AMBIT ENGINEERING,INC. CIVIL ENGINEERS AND LAND SURVEYORS
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29 December 2020

Dexter Legg, Chair
City of Portsmouth Planning Board
1 Junkins Avenue
Portsmouth, NH 03801

Re: City of Portsmouth Wetland Conditional Use Permit Request
Tax Map 159, Lot 7 & 8
163 Sparhawk Street
Portsmouth, New Hampshire

Dear Mr. Legg:

This letter transmits a City of Portsmouth Wetland Conditional Use Permit Amendment request for 695 square feet of disturbance within the 100' City of Portsmouth Wetland Buffer for the re-construction of an existing garage, installation of an infiltration trench, installation of a stone drip apron, and associated landscaping.

The property currently contains a single family residential structure, a wooden deck, a covered porch, a patio, an attached garage, stairs for access/egress, and associated landscaping.

The proposed infiltration trench and stone drip apron will allow for collection and infiltration of the stormwater from the proposed garage replacement.

According to the City of Portsmouth Zoning Ordinance, *Article 10.1017.50 Criteria for Approval*, the proposal shall comply with the following criteria:

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

The proposal is to re-construct an existing garage in the existing footprint. The entire garage and the entire lot is located within the 100' City of Portsmouth Wetland Buffer. Given that the proposed project includes the replacement of an existing structure, in the existing footprint, the land is reasonably suited to the use, activity, or alteration. In addition, the proposed replacement does not require the removal of any naturally vegetated buffer area surrounding the garage to achieve construction goals.

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

Due to the configuration of the lot, the location of nearby wetlands, there does not exist an area to propose the garage replacement while avoiding the 100' City of Portsmouth Wetland Buffer.

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

The proposal will not impact the existing wetland resource located adjacent to the site and its current functions and values. The proposed infiltration trench and stone drip apron will improve stormwater quality, treatment, and infiltration within the 100' City of Portsmouth Wetland Buffer. It is our belief that the above project will improve water quality entering the nearby wetland resource, and therefore have no adverse impact on the wetland functional values and the surrounding properties.

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

The areas within the 100' City of Portsmouth Wetland Buffer that are proposed to be impacted would be characterized as existing pavement and/or stone walkway. There will be no alteration of the natural vegetated state to achieve construction goals.

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

The project represents the alternative with the least adverse impacts to areas and environments while allowing reasonable use of the property. The proposal replaces an existing garage in the existing footprint. and provides a stormwater treatment and infiltration component, a function that does not currently exist.

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

There are no areas within the vegetated buffer strip that will be impacted or altered by this project.

Please contact me if you have any questions or concerns regarding this application.

Respectfully submitted,

Steven D. Riker
NH Certified Wetland Scientist/Environmental Permitting Specialist
Ambit Engineering, Inc.

Cc: Michael J. O'Connor-Owners/Applicant

NH DES-Wetlands Bureau Application
Michael J. O'Connor

SITE PHOTOGRAPHS
Garage Reconstruction

Site Photograph #1 August 2020

Site Photograph #2 August 2020

Site Photograph #3 August 2020

Site Photograph #4 August 2020

Site Photograph #5 August 2020

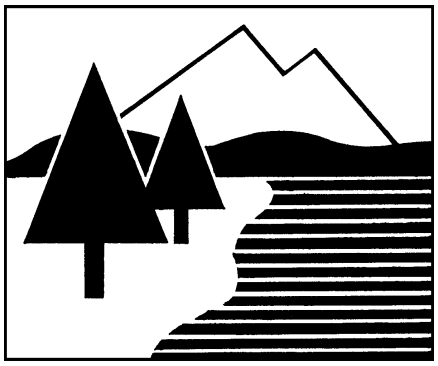
Site Photograph #6 August 2020

DRAINAGE ANALYSIS

O'CONNOR RESIDENCE

163 SPARHAWK STREET

PORTSMOUTH, NH



28 DECEMBER 2020

Ambit Engineering, Inc.

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REPORT

EXECUTIVE SUMMARY

This drainage analysis examines the existing and proposed stormwater drainage patterns for the proposed improvements on the lot at 163 Sparhawk Street in Portsmouth, NH, as shown on the Town of Portsmouth Assessor's Map 159, Lot 7. The total area of the lot is 3,198 square-feet.

The proposed construction involves reconstruction of the existing garage to include a roof drain, a drip edge, and a stone infiltration trench.

While this development has minimal potential to increase stormwater runoff to adjacent properties as there is no increase in impervious surface, this analysis is provided to the City of Portsmouth in support of a Conditional Use Permit Application.

INTRODUCTION

This drainage report is designed to assist the owner, planning board, contractor, regulatory reviewer, and others in understanding the impact of the proposed development project on local surface water runoff and quality. The project site is shown on City of Portsmouth, NH Assessor's Map 159 as Lot 7. The proposed project involves reconstruction of the existing garage, a roof drain, a drip edge, and a stone infiltration trench on the subject lot.

This report includes information about the existing site and the proposed site necessary to analyze stormwater runoff and design mitigation. The report includes maps of existing and proposed subcatchments and calculations of runoff. The report will provide a brief narrative description of the storm water runoff and describe numerically and graphically the surface water runoff patterns for this site. Proposed stormwater management and treatment structures and methods will also be described. To fully understand the proposed site development the reader should review a complete site plan set in addition to this report.

METHODOLOGY

This report uses the US Soil Conservation Service Method for prediction of storm water runoff. The SCS method is published in The National Engineering Handbook, Section 4 "Hydrology", in Technical Release No. 20, (TR-20) "Computer Program for Project Formulation Hydrology", and Technical Release-55 (TR-55) "Urban Hydrology for Small Watersheds". This report uses the HydroCAD program, written by Applied Microcomputer Systems, Chocorua, N.H., to apply these methods. Rainfall data and runoff curve numbers are taken from the Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing areas in NH.

SITE SPECIFIC INFORMATION

Located on Sparhawk Street in Portsmouth, NH, the existing 3,198 square-foot lot site is made up of a single soil type; 799 – Well Drained, Urban land-Canton complex. The lot contains some trees with an existing house and associated paving and grassed surfaces. The existing site has a curve number of 67 including its impervious surface. Areas with higher curve numbers will produce more runoff as compared to lower curve number areas.

DRAINAGE ANALYSIS

This drainage analysis consists of two sections, an analysis of the stormwater runoff from the site in the existing (or pre-developed condition) and an analysis of the stormwater runoff from the same area along with the associated proposed development. Areas and drainage information were taken from an existing conditions plan and site topographic map prepared by Ambit Engineering. Soils information used in the HydroCAD model are from the Soil Conservation Service, Soil Survey of Rockingham County.

Existing or Pre-Developed Site Runoff

The existing conditions for this site are defined by one subcatchment (ES1). Subcatchments were delineated by topography and critical areas of concern such as at down gradient property lines. In the pre-developed or existing conditions, the site runoff from Existing Subcatchment ES1 generally flows in a north-easterly direction toward North Mill Pond. The Existing Subcatchment defined by ES1 is comprised by the existing home, paved surfaces and grass.

The flow paths used in the HydroCAD model for existing conditions on this site are primarily sheet due to the small size of the individual subcatchments and a lack of any well defined drainage channels. The flow paths chosen in both the pre and post developed analysis are meant to be the longest time of concentration flow paths (woods or porous

surfaces have longer times of concentration as compared to pavement or lawns), not the longest length of flow path.

Table 1: Existing Local Watershed Subcatchment Summary.

Subcat	Area Sf	Tc min.	CN	100 Year Peak cfs	Associated Design Point
ES1	3198	5	67	0.78	DP1

See "Plan of Existing Subcatchments" – W1

Proposed or Post-Developed Site Runoff

The lot has on it an existing structure to which various improvements will be made including a reconstructed garage. While such improvements have minimal potential to generate an increase in stormwater runoff, the city of Portsmouth has an interest in reducing and treating runoff from the site.

The proposed conditions for this site are defined by three subcatchments (PS1, PS1a and PS1b). These subcatchments are analyzed at Discharge Point DP1. Subcatchment PS1 is similar in area and land cover as in ES1 except that the runoff from part of the garage roof is taken out and redirected to a proposed stone infiltration trench. Subcatchment PS1a is comprised of the westerly garage roof area, to be directed toward the adjacent stone infiltration trench. PS1b is comprised of the easterly portion of the garage roof, which is directed to a drip apron and sheet flow. The stone infiltration trench will provide treatment to the runoff as well as offset the peak flows anticipated from the impervious surfaces. All three nodes are analyzed at DP1.

The following table summarizes the developed conditions:

Table 2: Proposed or Developed Conditions

Subcatchment	Area Sf	Tc min	Weighted CN	100 Year Peak cfs	Associated Design Point
PS1	5,323	5	63	0.65	DP1
PS1a	175	5	98	0.06	DP1
PS1b	175	5	98	0.06	DP1

See "Plan of Proposed Subcatchments" – W2

Tc values are calculated according to TR-55 methodology. See "Plan of Proposed Subcatchments" – W2.

Peak Flow Rates

One of the main goals of any stormwater runoff analysis is to maintain peak runoff amounts at or below pre-developed levels. For this development, this is accomplished utilizing the stone infiltration trench. The following table summarizes the comparison of Pre vs. Post Development flows for a range of storm events:

	Q2 (cfs)		Q10 (cfs)		Q25 (cfs)		Q50 (cfs)		Q100 (cfs)	
Discharge Point	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DP 1	0.12	0.11	0.29	0.26	0.45	0.40	0.60	0.59	0.78	0.78

As the above table illustrates, Discharge Point 1 (DP1) shows decreases or no change for all storms considered in this analysis.

Conclusion

The existing lot can be redeveloped as shown on the submitted plans and will cause no negative impacts on abutting properties. This meets the requirements of the City of Portsmouth in terms of stormwater management.

STORMWATER MANAGEMENT
INSPECTION & MAINTENANCE PLAN

FOR

Michael J. O'Connor
PROPERTY LOCATED AT
163 Sparhawk Street Portsmouth, NH
December 28, 2020

Introduction

The intent of this plan is to provide Michael J. O'Connor, owner of property located at 163 Sparhawk Street, Portsmouth, NH, with a list of procedures that cover the inspection and maintenance requirements of the stormwater management structures for the proposed construction at the site.

The following inspection and maintenance program is necessary to keep the stormwater management structures functioning properly. These measures will also help minimize potential environmental impacts. By following the enclosed procedures, Michael J. O'Connor will be able to maintain the functional design of the stormwater management structures and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Stormwater Management System Components

The Stormwater Management System design components are a stone infiltration trench and stone drip apron.

The proposed construction includes the replacement of an existing garage that is attached to the existing residential structure. Since all of the proposed construction is within the City of Portsmouth's wetland buffer zone, the proposed stormwater structures will provide treatment for the proposed project.

The Stone Drip Apron underneath the proposed stairway access will capture runoff from a section of the roof of the garage and provide storage and percolation into the soil below. The stone infiltration trench will also provide storage and percolation of stormwater from the roof of the garage into the soil below.

The Stormwater Management System is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, the design includes the following elements:

Non-Structural BMP's

Non-Structural best management practices (BMP's) include temporary and permanent measures that typically require less labor and capital inputs and are intended to provide protection against erosion of soils. Examples of non-structural BMP's on this project include but are not limited to: temporary and permanent mulching, temporary and permanent grass cover, trees, shrubs and ground covers, miscellaneous landscape plantings, dust control, tree protection, topsoiling, sediment barriers, and a stabilized construction entrance.

Structural BMP's

Structural BMP's are more labor and capital-intensive structures or installations that require more specialized personnel to install. Examples on this project include but are not limited to: stone infiltration trench, roof drains, and drip apron.

Inspection & Maintenance Checklist/Log

The following pages contain maintenance specifications, a Stormwater Management System Inspection & Maintenance Checklist, and a blank copy of the Stormwater Management System Inspection & Maintenance Log. The forms are provided to Michael J. O'Connor and should be transferred to future homeowners and will serve as a guideline for performing the inspection and maintenance of the Stormwater Management System. This is a guideline and should be periodically reviewed for conformance with current practice and standards.

Stone Drip Apron Design

The intent of the stone drip apron is to provide for storage and percolation of runoff from the proposed deck. Stone Drip Aprons are meant to provide a porous medium (stone, 6" depth) that can withstand water velocity from the structure above, eliminating erosion at the point of contact. The base (24"-36" depth) of the drip edge is backfilled with coarse sand or gravel which allows the stormwater to quickly infiltrate into the ground where it is stored and slowly percolated into the surrounding subsoil. The Stone Drip Apron will extend from the foundation edge slightly further than the structure above to effectively capture runoff from the structure above, in this case a wooden deck.

Stone Drip Apron Maintenance

In order to keep the Stone Drip Aprons functioning properly, it is important to keep the filter surface porous and unplugged by debris. Remove any debris that may clog the stone surface. After leaf fall (i.e. in November), remove large accumulations of leaves. It is not necessary to remove every leaf but at the same time it is not desirable to have the stone surface completely covered with leaves to the point of plugging the stone surface.

Replace the stone surface with new stone as needed. If it is observed that water is ponding or percolating through the stone media very slowly, the stone surface and underlying course sand/gravel backfill base will need to be replaced as it is likely clogged from accumulating debris.

Stone Infiltration Trench Design

The intent of the infiltration trench is to provide for storage and percolation of runoff from a portion of the proposed garage roof. The trench provides 42 inches of depth of gravel and washed septic stone depth which allows the stormwater to quickly infiltrate into the trench area where it is stored and slowly percolated into the surrounding subsoil. A gutter with a downspout and leader to the trench effectively capture runoff from the roof of the garage, and conveys it via gravity to the trench.

Stone Infiltration Trench Maintenance

In order to keep the stone infiltration trench functioning properly, it is important to keep the collection gutter on the roof of the garage, the downspout and the leader to the trench clean and unplugged by debris. The infiltration trench is also equipped with a yard drain overflow/cleanout structure that will allow for the removal of any debris that is collected in the trench.

Remove any debris that may clog the gutter, downspout, leader to ensure that stormwater flows via gravity to the trench.

After leaf fall (i.e. in November), remove large accumulations of leaves from the gutter, downspout, and leader. If it is observed that stormwater is not entering the trench area, it is likely clogged from accumulating debris and needs to be cleaned.

The following summarizes the inspection and maintenance requirements for the various BMP's that may be found on this project.

1. **Grassed areas:** After each rain event of 0.5" or more during a 24-hour period, inspect grassed areas for signs of disturbance, such as erosion. If damaged areas are discovered, immediately repair the damage. Repairs may include adding new topsoil, lime, seed, fertilizer and mulch.
2. **Plantings**: Planting and landscaping (trees, shrubs) shall be monitored bi-monthly during the first year to insure viability and vigorous growth. Replace dead or dying vegetation with new stock and make adjustments to the conditions that caused the dead or dying vegetation. During dryer times of the year, provide weekly watering or irrigation during the establishment period of the first year. Make the necessary adjustments to ensure long-term health of the vegetated covers, i.e. provide more permanent mulch or compost or other means of protection.
3. **Stone Infiltration Trench:** The filtration trench should be monitored for siltation and weed growth. Any silt or vegetation that occurs in the trench should be removed.
4. **Roof Gutter:** Monitor gutter inlets and outlets for excessive accumulation of sediment.

The use of sand shall be prohibited, and the use of salt shall be limited.

Stormwater Management System

163 Sparhawk Street
Michael J. O'Connor

Inspection & Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Stone Drip Apron	Twice Yearly	Remove leaves / debris from surface	Clean and/or replace stone as needed
Stone Infiltration Trench	Twice Yearly	Inspect for damage, remove any debris from gutter, downspout and/or leader.	Clean entire drainage system and remove all sediments if discovered in piping

Stormwater Management System

163 Sparhawk Street
Michael J. O'Connor

Inspection & Maintenance Log

BMP/System Component	**Date Inspected**	**Inspector**	**Cleaning/Repair Needed** ***(List Items/Comments*****)**	**Date of Cleaning/Repair**	**Performed By**