80,383 sf 64.76% Impervious Runoff Depth>3.15"
Flow Length=546' Tc=6.7 min CN=77 Runoff=6.56 cfs 21,076 cf

Pond 2.0: RG-1 Peak Elev=22.83' Storage=1,963 cf Inflow=0.88 cfs 3,467 cf
Outflow=0.08 cfs 1,678 cf

Pond 3.0: RG 2 Peak Elev=34.67' Storage=8,976 cf Inflow=6.56 cfs 21,076 cf
Outflow=2.76 cfs 15,190 cf

Pond 3.1: Peak Elev=25.23' Storage=269 cf Inflow=2.76 cfs 15,190 cf
Discarded=1.74 cfs 15,199 cf Primary=0.00 cfs 0 cf Outflow=1.74 cfs 15,199 cf

Link PA-1: Inflow=0.01 cfs 77 cf
Primary=0.01 cfs 77 cf

Link PA-2: Inflow=0.43 cfs 3,156 cf
Primary=0.43 cfs 3,156 cf

Link PA-2.1: Inflow=0.08 cfs 1,678 cf
Primary=0.08 cfs 1,678 cf

Link PA-3: Inflow=0.91 cfs 3,651 cf
Primary=0.91 cfs 3,651 cf

Total Runoff Area = 152,082 sf Runoff Volume = 29,748 cf Average Runoff Depth = 2.35"
50.55% Pervious = 76,881 sf 49.45% Impervious = 75,201 sf

Summary for Subcatchment POST-1.0:

Runoff = 0.01 cfs @ 12.44 hrs, Volume= 77 cf, Depth> 0.34"
Routed to Link PA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
0	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
2,696	39	>75% Grass cover, Good, HSG A
2,696	39	Weighted Average
2,696		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0140	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
3.2	161	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.3	211	Total			

Summary for Subcatchment POST-2.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.43 cfs @ 12.09 hrs, Volume= 1,479 cf, Depth> 1.45"
Routed to Link PA-2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
2,461	98	Unconnected roofs, HSG A
1,310	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
8,476	39	>75% Grass cover, Good, HSG A
12,247	57	Weighted Average
8,476		69.21% Pervious Area
3,771		30.79% Impervious Area
2,461		65.26% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	20	0.0050	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
4.4	20	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST-2.1:

Runoff = 0.88 cfs @ 12.16 hrs, Volume= 3,467 cf, Depth> 1.67"
Routed to Pond 2.0 : RG-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
0	98	Unconnected roofs, HSG A
9,054	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
15,808	39	>75% Grass cover, Good, HSG A
24,862	60	Weighted Average
15,808		63.58% Pervious Area
9,054		36.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0150	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.4	44	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	18	0.0312	8.01	6.29	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
10.7	162	Total			

Summary for Subcatchment POST-3.0:

Runoff = 0.91 cfs @ 12.15 hrs, Volume= 3,651 cf, Depth> 1.37"
Routed to Link PA-3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
2,367	98	Unconnected roofs, HSG A
7,955	98	Paved parking, HSG A
5,715	30	Woods, Good, HSG A
15,857	39	>75% Grass cover, Good, HSG A
31,894	56	Weighted Average
21,572		67.64% Pervious Area
10,322		32.36% Impervious Area
2,367		22.93% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	91	0.0200	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.7	103	0.1159	2.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.2	194	Total			

Summary for Subcatchment POST-3.1:

[47] Hint: Peak is 260% of capacity of segment #4

Runoff = 6.56 cfs @ 12.10 hrs, Volume= 21,076 cf, Depth> 3.15"
Routed to Pond 3.0 : RG 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.62"

Area (sf)	CN	Description
18,639	98	Unconnected roofs, HSG A
33,415	98	Paved parking, HSG A
0	96	Gravel surface, HSG A
28,329	39	>75% Grass cover, Good, HSG A
80,383	77	Weighted Average
28,329		35.24% Pervious Area
52,054		64.76% Impervious Area
18,639		35.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0130	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.4	65	0.0153	2.51		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.3	103	0.0217	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	365	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
6.7	546	Total			

Summary for Pond 2.0: RG-1

Inflow Area = 24,862 sf, 36.42% Impervious, Inflow Depth > 1.67" for 10-Yr event
Inflow = 0.88 cfs @ 12.16 hrs, Volume= 3,467 cf
Outflow = 0.08 cfs @ 14.60 hrs, Volume= 1,678 cf, Atten= 91%, Lag= 146.0 min
Primary = 0.08 cfs @ 14.60 hrs, Volume= 1,678 cf
Routed to Link PA-2.1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 22.83' @ 14.60 hrs Surf.Area= 1,505 sf Storage= 1,963 cf
Flood Elev= 24.50' Surf.Area= 2,312 sf Storage= 5,157 cf

Plug-Flow detention time= 300.8 min calculated for 1,678 cf (48% of inflow)
Center-of-Mass det. time= 167.3 min (1,037.3 - 870.0)

Volume	Invert	Avail.Storage	Storage Description
#1	18.50'	6,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
18.50	1,106	0.0	0	0
20.00	1,106	40.0	664	664
22.00	1,106	10.0	221	885
25.00	2,553	100.0	5,489	6,373

Device	Routing	Invert	Outlet Devices
#1	Primary	19.37'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 19.37' / 18.69' S= 0.0283 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	19.00'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	22.00'	**10.000 in/hr Exfiltration over Surface area above 22.00'** Excluded Surface area = 1,106 sf
#4	Device 1	22.65'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	23.75'	**4.0" x 4.0" Horiz. Orifice/Grate X 104.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 14.60 hrs HW=22.83' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.08 cfs of 9.94 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.95 fps)
  │ └─**3=Exfiltration** (Passes 0.01 cfs of 0.09 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.43 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3.0: RG 2

Inflow Area = 80,383 sf, 64.76% Impervious, Inflow Depth > 3.15" for 10-Yr event
Inflow = 6.56 cfs @ 12.10 hrs, Volume= 21,076 cf
Outflow = 2.76 cfs @ 12.40 hrs, Volume= 15,190 cf, Atten= 58%, Lag= 18.0 min
Primary = 2.76 cfs @ 12.40 hrs, Volume= 15,190 cf
Routed to Pond 3.1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 34.67' @ 12.40 hrs Surf.Area= 3,584 sf Storage= 8,976 cf
Flood Elev= 35.25' Surf.Area= 3,785 sf Storage= 10,192 cf

Plug-Flow detention time= 169.5 min calculated for 15,158 cf (72% of inflow)
Center-of-Mass det. time= 78.1 min (902.6 - 824.5)

Volume	Invert	Avail.Storage	Storage Description
#1	28.50'	10,192 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.50	1,963	0.0	0	0
30.00	1,963	40.0	1,178	1,178
32.00	1,963	10.0	393	1,570
35.00	3,785	100.0	8,622	10,192

Device	Routing	Invert	Outlet Devices
#1	Primary	30.00'	**15.0" Round Culvert** L= 21.0' Ke= 0.500 Inlet / Outlet Invert= 30.00' / 28.50' S= 0.0714 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	29.00'	**1.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	32.00'	**10.000 in/hr Exfiltration over Surface area above 32.00'** Excluded Surface area = 1,963 sf
#4	Device 1	33.75'	**12.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	34.65'	**4.0" x 4.0" Horiz. Orifice/Grate X 104.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.74 cfs @ 12.40 hrs HW=34.67' TW=25.11' (Dynamic Tailwater)
1=Culvert (Passes 2.74 cfs of 11.88 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.11 cfs @ 10.40 fps)
3=Exfiltration (Passes 0.11 cfs of 0.38 cfs potential flow)
4=Orifice/Grate (Orifice Controls 1.39 cfs @ 4.17 fps)
5=Orifice/Grate (Weir Controls 1.24 cfs @ 0.46 fps)

Summary for Pond 3.1:

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=109)

Inflow Area = 80,383 sf, 64.76% Impervious, Inflow Depth > 2.27" for 10-Yr event
Inflow = 2.76 cfs @ 12.40 hrs, Volume= 15,190 cf
Outflow = 1.74 cfs @ 12.40 hrs, Volume= 15,199 cf, Atten= 37%, Lag= 0.0 min
Discarded = 1.74 cfs @ 12.40 hrs, Volume= 15,199 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link PA-3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 25.23' @ 12.51 hrs Surf.Area= 2,899 sf Storage= 269 cf
Flood Elev= 28.50' Surf.Area= 2,899 sf Storage= 6,043 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (903.2 - 902.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	25.00'	1,878 cf	**11.00'W x 181.62'L x 3.50'H Field A**
			6,992 cf Overall - 2,297 cf Embedded = 4,695 cf x 40.0% Voids
#2A	25.50'	2,297 cf	**ADS_StormTech SC-740 +Cap** x 50 Inside #1
			Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
			Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
			50 Chambers in 2 Rows
#3C	25.00'	858 cf	**11.00'W x 81.94'L x 3.50'H Field C**
			3,155 cf Overall - 1,011 cf Embedded = 2,144 cf x 40.0% Voids
#4C	25.50'	1,011 cf	**ADS_StormTech SC-740 +Cap** x 22 Inside #3
			Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
			Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
			22 Chambers in 2 Rows
		6,043 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**26.000 in/hr Exfiltration over Surface area**
#2	Primary	25.50'	**12.0" Round Culvert** L= 4.0' Ke= 0.500
			Inlet / Outlet Invert= 25.50' / 25.40' S= 0.0250 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf
#3	Device 2	26.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Device 2	28.35'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00
			Width (feet) 4.00 4.00

Discarded OutFlow Max=1.74 cfs @ 12.40 hrs HW=25.11' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.74 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=25.00' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Summary for Link PA-1:

Inflow Area = 2,696 sf, 0.00% Impervious, Inflow Depth > 0.34" for 10-Yr event
Inflow = 0.01 cfs @ 12.44 hrs, Volume= 77 cf
Primary = 0.01 cfs @ 12.44 hrs, Volume= 77 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 37,109 sf, 34.56% Impervious, Inflow Depth > 1.02" for 10-Yr event
Inflow = 0.43 cfs @ 12.09 hrs, Volume= 3,156 cf
Primary = 0.43 cfs @ 12.09 hrs, Volume= 3,156 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2.1:

Inflow Area = 24,862 sf, 36.42% Impervious, Inflow Depth > 0.81" for 10-Yr event
Inflow = 0.08 cfs @ 14.60 hrs, Volume= 1,678 cf
Primary = 0.08 cfs @ 14.60 hrs, Volume= 1,678 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PA-2 :

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-3:

Inflow Area = 112,277 sf, 55.56% Impervious, Inflow Depth > 0.39" for 10-Yr event
Inflow = 0.91 cfs @ 12.15 hrs, Volume= 3,651 cf
Primary = 0.91 cfs @ 12.15 hrs, Volume= 3,651 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 POST-1.0: Runoff Area=2,696 sf 0.00% Impervious Runoff Depth>0.81"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=39 Runoff=0.03 cfs 183 cf

Subcatchment POST-2.0: Runoff Area=12,247 sf 30.79% Impervious Runoff Depth>2.40"
Flow Length=20' Slope=0.0050 '/' Tc=5.0 min CN=57 Runoff=0.76 cfs 2,447 cf

Subcatchment POST-2.1: Runoff Area=24,862 sf 36.42% Impervious Runoff Depth>2.69"
Flow Length=162' Tc=10.7 min CN=60 Runoff=1.48 cfs 5,573 cf

Subcatchment POST-3.0: Runoff Area=31,894 sf 32.36% Impervious Runoff Depth>2.30"
Flow Length=194' Tc=9.2 min CN=56 Runoff=1.65 cfs 6,109 cf

Subcatchment POST-3.1: Runoff Area=80,383 sf 64.76% Impervious Runoff Depth>4.48"
Flow Length=546' Tc=6.7 min CN=77 Runoff=9.29 cfs 30,000 cf

Pond 2.0: RG-1 Peak Elev=23.14' Storage=2,464 cf Inflow=1.48 cfs 5,573 cf
Outflow=0.25 cfs 3,749 cf

Pond 3.0: RG 2 Peak Elev=34.73' Storage=9,191 cf Inflow=9.29 cfs 30,000 cf
Outflow=11.72 cfs 23,981 cf

Pond 3.1: Peak Elev=26.78' Storage=3,410 cf Inflow=11.72 cfs 23,981 cf
Discarded=1.74 cfs 21,587 cf Primary=1.45 cfs 2,404 cf Outflow=3.20 cfs 23,991 cf

Link PA-1: Inflow=0.03 cfs 183 cf
Primary=0.03 cfs 183 cf

Link PA-2: Inflow=0.76 cfs 6,196 cf
Primary=0.76 cfs 6,196 cf

Link PA-2.1: Inflow=0.25 cfs 3,749 cf
Primary=0.25 cfs 3,749 cf

Link PA-3: Inflow=2.37 cfs 8,512 cf
Primary=2.37 cfs 8,512 cf

Total Runoff Area = 152,082 sf Runoff Volume = 44,311 cf Average Runoff Depth = 3.50"
50.55% Pervious = 76,881 sf 49.45% Impervious = 75,201 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 POST-1.0: Runoff Area=2,696 sf 0.00% Impervious Runoff Depth>1.38"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=39 Runoff=0.06 cfs 311 cf

Subcatchment POST-2.0: Runoff Area=12,247 sf 30.79% Impervious Runoff Depth>3.38"
Flow Length=20' Slope=0.0050 '/' Tc=5.0 min CN=57 Runoff=1.10 cfs 3,451 cf

Subcatchment POST-2.1: Runoff Area=24,862 sf 36.42% Impervious Runoff Depth>3.73"
Flow Length=162' Tc=10.7 min CN=60 Runoff=2.09 cfs 7,724 cf

Subcatchment POST-3.0: Runoff Area=31,894 sf 32.36% Impervious Runoff Depth>3.26"
Flow Length=194' Tc=9.2 min CN=56 Runoff=2.41 cfs 8,670 cf

Subcatchment POST-3.1: Runoff Area=80,383 sf 64.76% Impervious Runoff Depth>5.76"
Flow Length=546' Tc=6.7 min CN=77 Runoff=11.86 cfs 38,566 cf

Pond 2.0: RG-1 Peak Elev=23.65' Storage=3,360 cf Inflow=2.09 cfs 7,724 cf
Outflow=0.40 cfs 5,872 cf

Pond 3.0: RG 2 Peak Elev=34.74' Storage=9,223 cf Inflow=11.86 cfs 38,566 cf
Outflow=12.89 cfs 32,474 cf

Pond 3.1: Peak Elev=28.33' Storage=5,847 cf Inflow=12.89 cfs 32,474 cf
Discarded=1.74 cfs 25,611 cf Primary=2.89 cfs 6,881 cf Outflow=4.64 cfs 32,492 cf

Link PA-1: Inflow=0.06 cfs 311 cf
Primary=0.06 cfs 311 cf

Link PA-2: Inflow=1.11 cfs 9,324 cf
Primary=1.11 cfs 9,324 cf

Link PA-2.1: Inflow=0.40 cfs 5,872 cf
Primary=0.40 cfs 5,872 cf

Link PA-3: Inflow=4.47 cfs 15,551 cf
Primary=4.47 cfs 15,551 cf

Total Runoff Area = 152,082 sf Runoff Volume = 58,722 cf Average Runoff Depth = 4.63"
50.55% Pervious = 76,881 sf 49.45% Impervious = 75,201 sf

3.2 Post-Development Watershed Plan

Tighe&Bond

SITE SPECIFIC SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND

SYMBOL	SOIL TYPE, SLOPE RATING	HSG
299C	UDORTHENTS, SMOOTHED, 8 TO 15 PERCENT SLOPES	A
299D	UDORTHENTS, SMOOTHED, 15 TO 25 PERCENT SLOPES	A
510A	HOOSIC, 0 TO 3 PERCENT SLOPES	A
510B	HOOSIC, 3 TO 8 PERCENT SLOPES	A
510C	HOOSIC, 8 TO 15 PERCENT SLOPES	A
699A	URBAN LAND, 0 TO 3 PERCENT SLOPES	D
699B	URBAN LAND, 3 TO 8 PERCENT SLOPES	D

NOTES:

1. SSSS PREPARED BY JOSEPHW. NOEL, NH CERTIFIED SOIL SCIENTIST #017, DATED 05/20/2024.
2. HYDROLOGIC SOIL GROUPS FOR DISTURBED SOILS WERE BASED ON MOST SIMILAR SOIL SERIES LISTED IN KSAT VALUES FOR NH SOILS, SSSNNE SPECIAL PUBLICATION NO. 5, 2009.
3. THIS DETAILED SITE SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, SITE SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT.
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENS OF RSA 485 A:17 AND NHDES ENV-WQ, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

LEGEND

POST-DEVELOPMENT WATERSHED BOUNDARY

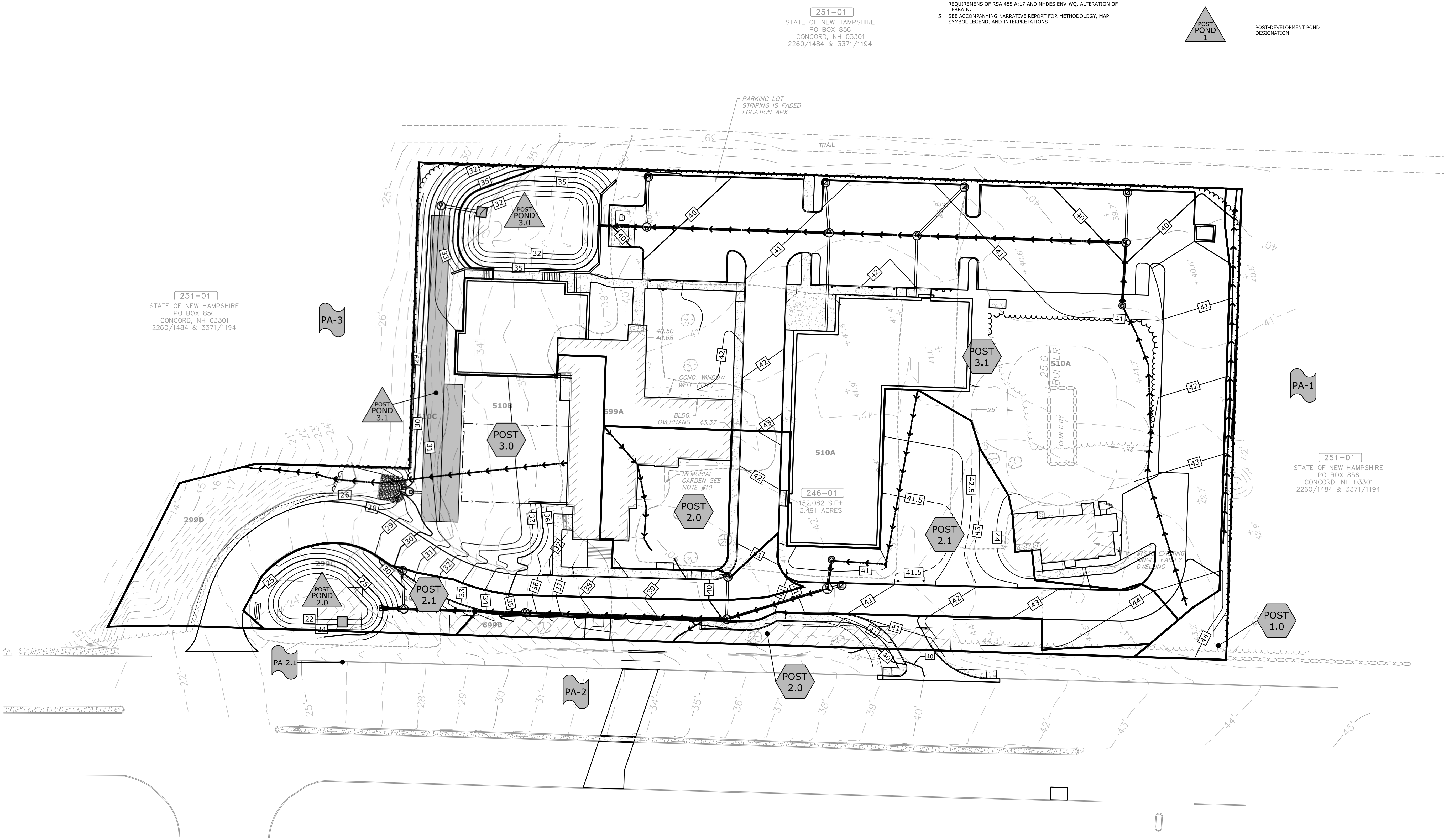
LONGEST FLOW PATH

SITE SPECIFIC SOIL SURVEY BOUNDARIES

POST 1.0 — POST-DEVELOPMENT WATERSHED AREA DESIGNATION

PA-1 — POINT OF ANALYSIS

POST POND 1 — POST-DEVELOPMENT POND DESIGNATION



0 30' 60'
GRAPHIC SCALE

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
C	7/24/2024	Planning Board Submission
B	6/17/2024	TAC Resubmission
A	5/20/2024	TAC Submission

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-HYDRO.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

POST-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-802

Last Saved: 7/3/2024
Plotted On:Jul 22, 2024-2:33pm By: BCurcio
Tighe & Bond:\\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-HYDRO.dwg

Section 4
Peak Rate Comparison

The following table summarizes and compares the pre- and post-development peak runoff rates from the 2-year, 10-year, 25-year and 50-year storm events at the point of analysis.

Table 4.1
Comparison of Pre- and Post-Development Flows (CFS)

	2-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm
Pre-Development Watershed				
PA-1	0.02	0.51	1.48	2.61
PA-2	0.36	1.24	2.08	2.94
PA-2.1	0.02	0.17	0.34	0.51
PA-3	0.38	1.81	3.27	4.78
Post-Development Watershed				
PA-1	0.00	0.01	0.03	0.06
PA-2	0.10	0.43	0.76	1.11
PA-2.1	0.01	0.08	0.25	0.40
PA-3	0.19	0.91	2.37	4.47

The Peak Runoff Control Requirements of Env-Wq 1507.06 are required to be met for all points of analysis. As shown in Table 4.1 the Post-development flows are decreased from the Pre-development flows for all points of analysis.

Section 5
Mitigation Description

The stormwater management system has been designed to provide stormwater treatment as required by the City of Portsmouth Site Review Regulations and NHDES AoT Regulations (Env-Wq 1500).

5.1 Pre-Treatment Methods for Protecting Water Quality

Pre-treatment for the stormwater filtration systems consists of off-line deep sump catch basins.

5.2 Treatment Methods for Protecting Water Quality.

The runoff from proposed impervious areas will be treated using Bioretention ISRs. These BMPs are sized to treat the Water Quality Flow of their respective subcatchment areas. The systems are outfitted with an outlet control structure to bypass the peak flows away from treatment. The BMP worksheet for this treatment practice has been included in Section 6 of this report.

The proposed stormwater management system is required to remove 80% of the annual Total Suspended Soils (TSS) loads and 50% of the annual Total Nitrogen (TN) loads per the City of Portsmouth's Site Plan regulations, Section 7.6.2.1.a.i. As shown in table 5.1 the pollutant removal efficiencies for the proposed treatment system exceeds the City of Portsmouth's removal requirements.

Table 5.1 – Pollutant Removal Efficiencies

BMP	Total Suspended Solids	Total Nitrogen	Total Phosphorus
Bioretention ISR[1]	90%	65%	65%

1. Pollutant removal calculations for Bioretention ISR with offline deep sump catchbasin pretreatment are shown in Table 5.3.

Table 5.3 – Pollutant Removal Calculations				
Bioretention ISR				
BMP	TSS Removal Rate	Starting TSS Load	TSS Removed	Remaining TSS Load
Deep Sump Catchbasin w/Hood[1]	0.15	1.00	0.15	0.85
Bioretention ISR[2]	0.90	0.85	0.77	0.08
	Total Suspended Solids Removed:			**92%**
	TN Removal Rate	Starting TN Load	TN Removed	Remaining TN Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Bioretention ISR[2]	0.65	0.95	0.62	0.33
	Total Nitrogen Removed:			**67%**
	TP Removal Rate	Starting TP Load	TP Removed	Remaining TP Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Bioretention ISR[2]	0.65	0.95	0.62	0.33
	Total Phosphorus Removed:			**67%**

1. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.
2. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.
3. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.

Section 6
BMP Worksheets

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Rain Garden ISR 1**

Enter the node name in the drainage analysis if applicable.

0.57	ac	A = Area draining to the practice	
0.21	ac	A_I = Impervious area draining to the practice	
0.37	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.38	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.22	ac-in	WQV= 1" x Rv x A	
790	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
79	cf	10% x WQV (check calc for sediment forebay)	
197	cf	25% x WQV (check calc for water stored in saturated zone)	
Offline Deep Sump		Method of Pretreatment	
N/A	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**$\geq$ 10%WQV**
821	cf	Volume below lowest orifice[1]	**$\geq$ 100%WQV**
664	cf	Water stored in voids of saturated zone	**$\geq$ 26%WQV**
0.02	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
22.65	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.01	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
43.86	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**$\geq$ 24-hrs**
18.00	in	Depth of Filter Media	**$\geq$ 18"**
3.00	:1	Pond side slopes	**$\geq$ 3:1**
Trash Rack		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of $\leq$6")?	
23.65	ft	Peak elevation of the 50-year storm event (E_{50})	
24.75	ft	Berm elevation of the pond	
YES		$E_{50} \leq$ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

Stage-Area-Storage for Pond 2.0: RG-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
18.50	1,106	0	21.10	1,106	785
18.55	1,106	22	21.15	1,106	791
18.60	1,106	44	21.20	1,106	796
18.65	1,106	66	21.25	1,106	802
18.70	1,106	88	21.30	1,106	807
18.75	1,106	111	21.35	1,106	813
18.80	1,106	133	21.40	1,106	818
18.85	1,106	155	21.45	1,106	824
18.90	1,106	177	21.50	1,106	830
18.95	1,106	199	21.55	1,106	835
19.00	1,106	221	21.60	1,106	841
19.05	1,106	243	21.65	1,106	846
19.10	1,106	265	21.70	1,106	852
19.15	1,106	288	21.75	1,106	857
19.20	1,106	310	21.80	1,106	863
19.25	1,106	332	21.85	1,106	868
19.30	1,106	354	21.90	1,106	874
19.35	1,106	376	21.95	1,106	879
19.40	1,106	398	22.00	1,106	885
19.45	1,106	420	22.05	1,130	941
19.50	1,106	442	22.10	1,154	998
19.55	1,106	465	22.15	1,178	1,056
19.60	1,106	487	22.20	1,202	1,116
19.65	1,106	509	22.25	1,227	1,176
19.70	1,106	531	22.30	1,251	1,238
19.75	1,106	553	22.35	1,275	1,301
19.80	1,106	575	22.40	1,299	1,366
19.85	1,106	597	22.45	1,323	1,431
19.90	1,106	619	22.50	1,347	1,498
19.95	1,106	641	22.55	1,371	1,566
20.00	1,106	664	22.60	1,395	1,635
20.05	1,106	669	22.65	1,420	1,706
20.10	1,106	675	22.70	1,444	1,777
20.15	1,106	680	22.75	1,468	1,850
20.20	1,106	686	22.80	1,492	1,924
20.25	1,106	691	22.85	1,516	1,999
20.30	1,106	697	22.90	1,540	2,076
20.35	1,106	702	22.95	1,564	2,153
20.40	1,106	708	23.00	1,588	2,232
20.45	1,106	713	23.05	1,612	2,312
20.50	1,106	719	23.10	1,637	2,393
20.55	1,106	724	23.15	1,661	2,476
20.60	1,106	730	23.20	1,685	2,559
20.65	1,106	735	23.25	1,709	2,644
20.70	1,106	741	23.30	1,733	2,730
20.75	1,106	747	23.35	1,757	2,817
20.80	1,106	752	23.40	1,781	2,906
20.85	1,106	758	23.45	1,805	2,996
20.90	1,106	763	23.50	1,830	3,086
20.95	1,106	769	23.55	1,854	3,179
21.00	1,106	774	23.60	1,878	3,272
21.05	1,106	780	23.65	1,902	3,366

Stage-Area-Storage for Pond 2.0: RG-1 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
23.70	1,926	3,462
23.75	1,950	3,559
23.80	1,974	3,657
23.85	1,998	3,756
23.90	2,022	3,857
23.95	2,047	3,959
24.00	2,071	4,061
24.05	2,095	4,166
24.10	2,119	4,271
24.15	2,143	4,377
24.20	2,167	4,485
24.25	2,191	4,594
24.30	2,215	4,704
24.35	2,239	4,816
24.40	2,264	4,928
24.45	2,288	5,042
24.50	2,312	5,157
24.55	2,336	5,273
24.60	2,360	5,391
24.65	2,384	5,509
24.70	2,408	5,629
24.75	2,432	5,750
24.80	2,457	5,872
24.85	2,481	5,996
24.90	2,505	6,120
24.95	2,529	6,246
25.00	**2,553**	**6,373**

Stage-Discharge for Pond 2.0: RG-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
18.50	0.00	21.10	0.00	23.70	0.41
18.55	0.00	21.15	0.00	23.75	0.42
18.60	0.00	21.20	0.00	23.80	5.50
18.65	0.00	21.25	0.00	23.85	11.60
18.70	0.00	21.30	0.00	23.90	11.68
18.75	0.00	21.35	0.00	23.95	11.75
18.80	0.00	21.40	0.00	24.00	11.83
18.85	0.00	21.45	0.00	24.05	11.90
18.90	0.00	21.50	0.00	24.10	11.97
18.95	0.00	21.55	0.00	24.15	12.04
19.00	0.00	21.60	0.00	24.20	12.12
19.05	0.00	21.65	0.00	24.25	12.19
19.10	0.00	21.70	0.00	24.30	12.26
19.15	0.00	21.75	0.00	24.35	12.33
19.20	0.00	21.80	0.00	24.40	12.40
19.25	0.00	21.85	0.00	24.45	12.47
19.30	0.00	21.90	0.00	24.50	12.54
19.35	0.00	21.95	0.00	24.55	12.61
19.40	0.00	22.00	0.00	24.60	12.68
19.45	0.00	22.05	0.01	24.65	12.75
19.50	0.00	22.10	0.01	24.70	12.82
19.55	0.00	22.15	0.01	24.75	12.88
19.60	0.00	22.20	0.01	24.80	12.95
19.65	0.00	22.25	0.01	24.85	13.02
19.70	0.00	22.30	0.01	24.90	13.09
19.75	0.00	22.35	0.01	24.95	13.15
19.80	0.00	22.40	0.01	25.00	**13.22**
19.85	0.00	22.45	0.01		
19.90	0.00	22.50	0.01		
19.95	0.00	22.55	0.01		
20.00	0.00	22.60	0.01		
20.05	0.00	22.65	0.01		
20.10	0.00	22.70	0.02		
20.15	0.00	22.75	0.04		
20.20	0.00	22.80	0.06		
20.25	0.00	22.85	0.10		
20.30	0.00	22.90	0.13		
20.35	0.00	22.95	0.17		
20.40	0.00	23.00	0.19		
20.45	0.00	23.05	0.22		
20.50	0.00	23.10	0.24		
20.55	0.00	23.15	0.26		
20.60	0.00	23.20	0.27		
20.65	0.00	23.25	0.29		
20.70	0.00	23.30	0.31		
20.75	0.00	23.35	0.32		
20.80	0.00	23.40	0.33		
20.85	0.00	23.45	0.35		
20.90	0.00	23.50	0.36		
20.95	0.00	23.55	0.37		
21.00	0.00	23.60	0.39		
21.05	0.00	23.65	0.40		

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Rain Garden ISR 2**

Enter the node name in the drainage analysis if applicable.

1.84	ac	A = Area draining to the practice	
1.19	ac	A_I = Impervious area draining to the practice	
0.65	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.63	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.16	ac-in	WQV= 1" x Rv x A	
4,222	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
422	cf	10% x WQV (check calc for sediment forebay)	
1,055	cf	25% x WQV (check calc for water stored in saturated zone)	
Offline Deep Sump		Method of Pretreatment	
N/A	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
4,366	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
1,178	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.10	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
33.70	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.10	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
23.45	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**≥ 24-hrs**
18.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
Trash Rack		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
34.74	ft	Peak elevation of the 50-year storm event (E_{50})	
35.25	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

Stage-Area-Storage for Pond 3.0: RG 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
28.50	1,963	0	31.10	1,963	1,394
28.55	1,963	39	31.15	1,963	1,404
28.60	1,963	79	31.20	1,963	1,413
28.65	1,963	118	31.25	1,963	1,423
28.70	1,963	157	31.30	1,963	1,433
28.75	1,963	196	31.35	1,963	1,443
28.80	1,963	236	31.40	1,963	1,453
28.85	1,963	275	31.45	1,963	1,462
28.90	1,963	314	31.50	1,963	1,472
28.95	1,963	353	31.55	1,963	1,482
29.00	1,963	393	31.60	1,963	1,492
29.05	1,963	432	31.65	1,963	1,502
29.10	1,963	471	31.70	1,963	1,512
29.15	1,963	510	31.75	1,963	1,521
29.20	1,963	550	31.80	1,963	1,531
29.25	1,963	589	31.85	1,963	1,541
29.30	1,963	628	31.90	1,963	1,551
29.35	1,963	667	31.95	1,963	1,561
29.40	1,963	707	32.00	1,963	1,570
29.45	1,963	746	32.05	1,993	1,669
29.50	1,963	785	32.10	2,024	1,770
29.55	1,963	824	32.15	2,054	1,872
29.60	1,963	864	32.20	2,084	1,975
29.65	1,963	903	32.25	2,115	2,080
29.70	1,963	942	32.30	2,145	2,187
29.75	1,963	982	32.35	2,176	2,295
29.80	1,963	1,021	32.40	2,206	2,404
29.85	1,963	1,060	32.45	2,236	2,515
29.90	1,963	1,099	32.50	2,267	2,628
29.95	1,963	1,139	32.55	2,297	2,742
30.00	1,963	1,178	32.60	2,327	2,858
30.05	1,963	1,188	32.65	2,358	2,975
30.10	1,963	1,197	32.70	2,388	3,093
30.15	1,963	1,207	32.75	2,419	3,213
30.20	1,963	1,217	32.80	2,449	3,335
30.25	1,963	1,227	32.85	2,479	3,458
30.30	1,963	1,237	32.90	2,510	3,583
30.35	1,963	1,247	32.95	2,540	3,709
30.40	1,963	1,256	33.00	2,570	3,837
30.45	1,963	1,266	33.05	2,601	3,966
30.50	1,963	1,276	33.10	2,631	4,097
30.55	1,963	1,286	33.15	2,661	4,229
30.60	1,963	1,296	33.20	2,692	4,363
30.65	1,963	1,305	33.25	2,722	4,499
30.70	1,963	1,315	33.30	2,753	4,635
30.75	1,963	1,325	33.35	2,783	4,774
30.80	1,963	1,335	33.40	2,813	4,914
30.85	1,963	1,345	33.45	2,844	5,055
30.90	1,963	1,354	33.50	2,874	5,198
30.95	1,963	1,364	33.55	2,904	5,343
31.00	1,963	1,374	33.60	2,935	5,489
31.05	1,963	1,384	33.65	2,965	5,636

Stage-Area-Storage for Pond 3.0: RG 2 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
33.70	2,995	5,785
33.75	3,026	5,936
33.80	3,056	6,088
33.85	3,087	6,241
33.90	3,117	6,396
33.95	3,147	6,553
34.00	3,178	6,711
34.05	3,208	6,871
34.10	3,238	7,032
34.15	3,269	7,195
34.20	3,299	7,359
34.25	3,330	7,524
34.30	3,360	7,692
34.35	3,390	7,860
34.40	3,421	8,031
34.45	3,451	8,203
34.50	3,481	8,376
34.55	3,512	8,551
34.60	3,542	8,727
34.65	3,572	8,905
34.70	3,603	9,084
34.75	3,633	9,265
34.80	3,664	9,448
34.85	3,694	9,631
34.90	3,724	9,817
34.95	3,755	10,004
35.00	**3,785**	**10,192**
35.05	3,785	10,192
35.10	3,785	10,192
35.15	3,785	10,192
35.20	3,785	10,192
35.25	3,785	10,192

Stage-Discharge for Pond 3.0: RG 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
28.50	0.00	31.10	0.00	33.70	0.10
28.55	0.00	31.15	0.00	33.75	0.10
28.60	0.00	31.20	0.00	33.80	0.14
28.65	0.00	31.25	0.00	33.85	0.20
28.70	0.00	31.30	0.00	33.90	0.29
28.75	0.00	31.35	0.00	33.95	0.39
28.80	0.00	31.40	0.00	34.00	0.50
28.85	0.00	31.45	0.00	34.05	0.63
28.90	0.00	31.50	0.00	34.10	0.76
28.95	0.00	31.55	0.00	34.15	0.86
29.00	0.00	31.60	0.00	34.20	0.95
29.05	0.00	31.65	0.00	34.25	1.02
29.10	0.00	31.70	0.00	34.30	1.09
29.15	0.00	31.75	0.00	34.35	1.16
29.20	0.00	31.80	0.00	34.40	1.22
29.25	0.00	31.85	0.00	34.45	1.28
29.30	0.00	31.90	0.00	34.50	1.33
29.35	0.00	31.95	0.00	34.55	1.38
29.40	0.00	32.00	0.00	34.60	1.43
29.45	0.00	32.05	0.01	34.65	1.48
29.50	0.00	32.10	0.01	34.70	6.60
29.55	0.00	32.15	0.02	34.75	12.00
29.60	0.00	32.20	0.03	34.80	12.07
29.65	0.00	32.25	0.04	34.85	12.15
29.70	0.00	32.30	0.04	34.90	12.22
29.75	0.00	32.35	0.05	34.95	12.29
29.80	0.00	32.40	0.06	35.00	12.36
29.85	0.00	32.45	0.06	35.05	12.43
29.90	0.00	32.50	0.07	35.10	12.50
29.95	0.00	32.55	0.08	35.15	12.57
30.00	0.00	32.60	0.08	35.20	12.64
30.05	0.00	32.65	0.08	35.25	**12.71**
30.10	0.00	32.70	0.08		
30.15	0.00	32.75	0.09		
30.20	0.00	32.80	0.09		
30.25	0.00	32.85	0.09		
30.30	0.00	32.90	0.09		
30.35	0.00	32.95	0.09		
30.40	0.00	33.00	0.09		
30.45	0.00	33.05	0.09		
30.50	0.00	33.10	0.09		
30.55	0.00	33.15	0.09		
30.60	0.00	33.20	0.09		
30.65	0.00	33.25	0.09		
30.70	0.00	33.30	0.09		
30.75	0.00	33.35	0.09		
30.80	0.00	33.40	0.09		
30.85	0.00	33.45	0.10		
30.90	0.00	33.50	0.10		
30.95	0.00	33.55	0.10		
31.00	0.00	33.60	0.10		
31.05	0.00	33.65	0.10		

APPENDIX A

SITE-SPECIFIC

SOIL MAP REPORT

FOR

1035 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

PREPARED FOR:

TIGHE & BOND, INC.
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

PREPARED BY:

JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908

MAY 28, 2024
JWN #23-68

JOSEPH W. NOEL
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(207) 384-5587

CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR

INTRODUCTION

On May 20, 2024, the property located at 1035 Lafayette Road in Portsmouth, New Hampshire was soil mapped following *Site-Specific Soil Mapping Standards for New Hampshire and Vermont* (Society of Soil Scientists of Northern New England, Version 7.0, July 2021). This type of soil map uses soil series names and is within the technical standards of the National Cooperative Soil Survey. The purpose of the soil map is to comply with the soil mapping requirements of RSA 485-A:17 and NH DES Env-Wq 1500, Alteration of Terrain for a Portsmouth Housing Authority development. The soil mapping legend conforms to the New Hampshire State-Wide Numerical Soils Legend.

A base map was provided by Tighe & Bond, Inc. that was produced by James Verra & Associates, Inc. that contained: 2-foot contours, existing conditions and the off-site wetland boundary that was conducted by the undersigned. This map was used for ground control and to assist in generating the Site-Specific Soil Survey. The hydrologic soil group for the natural/undisturbed soil was taken from the SSSNNE Special Publication No. 5. The HSG designation for Udorthents, smooth and the Urban land were estimated. Five backhoe excavated test pits were conducted on May 20, 2024 for stormwater planning and soil mapping purposes (test pit log information is attached). If additional soil observations are conducted, the soil map may be revised/fine-tuned.

The 3.5+/- acre parcel that was soil mapped is owned by The Parish of Christ Church Portsmouth. The developed portions consist of a church, asphalt paved access roads/parking, a single family dwelling with a yard, and a play yard used by an existing daycare business. Other existing features include a cemetery, subsurface drainage, retaining walls, and a municipal sewer line. The remaining undeveloped areas are forested. Test pits 1, 2 and 3 were conducted in northern areas where preliminary/potential stormwater structures are planned. These were also used to complete the soil survey. Test pits 4 and 5 were conducted along the southern side of the property for soil survey purposes only. Ms. Fiona Jones, Archeologist, from Heritage Consultants was present to collect separate data at each of the five test pits. The test pits were initially excavated to a 4 or 5 foot depth which allowed the upper layers to be described from within the pit. Pits were then excavated to a deeper depth to document (from outside the pit) features such as: bedrock, restrictive layers, observed water or estimated seasonal high water levels. These features were observed outside the excavation as Hoosic and Hoosic-like soils cut banks can easily cave-in. Two photos of Test Pit 5 have been included to illustrate representative soil conditions.

Due to the sensitive archeological nature of the site, test pit locations were very limited and needed approval of their locations prior to excavation. Transects were also limited for the same reason. Fortunately, the site is on a uniform landform and parent material so additional test pits are not needed at this time.

SOIL MAP UNITS

Map Symbol: 299
Soil Series: Udorthents, smooth

This map unit represents areas that has been filled, smoothed and regraded. The drainage class is estimated to be somewhat excessively drained. The underlain natural soils were formed in glacial outwash similar to the natural Hoosic soils. These soils are very deep to bedrock and are found in several mapping units in the mapping area along the northern edge of the site. These areas are moderately to steeply sloped and have a high to intermediate position on the landscape. Beneath the fill the original soil was most likely the Hoosic soils. Test Pit 1 is located in this mapping unit. Textures range from sandy loam fill to gravelly coarse sand with a seasonal highwater table at 46 inches. Slopes range from 8 to 25% (there may be small inclusions that are steeper). The hydrologic soil group is estimated to be A. This map unit may contain up to 10% inclusions of Hoosic or Hoosic-like soils.

Map Symbol: 510
Soil Series: Hoosic

This series consists of somewhat excessively drained soils that formed in glacial outwash. These soils are found throughout the mapping area, are very deep to bedrock, and are in high positions on the landscape. Test pits 2 thru 5 are conducted in these mapping units. Textures typically range from gravelly sandy loam, very coarse sand, gravelly sand, gravelly fine sandy loam, and gravelly loamy sand. The seasonal high water table is estimated to be 82" or deeper. Slopes range from 0-15%. The hydrologic soil group is A. This map unit may contain up to 10% inclusions of somewhat excessively drained Udorthents (disturbed surface layer), some limited paved areas, the cemetery, and Hoosic-like soils.

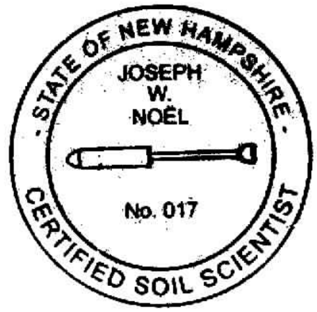
Map Symbol: 699
Soil Series: Urban land

This miscellaneous map unit represents areas that are covered by paved access roads/parking areas, a church, single family dwelling, etc. Due to the existing development and the existing daycare business no test pits were conducted here. These map units are found high on the landscape and were originally the coarse textured Hoosic soils that are very deep to bedrock. The existing seasonal highwater table is unknown but is most likely relatively deep (i.e., 6 to 8 feet below the surface). Slopes range from 0-8%. The hydrologic soil group is estimated to be D due to the extent of impervious surfaces. This map unit may contain up to 10% inclusions of excessively drained Udorthents or Hoosic-like soils.

CLOSING

Inaccuracies or deficiencies in the base map may be unknowingly reflected in the soil survey, particularly in the boundary line placement between soil map units. This map was designed to provide soil information for the Portsmouth Housing Authority development and to meet Alteration of Terrain requirements and may not be adequate for other purposes.

Joseph W. Noel, CPSS/SC
New Hampshire Certified Soil Scientist #017
New Hampshire Certified Wetland Scientist #086



JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908
(207) 384-5587

CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR

May 27, 2024

TEST PIT LOGS
1035 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE

Test Pits Conducted: May 20, 2024
By: Joseph W. Noel
New Hampshire Certified Soil Scientist #017

Test Pit 1

^A	0-9 inches	dark brown (10YR 3/3) sandy loam fill/regraded material, friable, granular
^Bw	9-23 inches	brown (10YR 4/3) loamy sand fill/regraded material, very friable, massive
Natural Subsoil		
Bw	23-46 inches	strong brown (7.5YR 4/6) gravelly loamy sand, loose, single grain
Cd	46-66 inches	grayish brown (2.5Y 5/2) fine sandy loam with some gravel, firm, massive to platy, common distinct redox features
2C	66-108 inches	light olive brown (2.5Y 5/3) gravelly very coarse sand, loose, single grain, common faint redox features

Seasonal High Water Table @ 46" (possible perched water table)
Observed Water Table none to 108"
Restrictive Horizon @ 46"
Bedrock none to 108"
Soil Series: Udorthents (Hoosic-like)
Note: 2C horizon described faint redox features in gravelly very coarse sand from outside of pit. Assumed to be an apparent water table.

Test Pit 2

^A	0-4 inches	dark brown (10YR 3/3) gravelly sandy loam fill/regraded material, friable, granular
^B	4-15 inches	dark yellowish brown (10YR 3/6) gravelly sandy loam fill/regraded material, friable, granular
Remnants Of Original Soil Surface		
Ab	15-16 inches	dark brown (10YR 3/3) gravelly sandy loam, friable, granular
Bw	16-31 inches	dark yellowish brown (10YR 4/4 & 10YR 4/6) gravelly loamy sand, very friable, massive
C1	31-39 inches	brown (10YR 4/3) very coarse sand, loose, single grain
C2	39-84 inches	brown (10YR 5/3) gravelly sand, loose, single grain
C3	84-102 inches	brown (10YR 5/3) gravelly sand, loose, single grain, common faint & few distinct redox features

Seasonal High Water Table @ 84" (estimated outside of pit – apparent water table)
Observed Water Table none to 102"
Restrictive Horizon none to 102"
Bedrock none to 102"
Soil Series: Hoosic (disturbed surface)

Test Pit 3

^A	0-16 inches	mixed very dark grayish brown (10YR 3/2) & dark brown (10YR 3/3) gravelly sandy loam fill/regraded material, friable, granular
Natural Subsoil		
Bw	16-38 inches	dark yellowish brown (10YR 4/6) gravelly fine sandy loam, friable, massive to blocky
BC	38-48 inches	brown (10YR 5/3) sand, very friable, massive
C1	48-82 inches	light olive brown (2.5Y 5/3) gravelly loamy sand to gravelly sand, friable, massive
C2	82-95 inches	light olive brown (2.5Y 5/3) gravelly sand, loose, massive, common faint & few distinct redox features

Seasonal High Water Table @ 82" (estimated outside of pit – apparent water table)
Observed Water Table none to 95"
Restrictive Horizon none to 95"
Bedrock none to 95"
Soil Series: Hoosic (disturbed surface)

Test Pit 4

Ap	0-22 inches	dark brown (10YR 3/3) gravelly sandy loam, friable, granular
Bw	22-39 inches	dark yellowish brown (10YR 4/6) gravelly sandy loam to loamy sand, very friable, massive
C	39-60 inches	brown (10YR 4/3) very gravelly loamy sand, loose, single grain

Seasonal High Water Table none to 60"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Hoosic

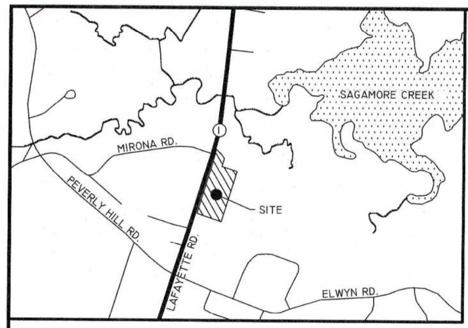
Test Pit 5

Ap	0-8 inches	very dark grayish brown (10YR 3/2) gravelly sandy loam, friable, granular
Bw	8-20 inches	dark yellowish brown (10YR 4/6) gravelly loamy sand, very friable, massive
C	20-60 inches	yellowish brown (10YR 5/4) very gravelly sand, loose, single grain

Seasonal High Water Table none to 60"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Hoosic

PHOTOS
1035 Lafayette Road – Portsmouth, New Hampshire
(Photos were taken by Joseph W. Noel on May 20, 2024)

The top photo is an example of the Hoosic Soil Series (Test Pit 5). The bottom photo shows the spoil from this test pit and illustrates the high percentage of coarse fragments.



LOCUS
(N.T.S.)

NH STATE PLANE COORDINATE SYSTEM
NAD 1983

SITE-SPECIFIC SOIL MAP NOTES

1) This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for use by Tighe & Bond, Inc. for a Portsmouth Housing Authority development and Alteration of Terrain requirements. It was produced by a certified soil scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a narrative report that accompanies this map.

2) This detailed Site-Specific Soil Map conforms to the standards of SSSNNE Publication No. 3, as amended, "Site-Specific Soil Mapping Standards for New Hampshire and Vermont".

3) This map has been prepared to comply with soil mapping requirements of RSA 485-A:17 and NH DES Env-Wq 1500, Alteration of Terrain.

4) The base map was produced by James Verra & Associates, Inc. It contains the existing conditions and wetland delineation (off-site) conducted by the undersigned. Soil mapping fieldwork was conducted on May 20, 2024. Five backhoe excavated test pits were conducted on May 20, 2024 for stormwater planning and soil mapping purposes. If additional soil observations/test pits are conducted, the soil map may be revised/fine-tuned. The hydrologic soil group for the soil map was taken from the SSSNNE Special Publication No. 5 for natural/undisturbed soils. The HSG designation for the Udorthents, smoothed and Urban land map units were estimated.

SOIL LEGEND

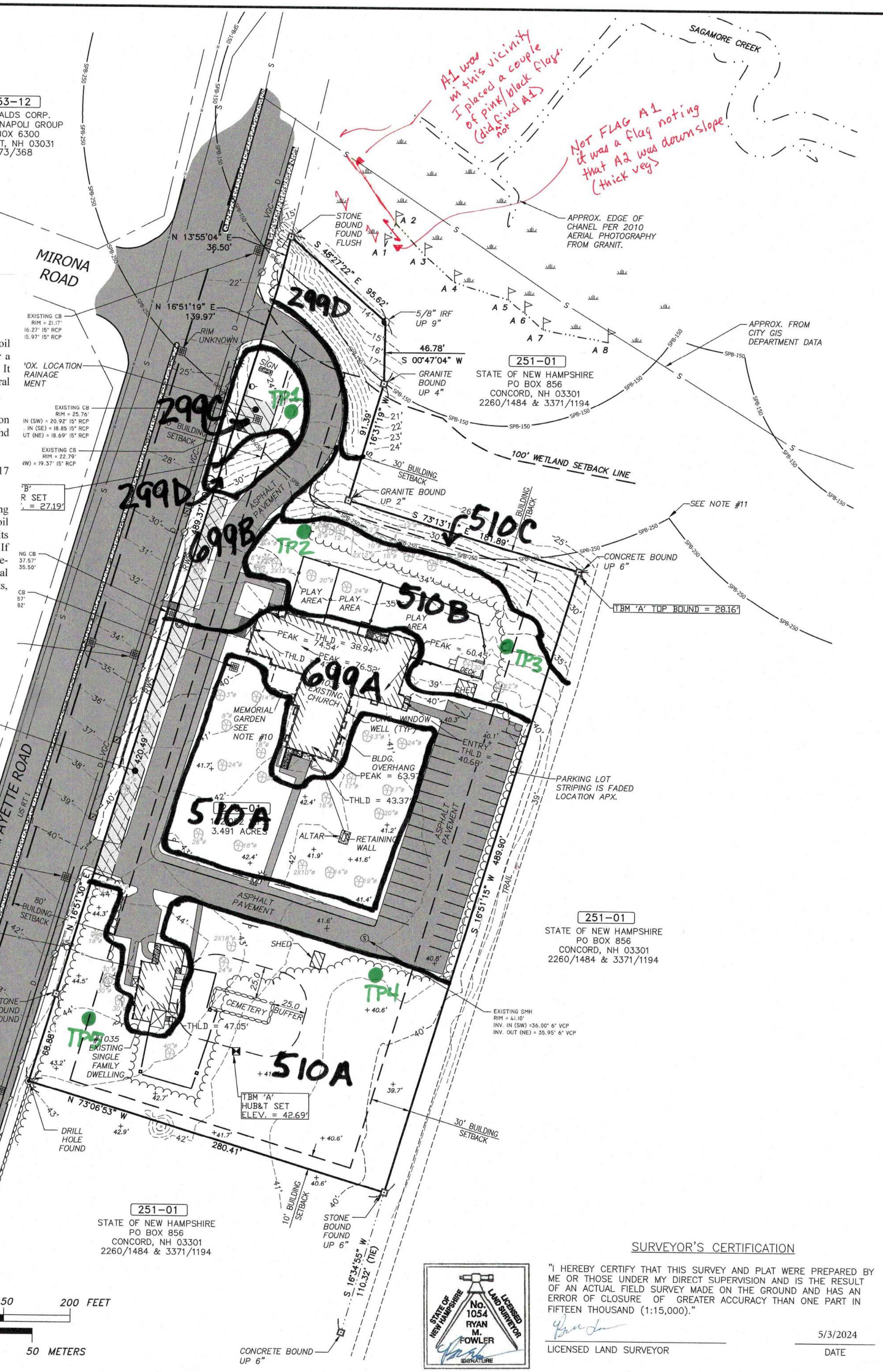
NUMERICAL SYMBOL	SOIL MAP UNIT NAME	HSG
299	Udorthents, smoothed	A (estimated)
510	Hoosic	A
699	Urban land	D (estimated)

ALPHA SLOPE SYMBOL	RANGE
A	0-3%
B	3-8%
C	8-15%
D	15-25%

Joseph W. Noel
NH Certified Soil Scientist #017

LEGEND:

- ● .... DRILL HOLE FOUND
- ◉ .... BOUND FOUND (AS NOTED)
- .... CHAIN LINK FENCE
- .... WOOD FENCE
- Ø .... UTILITY POLE
- .... UTILITY POLE W/TRANSFORMER
- .... GUY
- —OHW— .... OVERHEAD WIRES
- .... SIGN
- .... DOUBLE POST SIGN
- ◎ .... FLAGPOLE
- RCRD .... ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 246-01 .... TAX SHEET / LOT NO.
- EOP .... EDGE OF PAVEMENT
- LA .... LANDSCAPED AREA
- RWS .... STONE RETAINING WALL
- VGC .... VERTICAL FACED GRANITE CURB
- .... CATCH BASIN
- Ⓓ .... DRAIN MANHOLE
- Ⓢ .... SEWER MANHOLE
- .... TREE LINE/BRUSHLINE
- .... ELECTRICAL BOX
- .... LIGHT POLE
- .... MAILBOX
- .... WETLAND FLAG
- SPB-150 .... 150' SHORELAND PROTECTION BUFFER
- SPB-250 .... 250' SHORELAND PROTECTION BUFFER
- .... ASPHALT
- .... RAISED ASPHALT WALK
- .... CONCRETE
- .... CONCRETE PAVERS
- +41.6' .... SPOT ELEVATION
- THLD .... THRESHOLD



50 0 50 100 150 200 FEET
10 0 10 20 30 40 50 METERS

NOTES:

1. OWNER OF RECORD..................THE PARISH OF CHRIST CHURCH IN PORTSMOUTH
   ADDRESS..................................1035 LAFAYETTE ROAD, PORTSMOUTH, NH 03801
   DEED REFERENCE.......................1720/453 & 3371/1195
   TAX SHEET / LOT...................246-01

2. ZONED: ....SINGLE RESIDENCE B (SRB)

   MINIMUM LOT AREA ..15,000 S.F.
   FRONTAGE ....100'

   FRONT YARD SETBACK .....30'*
   SIDE YARD SETBACK ....10'
   REAR YARD SETBACK ......30'

   * SEE PORTSMOUTH ZONING SECTION 10.533 FOR SPECIAL YARD REQUIREMENTS ON LAFAYETTE ROAD. (80' FROM CENTERLINE OF LAFAYETTE ROAD.)

3. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF THE SUBJECT PARCEL AND THE IMPROVEMENTS THEREON FOR FUTURE SITE REDEVELOPMENT.

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: NAD83, VERTICAL DATUM: NAVD88. ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND PROCESSED BY OPUS. UNITS: US SURVEY FOOT.

6. THE PLAN IS BASED UPON A FIELD SURVEY COMPLETED IN JULY – AUGUST OF 2023 & MARCH 2024 WITH TRIMBLE S5 ROBOTIC TOTAL STATION, CARLSON BRX7 RTK GPS UNITS, PANASONIC FZ-M1/TRIMBLE TSC7 DATA COLLECTORS.

7. THE PARCEL SHOWN HEREON LIES WITHIN ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0270F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

8. WETLANDS WERE DELINEATED BY JOSEPH NOEL, CWS #86 ON 6/22/2023 AND WERE FIELD LOCATED BY JVA.

9. 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.

10. IT IS BELIEVED THAT THE "MEMORIAL GARDEN" DOES NOT HAVE ANY REMAINS OR URNS BURIED THERE BASED ON INFORMATION PROVIDED BY REPRESENTATIVES AT THE EPISCOPAL CHURCH OF NEW HAMPSHIRE. THERE IS A POSSIBILITY THAT ASHES HAVE BEEN SPRINKLED IN THE GARDEN. BASED ON THE INFORMATION PROVIDED THE MEMORIAL GARDEN MAY NOT BE CONSIDERED A CEMETERY AND WOULD NOT BE SUBJECT TO THE 25' BUFFER. FURTHER EXPLORATION SHOULD BE CONDUCTED TO CONFIRM NO HUMAN REMAINS ARE LOCATED IN THE GARDEN, EXTREME CAUTION SHOULD BE USED IN ANY EXCAVATION WITHIN 25' OF THE MEMORIAL GARDEN.

11. SHORELAND PROTECTION BUFFER SHOWN IS BASED ON THE CHANNEL LOCATION TAKEN FROM AERIAL PHOTOGRAPHY.

REFERENCE PLANS:

1. "PLAN OF LAND, PORTSMOUTH, N.H., FOR CHRIST EPSICOPOL CHURCH." REVISED SEPT. 1964, AND PREPARED BY JOHN W. DURGIN (JWD). JWD FILE NO. 2320S, PLAN NO. 8393. NOT RECORDED AND ON FILE WITH THIS OFFICE.

2. "LOT LINE ADJUSTMENT OF THE LANDS OF: D.R.E.D. & THE PARISH OF CHRIST CHURCH." LAST REVISED JUNE 22, 1999 AND PREPARED BY RICHARD D. BARTLETT & ASSOCIATES, INC. NOT RECORDED, AND ON FILE WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF NATURAL & CULTURAL RESOURCES, DIVISION OF FORESTS & LANDS. BARTLET JOB #298.111.

3. "STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION, RIGHT-OF-WAY, PLANS OF PROPOSED FEDERAL AID PROJECT, STP-X-T-001-1(90), N.H. PROJECT NO. 11855, US ROUTE 1 OVER SAGAMORE CREEK." DATED MARCH 14, 2000 AND PREPARED BY NHDOT & KIMBALL CHASE. RCRD PLAN #D-28308.

REV. NO.	DATE	DESCRIPTION	APPR'D
#1	5/3/24	COMMENTS PER PHAN & TEAM	RMF

TOPOGRAPHIC PLAN
1035 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
TAX MAP #246-01
LAND OF:
THE PARISH OF CHRIST CHURCH IN PORTSMOUTH
PREPARED FOR:
PORTSMOUTH HOUSING AUTHORITY

SURVEYOR'S CERTIFICATION

"I HEREBY CERTIFY THAT THIS SURVEY AND PLAT WERE PREPARED BY ME OR THOSE UNDER MY DIRECT SUPERVISION AND IS THE RESULT OF AN ACTUAL FIELD SURVEY MADE ON THE GROUND AND HAS AN ERROR OF CLOSURE OF GREATER ACCURACY THAN ONE PART IN FIFTEEN THOUSAND (1:15,000)."

LICENSED LAND SURVEYOR — DATE 5/3/2024

STATE OF NEW HAMPSHIRE — No. 1054 — RYAN M. FOWLER — LICENSED LAND SURVEYOR

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

RMF — DRAWN BY
RMF — PROJECT MGR

DATE:	4/2/2024
JOB NO:	24-2012
SCALE:	1" = 50'
DWG NAME:	24-2012_EX
PLAN NO:	24-2012
SHEET:	1 of 1

J:\2024 PROJECTS\24-2012 PHA 1035 LAFAYETTE RD PORTSMOUTH NH\24-2012\DWG\24-2012_EXCON_2.dwg 2024-05-03

APPENDIX B

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	43.052 degrees North
Longitude	70.768 degrees West
Elevation	0 feet
Date/Time	Tue Oct 10 2023 16:27:23 GMT-0400 (Eastern Daylight Time)

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	1.57	2.04	2.67	2.93	**1yr**	2.36	2.82	3.23	3.96	4.57	**1yr**
2yr	0.32	0.50	0.62	0.82	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.50	3.22	3.58	**2yr**	2.85	3.45	3.95	4.70	5.35	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.15	4.08	4.60	**5yr**	3.61	4.42	5.06	5.96	6.73	**5yr**
10yr	0.41	0.65	0.82	1.12	1.45	1.89	**10yr**	1.25	1.73	2.24	2.90	3.76	4.89	5.55	**10yr**	4.33	5.34	6.11	7.14	8.01	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.34	**25yr**	1.53	2.15	2.78	3.64	4.76	6.20	7.13	**25yr**	5.49	6.86	7.85	9.07	10.10	**25yr**
50yr	0.54	0.86	1.10	1.54	2.08	2.76	**50yr**	1.79	2.53	3.30	4.34	5.68	7.42	8.62	**50yr**	6.57	8.29	9.48	10.87	12.03	**50yr**
100yr	0.60	0.97	1.25	1.78	2.42	3.27	**100yr**	2.09	2.99	3.92	5.18	6.80	8.90	10.43	**100yr**	7.87	10.03	11.46	13.04	14.35	**100yr**
200yr	0.68	1.10	1.43	2.05	2.83	3.85	**200yr**	2.45	3.53	4.63	6.15	8.12	10.66	12.61	**200yr**	9.44	12.13	13.85	15.64	17.11	**200yr**
500yr	0.80	1.32	1.72	2.49	3.49	4.78	**500yr**	3.01	4.39	5.79	7.74	10.27	13.55	16.22	**500yr**	11.99	15.60	17.81	19.91	21.61	**500yr**

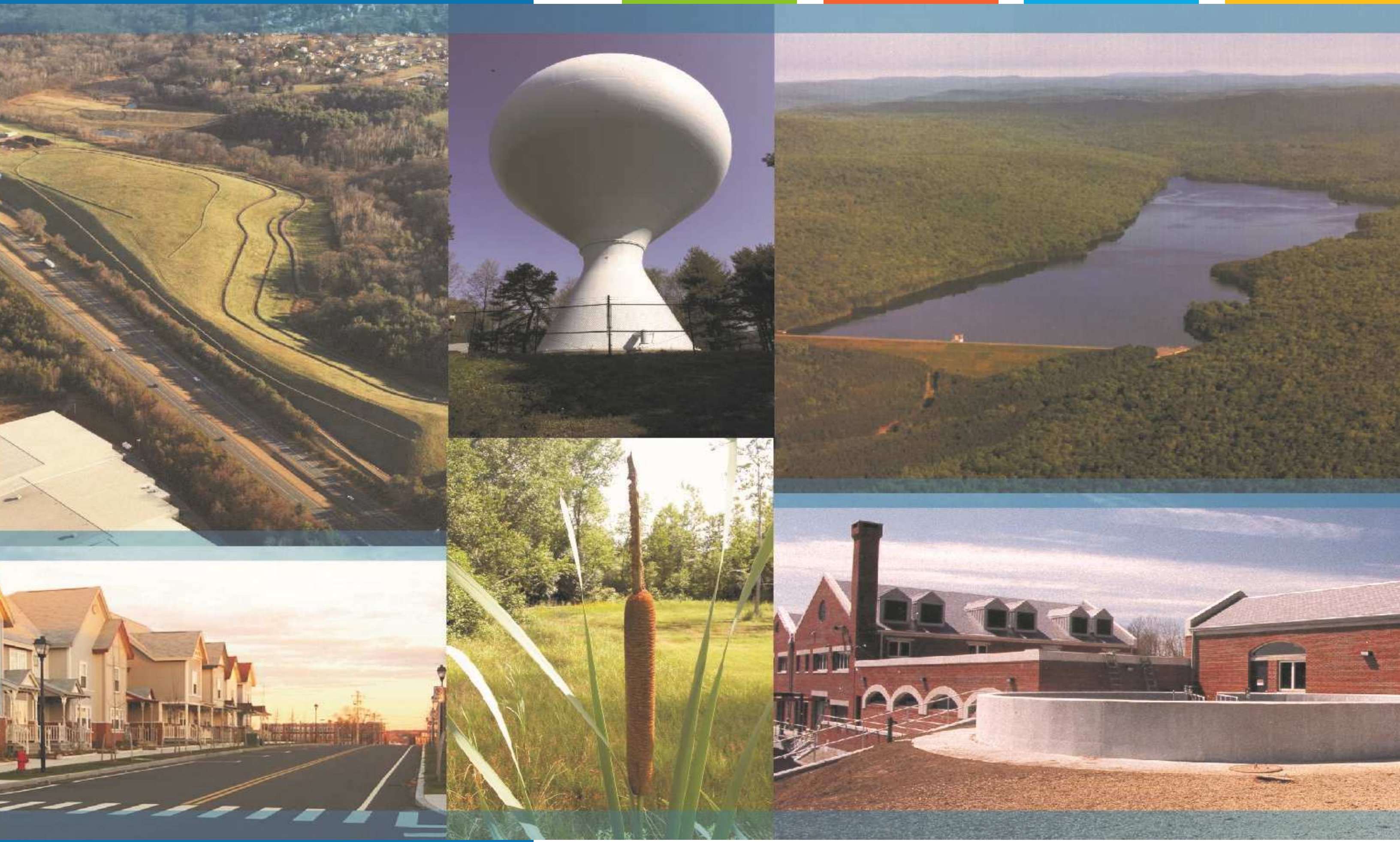
Lower Confidence Limits

	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**	0.63	0.87	0.92	1.33	1.68	2.25	2.53	**1yr**	1.99	2.43	2.88	3.18	3.91	**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	3.07	3.47	**2yr**	2.72	3.34	3.84	4.57	5.10	**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	3.81	4.22	**5yr**	3.37	4.06	4.74	5.57	6.28	**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	4.40	4.90	**10yr**	3.89	4.71	5.49	6.46	7.24	**10yr**
25yr	0.44	0.67	0.83	1.19	1.57	1.90	**25yr**	1.35	1.86	2.10	2.75	3.53	4.75	5.95	**25yr**	4.20	5.72	6.72	7.87	8.75	**25yr**
50yr	0.48	0.74	0.92	1.32	1.77	2.17	**50yr**	1.53	2.12	2.35	3.07	3.93	5.37	6.88	**50yr**	4.75	6.61	7.83	9.14	10.11	**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	6.04	7.95	**100yr**	5.35	7.65	9.12	10.64	11.68	**100yr**
200yr	0.60	0.90	1.14	1.64	2.29	2.82	**200yr**	1.98	2.76	2.94	3.77	4.79	6.78	9.19	**200yr**	6.00	8.84	10.63	12.40	13.51	**200yr**
500yr	0.69	1.03	1.32	1.92	2.73	3.37	**500yr**	2.36	3.30	3.42	4.30	5.45	7.90	11.13	**500yr**	7.00	10.70	13.00	15.20	16.37	**500yr**

Coastal and Great Bay Region Precipitation Increase		
	24-hr Storm Event (in.)	24-hr Storm Event + 15% (in.)
1 Year	2.67	3.07
2 Year	3.22	3.70
10 Year	4.89	5.62
25 Year	6.20	7.13
50 Year	7.42	8.53

www.tighebond.com

100% Recyclable



Proposed Mixed Use Development
1035 Lafayette Rd
Portsmouth, NH

Long-Term Operation & Maintenance Plan

Portsmouth Housing Authority

May 20, 2024

Last Revised: June 17, 2024

Tighe&Bond

100% Recyclable

Table of Contents

Section 1
Long-Term Operation & Maintenance Plan

It is the intent of this Operation and Maintenance Plan to identify the areas of this site that need special attention and consideration, as well as implement a plan to assure routine maintenance. By identifying the areas of concern as well as implementing a frequent and routine maintenance schedule the site will maintain a high-quality stormwater runoff.

1.1 Contact/Responsible Party

Portsmouth Housing Authority
245 Middle Street
Portsmouth, NH 03801

(Note: The contact information for the Contact/Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

1.2 Maintenance Items

Maintenance of the following items shall be recorded:

- Litter/Debris Removal
- Landscaping
- Catchbasin Cleaning
- Pavement Sweeping
- Bioretention ISR Maintenance
- Underground Infiltration Basin

The following maintenance items and schedule represent the minimum action required. Periodic site inspections shall be conducted, and all measures must be maintained in effective operating condition. The following items shall be observed during site inspection and maintenance:

- Inspect vegetated areas, particularly slopes and embankments for areas of erosion. Replant and restore as necessary
- Inspect catch basins for sediment buildup
- Inspect site for trash and debris

1.3 Overall Site Operation & Maintenance Schedule

Maintenance Item	Frequency of Maintenance
Litter/Debris Removal	Weekly
Pavement Sweeping - Sweep impervious areas to remove sand and litter.	Annually
Landscaping - Landscaped islands to be maintained and mulched.	Maintained as required and mulched each Spring
Catch Basin (CB) Cleaning - CB to be cleaned of solids and oils.	Annually
Bioretention ISR	Two (2) times annually and following any rainfall event exceeding 2.5 inches in a 24-hour period
Underground Infiltration Basin	Two (2) times annually and in accordance with Manufacturer's Recommendations (See section 1.5)
Rip Rap Apron	Annually

1.3.1 Disposal Requirements

Disposal of debris, trash, sediment and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

1.4 Bioretention System Requirements

Underground Detention System Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Pretreatment measure	Two (2) times annually	- Removal of accumulated sediment - No less than once annually
Drawdown Time	Once annually	- Removal of accumulated sediments or reconstruction of filter media if system does not drain within 72-hours following a rain event
Vegetation	Once annually	- Vegetation maintained in healthy condition - Pruning - Replacement of dead or diseased vegetation - Removal of invasive species

1.5 Underground Infiltration Basin Requirements

Infiltration Basin Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Monitor inlet and outlet structures for sediment accumulation	Two (2) times annually	- Trash, debris and sediment to be removed - Any required maintenance shall be addressed
Monitor infiltration system for sediment accumulation	Two (2) times annually	- Trash, debris and sediment to be removed - Any required maintenance shall be addressed

12.0 Inspection and Maintenance

12.1 Isolator Row Plus Inspection

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row PLUS. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a confined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3” (75 mm), cleanout is required.

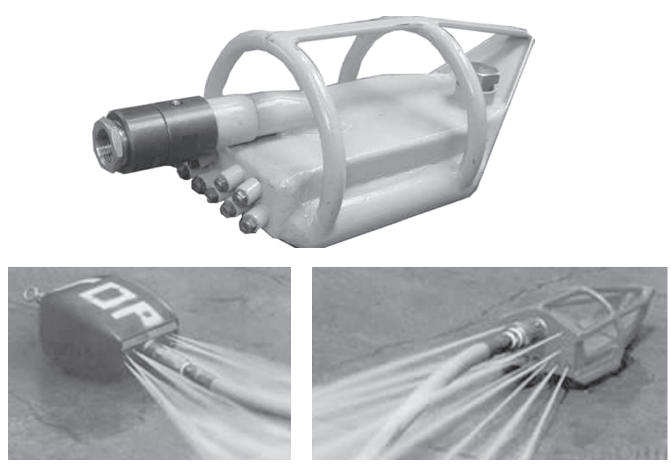
A StormTech Isolator Row PLUS should initially be inspected immediately after completion of the site’s construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site’s owner. Once in normal service, a StormTech Isolator Row PLUS should be inspected bi-annually until an understanding of the sites characteristics is developed. The site’s maintenance manager can then revise the inspection schedule based on experience or local requirements.

12.2 Isolator Row Plus Maintenance

JetVac maintenance is recommended if sediment has been collected to an average depth of 3” (75 mm) inside the Isolator Row PLUS. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row PLUS. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row PLUS while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming.
Most sewer and pipe maintenance companies have vacuum/ JetVac combination vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” (1125 mm) are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. The JetVac process shall only be performed on StormTech Rows that have ADS PLUS fabric over the foundation stone.

Looking down the Isolator Row PLUS

A typical JetVac truck (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row PLUS maintenance. (These are not StormTech products).

12.0 Inspection & Maintenance

StormTech Isolator Row Plus - Step-by-Step Maintenance Procedures

Step 1: Inspect Isolator Row PLUS for sediment

- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod, measure depth of sediment
  - iv. If sediment is at, or above, 3” (76 mm) depth proceed to Step 2. If not proceed to Step 3.
- B) All Isolator Plus Rows
  - i. Remove cover from manhole at upstream end of Isolator Row PLUS
  - ii. Using a flashlight, inspect down Isolator Row PLUS through outlet pipe
    1. Follow OSHA regulations for confined space entry if entering manhole
    2. Mirrors on poles or cameras may be used to avoid a confined space entry
  - iii. If sediment is at or above the lower row of sidewall holes [approximately 3” (76 mm)]proceed to Step 2. If not proceed to Step 3.

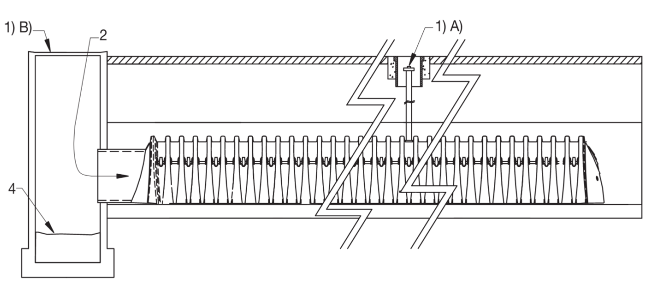
Step 2: Clean out Isolator Row PLUS using the JetVac process

- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45” (1125 mm) or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required during jetting

Step 3: Replace all caps, lids and covers

Step 4: Inspect and clean catch basins and manholes upstream of the StormTech system following local guidelines.

Figure 18 – StormTech Isolator Row Plus (not to scale)



12.3 Eccentric Pipe Header Inspection

Theses guidelines do not supercede a pipe manufacturer’s recommended I&M procedures. Consult with the manufacturer of the pipe header system for specific I&M procedures. Inspection of the header system should be carried out quarterly. On sites which generate higher levels of sediment more frequent inspections may be necessary. Headers may be accessed through risers, access ports or manholes. Measurement of sediment may be taken with a stadia rod or similar device. Cleanout of sediment should occur when the sediment volume has reduced the storage area by 25% or the depth of sediment has reached approximately 25% of the diameter of the structure.

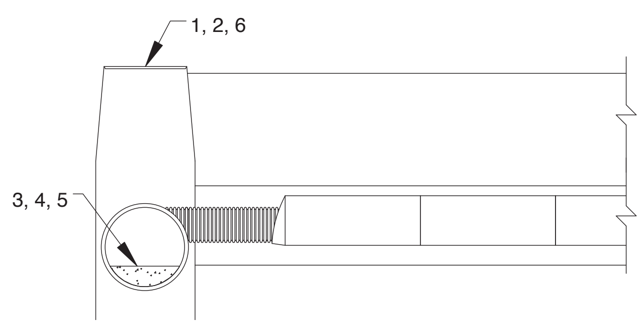
12.4 Eccentric Pipe Manifold Maintenance

Cleanout of accumulated material should be accomplished by vacuum pumping the material from the header. Cleanout should be accomplished during dry weather. Care should be taken to avoid flushing sediments out through the outlet pipes and into the chamber rows.

Eccentric Header Step-by-Step Maintenance Procedures

1. Locate manholes connected to the manifold system
2. Remove grates or covers
3. Using a stadia rod, measure the depth of sediment
4. If sediment is at a depth of about 25% pipe volume or 25% pipe diameter proceed to step 5. If not proceed to step 6.
5. Vacuum pump the sediment. Do not flush sediment out inlet pipes.
6. Replace grates and covers
7. Record depth and date and schedule next inspection

Figure 19 – Eccentric Manifold Maintenance



Please contact StormTech’s Technical Services Department at 888-892-2894 for a spreadsheet to estimate cleaning intervals.

1.6 Rip Rap Apron

Rip Rap Apron Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Rip Rap Apron	Annually	- Visually inspect for damage and deterioration - Repair damages immediately

1.7 Snow & Ice Management for Standard Asphalt and Walkways

Snow storage areas shall be located such that no direct untreated discharges are possible to receiving waters from the storage site (snow storage areas have been shown on the Site Plan). The property manager will be responsible for timely snow removal from all private sidewalks, driveways, and parking areas. Any snow accumulation beyond a height of 3’ in the snow storage areas will be hauled off-site and legally disposed of. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt and sand shall be used to the minimum extent practical (refer to the attached for de-icing application rate guideline from the New Hampshire Stormwater Management Manual, Volume 2,).

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

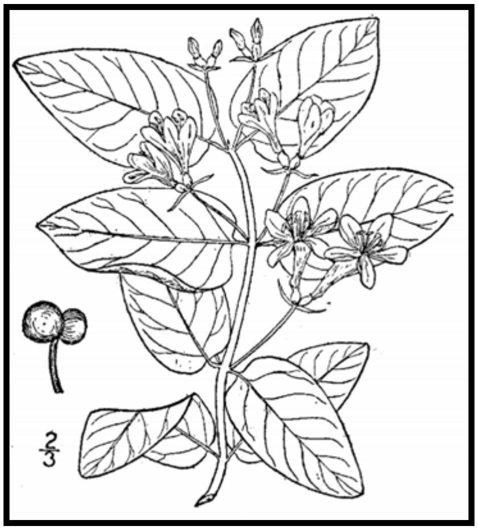
Section 2
Invasive Species

With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem is classified as an invasive species. Refer to the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plants for recommended methods to dispose of invasive plant species.

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

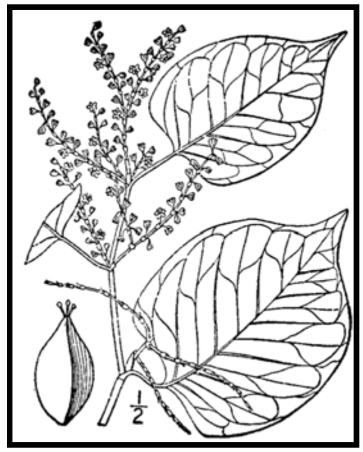
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

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.

Woody Plants	Method of Reproducing	Methods of Disposal
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)*	**Fruit and Seeds**	**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.
		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.
oriental bittersweet *(Celastrus orbiculatus)* multiflora rose *(Rosa multiflora)*	**Fruits, Seeds, Plant Fragments**	**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.
		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.

Non-Woody Plants	Method of Reproducing	Methods of Disposal
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)*	**Fruits and Seeds**	**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.
		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.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**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.	**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.

January 2010

Managing Invasive Plants

Methods of Control

by Christopher Mattrick

They're out there. The problem of invasive plants is as close as your own backyard.

Maybe a favorite dogwood tree is struggling in the clutches of an Oriental bittersweet vine. Clawlike canes of multiflora rose are scratching at the side of your house. That handsome burning bush you planted few years ago has become a whole clump in practically no time … but what happened to the azalea that used to grow right next to it?

If you think controlling or managing invasive plants on your property is a daunting task, you're not alone. Though this topic is getting lots of attention from federal, state, and local government agencies, as well as the media, the basic question for most homeowners is simply, "How do I get rid of the invasive plants in my own landscape?" Fortunately, the best place to begin to tackle this complex issue is in our own backyards and on local conservation lands. We hope the information provided here will help you take back your yard. We won't kid you—there's some work involved, but the payoff in beauty, wildlife habitat, and peace of mind makes it all worthwhile.

PLAN OF ATTACK

Three broad categories cover most invasive plant control: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. Biological controls use plant diseases or insect predators, typically from the targeted species' home range. Several techniques may be effective in controlling a single species, but there is usually one preferred method—the one that is most resource efficient with minimal impact on non-target species and the environment.

Spraying chemicals to control invasive plants.

MECHANICAL CONTROL METHODS

Mechanical treatments are usually the first ones to look at when evaluating an invasive plant removal project. These procedures do not require special licensing or introduce chemicals into the environment. They do require permits in some situations, such as wetland zones. [See sidebar on page 23.] Mechanical removal is highly labor intensive and creates a significant amount of site disturbance, which can lead to rapid reinvasion if not handled properly.

Pulling and digging

Many herbaceous plants and some woody species (up to about one inch in diameter), if present in limited quantities, can be pulled out or dug up. It's important to remove as much of the root system as possible; even a small portion can restart the infestation. Pull plants by hand or use a digging fork, as shovels can shear off portions of the root system, allowing for regrowth. To remove larger woody stems (up to about three inches in diameter), use a Weed Wrench™, Root Jack, or Root Talon. These tools, available from several manufacturers, are designed to remove the aboveground portion of the plant as well as the entire root system. It's easiest to undertake this type of control in the spring or early summer when soils are moist and plants come out more easily.

Using tools to remove woody stems.

Volunteers hand pulling invasive plants.

Suffocation

Try suffocating small seedlings and herbaceous plants. Place double or triple layers of thick UV-stabilized plastic sheeting, either clear or black (personally I like clear), over the infestation and secure the plastic with stakes or weights. Make sure the plastic extends at least five feet past the edge of infestation on all sides. Leave the plastic in place for at least two years. This technique will kill everything beneath the plastic—invasive and non-invasive plants alike. Once the plastic is removed, sow a cover crop such as annual rye to prevent new invasions.

Cutting or mowing

This technique is best suited for locations you can visit and treat often. To be effective, you will need to mow or cut infested areas three or four times a year for up to five years. The goal is to interrupt the plant's ability to photosynthesize by removing as much leafy material as possible. Cut the plants at ground level and remove all resulting debris from the site. With this treatment, the infestation may actually appear to get worse at first, so you will need to be as persistent as the invasive plants themselves. Each time you cut the plants back, the root system gets slightly larger, but must also rely on its energy reserves to push up new growth. Eventually, you will exhaust these reserves and the plants will die. This may take many years, so you have to remain committed to this process once you start; otherwise the treatment can backfire, making the problem worse.

CHEMICAL CONTROL METHODS

Herbicides are among the most effective and resource-efficient tools to treat invasive species. Most of the commonly known invasive plants can be treated using only two herbicides—glyphosate (the active ingredient in Roundup™ and Rodeo™) and triclopyr (the active ingredient in Brush-B-Gone™ and Garlon™). Glyphosate is non-selective, meaning it kills everything it contacts. Triclopyr is selective and does not injure monocots (grasses, orchids, lilies, etc.). Please read labels and follow directions precisely for both environmental and personal safety. These are relatively benign herbicides, but improperly used they can still cause both short- and long-term health and environmental problems. Special aquatic formulations are required when working in wetland zones. You are required to have a state-issued pesticide applicator license when applying these chemicals on land you do not own. To learn more about the pesticide regulations in your state, visit or call your state's pesticide control division, usually part of the state's Department of Agriculture. In wetland areas, additional permits are usually required by the Wetlands Protection Act. [See sidebar on page 23.]

Foliar applications

When problems are on a small scale, this type of treatment is usually applied with a backpack sprayer or even a small handheld spray bottle. It is an excellent way to treat large monocultures of herbaceous plants, or to spot-treat individual plants that are difficult to remove mechanically, such as goutweed, swallowwort, or purple loosestrife. It is also an effective treatment for some woody species, such as Japanese barberry, multiflora rose, Japanese honeysuckle, and Oriental bittersweet that grow in dense masses or large numbers over many acres. The herbicide mixture should contain no more than five percent of the active ingredient, but it is important to follow the instructions on the product label. This treatment is most effective when the plants are actively growing, ideally when they are flowering or beginning to form fruit. It has been shown that plants are often more susceptible to this type of treatment if the existing stems are cut off and the regrowth is treated. This is especially true for Japanese knotweed. The target plants should be thoroughly wetted with the herbicide on a day when there is no rain in the forecast for the next 24 to 48 hours.

Cut stem treatments

There are several different types of cut stem treatments, but here we will review only the one most commonly used. All treatments of this type require a higher concentration of the active ingredient than is used in foliar applications. A 25 to 35 percent solution of the active ingredient should be used for cut stem treatments, but read and follow all label instructions. In most cases, the appropriate herbicide is glyphosate, except for Oriental bittersweet, on which triclopyr should be used. This treatment can be used on all woody stems, as well as phragmites and Japanese knotweed.

For woody stems, treatments are most effective when applied in the late summer and autumn—between late August and November. Stems should be cut close to the ground, but not so close that you will lose track of them. Apply herbicide directly to the cut surface as soon as possible after cutting. Delaying the application will reduce the effectiveness of the treatment. The herbicide can be applied with a sponge, paintbrush, or spray bottle.

Cut stem treatment tools.

For phragmites and Japanese knotweed, treatment is the same, but the timing and equipment are different. Plants should be treated anytime from mid-July through September, but the hottest, most humid days of the summer are best for this method. Cut the stems halfway between two leaf nodes at a comfortable height. Inject (or squirt) herbicide into the exposed hollow stem. All stems in an infestation should be treated. A wash bottle is the most effective application tool, but you can also use an eyedropper, spray bottle, or one of the recently developed high-tech injection systems.

It is helpful to mix a dye in with the herbicide solution. The dye will stain the treated surface and mark the areas that have been treated, preventing unnecessary reapplication. You can buy a specially formulated herbicide dye, or use food coloring or laundry dye.

There is not enough space in this article to describe all the possible ways to control invasive plants. You can find other treatments, along with more details on the above-described methods, and species-specific recommendations on The Nature Conservancy Web site (tncweeds.ucdavis.edu). An upcoming posting on the Invasive Plant Atlas of New England (www.ipane.org) and the New England Wild Flower Society (www.newfs.org) Web sites will also provide further details.

Hollow stem injection tools.

Biological controls—still on the horizon

Biological controls are moving into the forefront of control methodology, but currently the only widely available and applied biocontrol relates to purple loosestrife. More information on purple loosestrife and other biological control projects can be found at www.invasiveplants.net.

DISPOSAL OF INVASIVE PLANTS

Proper disposal of removed invasive plant material is critical to the control process. Leftover plant material can cause new infestations or reinfest the existing project area. There are many appropriate ways to dispose of invasive plant debris. I've listed them here in order of preference.

1. **Burn it**—Make a brush pile and burn the material following local safety regulations and restrictions, or haul it to your town's landfill and place it in their burn pile.

2. **Pile it**—Make a pile of the woody debris. This technique will provide shelter for wildlife as well.

3. **Compost it**—Place all your herbaceous invasive plant debris in a pile and process as compost. Watch the pile closely for resprouts and remove as necessary. Do not use the resulting compost in your garden. The pile is for invasive plants only.


Injecting herbicide into the hollow stem of phragmites.

4. **Dry it/cook it**—Place woody debris out on your driveway or any asphalt surface and let it dry out for a month. Place herbaceous material in a doubled-up black trash bag and let it cook in the sun for one month. At the end of the month, the material should be non-viable and you can dump it or dispose of it with the trash. The method assumes there is no viable seed mixed in with the removed material.

Care should be taken in the disposal of all invasive plants, but several species need extra attention. These are the ones that have the ability to sprout vigorously from plant fragments and should ideally be burned or dried prior to disposal: Oriental bittersweet, multiflora rose, Japanese honeysuckle, phragmites, and Japanese knotweed.

Christopher Mattrick is the former Senior Conservation Programs Manager for New England Wild Flower Society, where he managed conservation volunteer and invasive and rare plant management programs. Today, Chris and his family work and play in the White Mountains of New Hampshire, where he is the Forest Botanist and Invasive Species Coordinator for the White Mountain National Forest.

Controlling Invasive Plants in Wetlands

Special concerns; special precautions

Control of invasive plants in or around wetlands or bodies of water requires a unique set of considerations. Removal projects in wetland zones can be legal and effective if handled appropriately. In many cases, herbicides may be the least disruptive tools with which to remove invasive plants. You will need a state-issued pesticide license to apply herbicide on someone else's property, but all projects in wetland or aquatic systems fall under the jurisdiction of the Wetlands Protection Act and therefore require a permit. ***Yes, even hand-pulling that colony of glossy buckthorn plants from your own swampland requires a permit.*** Getting a permit for legal removal is fairly painless if you plan your project carefully.

1. Investigate and understand the required permits and learn how to obtain them. The entity charged with the enforcement of the Wetlands Protection Act varies from state to state. For more information in your state, contact:

   ME: Department of Environmental Protection
   www.state.me.us/dep/blwq/docstand/nrpapage.htm

   NH: Department of Environmental Services
   www.des.state.nh.us/wetlands/

   VT: Department of Environmental Conservation
   www.anr.state.vt.us/dec/waterq/permits/htm/pm_cud.htm

   MA: Consult your local town conservation commission

   RI: Department of Environmental Management
   www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm

   CT: Consult your local town Inland Wetland and Conservation Commission

2. Consult an individual or organization with experience in this area. Firsthand experience in conducting projects in wetland zones and navigating the permitting process is priceless. Most states have wetland scientist societies whose members are experienced in working in wetlands and navigating the regulations affecting them. A simple Web search will reveal the contact point for these societies. Additionally, most environmental consulting firms and some nonprofit organizations have skills in this area.

3. Develop a well-written and thorough project plan. You are more likely to be successful in obtaining a permit for your project if you submit a project plan along with your permit application. The plan should include the reasons for the project, your objectives in completing the project, how you plan to reach those objectives, and how you will monitor the outcome.

4. Ensure that the herbicides you plan to use are approved for aquatic use. Experts consider most herbicides harmful to water quality or aquatic organisms, but rate some formulations as safe for aquatic use. Do the research and select an approved herbicide, and then closely follow the instructions on the label.

5. If you are unsure—research, study, and most of all, ask for help. Follow the rules. The damage caused to aquatic systems by the use of an inappropriate herbicide or the misapplication of an appropriate herbicide not only damages the environment, but also may reduce public support for safe, well-planned projects.

Section 3
Annual Updates and Log Requirements

The Owner and/or Contact/Responsible Party shall review this Operation and Maintenance Plan once per year for its effectiveness and adjust the plan and deed as necessary.

A log of all preventative and corrective measures for the stormwater system shall be kept on-site and be made available upon request by any public entity with administrative, health environmental or safety authority over the site including NHDES.

Copies of the Stormwater Maintenance report shall be submitted to the City of Portsmouth on an annual basis.

Stormwater Management Report						
Proposed Mixed-Use Development		**1035 Lafayette Road – Tax Map 246 Lot 1**				
BMP Description	**Date of Inspection**	**Inspector**	**BMP Installed and Operating Properly?**	**Cleaning / Corrective Action Needed**	**Date of Cleaning / Repair**	**Performed By**
Deep Sump CB's			❑Yes ❑No			
Bioretention ISR 1			❑Yes ❑No			
Bioretention ISR 2			❑Yes ❑No			
Underground Infiltration Basin			❑Yes ❑No			
Rip Rap Apron			❑Yes ❑No			

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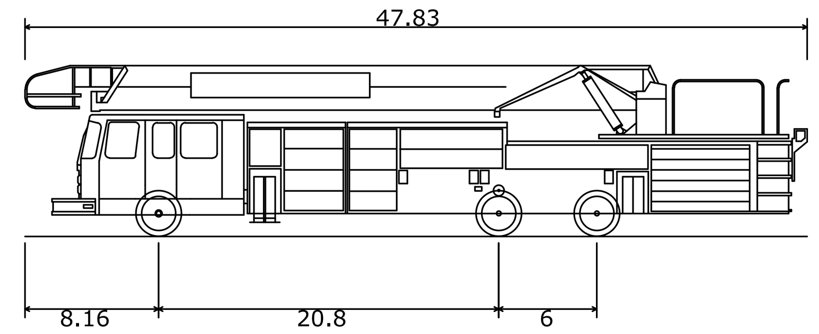
PROPOSED MIXED-USE DEVELOPMENT PORTSMOUTH, NH

FIRE TRUCK TURNING EXHIBIT



Portsmouth Fire Truck

Overall Length	47.830ft
Overall Width	8.500ft
Overall Body Height	10.432ft
Min Body Ground Clearance	0.862ft
Track Width	8.000ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	38.00°

LEGEND

- FORWARD VEHICLE WHEEL BASE
- FORWARD VEHICLE OVERHANG
- REVERSE VEHICLE WHEEL BASE
- REVERSE VEHICLE OVERHANG

Tighe&Bond

July 24, 2024
P5118-001-C-DSGN.dwg

Last Save Date: July 23, 2024 9:04 AM By: BCURCIO
Plot Date: Tuesday, July 23, 2024 Plotted By: Benjamin Curcio
T&B File Location: \\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DSGN.dwg Layout Tab: TRUCK

June 17, 2024

RE: Green Building statement for Housing Development at 1035 Lafayette Rd

The proposed development at 1035 Lafayette Road, in Portsmouth, NH, is committed to establishing a healthy, productive, sustainable and resilient work and living environment. The site plan incorporates a functional layout, with connection to existing outdoor green spaces and responsible landscaping architecture that helps form a relationship between the new and existing. The disruption of the existing site features is to be minimized wherever possible, while designing for a maximum reuse of the site's structures. The offices and temporary housing are being designed within the existing church's building, revitalizing the existing structure and site around it. The new construction of the multi-family building is being designed as a Passive House building, focusing on energy efficiency and sustainability, with air quality and water conservation practices incorporated.

The Following Green Building features and practices are incorporated to this project:

1. Surface storm water management techniques such as, but not limited to, reducing impervious surfaces, retaining or treating storm water for harvesting/use on site or recharging the groundwater, or improving site grading and drainage.
2. Incorporation of passive solar design, orientation, and shading, to maximize the energy efficiency and thermal performance of the building. The project will meet Passive House American Standards and will exceed code requirements for thermal performance.
3. Project landscaping will consist of indigenous, non-invasive plants in lieu of grass to reduce water consumption. Project will carefully be designed to address the incursion of invasive species. Local plant types will be chosen for hardiness for large temperature swings between cold winters and hot dry summers.
4. Demolition work associated with this project is limited to the removal of existing deteriorated asphalt. All structures present on the site are to be revitalized and reused. Deforesting of the site will be limited to the absolute necessary, aiming to retain the vast majority of existing vegetation.
5. The Haven portion of the site consists of the existing Christ Church and a new addition structure:
    - The existing church will house offices for Haven on the main and second floor, as well as the Little Blessings Daycare on the lower level.
    - The new structure will have a robust envelope to minimize the heating and cooling loads. The HVAC will be high efficiency electric service. The existing church was constructed in the 1960's, which can only be thermally improved and will not likely be heated and cooled with electric systems.
    - The church has a large surface of South facing pitched roof, which will be evaluated for the addition of a solar array.
6. The multi-family building is pursuing a Passive House certification and will be designed with increased insulation and air-tight envelope, to minimize energy losses through building assembly and geometry.

7. All dwelling units and common areas will have water-conserving fixtures or features including but not limited to toilets (1.28gpf), showerheads (2.0gpm), kitchen faucets (2.0gpm), and bathroom faucets (1.5gpm). All plumbing fixtures within apartments are placed in closest possible proximity to the hallways, reducing individual distribution line lengths, and wait time to deliver hot water. This project is pursuing Passive House certification and will be a subject to Water Sense design standard and testing.
8. All common areas, including corridors, will have ventilation systems to provide sufficient fresh air. Passive House design requires all spaces to receive proper ventilation to meet codes and provide sufficient flow rates. The Ventilation Schedule in the Construction Documents has specified air flows to meet the requirements, and the ventilation balancing has been satisfactory at testing.
9. All windows will be energy-efficient low E-argon windows and/or otherwise energy-efficient/Energy Star-qualified windows. Windows specified will exceed code requirements and meet or exceed Energy Star standards to meet Passive House requirements.
10. Direct Natural Lighting will be provided to all apartments living rooms and bedrooms, and to all common spaces, hallways, and offices.
11. All dwelling units and common areas are to be equipped with Energy Star-qualified or other equivalent high-performance appliances. All units, common areas, and exterior areas will be equipped with Energy Star-qualified or other equivalent high-performance lighting.
12. All dwelling units are planned to have individual electric meters, decentralizing energy draw, with the goal to improve individual tenant's consciousness of energy consumption. All common areas are on a separate electric meter.
13. Appropriately sized HVAC equipment for project design and location will be provided for HVAC equipment and distribution system within the building envelope to reduce thermal distribution losses. The mechanical system for HVAC will be designed to minimize line loss and in all duct work. All Distribution is planned to be within the building thermal shell.
14. All building's HVAC and Domestic Hot Water generation will be designed to reduce or eliminate fossil fuel consumption, with the goal of full electrification of the building systems.

Sincerely,

Sarah Hourihane, AIA, LEED AP
Principal Architect
Lassel Architects

Wm. North Sturtevant
Principal / CEO
JSA Design

Patrick Crimmins, PE
Vice President
Tighe & Bond

Robbi Woodburn, ASLA
Principal
Woodburn & Company

DRAFT REPORT FEBRUARY 2024

GROUND PENETRATING RADAR SURVEY OF THE LANGDON SLAVE BURIAL GROUND, PORTSMOUTH, NEW HAMPSHIRE

PREPARED FOR:

PORTSMOUTH HOUSING

PORTSMOUTH HOUSING AUTHORITY

245 MIDDLE STREET

PORTSMOUTH, NH 03801

PREPARED BY:

HERITAGE CONSULTANTS

830 BERLIN TURNPIKE

BERLIN, CONNECTICUT 06037

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CHAPTER I
INTRODUCTION

Introduction
Heritage Consultants, LLC (Heritage), under contract to the City of Portsmouth Housing Authority, completed a Ground Penetrating Radar (GPR) prospection survey of the Langdon Slave Burial Ground (Figure 1). The goal of the work was to identify all marked and unmarked burials within the burying ground through non-invasive GPR survey. The project area totaled approximately 0.22 acres.

Scope of Work
Heritage's work on the GPR prospection survey included the following tasks:

- Task 1. Background research and a detailed review of available primary and secondary sources, maps, and aerial photographs of the property to be surveyed.

- Task 2. Establishing four systematic GPR survey grids within the project area: the beginning and end points of each grid were recorded using a differential global positioning system (GPS) to provide accurate control points for the survey.

- Task 3. A non-invasive GPR prospection survey of the entire study area. No ground disturbance or ground-truthing of anomalies were undertaken as part of the project.

- Task 4. Review the GPR, background, and imagery data to systematically assess the survey area for soil anomalies, and to make informed decision about the nature of these soil anomalies (i.e., grave shafts, landscaping, utilities, etc.)

- Task 5. Produce this comprehensive technical report, inclusive of detailed summaries of all facets of research, methodology, survey results, and recommendations.

Project Personnel
All fieldwork and analysis were performed under the direction of David E. Leslie, Ph.D., RPA. GPR prospection fieldwork was conducted by Geophysical Specialists, Cole Peterson and Fiona Jones. Dr. Leslie and Ms. Jones analyzed and interpreted all GPR data and wrote the GPR results section of the report. Ms. Jones also performed the GIS services for the project. The historical background section of the report was written by Kristen Noble Keegan, Ph.D.

Organization of the Report
The natural setting of the region encompassing the study area is presented in Chapter II; it includes a review of the geology, hydrology, and soils, of the project region. The historical background of the project region is outlined in Chapter III. The methods used to complete this investigation are discussed in Chapter IV. The results of the survey are discussed in detail in Chapter V. Finally, management recommendations are contained in Chapter VII.

CHAPTER II
NATURAL SETTING

Introduction

This chapter provides a brief overview of the natural setting of the region containing the study area associated with the Langdon Slave Burial Ground. Previous archaeological research conducted throughout southern New England has resulted in the documentation of a few specific environmental factors which can be associated with both prehistoric and historic period site selection. These include general ecological conditions, as well as types of fresh water sources, soils, and slopes present in the area. The remainder of this section provides a brief overview of the ecology, hydrological resources, and soils present within the vicinity of the study area and the larger region in general.

Ecoregion of the Study Area

The project area is considered part of the Gulf of Maine Coastal Lowland ecoregion, as defined by the United States Environmental Protection Agency (US EPA) in 2009. The Gulf of Maine Coastal Lowland consists of plains and salt marshes with tidal flats, beaches, and bays along the coast that stretches from the Casco Bay region of southern Maine, south towards the northeast coastal region of Massachusetts. It is characterized by a humid climate that is often influenced by the effects of the Atlantic Ocean, though partially protected by Cape Cod. The southern portion of the Gulf of Maine Coastal Lowland vegetation consists of oak-pine forests, swamps, and bogs. Elevations are typically 76.2 meters (250 feet) at its highest, and sea level at its lowest. The bedrock within the Gulf of Maine Coastal Lowland ecoregion is described as mostly "metasedimentary rocks, intruded by Paleozoic and Mesozoic plutonic bodies." Soils in this ecoregion consist of silt, clay, and glacial sands (Griffith 2009).

Soils Comprising the Study Area

The Windsor series consists of very deep, excessively drained soils formed in sandy outwash or eolian deposits. They are nearly level through very steep soils on glaciofluvial landforms. Slope ranges from 0 to 60 percent. A typical profile associated with Windsor soils is as follows: Oe—0 to 3 cm; black (10YR 2/1) moderately decomposed forest plant material; many very fine and fine roots; very strongly acid; abrupt smooth boundary; A—3 to 8 cm; very dark grayish brown (10YR 3/2) loamy sand; weak medium granular structure; very friable; many very fine and fine roots; strongly acid; abrupt wavy boundary; Bw1—8 to 23 cm; strong brown (7.5YR 5/6) loamy sand; very weak fine granular structure; very friable; many fine and medium roots; strongly acid; gradual wavy boundary; Bw2—23 to 53 cm; yellowish brown (10YR 5/6) loamy sand; very weak fine granular structure; very friable; common fine and medium roots; strongly acid; gradual wavy boundary; Bw3—53 to 64 cm; light yellowish brown (10YR 6/4) sand; single grain; loose; few coarse roots; strongly acid; clear wavy boundary; and C—64 to 165 cm; pale brown (10YR 6/3) and light brownish gray (10YR 6/2) sand; single grain; loose; few coarse roots; strongly acid.

Previous Investigation of the Study Area

A previous ground penetrating radar survey was conducted adjacent to and within the stone-walled cemetery at an unknown date. This survey was conducted on behalf of Black Heritage Trail New Hampshire, a nonprofit organization that promotes the African American history of New Hampshire. Heritage requested a copy of this report but was not able to acquire it prior to data analysis and preparation of this report. While the report was not available, a brief synopsis of the report was forwarded to Heritage, indicating the proponents had identified burials within and adjacent to the cemetery, indicating that the stone walls surrounding the cemetery may have been erected at some point after the interments were commonplace.

Summary

A review of mapping, geological data, ecological conditions, soils, slopes, and proximity to water suggests that portions of the Project area appear to be amenable to conditions generally associated with historical burying grounds. This includes areas of low to moderate slopes with well-drained soil located in close proximity to estuarine and fresh water sources. Moreover, the soils predicted to be within the project area, as well as the results of a previous geophysical survey, indicate that the Project area is amenable to geophysical surveys, such as GPR (Conyers 2004).

Chapter III
Historic Background

As discussed in Chapter 1 of the document, the project items consist of a 0.22-acre parcel of land in the city of Portsmouth in Rockingham County. Located on the west side of Lafayette Road (Route 1), a route dating to the early nineteenth century, the small parcel is enclosed by stone walls and according to oral tradition and historical documents, is the site of multiple burials of African-American people once held in slavery by members of the Langdon family. The site is situated on generally level ground, a short distance to the south of the tidal marsh associated with Sagamore Creek. The Langdons were a prominent family who lived in Dartmouth well before the year 1700; as is discussed below, Governor John Langdon owned the project area and passed it on to his daughter, Elizabeth Langdon Elwyn, in the early nineteenth century.

Although Portsmouth was the state's only seaport and the leading municipality of the county for most of its history, the large areas of wetlands within its territory hampered its agricultural and residential development. Further, the lack of usable waterpower other than tidal flows limited its early industrial growth. Nonetheless, its harbor and associated shipping and fishing industries encouraged a larger population than most agricultural towns were able to secure during the colonial and nineteenth-century eras. In the modern era, the wetlands areas and the trend of single-family housing development continued to keep the population relatively small, even as the local and regional economies shifted toward modern commercial and service type activities.

Native American History

The Native Americans of this region have been referred to as the Pennacook-Pawtucket group, inhabiting a coastal region bounded roughly by the Saco River valley in Maine and northeastern Massachusetts on the south. Like other groups in the region, they cultivated corn and other plants, in addition to seasonal hunting, fishing, and gathering. Seventeenth-century accounts from colonists refer to disease epidemics in the first decades of the century, which are presumed to have forced the surviving populations into new social and political groupings, all of which are poorly documented. Many groups, due to these colonial pressures, sold their territories to colonists and moved inland to colonist-sponsored "praying towns" or to other Native American communities. Their relations with the colonists deteriorated before and after King Philip's War (1675-1676), leading even more people to relocate. By 1700 there were few Native Americans left in the region, though some of these returned periodically for hunting and fishing; there also are some communities that survive to the present day (Grumet 1995). It should be noted that there is little agreement in the literature about what the original peoples of the region should be called (Johnson 1995).

The lack of specific information Native Americans of this area may be explained by the very early date – 1629 – of a deed that covered the entire coastal area from the Pascataqua River south to the Merrimack River (just over the present New Hampshire – Massachusetts border). According to Belknap, who transcribed the text of the deed in the eighteenth century, the Native American signatories were "Passaconaway Sagamore of Penacook, Runnaawitt of Pantucket, Wahannonawitt of Squamscot, and Rowls of Newichwannock," and they were, according to the document, looking for allies against an enemy group they called the "Tarrateens" (Belknap 1784:10). These "of" designations appear to refer to four separate locations or communities, with no identified, overarching political organization identified in the deed. Interestingly, although Belknap called this a purchase, he went on to report that the terms included an annual mutual exchange of goods between two of the parties and their heirs. These terms seem more like a treaty or a lease than a proper transfer of title, and in addition to the annual exchange, the Native

Americans also reserved a perpetual right to hunt, fish, and plant in the area; but the colonists, as they did throughout North America, proceeded as if an absolute transfer had occurred. Inevitably, conflicts arose as the colonists worked to transform the land to their liking and ignored or overruled Native American protests. In the context of the repeated episodes of violence from 1675 through much of the eighteenth century (many of them actually related to the British wars with the French), the rapid departure of most of the Native Americans from this region is understandable (Morison and Morison 1976). As noted above, the Native American side of the multiple military conflicts after 1677 was not made up of people who lived nearby, but rather of people who had moved away or had always resided further north.

History of Rockingham County

Incorporated in 1771, Rockingham is a coastal county that abuts the state of Massachusetts on the south and also shares a border with the state of Maine and Piscataqua River on part of its northern line. From its coastal wetlands, the county's terrain slopes upward toward the west, with its higher elevations being in the northwestern section. By 1810, the county contained 46 towns and over 50,000 residents, some of whom worked in its seven textile mills and five paper mills, as well as various gristmills, sawmills, and other agricultural processing facilities (Merrill and Merrill 1817:189). The number of municipalities had been reduced to 38 as of the 1880s (Hurd 1882:1). In 1900, the population of Portsmouth was approximately twice that of the next largest municipality (Exeter), and a clear majority of the municipalities had fewer than 1,000 residents. During the twentieth century and into the twenty-first, however, many Rockingham County towns developed substantial suburban populations, and many became rural residential communities as well (Keegan 2022).

History of the Town and City of Portsmouth

As New Hampshire's only seaport, Portsmouth has held a prominent position in the colony's and state's history. It is located on a peninsula defined by the Atlantic Ocean on its east, Piscataqua River on its north, and on its west by Little Bay and Great Bay, bodies of water formed by the inflows of Oyster River, Lamprey River, and Squamscott River. The northeastern end of the town includes a number of islands, the port, and the port's surrounding urban area; the southern end contains a number of large areas of wetlands, some level ground, and areas of commercial and suburban development surrounded by undeveloped land. The project area is near the north end of the southern area, with tidal marsh to its north, intensive post-1970 commercial development to its west, and the state's urban forestry center and associated public trails to its east and south.

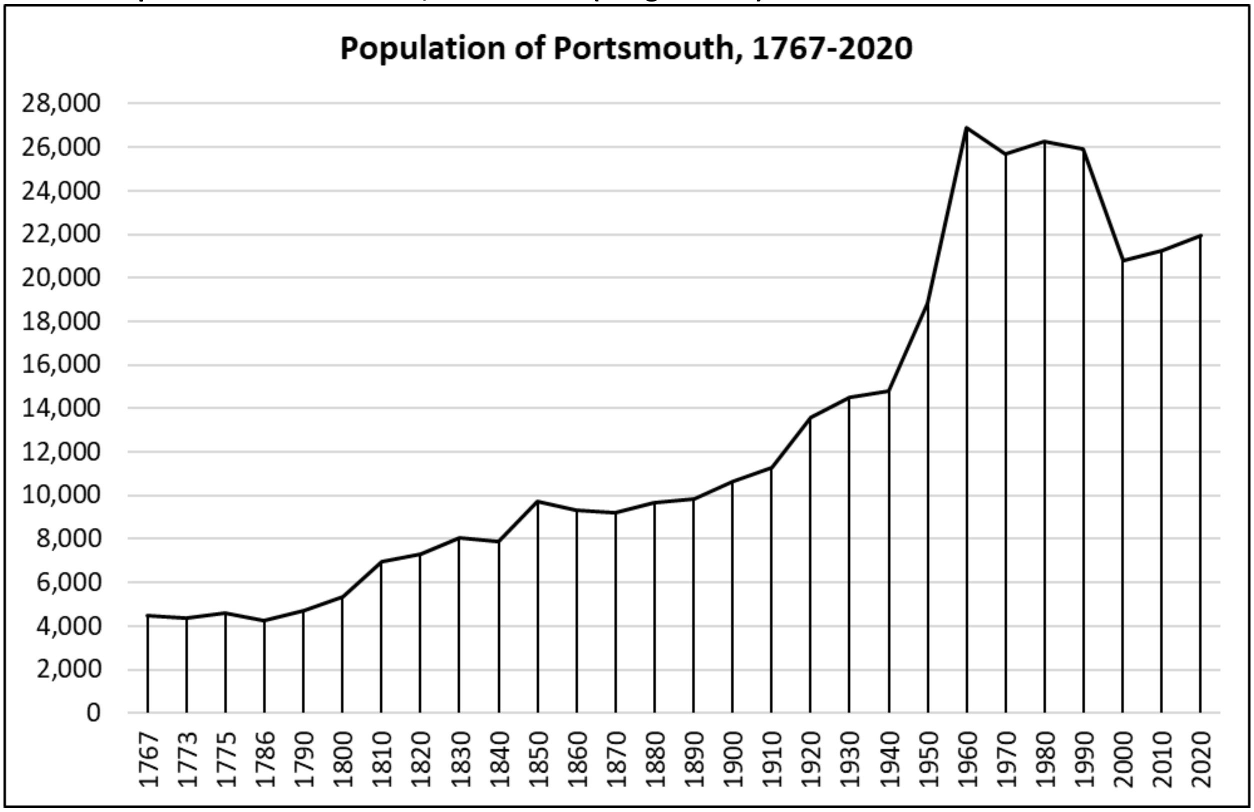
The 1629 purchasers of this territory, mentioned in the Native American history section above, were "John Whelewright of the Massachusetts Bay, late of England, minister of the gospel," and several others (Belknap 1784:11). The theoretical land claim based on this document was actually in conflict with a prior grant from the monarch-established Council for New England to Captain John Mason and Sir Ferdinando Gorges in 1621, which ignored the existence of the Native Americans entirely. In 1622, these grantees established the Company of Laconia, which sent an expedition under David Thomson to establish a colony in their territory, and in 1623 he began the first colonial settlement in New Hampshire in the vicinity of Odiorne Point in the present Town of Rye. At some point in the next few years, the Laconia Company was dissolved, and then Mason, who took ownership of the New Hampshire region from the partnership, died suddenly in 1635. In addition to the generations-long legal entanglements caused by the Mason grants, the chief legacy of this episode was the establishment of the 1623 settlement by Thomson and another somewhat further north. Before the company dissolved, Thomson's settlement attempt was reassigned to Walter Neale in 1630; before Neale returned to England in 1633, he helped establish fisheries, a sawmill, and the place that eventually became Strawbery Banke (later Portsmouth). Odiorne Point was left behind by these developments. In 1641, the approximately 1,000 colonists on the lower Piscataqua River decided to affiliate with the Massachusetts Bay Colony (Mawson et al. 1992; Morison and Morison 1976).

The need for this decision reflects the confusion of claims and new settlements. In the early decades of British colonization of New England, which is often overlooked. In the future New Hampshire, the leading towns in the area were New Castle, on Great Island, and Portsmouth (initially called Strawbery Banke). Between the ongoing claims of John Mason's heirs, the independent tendencies of the settlers, and the wars with the Native Americans, the area's government remained somewhat disordered for many years. Even the British monarch's initial creation of the royal Province of New Hampshire in 1679 did little to quell the conflicts or establish long-term government; it was not until after the Crown's efforts to reorganize the whole region in the 1680s and then the Glorious Revolution that, in 1691, a permanent charter was issued, and even then it was decades before the colony became properly organized (Morison and Morison 1976). Nonetheless, in the interim the Massachusetts Bay government, in 1653, granted Strawbery Banke's petition to be recognized as an official town called Portsmouth. In 1693, the town of New Castle was created out of Portsmouth by the new Province of New Hampshire (Hazlett 1915).

The earliest settlers of Portsmouth adhered to the Church of England and built a church in approximately 1638. This fact displeased the Congregationalist government of the colony of Massachusetts Bay that claimed jurisdiction over the area; as a result, it forced the first minister to leave the colony in 1642 and sent a series of Congregational ministers to serve until one chose to stay permanently beginning in 1658. A Congregational meeting house was built in 1657. Episcopalian worship was formally re-established in the 1730s. Towards the end of the century, religious diversity increased with a Universalist congregation established in 1773, which built its own church building in 1784. The town's first bank was incorporated in 1792, followed by three others in the first two decades of the nineteenth century (De Normandie 1882:49-50, 55, 76; Hayford 1882:95). The first colonial census, in 1767, reported that Portsmouth already had 4,466 residents. This number remained stable through the remainder of the colonial and Revolutionary periods, although the first federal census in 1790 showed a noticeable increase to 4,720 residents. The succeeding decades of the early national period saw a generally rapid increase of population, to 8,026 residents, followed by a slight decline to 7,887 residents as of 1840 (see Chart 1 below; Keegan 2022).

The first known enslaved African arrived in Portsmouth in 1645. Although systematic population statistics were not collected until much later, a governor's report from 1708 stated that all of New Hampshire's population included 70 enslaved people. Although multiple Portsmouth-based ship captains engaged in the slave trade during the eighteenth century, records indicate that most ships calling at the port had offloaded all but a handful of their enslaved people prior to arriving. One exception was the *Exeter*, which was inventoried in 1756 because its owner had died during the voyage and carried a total of 61 enslaved people (Sammon and Cunningham 2004:16-17). After generations of these slave ships arriving in port, the censuses of 1773 and 1786 reported 160 and 89 African-Americans, respectively, enslaved and living in Portsmouth (New Hampshire 1877:10:627, 648). By the time of the 1790 census, the reported number of enslaved people in Portsmouth was 26 individuals, while the number of "all other free persons" was 76 individuals; if these numbers did not include any Native Americans, then that was a total of 102 African-Americans living in Portsmouth in that year, the majority of them free persons (Sammon and Cunningham 2004:82).

Chart 1: Population of Portsmouth, 1767 – 2020 (Keegan 2022).



The Langdon family's documented history with slavery began in 1699, when Captain Tobias Langdon purchased a teenaged African-American youth, followed by his purchase of a woman named Hannah in 1718. His 1724 will bequeathed the multiple, but unspecified, people he held in slavery to his son John Langdon Sr. The names of enslaved people noted in the family's records over the generations also included Pomp (purchased 1743), Nanne (transferred from one Langdon to another in 1763), and Violet (purchased 1773) (Sammon and Cunningham 2004:40-42). This is unlikely to be a full accounting of the number of people held in slavery by this family. By the time of the 1790 census, however, only one of the five Langdon households in Portsmouth reported the presence of a nonwhite person; this was John Langdon's household, which included only one free person. There were, however, 15 households headed by "other free persons" in the town (United States Census 1907:80-82). At the time of the 1790 census, the actions of the New Hampshire's legislature had done nothing directly to abolish slavery there, although its 1789 tax code said that enslaved people were to "cease to be known and held as property." Nonetheless, within a few decades the small number of enslaved people listed in Dartmouth in the 1790 census was zero, and 1840 was the last year in which the census found any enslaved persons in the state. The state formally abolished slavery in 1857, after any written documentation of the practice ceased to exist (Sammon and Cunningham 2004:77).

A map of Portsmouth compiled in 1805 showed a small, dense urban area around the port, flanked by mill ponds to its west and south. The map's depiction of natural features included only bodies of water and swamp areas, along with some notable rocks. The cultural features mainly included roads, farmhouses and other residences, bridges. No attempt was made to label individual buildings within the urban area; outside it, the mapmaker noted taverns, schoolhouses, and a rope walk, along with householders. Although this historic map lacks precision, it can be used as a general indication of locations. To the southeast of the project area, along Elwyn Road, the map displays two buildings labeled with "Gov. Langdon's Seat" and "Gov. Langdon" (Figure 2; Merrill 1805). The governor elected in that year was John Langdon (1739-1819), whose grandfather was Tobias Langdon. A Revolutionary War veteran, he held a variety of offices in addition to the governorship. The map's identification of his "seat" in rural Portsmouth was in spite of the fact that he had built a mansion in urban Portsmouth in 1784. This extensive farm later became associated with the name of Elwyn because John Langdon's only child, Elizabeth, married one Thomas Elwyn before 1800 and they and their son John eventually settled there (Foster 1896:10-11, 126). In the 1800 census, John Langdon's household continued to include one other free person, and that was also the case for John Langdon Esq.'s household in 1810 (United States Census 1800, 1810). No evidence of African-American household membership for the Elwyns has been found.

A gazetteer published in 1817 called Portsmouth "the metropolis of New-Hampshire." It reported that the town contained 927 houses (some of them three stories high) and a wide array of public buildings, including seven churches, an academy, two markets, and an almshouse, as well as the county courthouse and jail. The churches served congregations of Universalists, Methodists, Baptists, Episcopalians, and Congregationalists. Private enterprises included banks, insurance companies, a museum, and a water company. The largest wharf had been built by private capital in 1795 and was the site of a large market house that also served as the town hall. The millponds shown on the map discussed above were the site of tide mills. The harbor and wharves served national and international trade as well as a fishing fleet (Merrill and Merrill 1817:183, 185). An 1823 gazetteer reported that Portsmouth contained 280 stores (by far the largest number in the county), seven taverns, twelve bark mills, and twelve tanneries (the latter two facilities also being the largest number of each in the county) (Farmer and Moore 1823:51).

After 1840, Portsmouth's population rose to 9,738 residents and then stagnated for four decades, only returning to nearly the same population (9,690 residents) as of 1880 (see Chart 1; Keegan 2022). A topographic map compiled in the early 1840s showed that Lafayette Road, which would have required the construction of expensive causeways and bridges, had been constructed. The name "Elwyn" was one of the few marked on this map, appearing both at several buildings to the southeast of the project area on Elwyn Road, and at a primary triangulation point to its northeast. Near the project area itself, the map indicates that there was some forest along the road and also some cleared areas. It also shows that at that time, Lafayette Road was lined on both sides with stone walls (United States Topographic 1844; Figure 3).

In 1849, a gazetteer reported that Portsmouth's notable agricultural products included only corn, potatoes, and hay. Its industries included a large machine and blacksmith shop making machinery, railroad cars, and other items; an iron foundry; and three steam-powered textile mills. The economy appears to have been more focused on trade and shipping than general manufacturing, however. At that time, the Eastern Railroad (opened in 1840) connected the town to Boston, and the railroad to Concord (incorporated in 1845) was being constructed (Hayward 1849:116-119, 187). The year 1849 was also when the city of Portsmouth was incorporated. A map of Rockingham County published in 1857 showed the dense urban area without many details, and the homes and farmsteads scattered along the roads in the rest of the town. No features other than Lafayette Road were shown near the project area; the site of the former John Langdon homestead was occupied by J. L. Elwyn, his grandson (Figure 4; Chace 1857).

A gazetteer published in 1874 stated that Portsmouth was the second wealthiest city in New Hampshire. In addition to mercantile trade, the town's manufacturing had been increasing for some time. These firms' products included textiles, leather goods, cod liver oil, ships, printing, carriages, furniture, and a wide variety of other items. Nonetheless, only 1,025 people (624 men and 401 women) were reported to be employing in manufacturing. In agriculture, a specialization in apples had developed. The number of churches had reached 10 congregations, including one for Catholics and one for Unitarians in addition to the older ones. Numerous banks, newspapers, and shipping vessels were based in Portsmouth, and there were five hotels (Fogg 1874:307-310). In the early 1880s, a list of incorporated manufacturing firms included two breweries, a water company, a bridge company, and a gas-fueled light company (Hayford 1882:99).

After 1880, Portsmouth's population began a gradual rising trend that brought it to 11,269 residents as of 1910. A faster growth rate over the next few decades, other than in the 1930s, yielded a population of 14,821 residents as of 1940. Then, suburbanization during the following two decades caused the population to nearly double, so that there were 26,900 residents in Portsmouth as of 1960. The remainder of the century, however, saw a generally downward trend, especially in the 1990s, so that in 2000 there were 20,784 residents. The first two decades of the twenty-first century brought a slight recovery, and in 2020 there were a reported 21,956 residents (see Chart 1; Keegan 2022). A list of corporations in 1915 included breweries, shoes, buttons, coal gas, electric power, and a foundry in the manufacturing sector. Also listed were two corporations in charge of bridges, two fire insurance companies, banks, a business school, and a coal company. The Navy Yard is also listed (Hazlett 1915:207).

In a 1952 aerial photograph, the area corresponding to the historic Langdon/Elwyn farm was still mostly cleared land, with a farmstead in the southeast and a wood lot in the angle of Lafayette Road and Elwyn Road. There were also, in approximately the right location to be the project area, a small grove of trees and a visible anomaly that may indicate that the old African-American cemetery had not been plowed over (Figure 5; USDA 1952). The 1962 aerial photograph showed the newly-built house to the west of the project area and, also, an irregularity (perhaps trees, bushes, or stone walls) amid the still-cleared area that may be the project area (Figure 6; NH GRANIT 1962). By 2021, the aerial photography indicates that no crop-growing agricultural land was still present in the vicinity of the project area, though there were cleared areas in the adjacent state forestry property. Both the project area and the nearby house were surrounded and obscured by heavy tree cover.

The population and economy of twenty-first century Portsmouth was very different from previous eras. As of 2012, manufacturing employed 1,851 workers, while the grouping of agriculture, forestry, fishing, mining, and construction employed 449 workers. The wide range of service industries, in contrast, employed 25,151 people (86 percent of the total), led by the fields of health care and social service, retail trade, and accommodation and food service; an additional 1,823 people worked for various levels of government (Portsmouth 2014:14, 16). The city's planning documents from the period emphasized improving quality of life, including preserving historic buildings, providing non-automobile travel options and recreation opportunities, and encouraging the arts for both community and economic development purposes (Portsmouth 2016).

Conclusions

Although the historians Sammons and Cunningham (2004) cited here have done considerable research in the Langdon family papers, it appears that they either could not find, or did not mention, information about how many people were held in slavery by that family. It seems that only the four named individuals mentioned above have been documented, and no information about their deaths or burials has been found thus far. It also is not clear when the stone wall was built around the cemetery. The persistence of the fieldstone memorials does indicate that any historic plowing of the fields most likely did avoid them. It is also possible, given the historic tendency to engage in postmortem segregation of African-American people, that an unknown number of enslaved or free persons who lived and died in the surrounding area were also buried in this location. Further research might examine additional Langdon family probate records for more information about the numbers of people they held in slavery; in addition, descriptions of the real estate in those records may have mentioned the cemetery.

CHAPTER IV
METHODS

Research Design

The primary objectives of the current investigation were to confirm the presence of burials associated with the Langdon Slave Burial Ground in Portsmouth, New Hampshire. The methods employed were intended to be non-invasive and to aid in determining the next preservation steps for the cemetery.

The GPR survey area encompassed an approximately 0.22-acre area around and within the known location of the Langdon Slave Burial Ground. While the burial ground preserves several fieldstone markers and extant stone wall boundaries, the lack of records and construction date for the boundary walls indicates that the bounds of the cemetery are currently unknown. The GPR area was intended to encompass as much of the area immediately surrounding the burial ground, excepting the existing trees and modern development. As no archaeological excavations were conducted as part of the current study, all assessments were based on the results of the archival research and GPR survey.

Methods of Investigation

All work for this project was performed in accordance with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716); with the *Standards and Guidelines for Archaeological Investigations in New Hampshire,* promulgated by the New Hampshire Division of Historical Resources Department of Natural and Cultural Resources (NHDHR) in Concord, New Hampshire. All of the work was directed by a professional archaeologist who exceeds the qualifications standards established by the Standards and Guidelines, which adhere to those promulgated by the federal government under the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (36 CFR 61).

Background

Heritage reviewed available information on the project vicinity, including secondary sources such as published articles and books, National Register of Historic Places Nomination Forms, and historical documents for relevant information. The background research also included consultation with individuals and organizations who might have information relevant to understanding the archaeological or cultural sensitivity of the project area.

GPR Prospection Survey

GPR is an active, non-invasive geophysical method that records contrasts in the dielectric properties of subsurface materials (Heimmer and De Vore 1995; Clark 2001; Bristow and Jol 2003; Conyers 2004, 2006; Daniels 2004). A pulse of transmitted electromagnetic energy emitted from the GPR antenna is reflected or absorbed by such contrasts and the resulting reflections are recorded to produce a vertical profile. The majority of reflections are generated at interfaces between materials of differing relative dielectric permittivity; i.e., at the boundary between different stratigraphic layers, where changes in velocity occur. A two-dimensional GPR profile is a representation of vertical and horizontal stratigraphy consisting of individual traces, resulting from a single pulse of energy and the resulting reflections at a given location, that are stitched together to produce an image of dielectric contrasts. In this sense, GPR does not provide a stratigraphic profile; rather, it generates a representation of local dielectric contrasts that provides a proxy for subsurface stratigraphic changes.

GPR is an established prospection method for human graves, as well as for archaeological features such as wells, privies, and other shaft features, buried building foundations, trenches, and other forms of cultural stratigraphy. These features are visible with GPR due to dielectric contrasts that often exist between feature fill and surrounding sediment, visible truncation of internal stratigraphic layers, or high reflection amplitude from intense signal reflection from bricks or stones. Prospection for human burials is a common GPR application due to the subsurface signatures outlined above. A grave shaft itself is a vertical cut through subsurface stratigraphy and should be recognizable as such. The grave fill should contain internal characteristics derived from disturbance of soil layers that should contrast sharply with undisturbed subsoil (Bevan 1991). Unmarked graves in disturbed soil contexts, may be more difficult to discern. Also, the actual interred remains are not generally resolvable in GPR data in the absence of chemical changes derived from decay (Bevan 1991). Well-preserved coffins and both brick and concrete vaults provide an ideal point-source object to generate a characteristic hyperbolic reflector in the GPR data, as well as a high-amplitude reflector that can be traced horizontally in three-dimensional time slices. Profiles are generally collected across marked graves to serve as a comparative data set. Ideal amplitude or plan view maps of grave shafts in a 18th century cemetery in Rexford, New York, and two-dimensional profiles of grave shafts and coffins are displayed in Figure 7, in most unmarked burial investigations GPR results are not as clear as the example in Figure 7.

GPR prospection for historical period features such as cellar holes, piers, or middens is also a common application due to the subsurface signatures outlined above. The cellar hole is a vertical cut through subsurface stratigraphy and should be recognizable. The cellar or midden fill should contain internal characteristics derived from disturbance of soil layers that should contrast sharply with undisturbed subsoil. Cellar holes or middens in disturbed soil contexts, or land that has undergone significant landscaping activities, may be more difficult to discern. Stone-lined cellar holes or features such as wells provide an ideal point-source object to generate a characteristic hyperbolic reflector in the GPR data, as well as a high-amplitude reflector that can be traced horizontally in three-dimensional time slices. An ideal amplitude map and profile transect displaying a stone lined cellar hole and stone lined well from a 17th century farmstead in Glastonbury, Connecticut, are displayed in Figure 8.

Throughout this work, a GSSI Utility Scan GPR system with a 350 MHz HyperStacking antenna was used to conduct the GPR survey. The antenna and UtilityScan are mounted on a custom-built carriage by GSSI and utilized encoder-triggered collection of 50 traces per meter (1 reading every 2 cm or 0.8 in). All GPR data were collected at 25-cm intervals in 10 unidirectional transect grids. In areas where obstructions were encountered that prevented completion of the survey transect, such as a headstone, fence, tree, etc., an additional or continuation transect was collected, beginning at the opposite end of the obstacle. Prior to beginning the continuation, the position of the GPR machine was carefully recorded, manually, to ensure that no data was lost during the survey. This also minimized the potential for errors during the three-dimensional "stitching" of transect lines within each grid. Where possible, obstacles were removed to permit free travel along the collection transects. The collection of field data in uni-directional transects that were tightly spaced was critically important, because it provides more secure data for three-dimensional interpretations of geometric targets. If the transects were spaced farther apart, the post-processing software may aggregate features in three-dimensions, which provide the appearance of "ghost" targets that are not based on two-dimensional data (See TerraSearch Geophysical 2023 for an illustration of this effect).

The GSSI Utility Scan GPR System also includes a tool where the user is able to mark above-ground features while surveying. This is especially useful in cemeteries, where the user can pinpoint exactly when the antenna is directly adjacent to a grave marker. This feature was utilized while surveying within the stone-walled cemetery and the location of the grave markers are displayed in Figure 9. It should be noted that the parameters for quantifying a headstone were very broad in this context because the stones within the cemetery are mostly large, unaltered fieldstones (Photo 2). It is possible that some of these stones may be footstones or may not be grave markers at all. There is no way to distinguish headstones from footstones in this context due to the absence of inscriptions and a clear cemetery layout, except through the geophysical analyses presented below. Alternatively, it is also possible that there were more grave markers within the burial ground that were removed or used to make the stone wall surrounding the cemetery.

Grid Layout

A total of four grids were collected during the fieldwork effort (Figure 10). These grids were laid out to maximize the surveyable area within and immediately around the stone-walled cemetery.

Grid 1 measured the entire width of the stone-walled cemetery, approximately 12 meters (39.37 feet), with transects running north and continuing east. Grid 1 measured 12 meters (39.37 ft) in the X direction, and 4 meters (13.12 ft) in the Y direction. Data collection began in the southwest corner and included 49 individual transects. Grid 2 was located north of Grid 1, in the grassy area between the church parking lot and the cemetery with transects running south and continuing west. Grid 2 measured 30 meters (98.42 ft) in the X direction, and 15 meters (49.21 ft) in the Y direction. Data collection began in the northeast corner and included 121 individual transects. Grid 3 was located in the fenced-in yard behind the rectory house, with transects running north and continuing east. Grid 3 measured 11.5 meters (37.72 ft) in the X direction and 25 meters (82.02 ft) in the Y direction. Data collection began in the southwest corner and included 47 individual transects. Grid 4 was located in the wooded area south of the cemetery and east of the fenced-in yard, with transects running north and continuing east. Grid 4 measured 8 meters (26.24 ft) in the X direction and 5 meters (16.4 ft) in the Y direction. Data collection began in the southwest corner and included 33 individual transects.

The corners of the GPR grid and start and end points of each transect were mapped with a differential GPS to provide decimeter accurate control grid points, and each transect was recorded with an Emlid Reach RS2+. The Emlid Reach RS2+ is capable of real time kinematic (RTK) corrections and was configured within the Networked Transport of RTCM via Internet Protocol (NTRIP), providing centimeter accurate corrections to the GPS data collected.

Data Analysis and Report Preparation

Data Analysis

All GPR profiles were interpreted and analyzed using GSSI RADAN software, using industry standard techniques (i.e., Conyers 2006; Leach 2019; 2021). These techniques include the following RADAN software adjustments to the raw data collected in the field: Time Zero, Range Gain, Background Removal, Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) Filters, Migration, as well as three-dimensional and two-dimensional exploratory data analysis. Each of these techniques are described in more detail below.

Time Zero is a position correction of the actual ground surface relative to the radar pulse that is transmitted from the machine, which is measured in nanoseconds. For the Utility Scan, the position correction is generally very small, approximately 1 – 3 nanoseconds. Range Gain is a critical analytical technique, because it allows the user to attenuate the radar signal relative to depth from the recording machine. As the signal travels farther from the machine, the signal is weaker, and vice versa. To compensate for this, and to properly interpret the entire target depth for the GPR analysis, the dataset must be normalized. Heritage used an exponential Range Gain to interpret the data, because this technique most closely follows the loss of signal with depth relative to the machine. Background Removal is another normalization technique that removes horizontal “noise” from the dataset, or those targets that extend the entire length of a GPR transect and are thus not relevant for an archaeological analysis (but may be relevant for geological analyses); noise interference from radio frequencies (cell towers, wi-fi, radio towers, etc.) are also removed using the Background Removal function. FIR and IIR Filters are generally applied as a custom background removal of frequencies that appear spurious after an exploratory analysis. Migration is a transformation that flattens the appearance of a conical shape that is associated with hyperbolic reflectors that are visible at depth and thus farther away from the machine in horizontal space. Because grave shafts are not ideal migration targets (these present large hyperbolic targets), the dataset was viewed closely before and after migration.

Finally, while three-dimensional viewing of the dataset presents a powerful way to visually interpret geometric patterns in any GPR dataset, this is merely an algorithmic way to view two-dimensional data. All GPR transects were explored in two-dimensions in their raw and post-processed formats; these data were then compared and contrasted with three-dimensional geometric targets to appropriately interpret any possible rectangular targets that approximate burial shaft dimensions. These techniques are applied generally to a dataset to “ground” the analysis. There is no “cookie cutter” approach to GPR analysis. Each survey presents unique environmental and soil conditions that require informed choices in both the analysis and the collection of data.

<u>Report Preparation</u>

The data gathered during the survey are synthesized and presented in this report. While Heritage understands that this work is being conducted solely for planning purposes, all work was conducted in compliance with the Secretary of the Interior’s Standards for Archeological Documentation and the *Standards and Guidelines for Archaeological Investigations in New Hampshire,* promulgated by the NHDHR.

CHAPTER V
RESULTS

GPR Survey Results

As described in Chapter IV, a total of four grids were collected during the fieldwork effort. These grids were laid out within the 50-foot buffer around the Langdon Slave Burial Ground. A total of 250 individual transects were collected and analyzed during this survey. Figure 11 shows the location of each individual transect in green.

During the analysis, burials identified within the boundaries of the cemetery (Grid 1) were identified as probable marked burials. Burials identified outside of the cemetery were identified as probable unmarked burials. Our identification of these burials as probable, versus potential, indicates a greater degree of certainty in the identification of interments. Potential interments represent identifications that are less certain, and may contain burials, but may also represent taphonomic signatures such as tree throws or rock pulls that are unrelated to interment practices. Probable burials are therefore almost certainly burials where individuals were interred within a coffin, as the wood or metal hardware from a coffin create a highly reflective signal to the GPR antenna. The geophysical signatures of these events cannot always be distinguished from those of burials in which coffins have degraded significantly, but when the surrounding context features minimal disturbances and well-preserved coffins, these can be identified. Finally, care was taken to consider the possibility of non-burial related features including utilities, trenches, tree roots, etc.

While relatively few burials were clear, reflective rectangles in plan view, a portion of the burials displayed several of the qualities associated with coffin burials. Select burials have been annotated to illustrate some of these characteristics. To begin, most potential burials were highly reflective, suggestive of significant soil differences in areas that contained probable coffins from areas of normal subsoil. This intense reflectivity may be a result of air voids contained within portions of semi-decayed coffins, as well as the presence of buried metal coffin hardware that GPR energy cannot penetrate. The high amplitude of these reflectors was generally a unique feature of the anomalies identified as probable burials, as shallower targets interpreted as tree roots tended to display more muted reflections, were dendritically shaped within plan view amplitude maps, and were generally reflective at different depths in successive profiles. Coffins, on the other hand, display as rectangular in plan view and are generally reflective at the same depth. A second characteristic of many of the anomalies interpreted as burials was a broad hyperbola in the radargram or profile view. Hyperbolas form in GPR data as a result of the conical spread of GPR energy through the ground, with the central peak of the hyperbola marking the top of a given target. If the target has a flat top (like many coffins), then it will remain at a constant distance from the antenna, producing a flat band across the top of the target. In practice, since most coffins face some amount of decomposition or collapse, these bands rarely present as being perfectly flat. However, even a semi-decomposed coffin can produce a broader top than targets like tree roots that tend not to have large horizontal expanses.

The maps and other graphic data provided within this section of the Report are intended to illustrate the findings of the GPR survey. Figures 12 through 31 are three-dimensional amplitude maps created to show the results of the GPR survey in each area. In each of these maps, the survey data has been compiled and is presented in successive 10 cm (3.9 in) increments for depths of 0 to 200 cm (0 to 78.74 in) below surface (cmbs). Separate annotation maps in plan view are also included in Figures 32 through 44, which display the locations of identified features. Select relevant profiles of probable marked burials, probable unmarked burials, and other relevant features are also indicated by separate annotations and shown overlaid onto the amplitude maps in separate figures. These are found in Figures 45 to 51.

Grid 1

Survey Grid 1 measured 12 m x 4 m (39.37 ft x 13.12 ft) and included 49 individual profile transects. Amplitude maps for this survey grid, are displayed in Figures 12 through 31, while individual annotations for Survey Grid 1 are included in Figures 34 through 41. Grid 1 begins in the southwest corner of the burying ground and is characterized by approximately nine small, uninscribed stones placed sporadically throughout the cemetery, as well as two large trees, one in the southwest corner, and one in the center of the grid along the northern edge (Photo 3). These stones are likely the markers for the enslaved individuals buried at the cemetery (Black Heritage Trail New Hampshire 2018).

In total, Grid 1 contained six probable marked burials and two probable unmarked burials. This would support the possibility that at least two of the stones in the cemetery are footstones. The burials in Grid 1 can be seen in plan view from Figures 34 to 41. A selected profile can be seen in Figure 45, where the location of the profile is indicated by the white arrow on the plan view map, and the probable marked burials are indicated by the green arrows on the profile. The burials displayed clear hyperbolas, which likely represents the top of relatively well-preserved coffins. These hyperbolas appear to partially overlap; however, this does not mean that the burials themselves overlap. The overlapping hyperbolas instead indicate that the burials are spaced densely enough that the narrow conical spread of GPR energy can detect more than one coffin in the same scan. Additionally, these burials are visible in the plan view, indicating that both the soils are amenable to GPR analyses, and the coffins are relatively well preserved. In Figure 20, there are clear right angles that are white in color. These angles represent the corner edges of the grave shaft. The coffins/interments themselves appear in lower amplitude reflections, meaning they are a darker grey in plan view as opposed to being white. Finally, each of the probable burials also displayed faint, ninety-degree vertical cuts in the stratigraphy that are indicative of the excavation of and filling in of the grave shaft during burial. Each of the identified burials within the cemetery appear to reflect an east to west alignment, consistent with Judeo-Christian burial practices that were common during the 18th and 19th centuries in New England.

There were no other features identified in Grid 1.

Grid 2

Survey Grid 2 measured 30 m x 15 m (98.42 ft x 49.21 ft) and included 121 individual transects. Amplitude maps for this survey grid are displayed in Figures 12 to 31, and annotations for Grid 2 are displayed in Figures 32 to 43. Grid 2 began in the northeast corner of the grassy area north of the cemetery with transects running south towards the cemetery, and later the fence and rectory house. There were four trees in the grid, two of which were directly adjacent to the stone wall around the cemetery. The asphalt path that leads to the fenced-in yard is visible from the surface and is in the western region of Grid 2.

There is a long trench feature that runs from the northeast corner of Grid 2 to where the fence and stone wall meet, towards the southwest corner. This feature can be seen in plan view from Figures 36 to 43, and in profile view in Figure 46. The location of the selected profile is indicated by the white arrow on the plan view map, and the trench feature is indicated by the blue arrow in the profile. The trench displays clear stratigraphic cuts at the boundaries of the feature, with a highly reflective, dense fill zone that maintains the same width and depth throughout its entire length across Grid 2. This high amplitude banding suggests that this trench is modern.

There are also three small utility lines in Grid 2. Two of these run parallel to each other, running east to west, and are directly adjacent to the rectory house. The third utility is towards the northeast corner of the grid, and also runs east to west. The utilities can be seen in plan view from Figures 33 to 35.

There were also five probable unmarked burials identified within Grid 2. All of the burials are relatively close to the cemetery, and mostly surround the easternmost tree in the grid. These probable burials are also laid out in an east to west alignment, similar to those identified within the confines of the extant cemetery. These burials can be seen in plan view from Figure 37 to 43. The first selected profile can be seen in Figure 47. The location of the selected profile is indicated by the white arrow in the plan view map, and the burial features are indicated by the red arrows in the profile. The burials in Figure 47 display two tight, highly reflective, steep hyperbolas, which indicate well-preserved coffins; as with the interments in the cemetery, there are also faint ninety-degree vertical cuts in the stratigraphy likely indicative of the grave shaft morphology.

The second selected profile can be seen in Figure 48. The location of the selected profile is indicated by the white arrow in the plan view map, and the burial features are indicated by the red arrows in the profile. The leftmost burial feature displays a faint, irregular, and distorted shape within stratigraphic cuts that indicate a probable grave shaft. Stratigraphic cuts are visible in the upper levels of the profile and align with the edges of the higher amplitude reflections that represent the feature itself. Stratigraphic cuts often create a different visible difference in appearance when comparing the inside of their boundaries to the soil outside of the boundaries of the feature. These cuts may also appear similar to a hyperbola tail that will outline the edges of the feature. These characteristics indicate that this burial appears to be a much more degraded coffin burial in comparison to the other burials in the entire survey area. The rightmost burial, oppositely, displays a clearer hyperbola within the stratigraphic cuts of a grave shaft. Although these features are less clearly identifiable compared to other burials in the surveyed area, they display a consistent depth and width, orientation, and overall dimensions similar to marked probable burials within the cemetery, indicating that these are most likely unmarked burials.

It is important to note that the burials identified in Grid 2 are directly adjacent to a large tree. Tree roots can also reflect strong, tight hyperbolas that can be mistaken for cultural features like coffins. However, extra care was taken to ensure that the identified features maintain the correct size, shape, and consistent depth before concluding that the feature is a potential burial. Tree roots will fluctuate in shape, depth, and strength of the reflection, whereas coffins will have a consistent reflection, overall shape, and depth.

There were no other features identified in Grid 2.

Grid 3

Survey Grid 3 measured 11.5 m x 25 m (37.72 ft x 82.02 ft) and included 47 individual transects. Amplitude maps for this survey grid are displayed in Figures 12 to 31, and annotations for Grid 3 are displayed in Figures 32 to 43. Grid 3 began in the southwest corner of the fenced-in yard adjacent to the rectory house, with transects running north. The cemetery was directly east of the northeast region of Grid 3. Grid 3 can be characterized by a mix of sandy soils and gravel, which are visible from the surface. The asphalt path that begins in the parking lot runs into the northern region of Grid 3.

There is a large fill layer in Grid 3, that extends, at its shallowest point, from the northernmost region of the grid down to center of the southern region of the grid, where there is a large tree. At its deepest point, the fill layer is directly adjacent to the house. This feature can be seen in plan view from Figures 34 to 37, and in profile view in Figure 49. The location of the selected profile is indicated by the white arrow in the plan view map and the fill layer feature is indicated by the dark blue arrow in the profile. The fill layer displays a reflective, consistent, horizontal feature.

There are also two utility lines in Grid 3 that extend on either side of the large tree in the southern portion of the grid and intersect at the easternmost edge of the grid. These utilities can be seen in plan view from Figures 39 to 44, and in profile view in Figure 50. The location of the selected profile is indicated by the white arrow in the plan view map and the utilities are indicated by the magenta arrows in the profile. The utilities display as highly reflective, wider hyperbolas. The stratigraphic cuts are especially clear in the leftmost utility.

There were no burials or additional features identified in Grid 3.

Grid 4

Grid 4 measured 8 m x 5 m (26.24 ft x 16.4 ft) and included 33 individual transects. Amplitude maps of this survey grid are displayed in Figures 12 to 31, and annotations for Grid 4 are displayed in Figures 39 to 43. Grid 4 is located in a small section of the wooded area, directly south of the cemetery, with transects running north. Despite extensive efforts to clear the vegetation in Grid 4, there were four small trees in the grid.

There was only one feature identified in Grid 4, a probable unmarked burial in the western region of the grid. This burial can be seen in plan view from Figures 39 to 43, and in profile view in Figure 51. The location of the profile is indicated by the white arrow in the plan view map, and the burial is indicated by the red arrow in the profile. This burial is the most well-preserved burial compared to the burials in Grids 1 and 2. The burial in Grid 4 also displays clear stratigraphic cuts, indicating the grave shaft. The highly reflective, clear, flat hyperbola is an indication of the top of a nearly intact coffin. Additionally, unlike most of the other burials in Grids 1 and 2, the burial in Grid 4 is visible from plan view as a clear, reflective, rectangular shape. This burial is also laid out in an east to west alignment, similar to the marked burials within the bounds of the extant cemetery.

No other features were identified within Grid 4.

CHAPTER VI
CONCLUSIONS

Heritage Consultants, LLC, under contract to the City of Portsmouth Housing Authority, completed a GPR prospection survey of the Langdon Slave Burial Ground. The goal of the work was to identify all marked and unmarked burials within and adjacent to the burying ground through a non-invasive GPR survey. The project area totaled approximately 0.22 acres. A total of four grids were collected during the fieldwork effort. These grids were laid out within the 50-foot buffer around the Langdon Slave Burial Ground, to ensure that all probable burials were identified as part of this survey. The gridded surveys included a total of 250 individual transects that were collected and analyzed.

Numerous features were identified within the four gridded surveys conducted via GPR. Several of these features are modern and do not relate to the Langdon Slave Burial Ground, but instead represent later, intrusive effects to the property. These features include five separate utility lines, an asphalt pathway, a large trench, and an area of homogenous fill soils. In addition to these modern features, nine individual grave markers were identified within the stone walled bounds of the cemetery (Grid 1), associated with six marked probable graves identified through GPR work, as well as two unmarked probable graves within the cemetery. In addition to the eight identified graves within the cemetery, six additional probable unmarked graves were identified outside the bounds of the cemetery, including five within Grid 2 and one within Grid 4. A total of 14 graves were therefore identified via geophysical survey methods. All features identified in Survey Grids 1 through 4 can be seen over aerial imagery in Figure 52.

Heritage understands that the City of Portsmouth Housing Authority is interested in preserving the Langdon Slave Burial Ground from future demolition or development. Based on the GPR survey and archival research, it is now likely that at least fourteen burials are preserved within and adjacent to the burial ground. While every effort has been made to identify features of interest through GPR, these methods are not foolproof, and have not been ground-truthed to verify the interpretations. If development is planned in areas near the probable burial locations, Heritage recommends that an archaeological protection plan be developed to ensure that no inadvertent impacts to the burial ground and interments occurs. The archaeological protection plan should be developed in conjunction with the NHDHR, any federal agency that may require permits for the work, and potential consulting parties, namely descendants associated the cemetery, if identifiable, or preservation organizations with connections to the cemetery, such as the Black Heritage Trail New Hampshire. This outreach and protection plan will ensure that human remains are not inadvertently disturbed by any planned construction.

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Appendix 1

Figures

Figure 1: General Project area, displayed on satellite imagery background.

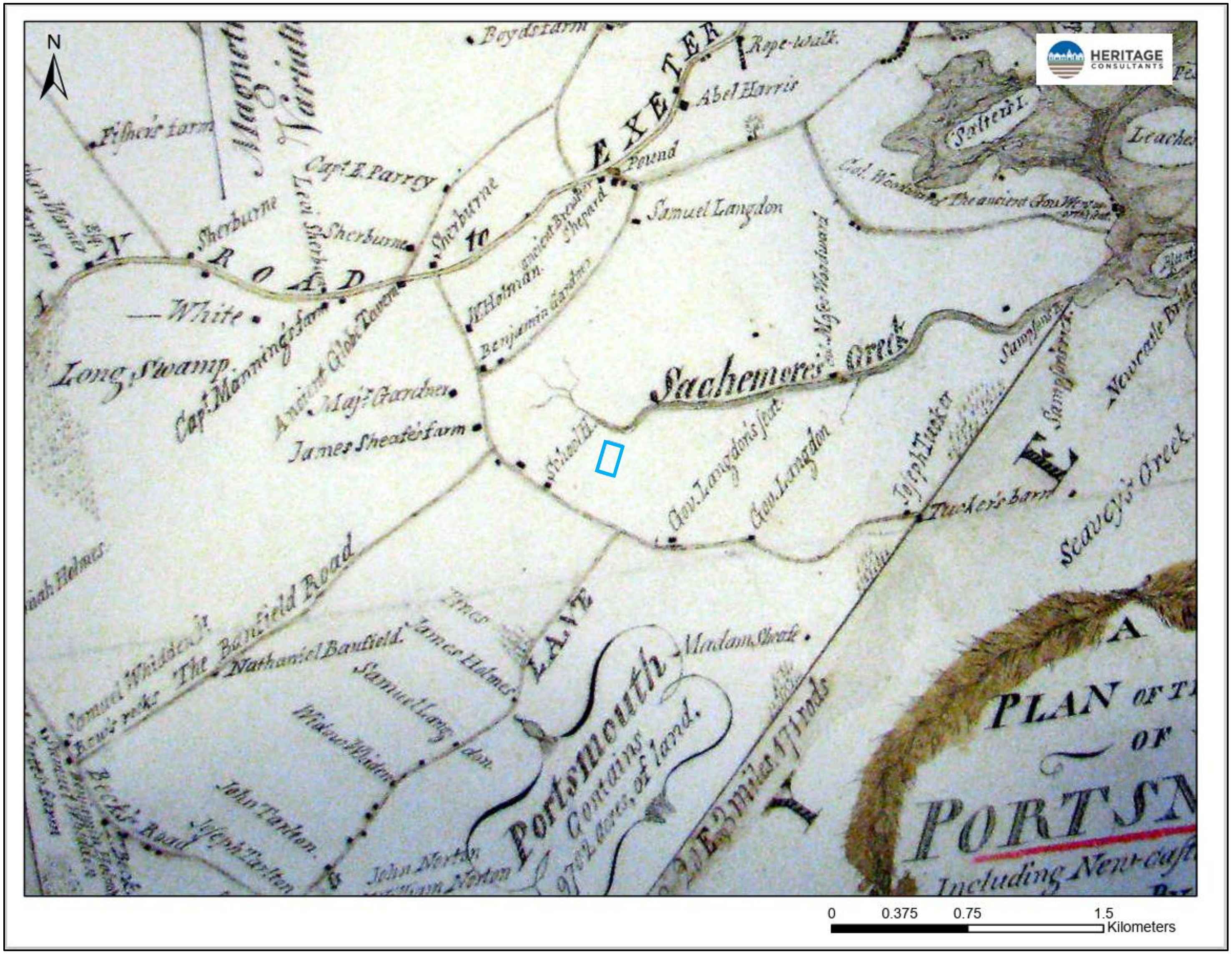


Figure 2: Excerpt from 1805 map of Portsmouth, New Hampshire, and the surrounding towns. Survey area shown in blue.

Figure 3: Excerpt from 1844 Survey of the Harbor of Portsmouth, New Hampshire, made by United States Topographic Engineers. Survey area shown in blue.

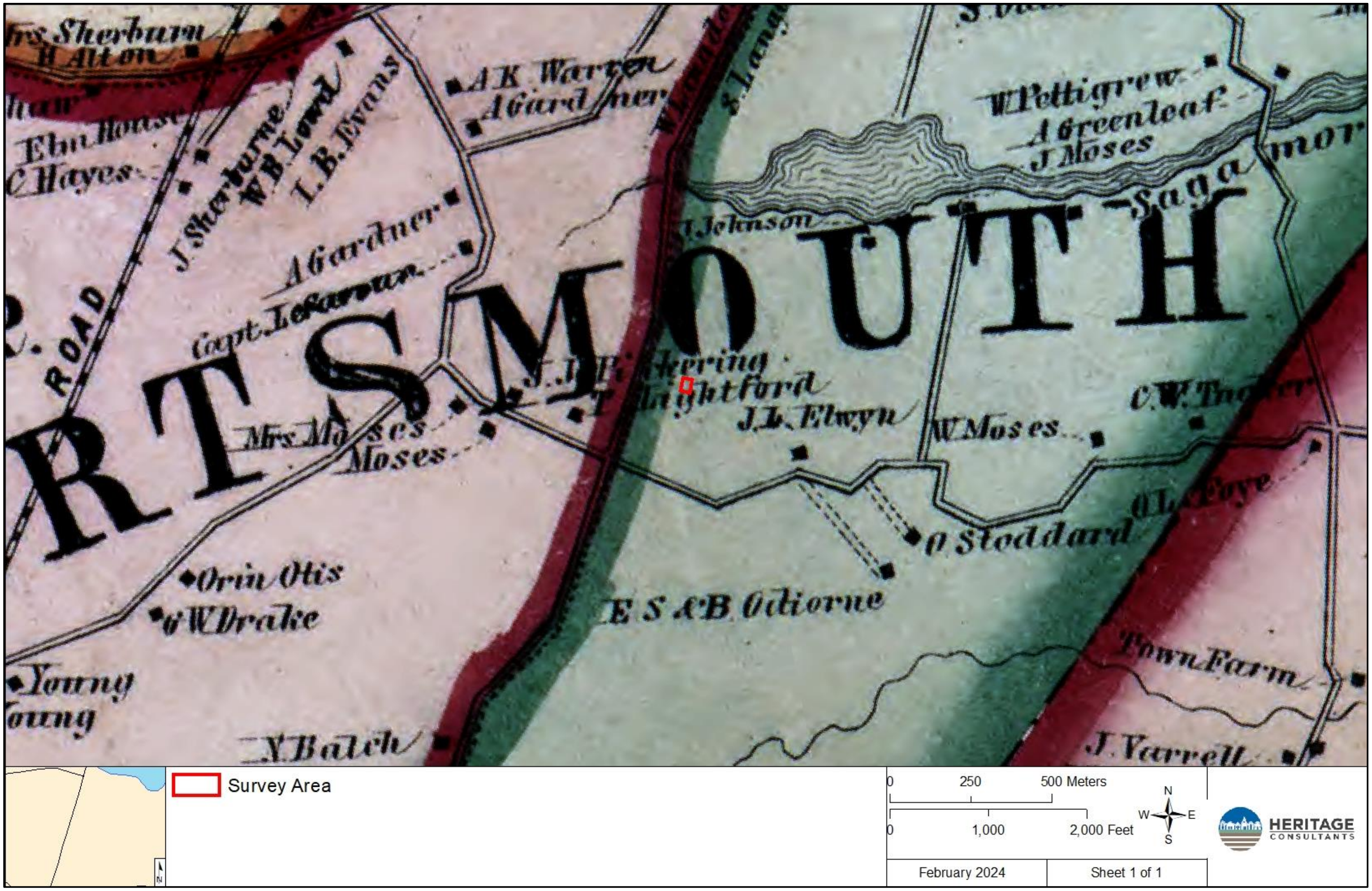
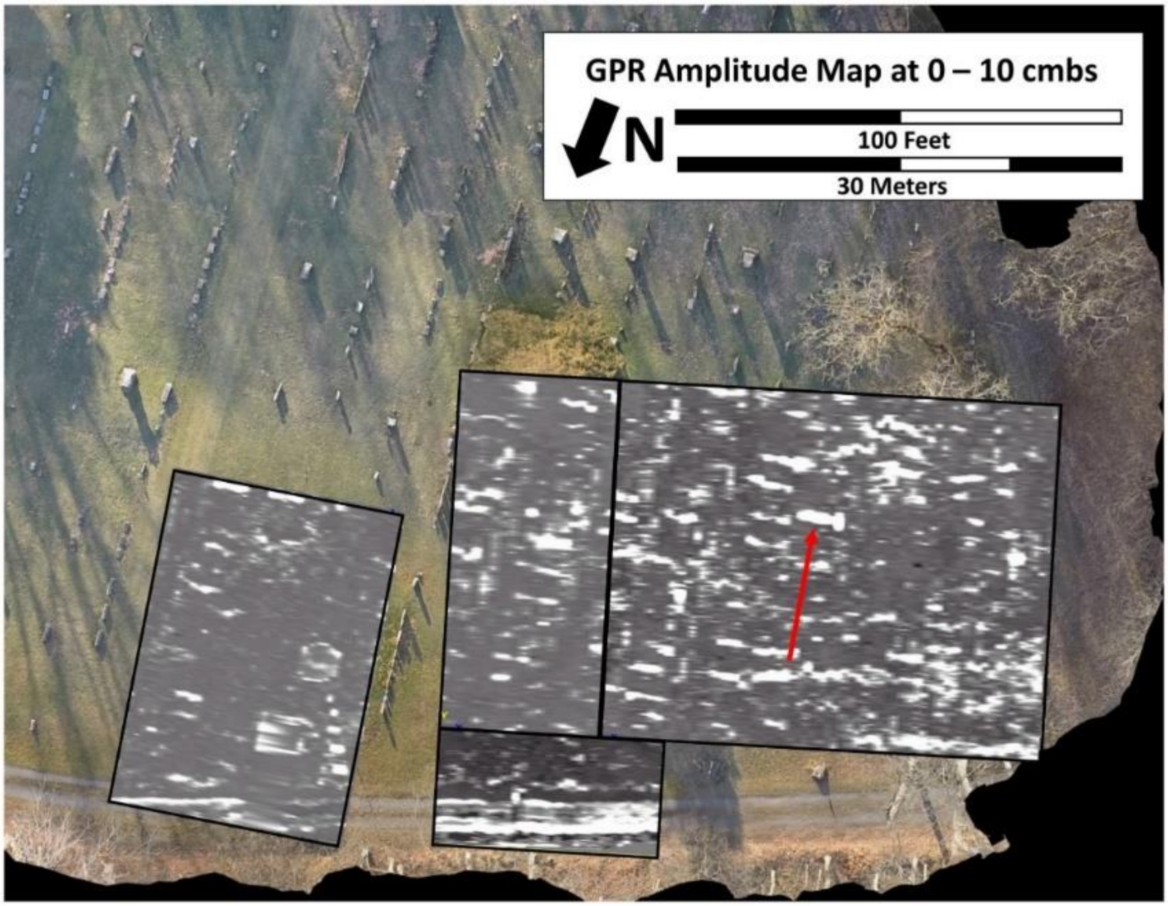


Figure 4: Excerpt from 1857 map of Rockingham County, New Hampshire. Survey area shown in red.

Figure 5: Excerpt from 1952 aerial image of Portsmouth, New Hampshire. Survey area shown in blue.

Figure 6: Excerpt from 1962 aerial image of Portsmouth, New Hampshire. Survey area shown in blue.



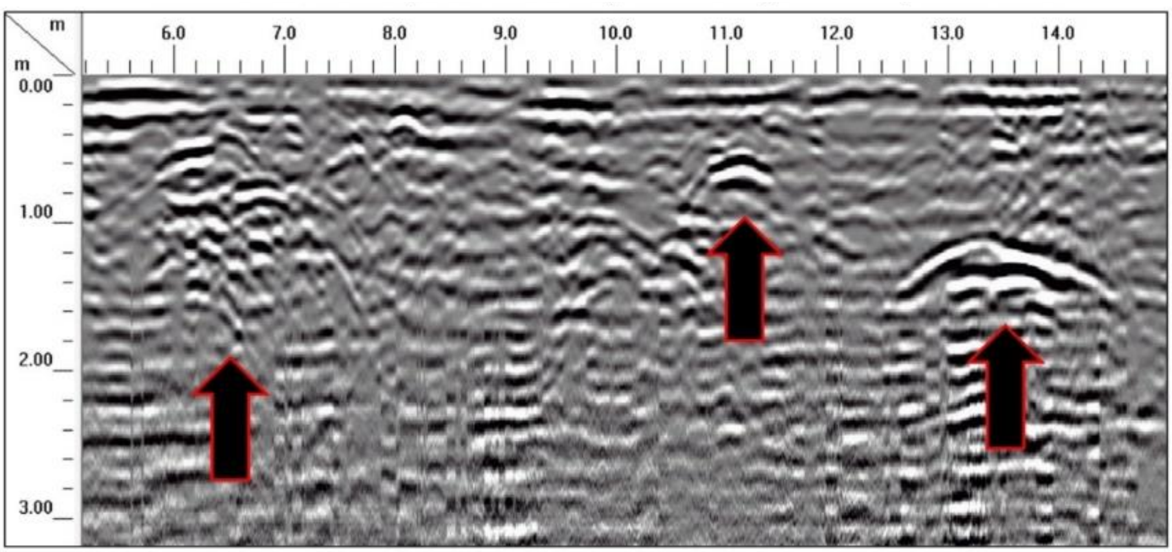


Figure 7: GPR Example Amplitude Map of marked and unmarked graves, Vischer Ferry Cemetery, Rexford, New York.

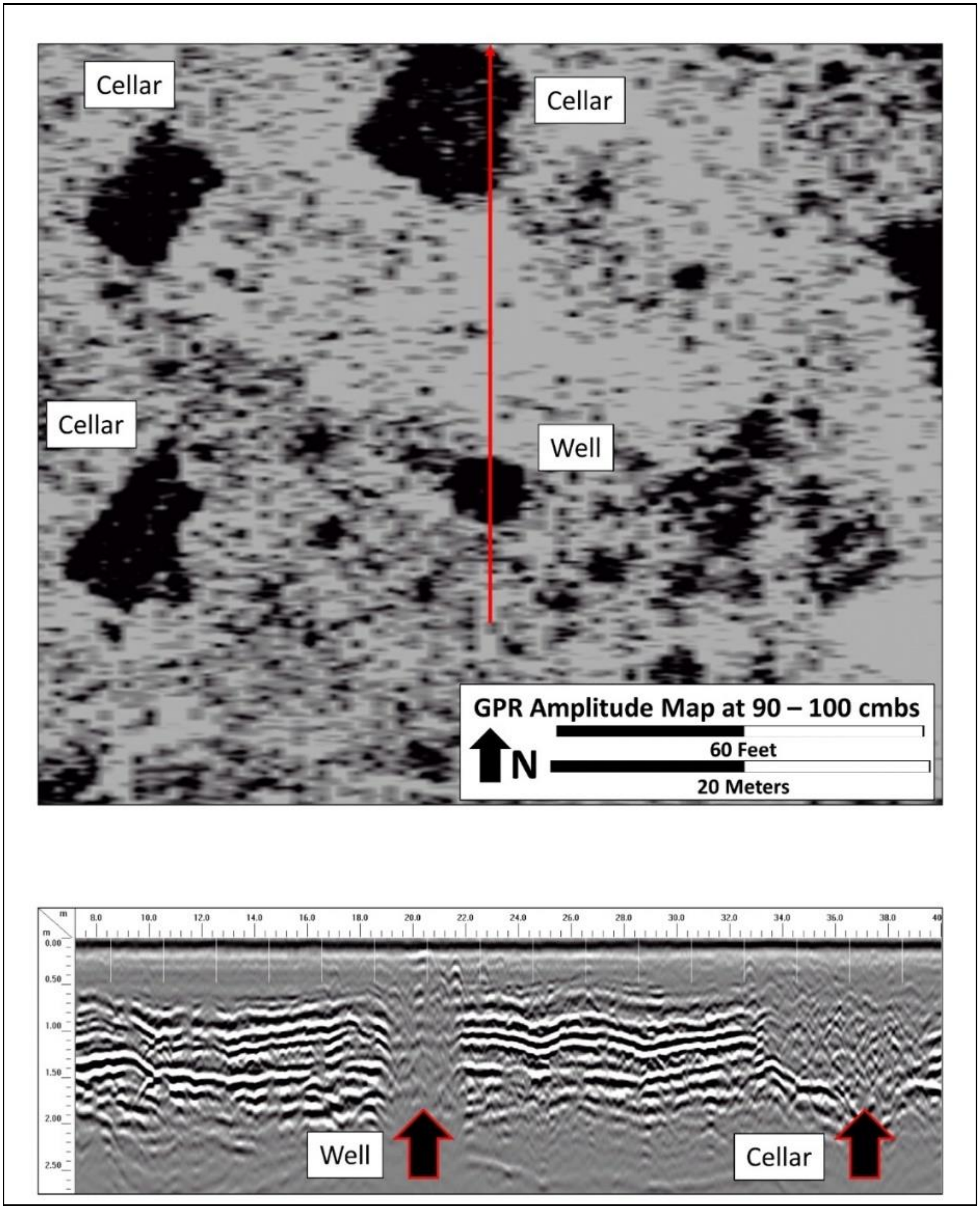


Figure 8: GPR Example Amplitude Map of a 17th century well and cellar hole, Hollister Site, South Glastonbury, Connecticut.

Figure 9: Location of potential grave markers within the stone-walled cemetery at the Langdon Burial Ground.

Figure 10: Location of GPR Survey Grids, displayed on satellite imagery background.

Figure 11: Location of GPR survey transects, displayed on satellite imagery background.

Figure 12: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 13: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 14: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 15: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 16: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 17: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 18: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 19: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 20: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 21: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 22: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 23: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 24: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 25: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 26: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 27: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 28: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 29: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 30: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 31: GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 32: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 33: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 34: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 35: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 36: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 37: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 38: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 39: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 40: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 41: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 42: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 43: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

Figure 44: Annotated GPR amplitude map of Survey Grids 1-4, with approximate depth indicated.

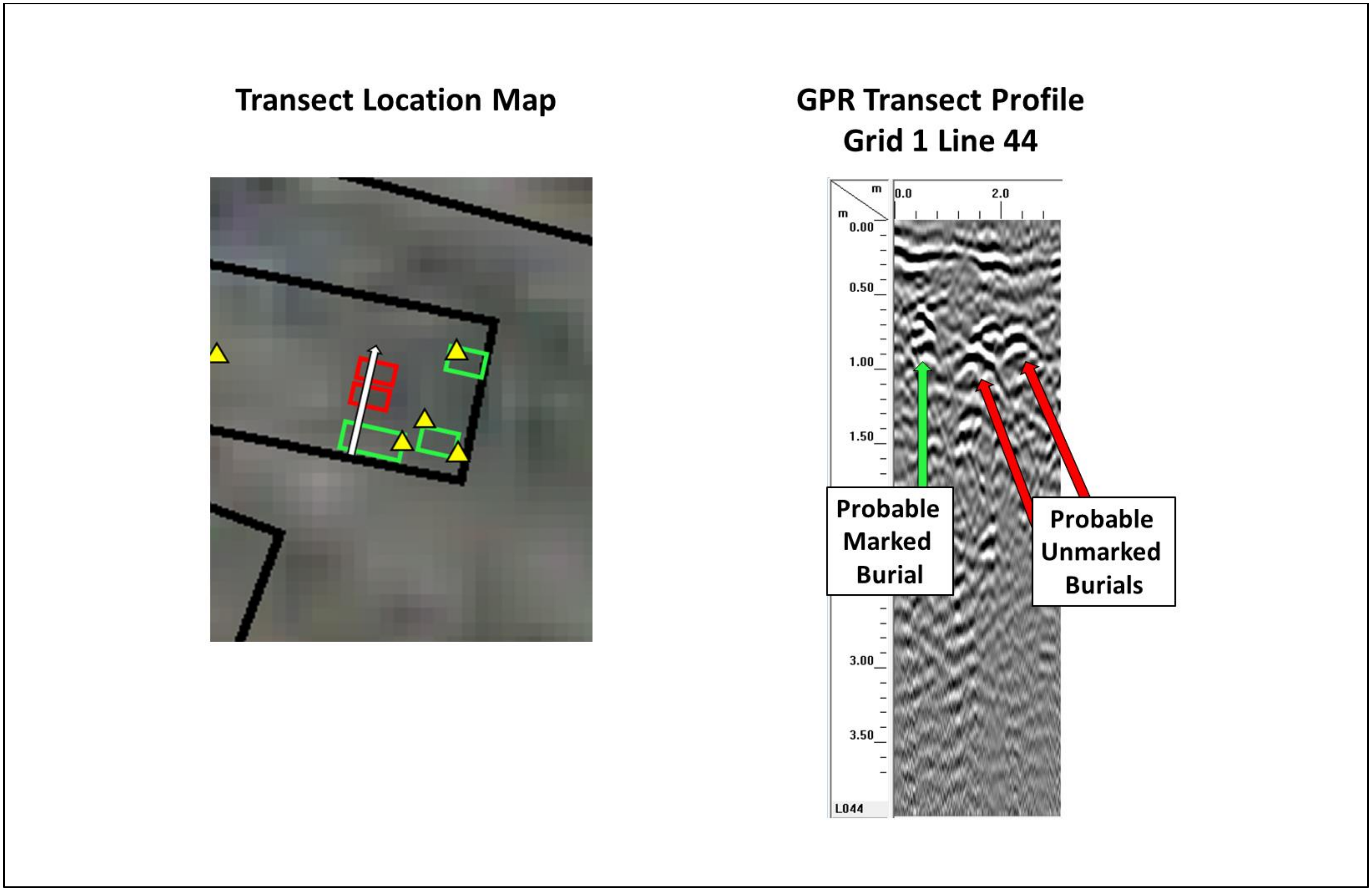


Figure 45: Selected GPR profile of probable marked and unmarked burials located in Grid 1. The position of radar profile is indicated by the white arrow in the left plan view map, and the features are indicated by the green and red arrows in the radargram to the right.

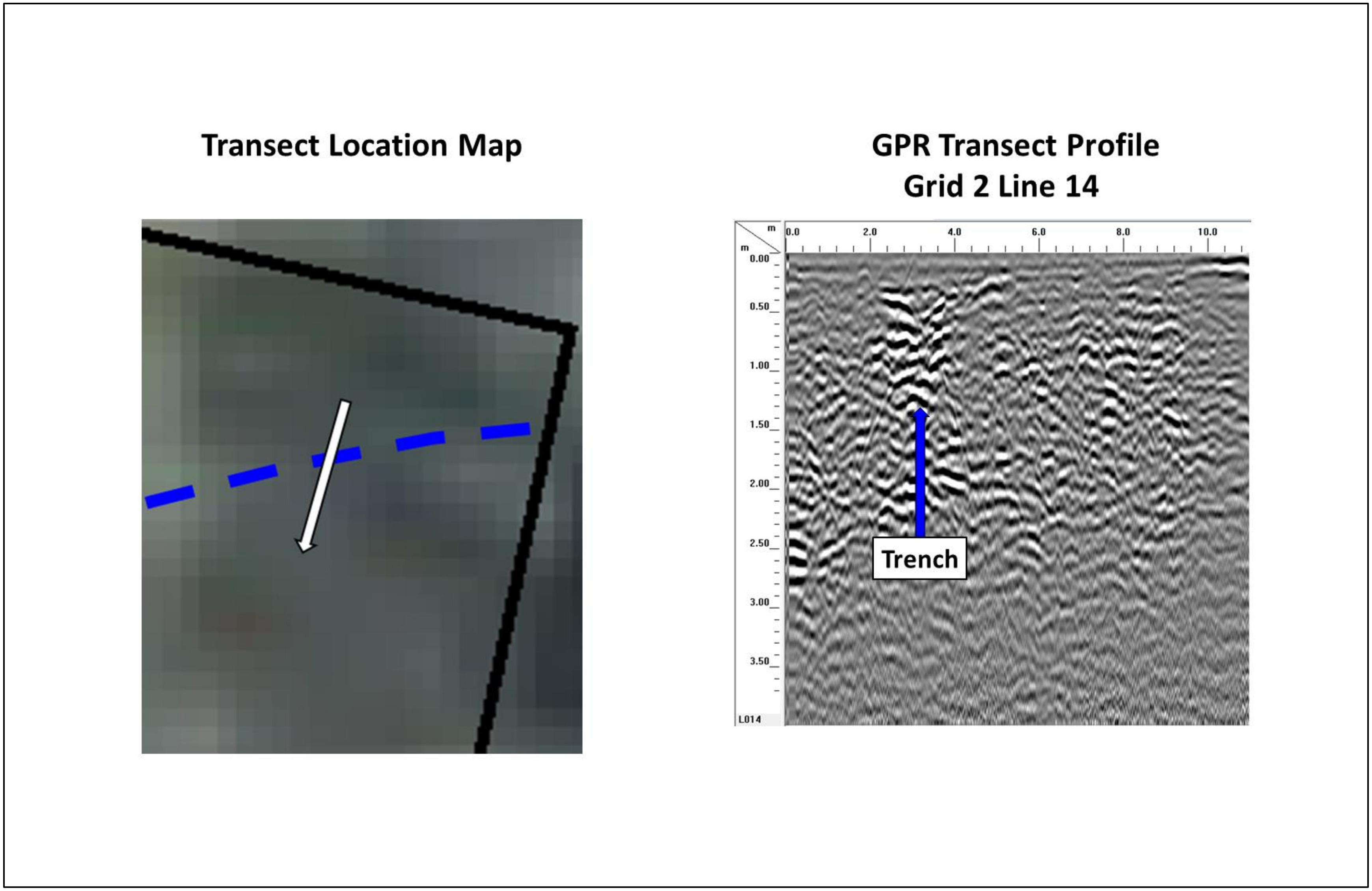


Figure 46: Selected GPR profile of the trench feature located in Grid 2. The position of radar profile is indicated by the white arrow in the left plan view map, and the feature is indicated by the blue arrow in the radargram to the right.

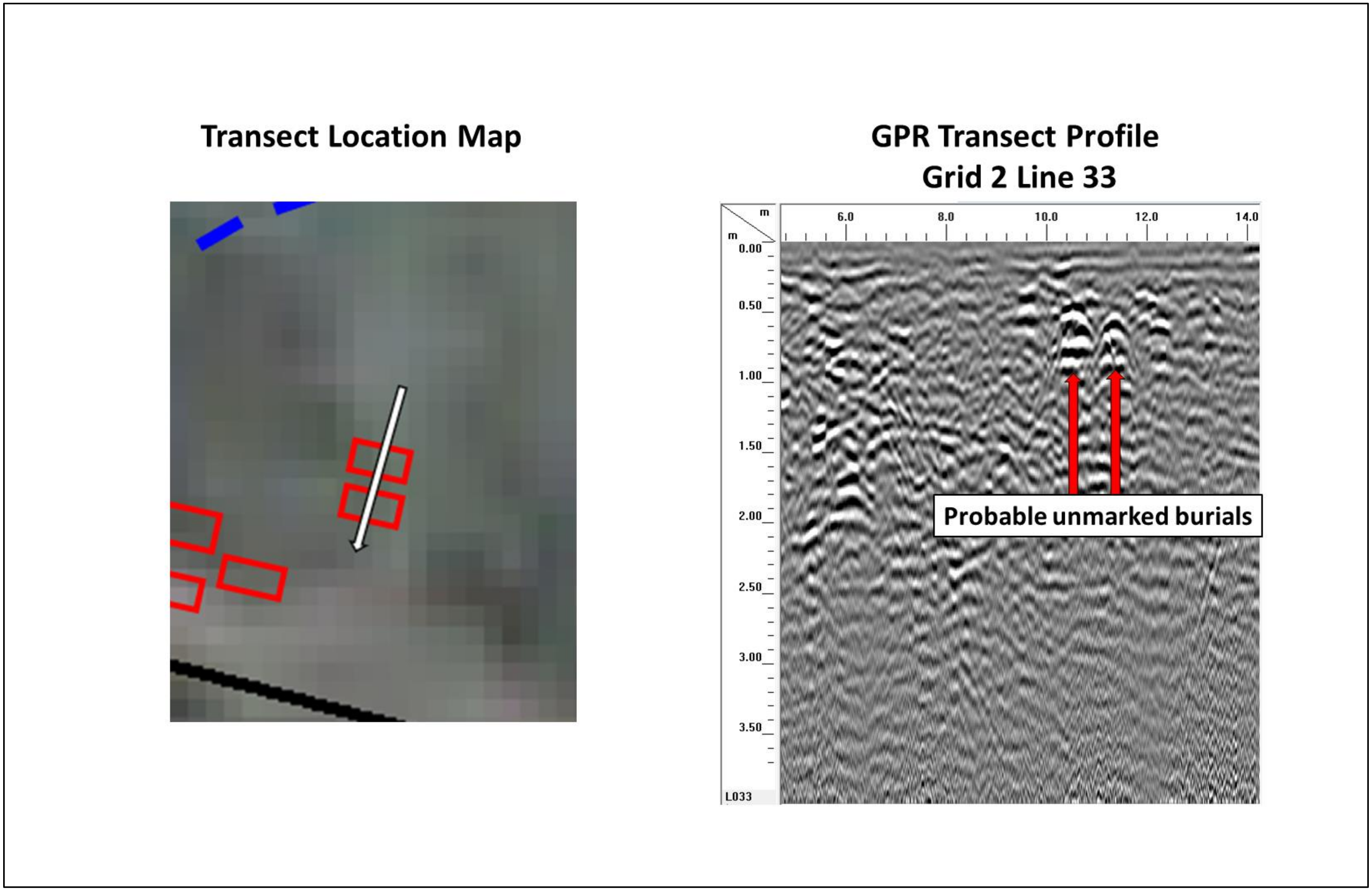
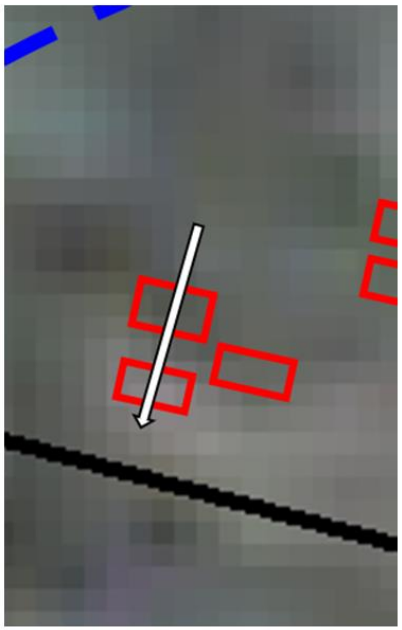


Figure 47: Selected GPR profile of probable unmarked burials located in Grid 2. The position of radar profile is indicated by the white arrow in the left plan view map, and the burials are indicated by the red arrows in the radargram to the right.

Transect Location Map



GPR Transect Profile
Grid 2 Line 46

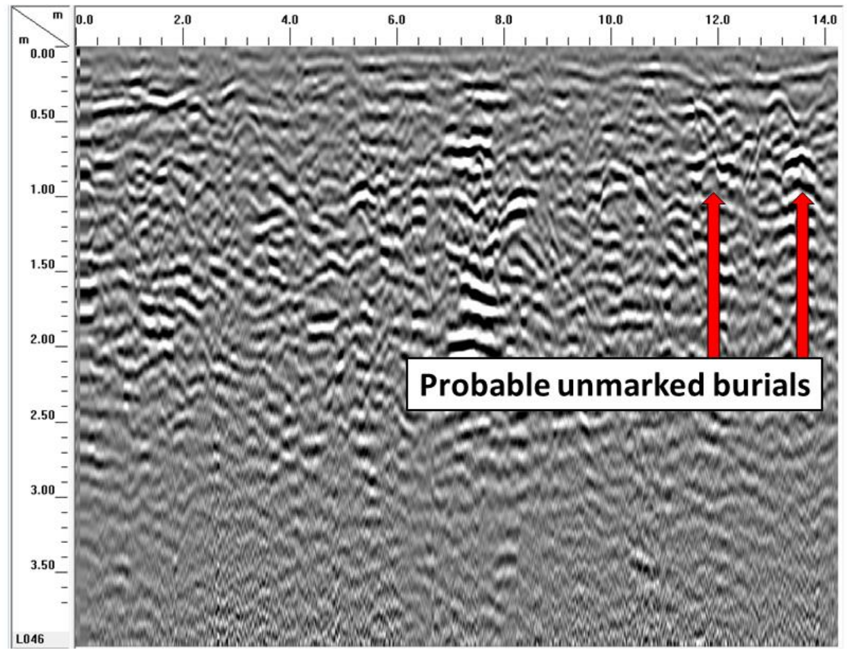
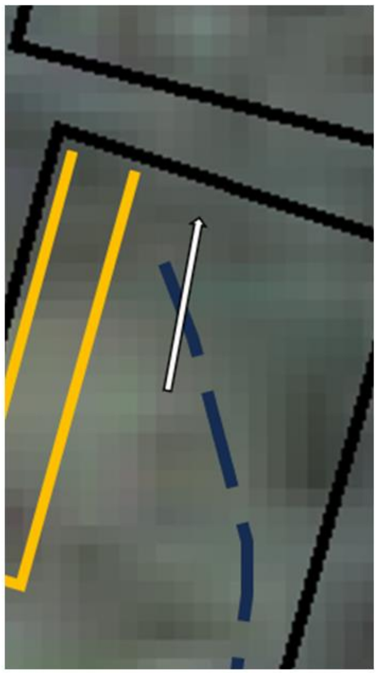


Figure 48: Selected GPR profile of the probable burials located in Grid 2. The position of radar profile is indicated by the white arrow in the left plan view map, and the burials are indicated by the red arrows in the radargram to the right.

Transect Location Map



GPR Transect Profile
Grid 3 Line 38

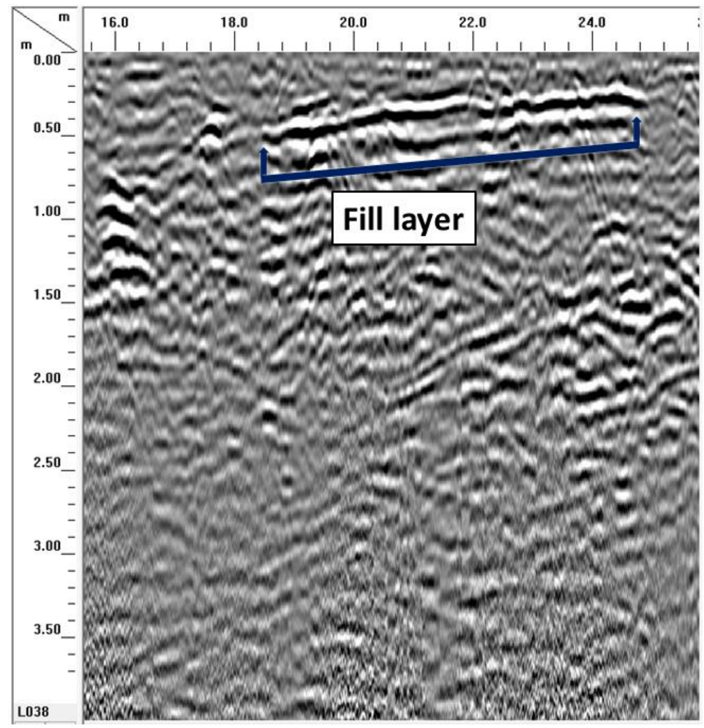
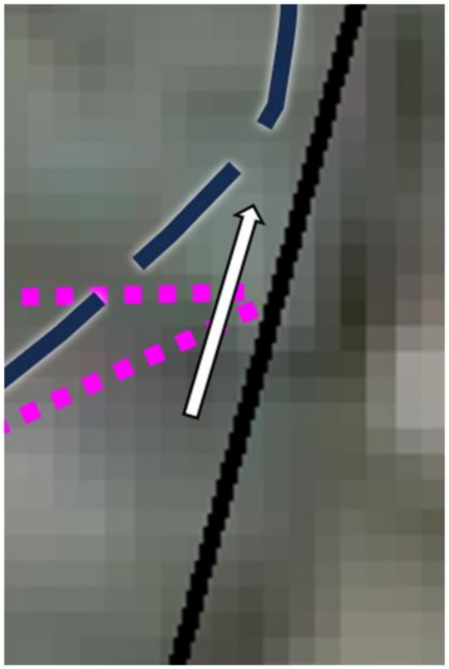


Figure 49: Selected GPR profile of the fill layer feature located in Grid 3. The position of radar profile is indicated by the white arrow in the left plan view map, and the feature is indicated by the dark blue arrow in the radargram to the right.

Transect Location Map



GPR Transect Profile
Grid 3 Line 51

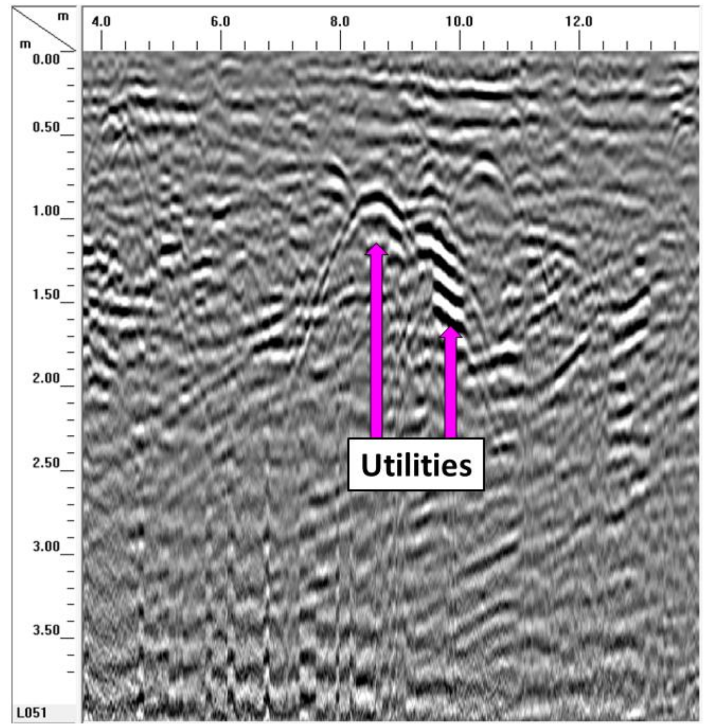


Figure 50: Selected GPR profile of the utilities located in Grid 3. The position of radar profile is indicated by the white arrow in the left plan view map, and the utilities are indicated by the magenta arrows in the radargram to the right.

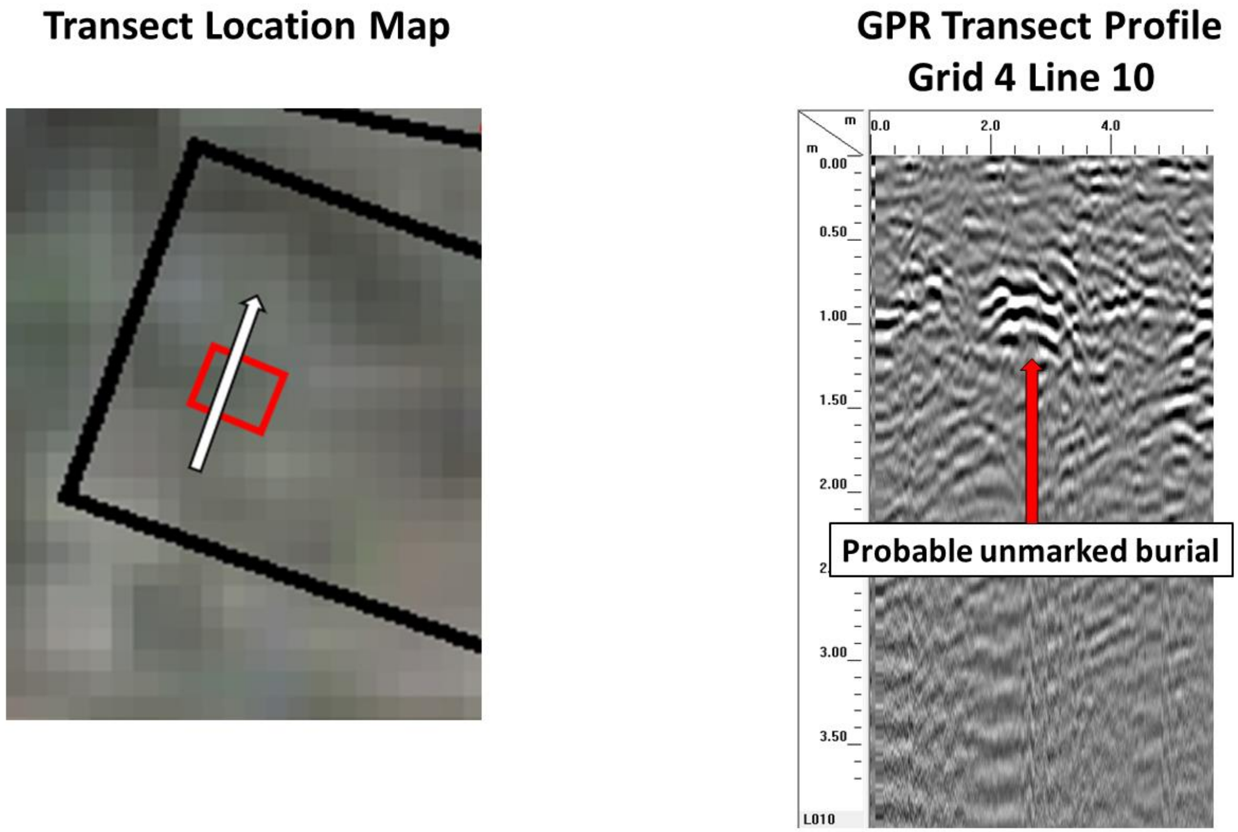


Figure 51: Selected GPR profile of the probable unmarked burial located in Grid 4. The position of radar profile is indicated by the white arrow in the left plan view map, and the burial is indicated by the red arrow in the radargram to the right.

Figure 52: Annotated aerial image of all features identified in Survey Grids 1 – 4.

Appendix 2
Photos

Photo 1: Photograph of GPR Survey Grid 1, the stone-walled cemetery, facing southwest.

Photo 2: Close-up photograph of the potential burial markers on the western side of Survey Grid 1, facing west.

Photo 3: Photograph of GPR Survey Grid 1, inside the stone-walled cemetery, facing west.

Photo 4: Photograph of GPR Survey Grid 2, facing west.

Photo 5: Photograph of GPR Survey Grid 4, facing northwest.

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: Portsmouth Housing Authority Date Submitted: May 20, 2024

Application # (in City's online permitting): LU 23-

Site Address: 1035 Lafayette Rd Map: 246 Lot: 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)**	Enclosed	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)**	Enclosed	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)**		
☑	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)**	Site Plan Sheet C-102	N/A
☑	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1D)**	Site Plan Sheet C-102	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)**	Enclosed Cover Sheet	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)**	Existing Conditions Plan Sheets	N/A
☑	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1G)**	Cover Sheet	N/A
☑	List of reference plans. **(2.5.3.1H)**	General Notes Sheet G-100 & Existing Conditions Plan Sheets	N/A
☑	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1I)**	General Notes Sheet G-100	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)**	Existing Conditions Plan Sheets	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)**	Existing Conditions Plan Sheet	N/A
☑	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	Required on all plan sheets	N/A
☑	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	Required on all plan sheets	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)**	Required on all plan sheets	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.	Existing Conditions Plan Sheets	
☑	**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.	Architectural Plan Sheets	
☑	**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).	Site Plan Sheet C-102	
☑	**4. Parking and Loading: (2.5.4.3D)** • Location of off street parking/loading areas, landscaped areas/buffers; • Parking Calculations (# required and the # provided).	Site Plan Sheet C-102	
☑	**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).	Utilities Plan Sheet C-104	
☑	**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.	Utilities Plan Sheet C-104	

☑	**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.	Utilities Plan Sheet C-104	
☑	**8. Solid Waste Facilities: (2.5.4.3H)**		
	• The size, type and location of solid waste facilities.	Site Plan Sheet C-102	
☑	**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.	Grading and Drainage Plan Sheet C-103	
☑	**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.	Photometrics Plan	
☑	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	Photometrics Plan	
☑	**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.	Landscape Plan Sheet	
☑	**13. Contours and Elevation: (2.5.4.3L)** • Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Grading and Drainage Plan Sheet C-103	
☑	**14. Open Space: (2.5.4.3M)** • Type, extent and location of all existing/proposed open space.	Site Plan Sheet C-102	
☑	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	Existing Conditions Plan Sheets	
☑	**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).	Site Plan Sheet C-102	
☑	**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)**	Enclosed	
☑	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	Grading and Drainage Plan Sheet C-103	
☑	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)**	N/A	
☑	Stormwater Management and Erosion Control Plan. **(7.4)**	Enclosed	
☑	Inspection and Maintenance Plan **(7.6.5)**	Enclosed	

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)**	Cover Sheet	
☑	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: • Calculations relating to stormwater runoff; • Information on composition and quantity of water demand and wastewater generated; • Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; • Estimates of traffic generation and counts pre- and post-construction; • Estimates of noise generation; • A Stormwater Management and Erosion Control Plan; • Endangered species and archaeological / historical studies; • Wetland and water body (coastal and inland) delineations; • Environmental impact studies. **(2.5.3.2B)**	Enclosed	
☑	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)**	The applicant is currently working with Eversource to get a will serve letter.	

☑	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)**	Cover Sheet	
☑	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)**	Site Plan Sheet C-102	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)**	Site Plan Sheet C-102	N/A

Applicant's Signature: Neil Han _______________ **Date:** 5/20/2024

Site Plan Review Application Fee

Project: 1035 Lafayette Rd **Map/Lot:** Map 246 Lot 1

Applicant: Portsmouth Housing Authority

All development

Base fee $600			$600.00
Plus $5.00 per $1,000 of site costs			
Site costs	$1,000,000	+	$5,000.00
Plus $10.00 per 1,000 S.F. of site development area			
Site development area	142,460 S.F.	+	$1,424.60
		Fee	**$7,024.60**

Maximum fee: $20,000.00

Fee received by: ______________________________ Date: ____________________

Note: Initial application fee may be based on the applicant's estimates of site costs and site development area. Following site plan approval, the application fee will be recalculated based on the approved site plan and site engineer's corresponding site cost estimate as approved by the Department of Public Works, and any additional fee shall be paid prior to the issuance of a building permit.