CITY OF LEWISTON
PLANNING BOARD MEETING
Monday, April 9, 2018 – 5:30 P.M.
City Council Chambers – First Floor
Lewiston City Building
27 Pine Street, Lewiston, ME

AGENDA

I. ROLL CALL

II. ADJUSTMENTS TO THE AGENDA

III. CORRESPONDENCE

IV. PUBLIC HEARINGS:

An application submitted by Terradyn Consultants, LLC on behalf of Chase Custom Homes & Finance to create a 31 lot single family subdivision on an undeveloped 33.2 acre parcel located at 131 Hogan Road.

V. OTHER BUSINESS:

a) Recommendation regarding the disposition of 115 Shawmut Street.
b) Leblanc Subdivision Revision II
c) Discussion Regarding Shoreland Zoning Ordinance
d) Any other business Planning Board Members may have relating to the duties of the Lewiston Planning Board.

VI. READING OF THE MINUTES: Motion to adopt the March 26, 2018 draft minutes

VII. ADJOURNMENT

The City of Lewiston is an EOE. For more information please visit our website @ www.lewistonmaine.gov and click on the Non-Discrimination Policy.

CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: **Planning Board**
FROM: **David Hediger, City Planner**
DATE: **April 5, 2018**
RE: **April 9, 2018 Agenda Item IV(a)**

An application submitted by Terradyn Consultants, LLC on behalf of Chase Custom Homes & Finance to create a 31 lot single family subdivision on an undeveloped 33.2 acre parcel located at 131 Hogan Road.

Terradyn Consultants, LLC has submitted an application on behalf of Chase Custom Homes for the construction of a 31-lot single-family subdivision on 33.2 acres located at 131 Hogan Road. The property is located in the Suburban Residential (SR) district with lots to be serviced by approximately 3,600' of new public streets. The development is utilizing the city's standards for single-family cluster developments, pursuant to Article XIII, Section 7 of the Zoning and Land Use Code. This provides for smaller lot sizes and approximately 11 acres of common open space. The subdivision is also subject to the development review criteria of Article XIII, Section 4 and subdivision criteria of Section 5. Given the size of the development, the project is being reviewed by the city's under delegated review authority from Maine Department of Environmental Protection (MDEP) for Site Location of Development (i.e. site law) purposes.

An extensive application package has been provided. The applicant has provided revisions and review comments to the satisfaction of staff. The following should be noted:

- The cluster provisions of Article XIII, Section 7 allow a property owner to reduce lot sizes by half of what would otherwise be required by the underlying zoning district. Frontage and setback requirements may also be reduced. In exchange for reduced lot sizes, open space must be provided. Approximately 11 acres of open space have been provided that will fall under the responsibility of the lot owners of the subdivision, as identified in the proposed declaration of protective covenants and noted on sheet c-1.0, note 10. The minimum amount of open space is essentially determined by making up the difference of the aggregate lot size reduction in land dedicated as common open space (see page 6 of application cover letter).
- The site plans show building envelopes with reduced building setbacks as allowed in a cluster subdivision. The specific space and bulk standards for this development are noted on sheet c-1.0 listing both the underlying provisions of the SR district and the allowed reductions.
- All lots will be serviced by city water and private septic systems. No lot in the subdivision shall be less than 20,000 square feet in size. This is the minimum lot area allowed by the plumbing code for a septic system and also the minimum lot size allowed in SR district within a cluster subdivision.

- All roads proposed are to be constructed to city streets standards for acceptance by the city. Staff has reminded the applicant of the following provisions contained in Article XIII, Section 12:
    - The developer shall file a performance guarantee or conditional agreement with the city covering the following improvements:
        - The construction of any streets which are eligible to be accepted by the city as public ways; the construction of any water supply or sewerage system other than individual on-site facilities; the construction of any drainage systems; the construction of erosion and sedimentation control measures or landscaping required to meet the standards of this Code; and, the maintenance of the improvements listed above until the street and related improvements are accepted by the city.
    - The amount of the performance guarantee shall be 125 percent of the cost of furnishing, installing, connecting and completing in good working condition all of the street grading, paving, storm drainage, utilities, and other similar improvements, including maintenance until accepted by the city, as specified above. All guarantees shall be conditioned upon the completion of all such improvements within two years from the date of the approval of the plan, as recorded on the plan, with extensions to this deadline only as permitted by this Code. If a performance guarantee as has been satisfactorily filed with the city, building permits may be issued for construction within the development prior to completion of required improvements, but prior to occupancy of a building or dwelling unit, the improvements serving that building or dwelling unit shall be in place and serviceable.
    - The conditional agreement shall be endorsed by the planning board on the plan, and shall provide that no lot or parcel of land may be conveyed, and that no permit may be issued by the city for any building or other permanent structure within the development until the completion of the street grading, paving, storm drainage, utilities and other similar improvements as specified in the plan; and the acceptance of any public improvements by the city. The agreement shall be conditioned upon the completion of all such improvements within two years from the date of the approval of the plan, as recorded on the plan. An extension of the deadline in a performance guarantee or conditional agreement may only be granted by the Planning Board for good cause shown and the extension request must be made at least 60 days prior to the time of expiration.
    - The applicant is aware of the above referenced provisions and the option of a performance guarantee or conditional agreement. Staff recommends as a condition of approval that a note is added to the plan that no lot or parcel of land may be conveyed, and that no permit may be issued by the city for any building or other permanent structure within the development until the completion of the street grading, paving, storm drainage, utilities and other similar improvements as specified in the plan; and the acceptance of any public improvements by the city

unless a performance guarantee has been provide to the city's satisfaction in accordance with Article XIII, Section 12 of the Zoning and Land Use Code.

- The stormwater system associated with the roads construction has been reviewed to the satisfaction of Public Works. The system will consist of gravel wetlands, under-drain filter, level spreaders, forested buffers, etc. Stormwater improvements within the right-of-way of the city shall be the responsibly of the city's once the roads are accepted. Stormwater improvements located outside the right-of-way shall be the responsibility of lot owners of the subdivision, as note in the declaration of protective covenants. Staff recommends as a condition of approval that evidence of a final inspection of the storm water system shall be provided to the city by the designing engineer along with a written statement indicating that the storm water system has been completed in accordance with the approved plans.
- Approximately 14,829 square feet of wetland alterations is proposed with the construction of this development. This requires a Tier 1 permit from MDEP. The application is currently pending. Staff recommends as a condition of approval no development activity occur until evidence is provided of a MDEP permit for wetland alterations.

All other review comments from city staff have been addressed to staff's satisfaction with revisions provided by the applicant.

City staff has no additional comments at this time. Staff recommends approval of the proposed project, with the following conditions:

1. A note is added to the cover sheet that prior to any certificate of occupancy being issued that evidence of a final inspection of the stormwater system be provided to the city by the designing engineer along with a written statement indicating that the stormwater system and all site improvements have been completed in accordance with the approved plans.
2. A note is added to the plan that no lot or parcel of land may be conveyed, and that no permit may be issued by the city for any building or other permanent structure within the development until the completion of the street grading, paving, storm drainage, utilities and other similar improvements as specified in the plan; and the acceptance of any public improvements by the city unless a performance guarantee has been provide to the city's satisfaction in accordance with Article XIII, Section 12 of the Zoning and Land Use Code.
3. No building permits be issued or construction activity occurs until evidence of MDEP approval for wetland alterations has been provided to the city.

ACTION NECESSARY

Make a motion that the application submitted by Terradyn Consultants, LLC on behalf of Chase Custom Homes & Finance to create a 31 lot single family subdivision on an undeveloped 33.2 acre parcel located at 131 Hogan Road meets all of the necessary criteria contained in the Zoning and Land Use Code, including, but not limited to Article XIII, Section 4, 5 and 7 of the Zoning and Land Use Code, and that approval be granted (including, if any, specific conditions raised by the Planning Board or staff).

1660

March 28, 2018

City of Lewiston, Maine Planning Department
c/o Mr. David Hediger, Deputy Director / City Planner
27 Pine Street
3rd Floor
Lewiston, ME 04240

Major Site Plan Application – Sanctuary Estates, Lewiston, Maine

On behalf of Chase Custom Homes & Finance, we are pleased to submit the Development Review Application and Site Location of Development (SLODA) Applications for the proposed Sanctuary Estates subdivision. The development is proposed to be a clustered subdivision with a total of 31 single family house lots with approximately 11 acres of common open space along with the related public roadways, underground utilities & stormwater management features.

The 33.2 acre development parcel is located on the southeast side of Hogan Road in Lewiston, Maine. The property is shown as Lot 54 on the City of Lewiston Tax Map #115. It's located within the Suburban Residential (SR) District. The site is an undeveloped forest with the exception of a centrally located meadow. The site contains undulating slopes with some areas of shallow bedrock. A series of forested wetlands are located in the lower areas of the site.

Sanctuary Estates is proposed to be a single-family cluster development which allows individual lot sizes to be reduced to 50 percent of that required by the district requirements and reduces the minimum street frontage to 50 ft. All proposed lots are at least 20,000 sf and have at least 50 feet of street frontage. Each lot will be served by public water, underground electric & private subsurface septic systems.

The project will be accessed by a new set of roads. Approximately 3,600' of new public roadway will be created. Two of the four proposed roads will be designed to the public street standard and will have a 24' wide driving surface and 2' wide shoulders. The other two roads will be classified as public courts and will have a 24' wide driving surface with no shoulders.

Stormwater runoff will be conveyed to a variety of BMPs that will provide the necessary water quantity control & water quality treatment. The stormwater management system features two gravel wetlands, one under-drained filter basin, a series of level lip spreader/forested buffer combinations, forested buffers & roof drain filter strips.

The attached plan set is based upon a boundary and topographic survey that was performed by George Bouchles, PLS, SE of Cadmaster Land Surveying & Septic Design, Inc. George provided ground topography on Hogan Road at the proposed road connection. The remainder of the site shows topographic information obtained from the State of Maine Office of GIS. George also evaluated test pits on each lot for septic suitability. The site natural resources mapping was

performed by Statewide Surveys, Inc. They provided the wetland delineation with vernal pool assessment and a Class A High Intensity Soil Survey of the property.

The following information addresses the Development Review Standards of Section 4 of Article XIII of the Zoning & Land Use Code:

Utilization of the Site

The proposed development concept was heavily influenced by the natural features of the site. The property contains a series of forested wetlands and several areas of shallow bedrock. The roads were sited to avoid the wetlands wherever possible and the lots were clustered into the upland areas of the property. Areas of known shallow bedrock were generally avoided. Where avoidance was not possible, the roadway finished grade was lifted to reduce or remove the need for widespread blasting.

Traffic Movement Into and Out of the Development Area

The project will not result in an unreasonable congestions or unsafe conditions in the surrounding neighborhood due to the location of the intersection with Hogan Road, limited number of expected trips & capacity of the proposed road network.

Chase Lane is proposed to intersect with Hogan Road at a 90 degree angle directly across from Lemay Avenue. This configuration will be far safer than offsetting Chase Lane from Lemay Avenue by a small distance.

The estimated vehicular traffic can be obtained from the Trip Generation Manual, published by the Institute of Transportation Engineers. Section 210 – Single-Family Detached Housing was used as a basis for the calculation and is summarized as follows:

- Average Daily Trip Generation = 9.57 Trips /Dwelling Unit = **297 Trips/Day**
- Average Weekday AM Peak Hour = 0.77 Trips/Dwelling Unit = **24 Trips/Hour**
- Average Weekday PM Peak Hour = 1.02 Trips/Dwelling Unit = **32 Trips/Hour**

Since the anticipated peak hour trip generation is less than 100, a more in-depth traffic analysis is not required.

Chase Lane was designed to the Public Road standard and is capable of supporting up to 1,000 vehicle trips per day according to the City of Lewiston Policy for Design of Streets & Sidewalks.

Access into the Site

Access to this subdivision will be provided off from Hogan Road, directly across from Lemay Avenue. At this intersection, a maximum grade of 3% will be maintained for the first 100'. The speed limit on Hogan Road is 25 MPH. According to Table 4-1 of the MDOT Highway Design Guide, the necessary sight distance on a level road with a speed limit of 25 MPH is 155'. The available sight distance far exceeds the minimum in both directions. The view to the northeast is generally unobstructed all the way to Stetson Road (approximately 950'). The view to the southwest is obstructed by a nearby power pole and some landscaping on the adjacent lot. These obstructions

limit the measured sight distance to approximately 300', which is still nearly double the required amount.

Internal Vehicular Circulation

Approximately 3,600' of new roadway will be created in the subdivision, including two public roads, and two public courts. The roads were designed to generally conform to the natural terrain and will provide safe & easy passage for both residents and emergency vehicles to each of the 31 proposed residential lots.

The internal roads feature gentle curves that will provide visual interest and avoid visual conformity. There are no proposed through streets.

Pedestrian Circulation

Pedestrians will have direct access to several area of common open space. There are no sidewalks proposed in the Sanctuary Estates Subdivision. There are no sidewalks on Hogan Road or in any of the surrounding neighborhoods.

Stormwater Management

A stormwater management evaluation has been prepared to consider both pre and post-development peak rates of runoff for the 2, 10 & 25 year/24 hour storm events, as well as proposed water quality treatment (See Section 12 of SLODA). The stormwater management system includes two gravel wetlands, an under-drained soil filter, level spreader/forested buffer combinations, perimeter buffers and roof-drain filter strips on some of the single family houses. A combination of drainage swales and catch basins with interconnected culverts will be used to collect stormwater and transport it to localized stormwater treatment areas. The evaluation shows that all post development peak rates of runoff are below pre development levels for all study points and that the design meets the MDEP general water quality standards.

The stormwater facilities will be maintained by the homeowners association. Guidance for the inspection & maintenance of all stormwater facilities is included in Section 12.

Dale Brewer, CSS of Statewide Surveys, Inc. performed a Class A High Intensity Soil Survey (See Section 11 of SLODA) on the property. He explored the site for wetland areas in April and May of 2017. His delineation is shown on the attached plans. Approximately 14,289 SF of wetlands are proposed to be permanently altered. A Tier 1 wetland alteration permit application has been filed with the Maine DEP.

Erosion Control

An erosion control plan has been provided per MDEP guidelines (See the attached plans and Section 14 of SLODA). All roadways were designed to utilize the existing topography which will minimize disturbance. Details for typical erosion control measures for the single family homes have also been included within the project details.

Water Supply

The new subdivision will connect to the public water system. According to plans provided by the City, there is a 12" ductile iron water main located within the Hogan Road right of way. An 8"

water main will be extended through the development to provide both drinking water and fire protection.

Each of the proposed 31 homes is proposed to be a 3 bedroom residence with an assumed daily water demand of 270 gallons per day. We believe that the City Engineering/Public Works departments will find that they have ample capacity to service the development.

Sewage Disposal

The public sewer system does not extend to the site. The closest gravity manhole is more than 600' southeast of our proposed intersection with Hogan Road. It would require a pump station & force-main to connect. This, in combination with the development properties undulating terrain have led us to propose private individual subsurface septic systems for each of the lots. George Bouchles, S.E., P.L.S. of CadMaster Land Surveying & Septic Designs evaluated test pits for each lot. His report and test pit logs can be found in Section 17 of the SLODA.

Utilities

Overhead electrical and telephone service on Hogan Road will drop to an underground line at the entrance to the new subdivision. Underground utilities will be installed throughout the development. The number of transformers have been minimized. They've been placed behind the roadway ditches to minimize their visual impact.

Natural Features

Significant efforts were made to preserve the site's natural features. Approximately 11 acres of naturally wooded Open Space area will be maintained at the rear of the site. The existing forested wetlands will not be disturbed except at road crossings. The site contains mature tree growth in all areas except for an existing meadow that located in the central portion of the site.

Groundwater Protection

The project will not have any expected impact to the groundwater. See Section 15 of the SLODA for the sand and gravel aquifer map. The project will be serviced by public water and a stormwater collection and treatment system, which reduces the development's potential to negatively impact groundwater in the area.

Water and Air Pollution

The proposed development will not result in undue water or air pollution. All septic systems will be designed to meet State standards. The stormwater runoff will be treated & filtered per MDEP regulations.

Exterior Lighting

Lights will be provided at the intersection of Chase Lane & Hogan Road as well as at all interior intersections per City of Lewiston ordinance requirements. The City specification is shown on sheet C-2.0 of the attached plan set.

Waste Disposal

The majority of the waste will be generated by the harvesting of the trees and the removal of the stumps. Marketable timber will be removed from the project site and sold. Smaller woody debris will be mulched and used as a soil amendment or as an erosion control measure. Stump grindings will be used to make erosion control mix berms, which will be used to augment or substitute for silt fence. Excess stumps and other organic debris may need to be disposed of at a licensed facility.

Any general construction debris associated with the Project, including packing or transportation materials, will be disposed of at appropriately licensed disposal facilities. We anticipate that construction and demolition debris will be transported to KTI Biofuels of Lewiston, ME., where it will be transported to the Juniper Ridge Landfill in West Old Town, ME.

Residential waste will be collected by the City of Lewiston once occupancy permits are granted.

Lot Layout

The lots within the parcel were laid out to fit in with the natural topography of the site and to allow for sufficient buildable areas.

Landscaping

Significant efforts were made to preserve the site's natural features. Approximately 11 acres of naturally wooded Open Space area will be maintained at the rear of the site. Additionally, 10-foot wide vegetated buffers will be maintained and/or installed where the proposed development directly abuts existing residential use lots. These buffers are to be located near existing homes on Hogan Road, Seville Place, Amos Court and Stetson Road. The existing forested wetlands will not be disturbed except at road crossings. The site contains mature tree growth in all areas except for an existing meadow that located in the central portion of the site.

Shoreland Relationship

The property is not located along the shoreland of any water body. There are several small intermittent streams that will be protected by forested buffers.

Open Space

The subdivision will have 11 acres of common open space to provide for recreation areas to meet the needs of the residents. The open space will be owned by the Sanctuary Estates Homeowners Association and will remain forested. See Standards for Single Family Cluster Developments (below) for further details about the open space.

Technical and Financial Capacity

The applicant is an experienced developer and has hired Terradyn Consultants, LLC to assist with the permitting. Terradyn Consultants, LLC has designed many similar projects since being established in 2005. Terradyn was assisted by CADmaster Drafting, Land Surveying & Septic Designs (boundary survey & septic test pit evaluation) and Statewide Surveys, Inc. (high intensity soil survey & wetland delineation).

A cost estimate and proof of financial capacity can be found in the SLODA Section 3.

Buffering

A minimum 30-foot wide vegetated yard area will be maintained along the perimeter of the development parcel where lot are proposed. Additionally, much of the common open space is located along the perimeter of the project.

Compliance with District Regulations

This subdivision is located within the Suburban Residential (SR) district. All standards in the space and bulk table were met with the exception of lot size and setbacks which were reduced for single family cluster developments.

Design Consistent with Performance Standards

The design is consistent with the applicable standards set forth in Article XII which include:

Earth material removal standards
Erosion and sedimentation control
Environmental Performance Standards

Standards for Single-Family Cluster Developments

Sanctuary Estates meets all of the standards required for single-family cluster developments. Individual lot sizes and front setbacks were reduced to 50 percent of that required by the district requirements. Lot frontages were reduced to a minimum width of 50'.

The open space is required to be at least as big as the combination of the following:

- (From Article XIII – Section 7) Difference of the aggregate lot area (823,991 SF) and the aggregate required lot area outside of cluster subdivision regulations (40,000 SF x 31 Lots = 1,240,000 SF) = 416,009 SF
- (From Article XIII – Section 4.s.d) 1,000 SF for dwelling units with three or more rooms designed or used for sleeping: 31 lots x 1,000 SF = 31,000 SF
- The sum of the required area is 447,009 SF.
- The proposed open space is approximately 469,403 SF.
- 50% of the open space must be usable. The total area of non-wetlands in the open space is approximately 288,541 SF, which shows that 64.5% of the open space is usable.

The following information addresses the Development Review Standards of Section 5 of Article XIII of the Zoning & Land Use Code:

1. The project will not result in undue water or air pollution. Stormwater runoff will be directed to a variety of BMPs that will property filter the water. The stormwater design was developed to meet the City of Lewiston & Maine Department of Environmental Protection regulations (See SLODA Section 12). All lots will contain an individual private subsurface septic system. Test pit were evaluated for each lot that prove that septic systems can be properly designed & installed for each lot (See SLODA Section 17). The project is not located within any flood plain.

2. The project will connect to the public water supply system. The system has adequate capacity and pressure to serve the proposed development.

3. The project will not over burden the public water supply system. The system has adequate capacity and pressure to serve the proposed development.

4. The project will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water so that a dangerous or unhealthy condition may result. A detailed erosion control plan has been developed for the project (See SLODA Section 14 & construction plans). A Class A High Intensity Soil Survey was completed for the project (See SLODA Section 11) to verify soil types. Stormwater velocities were then calculated to ensure that proper stabilization measures were used (See SLODA Section 12).

5. The project will not cause unreasonable highway or public road congestion or unsafe conditions with respect to use of the highways or public roads, existing or proposed. All new roads were designed to meet the City of Lewiston standards. The main entrance is located directly across from Lemay Avenue and contains sufficient sight distance. The number of projected trips will not impact the level of service of the surrounding road network.

6. The project will provide for adequate sewage waste disposal. Each lot contains at least one passing soil test pit that shows that a private subsurface septic system can be constructed that would meet State requirements (See SLODA Section 17).

7. The project will not cause an unreasonable burden on the ability of the municipality to dispose of solid waste and sewage. The development will not connect to the City sewer system. Construction debris will be brought to a licensed facility. The creation of 31 new residential lots does not represent a significant increase to the City of Lewiston's solid waste collection program.

8. The project will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic or rare and irreplaceable natural areas or any public rights for physical or visual access to the shoreline. The site is not located near any historic property (See SLODA Section 8), does not contain any unusual natural area (See SLODA Section 9) and is not located along any shoreline. The project features approximately 11 acres of common open space. Perimeter buffers will are located around the outer edges of the project and will help maintain the scenic and natural beauty of the site.

9. The project is in conformance with the City code and comprehensive plan. The project meets all codes and is located within a designated residential growth area.

10. The subdivider has adequate technical and financial capacity. The subdivider is an experienced developer (See SLODA Section 3) and has provided proof of financial capacity (See SLODA Section 3).

11. The project is not located within 250' of any pond, lake, river or tidal water so this section is not applicable.

12. The project will not, alone or in conjunction with existing activities, adversely affect the quality or quantity of groundwater. The project's stormwater design makes use of several infiltration measures that are meant to keep stormwater spread out in an effort to recharge groundwater (See SLODA Section 12). The project will be using the municipal water system, so localized groundwater quantity will not be impacted. Each lot will have

a private subsurface septic system that will be able to meet State standards (See SLODA Section 17).

13. The project is not located within any flood plain so this section is not applicable.
14. The project will not interfere unreasonably with the solar access of existing buildings or adjacent parcels. The project is a residential subdivision so it will have no impact to solar access of abutting parcels or existing buildings.

A Maine DEP Site Location of Development Act (SLODA) Permit is required for this project. That permit application contains 25 Section and can be found in the attached Sanctuary Estates SLODA Application. The sections are as follows:

1. Development Description
2. Right, Title & Interest (including property deeds)
3. Financial Capacity (including construction cost estimate & proof of financial capacity)
4. Technical Ability
5. Noise
6. Visual Quality
7. Wildlife & Fishieries
8. Historic Sites
9. Unusual Natural Areas
10. Buffers
11. Soils
12. Stormwater Management
13. Urban Impaired Streams (n/a)
14. Basic Standards (Erosion Control)
15. Groundwater
16. Water Supply
17. Wastewater Disposal
18. Solid Waste
19. Flooding
20. Blasting
21. Air Emissions
22. Odors
23. Water Vapor (n/a)
24. Sunlight (n/a)
25. Notices (including abutter list)

The following items are attached to this submittal:

- Development Review & SLODA Application Fee ($3,550 & $1,000)
- Development Review Application & Checklist
- Comment Response Letter & Attachments
- Draft Association Documents
- Preliminary Construction Plan Set
- Existing Conditions Plan
- MDEP Site Location of Development Application & required attachments

We are hopeful that you will review the enclosed plans & materials and provide comments so that we may proceed to the planning board at the earliest convenience. Thank you for your consideration, and please call me if you have any questions as you review the enclosed plans and information.

Sincerely,

Terradyn Consultants, LLC

Jeffrey D. Amos, P.E.

Development Review Application

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

PROJECT NAME: Sanctuary Estates

PROPOSED DEVELOPMENT ADDRESS: Hogan Road, Lewiston, Maine

PARCEL ID#:

REVIEW TYPE: **Site Plan/Special Exception** ☐ **Site Plan Amendment** ☐
Subdivision ☒ **Subdivision Amendment** ☐

PROJECT DESCRIPTION: 31-Lot Single Family Housing Development on an Undeveloped 33.2 Acre Parcel

CONTACT INFORMATION:

Applicant	
Name:	Chase Custom Homes & Finance
Address:	290 Bridgton Rd, Westbrook, ME
Zip Code	04092
Work #:	(207) 892-2700
Cell #:	
Fax #:	
Home #:	
Email:	jchase@cchfi.com

Property Owner	
Name:	Same as applicant
Address:	
Zip Code	
Work #:	
Cell #:	
Fax #:	
Home #:	
Email:	

Project Representative	
Name:	Jeff Amos, P.E., c/o Terradyn Consultants, LLC
Address:	P.O. Box 339, New Gloucester, ME
Zip Code	04260
Work #:	207-926-5111
Cell #:	207-272-7571
Fax #:	
Home #:	
Email:	jeff@terradynconsultants.com

Other professional representatives for the project (surveyors, engineers, etc.),	
Name:	
Address:	
Zip Code	
Work #:	
Cell #:	
Fax #:	
Home #:	
Email:	

PROJECT DATA

The following information is required where applicable, in order to complete the application

IMPERVIOUS SURFACE AREA/RATIO

Existing Total Impervious Area	0	sq. ft.
Proposed Total Paved Area	88,947	sq. ft.
Proposed Total Impervious Area	5.27 Acres (incl. lots)	~~sq. ft.~~
Proposed Impervious Net Change	5.27 Acres (incl. lots)	~~sq. ft.~~
Impervious surface ratio existing	0	% of lot area
Impervious surface ratio proposed	14.9	% of lot area

BUILDING AREA/LOT COVERAGE

Existing Building Footprint	0	sq. ft.
Proposed Building Footprint	n/a	sq. ft.
Proposed Building Footprint Net change	n/a	sq. ft.
Existing Total Building Floor Area	0	sq. ft.
Proposed Total Building Floor Area	n/a	sq. ft.
Proposed Building Floor Area Net Change	n/a	sq. ft
New Building	n/a	(yes or no)
Building Area/Lot coverage existing	0	% of lot area
Building Area/Lot coverage proposed	n/a	% of lot area

ZONING

Existing	Suburban Residential
Proposed, if applicable	

LAND USE

Existing	
Proposed	Cluster Subdivision

RESIDENTIAL, IF APPLICABLE

Existing Number of Residential Units	0
Proposed Number of Residential Units	31
Subdivision, Proposed Number of Lots	31

PARKING SPACES

Existing Number of Parking Spaces	n/a
Proposed Number of Parking Spaces	n/a
Required Number of Parking Spaces	n/a
Number of Handicapped Parking Spaces	n/a

ESTIMATED COST OF PROJECT

$920,000

DELEGATED REVIEW AUTHORITY CHECKLIST

SITE LOCATION OF DEVELOPMENT AND STORMWATER MANAGEMENT

Existing Impervious Area	0	sq. ft.
Proposed Disturbed Area	15.62 Acres	~~sq. ft.~~
Proposed Impervious Area	5.27 Acres	~~sq. ft.~~

1. ***If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with MDEP.***
2. ***If the proposed impervious area is greater than one acre including any impervious area crated since 11/16/05, then the applicant shall apply for a MDEP Stormwater Management Permit, Chapter 500, with the City.***
3. ***If total impervious area (including structures, pavement, etc) is greater than 3 acres since 1971 but less than 7 acres, then the applicant shall apply for a Site Location of Development Permit with the City. If more than 7 acres then the application shall be made to MDEP unless determined otherwise.***
4. ***If the development is a subdivision of more than 20 acres but less than 100 acres then the applicant shall apply for a Site Location of Development Permit with the City. If more than 100 acres then the application shall be made to MDEP unless determined otherwise.***

TRAFFIC ESTIMATE

Total traffic estimated in the peak hour-existing (Since July 1, 1997) 0 passenger car equivalents (PCE)

Total traffic estimated in the peak hour-proposed (Since July 1, 1997) 32 passenger car equivalents (PCE)

If the proposed increase in traffic exceeds 100 one-way trips in the peak hour then a traffic movement permit will be required.

Zoning Summary

1. Property is located in the Suburban Residential zoning district.
2. Parcel Area: 33.2 acres / _____ square feet(sf).

Regulations	Required/Allowed	Provided
Min Lot Area	20,000 sf	20,000 sf
Street Frontage	50 ft	50 ft
Min Front Yard	12.5 ft	12.5 ft
Min Rear Yard	5 ft	5 ft
Min Side Yard	5 ft	5 ft
Max. Building Height	35 ft	35 ft
Use Designation		
Parking Requirement	1 space/ per_____ square feet of floor area	
Total Parking:		
Overlay zoning districts (if any):		
Urban impaired stream watershed?	YES/NO If yes, watershed name NO	

DEVELOPMENT REVIEW APPLICATION SUBMISSION

Submission shall include payment of fee and fifteen (15) complete packets containing the following materials:

1. Full size plans containing the information found in the attached sample plan checklist.
2. Application form that is completed and signed.
3. Cover letter stating the nature of the project.
4. All written submittals including evidence of right, title and interest.
5. Copy of the checklist completed for the proposal listing the material contained in the submitted application.

Refer to the application checklist for a detailed list of submittal requirements.

L/A's development review process and requirements have been made similar for convenience and to encourage development. Each Citys ordinances are available online at their prospective websites:
Auburn: www.auburnmaine.org under City Departments/ Planning and Permitting/Land Use Division/Zoning Ordinance
Lewiston: http://www.ci.lewiston.me.us/clerk/ordinances.htm Refer to Appendix A of the Code of Ordinances

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, I certify that the City's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for development review only; a Performance Guarantee, Inspection Fee, Building Permit Application and other associated fees and permits will be required prior to construction.

Signature of Applicant:	**Date:** 12/19/2017

Development Review Checklist

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

THE FOLLOWING INFORMATION IS REQUIRED WHERE APPLICABLE TO BE SUBMITTED FOR AN APPLICATION TO BE COMPLETE

PROJECT NAME: Sanctuary Estates

PROPOSED DEVELOPMENT ADDRESS and PARCEL #: Hogan Road

Required Information		Check Submitted		Applicable Ordinance	
Site Plan		**Applicant**	**Staff**	**Lewiston**	**Auburn**
	Owner's Names/Address	X			
	Names of Development	X			
	Professionally Prepared Plan	X			
	Tax Map or Street/Parcel Number	X			
	Zoning of Property	X			
	Distance to Property Lines	X			
	Boundaries of Abutting land	X			
	Show Setbacks, Yards and Buffers	X			
	Airport Area of Influence (Auburn only)				
	Parking Space Calcs	n/a			
	Drive Openings/Locations	X			
	Subdivision Restrictions	X			
	Proposed Use	X			
	PB/BOA/Other Restrictions	X			
	Fire Department Review	X			
	Open Space/Lot Coverage	X			
	Lot Layout (Lewiston only)	X			
	Existing Building (s)	X			
	Existing Streets, etc.	X			
	Existing Driveways, etc.	X			
	Proposed Building(s)	n/a			
	Proposed Driveways	n/a			
Landscape Plan					
	Greenspace Requirements	n/a			
	Setbacks to Parking	n/a			
	Buffer Requirements	X			
	Street Tree Requirements	X			
	Screened Dumpsters	n/a			
	Additional Design Guidelines	n/a			

	Planting Schedule	n/a			
Stormwater & Erosion Control Plan					
	Compliance w/ chapter 500	X			
	Show Existing Surface Drainage	X			
	Direction of Flow	X			
	Location of Catch Basins, etc.	X			
	Drainage Calculations	X			
	Erosion Control Measures	X			
	Maine Construction General Permit	X			
	Bonding and Inspection Fees	--			
	Post-Construction Stormwater Plan	X			
	Inspection/monitoring requirements	X			
	Third Party Inspections (Lewiston only)	X			
Lighting Plan					
	Full cut-off fixtures	n/a			
	Meets Parking Lot Requirements	n/a			
Traffic Information					
	Access Management	X			
	Signage	X			
	PCE - Trips in Peak Hour	X			
	Vehicular Movements	X			
	Safety Concerns	X			
	Pedestrian Circulation	X			
	Police Traffic	X			
	Engineering Traffic	X			
Utility Plan					
	Water	X			
	Adequacy of Water Supply	--			
	Water main extension agreement	--			
	Sewer	n/a			
	Available city capacity	n/a			
	Electric	X			
	Natural Gas	--			
	Cable/Phone	X			
Natural Resources					
	Shoreland Zone	n/a			
	Flood Plain	n/a			
	Wetlands or Streams	X			
	Urban Impaired Stream	n/a			
	Phosphorus Check	n/a			
	Aquifer/Groundwater Protection	n/a			
	Applicable State Permits	X			
	No Name Pond Watershed (Lewiston only)	n/a			

	Lake Auburn Watershed (Auburn only)	n/a			
	Taylor Pond Watershed (Auburn only)	n/a			
Right Title or Interest					
	Verify	X			
	Document Existing Easements, Covenants, etc.	X			
Technical & Financial Capacity					
	Cost Est./Financial Capacity	--			
	Performance Guarantee	--			
State Subdivision Law		--			
	Verify/Check	X			
	Covenants/Deed Restrictions	--			
	Offers of Conveyance to City	n/a			
	Association Documents	--			
	Location of Proposed Streets & Sidewalks	X			
	Proposed Lot Lines, etc.	X			
	Data to Determine Lots, etc.	X			
	Subdivision Lots/Blocks	X			
	Specified Dedication of Land	X			
Additional Subdivision Standards					
	Single-Family Cluster (Lewiston only)	X			
	Multi-Unit Residential Development (Lewiston only)	n/a			
	Mobile Home Parks	n/a			
	Private Commercial or Industrial Subdivisions (Lewiston only)	n/a			
	PUD (Auburn only)	n/a			
A jpeg or pdf of the proposed site plan		X			
Final sets of the approved plans shall be submitted digitally to the City, on a CD or DVD, in AutoCAD format R 14 or greater, along with PDF images of the plans for archiving		--			

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March 27, 2018

David Hediger, City Planner
City of Lewiston
27 Pine Street
Lewiston, ME 04240-7201

Comment Response: Sanctuary Estates– Hogan Road

We are pleased to provide additional information in regard to the Sanctuary Estates project. We have listed your comment followed by a response shown in *italics.*

Planning & Code Enforcement Comments

1. Prior to the streets acceptance:
    a. Evidence of a final inspection of the storm water system shall be provided to the city by the designing engineer along with a written statement indicating that the storm water system has been completed in accordance with the approved plans.

    Response: Comment acknowledged.

2. Cover sheet needs a signature block for the Planning Board's approval.

    Response: A signature block has been added to the cover sheet.

3. Note must be added to the cover sheet that referencing the plans expiration of approval: see Article XIII, Section 11(a)(1).

    Response: See Note #1 on the Cover Sheet.

4. Page 3, declaration of covenants: there is a typo with respect to the underground utility easements.

    Response: The typographic error has been corrected.

5. T-turns/hammerheads may be reduced to 50' in length from center line, if desired.

    Response: The hammerhead turnarounds have been reduced to 50' from center line, as allowed. They've been re-dimensioned on the site plans.

6. Plans show a 10' buffer around the perimeter of the development. SR district space and bulk requires specific yard and setbacks for the entire perimeter of the subdivision from abutting properties. See Article XI, Section 23 and amend plan accordingly.

Response: We've updated the perimeter setbacks & yards. The 10' buffer has been removed.

7. Open space on the plans must be labeled as "reserved for recreation and/or conservation purposes". See Article XIII, Section 4(s)(4).

   Response: The open space areas have been labeled as requested on the subdivision plans.

8. Cluster provisions require open space to be the responsibility of homeowners association. See Article XIII, Section 7(c)(8). This should be noted on the plan.

   Response: See Note #10 on C-1.0 for the requested note.

9. Documentation related to financial capacity needed. See Article XIII, Section 4(t).

   Response: See Section 3 – Financial Capacity for letter from Machias Savings Bank.

10. Need a letter signed by owner, acknowledging agent of project, etc.

    Response: See attached agent authorization letter.

11. Plans being recorded should make note that this is a cluster subdivision and specifically note the reductions in setbacks, etc. pursuant to Article XIII, Section 7 of the Zoning and Land Use Code. The note should make it clear as to what and why there are reductions in space and bulk standards.

    Response: We've updated Note #6 on C-1.0 to provide this information.

12. Applicant should familiarize themselves with the requirements of Article XIII, Section 12 and be aware of the performance guarantee/conditional agreement requirements with respect to the sale of lots and/or acceptance of the streets.

    Response: Comment acknowledged.

13. Please clarify construction schedule of stormwater improvements. For example, lots 27-30: rip-rap swale. This should be completed prior to the lots being sold or building permits issued. Similar concerns with lots 7 and 21.

    Response: We've clarified the schedule for all perimeter swales on the grading plans. The swale will need to be constructed prior construction activities starting on Lots 7 & 27-30. Level Spreader #4 will need to be constructed prior to construction activities starting on Lot #21.

14. Proposed street name of Moody Road will not be allowed as that street name already exists. Please amend.

Response: Moody Road has been renamed Terina's Way.

15. Plan set must include survey plan.

Response: The survey is included within the plan set.

Public Works Comments

Policy for Design and Construction of Streets and Sidewalks:

1. Section 2.02 – Erosion Control a. Erosion Control matting is required along the edge of roadway.

Response: Erosion control matting is now shown on the typical road cross section.

2. Section 2.03 – Stormdrains

a. Underdrain should be added to the areas where curb is installed or where the roadway gravels are not daylighted in the ditch section.

Response: Underdrain has been added to Chase Lane from the beginning to Station 3+00 along the right edge of the roadway and from the beginning to Station 1+00 along the left edge of the same section of road. This is noted on Sheet C-3.0. All other curbed section daylight.

b. The material types are not listed on the plans; the City uses ADS Sanitite for Stormdrain and ADS N-12 for underdrain.

Response: See note #12 on Sheet C-3.0.

c. Pipe bedding and backfill for stormdrain shall be ¾" crushed stone to 8" above the pipe.

Response: See typical underdrain section on Sheet C-6.3.

3. Section 2.05 – Water Supply

a. The City will complete the tap on the existing watermain in Hogan Road the contractor will be responsible for excavating the trench, shoring the excavation, and installing the sleeve on the main.

Response: See Note#5 of the Waterline Installation Notes on Sheet C-4.0.

b. All water materials that will be installed in the existing right of way and future right of way shall be purchased through the City.

Response: See Note#6 of the Waterline Installation Notes on Sheet C-4.0.

c. The 8" main shall be ductile iron and the services shall be copper to the curb stop.

Response: See Typical Water Service Connection on Sheet C-6.3.

d. Hydrants will be required at the three dead ends of the mains, the 2" blow off located at the intersection of Moody and Hallee can remain for use as an air release.

Response: Hydrants have been placed at the requested locations.

e. New mains require pressure testing, chlorination and bacteriological testing prior to use. This can be tested either through the City or contracted out depending upon schedule and City work load fees associated for the City crews will be billed on an hourly basis.

Response: Comment acknowledged.

4. Section 2.06 - Street Lighting

a. One additional street light will be required on the curve on Chase Lane in the vicinity of STA 6+00, preferably located on the inside of the curve.

Response: At street light has been added at the requested location.

5. Section 3.02 – Minimum Geometric Requirements

a. The two foot shoulders required for the Public Street shall be paved; several notes on the plans indicate they are gravel.

Response: Plans have been corrected to note the paved shoulder.

6. Section 3.03 – Grades, Intersections, Access, and Sight Distance

a. Will adequate sight distance exist at the proposed intersections within the development?

Response: Sight distance exceeds ordinance requirements at all internal intersections due to both the alignment and the clearing that will result in the construction of the road-side ditches.

b. Have the driveways for the proposed lots been reviewed for sight distance?

Response: We believe that the expected sight distance exceeds ordinance requirements for all driveways.

7. Section 4.04 – Monuments

a. Concrete Monuments are required for the project at each angle point and point of tangency.

Response: Monuments are now shown at the required locations.

8. Preconstruction/Prepave Meeting

a. Prior to the start of construction a Precon/Prepave will be required, this will be coordinated through the City Engineer. At that meeting the steps involved in street acceptance can be reviewed.

Response: Comment acknowledged

Plans:

9. Sheet C-4.0 Utility Plan

a. Polyethylene Encasement is not required in the City Standards unless corrosive soils are known to be present.

Response: We've updated Note #2 on C-4.0 to reflect this information.

10. Sheet C-4.1 Utility Plan

a. The blow off located at STA 0+60 on Moody Lane may remain as an air release; the remaining blowoffs in the development will need to be replaced with Hydrants.

Response: Hydrants have been added at the requested locations.

11. Sheets C-4.0 to C4.2

a. The limits of the ditching and stormdrain piping needs to be in the right of way or a drainage easement needs to be established for future maintenance of the ditches and stormdrain.

Response: drainage easements have been added to the subdivision plan.

b. Electrical and Telecom conduit crossings of the proposed streets for services will require easements for the portion within the right of way.

Response: Easements have been added to the subdivision plans.

12. Sheets C-5.0 to 5.2

a. 2" rigid insulation should be added to the plans in areas where stormdrains cross the watermain.

Response: Rigid insulation has been added to the plans in the appropriate locations. Also see note #7 of the Waterline Installation Notes on C-4.0.

13. Sheet C-6.1 Details

a. Catchbasin Detail-Curb Inlet Detail – The City requires snouts on all outlet pipes less than 18", the frame and grates shall be cascade style.

Response: Catch Basin Detail has been updated as requested. We've also added a snout detail to C-6.3.

b. Additional details should be added for:

i. Underdrain
ii. Drainage Manholes
iii. Air Releases
iv. Watermain Trench Detail
v. Water Service Trench Detail
vi. Conduit detail

Response: The requested details have been added.

14. Sheet C-6.2 Details

a. Tee & Bend Detail – LPW utilizes precast concrete thrust blocks not cast in place.

Response: The detail has been revised as requested.

Stormwater:

15. Maintenance Plan of Stormwater Management Facilities

a. List of Stormwater Measures – Stormwater Impoundment #1 and Level Spreaders should be added to the list.

Response: Stormwater Impoundments & Level Spreaders have been added to the maintenance plan.

16. Hydrocad Calculations

a. The 10 year storm calculations were not provided for the post condition.

Response: 10 Year storm calculations are attached.

b. The 25 year storm calculations provided do not provide for one foot of freeboard in the ponds. The 100 year storm calculations include the outlet

Response: We've provided 1' of freeboard in all ponds and have removed the outlet for the 100 year calculations.

Volume III-BMP Technical Design Manual:

17. Chapter 3 – Detention Basins for Flooding Control

a. Access – A maintenance access should be shown to access the detention basin and the level lip spreader.

Response: Access has been provided to the detention basin/level spreader combination. The maintenance of these bmp's should be limited to a small equipment or direct manpower.

b. Sediment Pretreatment - The rip rap apron at the inlet of the pond should be constructed as a sediment forbay sized to handle the sediment loading for the tributary area.

Response: The total area of roads & driveways in the pond watershed is estimated conservatively at 1.2 acres. Based upon MDEP methodology, that would require a sump of 67 cf (10 storms x 1.2 Acres x 500 lbs/acre-storm / 90 lbs/cf). The sump is specified to be a minimum of 6" deep and has an area of 220 sf and a volume of 110 cf. The sump is approximately size.

c. Embankments – The plan view for the pond indicates a 3' wide berm at an elevation of 266.75, the detail indicates a 6' berm with an elevation of 266.50 (elevation 266.50 does not provide one foot of free board in the 25-year spillway calculations).

Response: The berm elevation is 266.75 and has been clarified on the plans. 1 foot of freeboard is provided.

d. Emergency Spillway – The 25 year storm calculations provided do not provide for one foot of freeboard in the pond (depending on which elevation in c. is correct). The 100 year storm calculations include the outlet control structure and should be revised to include only the emergency spillway.

Response: See our answer above. The 100 year calculations have been revised as requested for all ponds.

18. Chapter 5 – Vegetated Buffers

a. Deed Restrictions or Covenants - Deed restrictions should be placed on those lots with designated buffers to insure that they are maintained as intended, if they are located in open space it should be included in the covenants.

Response: Comment acknowledged. We have attached the deed restriction language in Section 12 of the Site Location Application. We've also attached it to this response letter for ease of review.. We will be using the suggested language that is included with Chapter 500.

19. Chapter 7.1 – Grassed Underdrain Soil Filters

a. Separation from Seasonal High Water Table -The plans indicate that a test pit was completed at this location, if the seasonal water table is within 18" of the bottom of the filter basin an impermeable liner should be added.

Response: A 30 MIL impermeable PVC liner has been added to the pond cross section.

b. Sediment Pretreatment - Has the sediment forebay been sized to handle the annual sediment load for the area tributary to the filter basin?

Response: The total area of roads & driveways in the pond watershed is estimated conservatively at 0.8 acres. Based upon MDEP methodology, that would require a sump of 46 cf (10 storms x Area x 500 lbs/acre-storm / 90 lbs/cf). The sump is specified to be a minimum of 6" deep and has an area of 170 sf and a volume of 85 cf. The sump is approximately double the minimum size.

c. Underdrain Pipe - Is the underdrain pipe 4" or 6"? The pipe is labeled as 4" but the cleanouts are 6"? The BMP recommends that these be a rigid underdrain pipe (PVC SCH 40 or SDR 35) the note on the plans would allow for HDPE.

Response: The underdrain has been specified as 6" PVC SCH 40 or SDR 35.

d. The 25 year storm calculations provided do not provide for one foot of freeboard in the pond. The 100 year storm calculations include the outlet control structure and should be revised to include only the emergency spillway.

Response: We've raised the berm elevation to 290.60 and now have 1.06' of freeboard in the 25 year storm event.

20. Chapter 7.4 – Gravel Wetlands (Gravel Wetland #1)

a. Storage for Quantity Control – The BMP does not recommend a ponding elevation in excess of three feet, the water level in the 25 year storm is 3.41 feet.

Response: We've increased the size of the pond to reduce the ponding elevation to just below 3' in the 25 year storm event.

b. Emergency Spillway - The 100 year storm calculations include the outlet control structure and should be revised to include only the emergency spillway.

Response: See attached calculations.

c. Based on the grading provided it appears that the emergency spillway will sheet flow to the street, a low area will need to be created and the water will need to be piped to the catchbasin.

Response: We've added a low area to the plan & have added an outlet pipe as suggested.

d. The plan view, cross section, and details have different elevation for the top of the berms and spillways (internal and emergency) the plans should be reviewed and the correct elevations labeled to insure it is built correctly.

Response: The plan view, cross section & details have been corrected.

21. Chapter 7.4 – Gravel Wetlands (Gravel Wetland #2)

a. Access - The access road should be constructed 10' wide with a maximum grade of 15%.

Response: We've graded the 10' wide pond access to be 11% over the first 6' before transitioning to 15%. The driveway now meets MDOT driveway entrance standards. See C-6.4 for detailed grading.

b. Emergency Spillway - The 25 year storm calculations provided do not provide for one foot of freeboard in the pond. The 100 year storm calculations include the outlet control structure and should be revised to include only the emergency spillway.

Response: We raised the berm by 0.1' to provide the necessary 1' of freeboard.

c. The plan view, cross section, and details have different elevation for the top of the berms and spillways (internal and emergency) the plans should be reviewed and the correct elevations labeled to insure it is built correctly.

Response: We updated the elevations on the spillway cross section. It also should be noted that there is a primary flow channel (spillway) on the internal berms that is 6" below the berm elevation. This detail was requested by MDEP on our last two gravel wetland designs.

22. Chapter 7.5 – Roof Dripline Filters

a. Treatment Storage – The BMP Technical Design Manual recommends a maximum depth of the reservoir layer of 12", the plans indicate an 18" depth.

Response: The BMP detail is not very clear. I don't believe that a maximum depth of 12" is a requirement. There is an example of how to size the treatment storage on the BMP detail page. It states: (For example, a 30 foot wide roof panels will need a 4 foot wide by 1.5 deep rock storage bed.). MDEP has reviewed several of our projects that use this bmp and have approved reservoir courses greater than 12" each time.

b. Filter Sizing - The BMP recommends sizing for the 24-hour 25 year storm or providing for an overflow, has the drainage layer been sized for the 25 year storm, if not a detail should be added showing the appropriate overflow.

Response: The filter has not been sized for the 25 year storm. The roof areas are included within the areas routed to the stormwater ponds. We've updated the detail on C-6.4 to show how the site should grade away from the filter area.

23. All the stormwater BMP listed above shall be maintained in accordance with the appropriate BMP. The homeowner's association will be responsible for all maintenance associated with these facilities.

Response: Comment acknowledged. The updated Maintenance of Stormwater Facilities will be attached to the final association documents.

The following items are attached:

- Agent Authorization Letter
- Sample Forested Buffer Deed Restriction Language

Prepared by,
Terradyn Consultants, LLC

Jeffrey D. Amos, P.E.

March 27, 2018

David Hediger, City Planner
City of Lewiston
27 Pine Stret
Lewiston, ME 04240-7201

Agent Authorization: Sanctuary Estates

David,

I hereby authorize Jeff Amos & Terradyn Consultants, LLC to act as my agent for the Sanctuary Estates subdivision project. I give him/them permission to represent our interests on this project.

Sincerely,

John Chase
Chase Custom Homes & Finance

APPENDIX G. Suggested templates for deed restrictions and conservation easements for use under the Stormwater Management Law

1. Forested buffer, limited disturbance

DECLARATION OF RESTRICTIONS (Forested Buffer, Limited Disturbance)

THIS DECLARATION OF RESTRICTIONS is made this _____day of _____, 20___,
by _____ , _____,
(name) (street address)
_____, _____County, Maine, _____, (herein referred to as the
(city or town) (county) (zip code)
"Declarant"), pursuant to a permit received from the Maine Department of Environmental Protection under the Stormwater Management Law, to preserve a buffer area on a parcel of land near
_____,_____ .
(road name) (known feature and/or town)

WHEREAS, the Declarant holds title to certain real property situated in _____, Maine
(town)
described in a deed from_____ to _____dated
(name) (name of Declarant)
_____, 20____, and recorded in Book ____ Page ____ at the _____County Registry of Deeds, herein referred to as the "property"; and

WHEREAS, Declarant desires to place certain restrictions, under the terms and conditions herein, over a portion of said real property (hereinafter referred to as the "Restricted Buffer") described as follows: (Note: Insert description of restricted buffer area location here)

WHEREAS, pursuant to the Stormwater Management Law, 38 M.R.S. Section 420-D and Chapter 500 of rules promulgated by the Maine Board of Environmental Protection ("Stormwater Management Rules"), Declarant has agreed to impose certain restrictions on the Restricted Buffer Area as more particularly set forth herein and has agreed that these restrictions may be enforced by the Maine Department of Environmental Protection or any successor (hereinafter the "MDEP"),

NOW, THEREFORE, the Declarant hereby declares that the Restricted Buffer Area is and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth herein. The Restrictions shall run with the Restricted Buffer Area and shall be binding on all parties having any right, title or interest in and to the Restricted Buffer Area, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Restricted Buffer Area or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Covenant Area or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Restricted Buffer Area subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1. **Restrictions on Restricted Buffer Area**. Unless the owner of the Restricted Buffer Area, or any successors or assigns, obtains the prior written approval of the MDEP, the Restricted Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Restricted Buffer Area to filter and absorb stormwater, and to maintain compliance with the Stormwater Management Law and the permit issued thereunder to the Declarant, the use of the Restricted Buffer Area is hereinafter limited as follows.

   a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Restricted Buffer Area, nor may the topography of the area be altered or manipulated in any way;

   b. Any removal of trees or other vegetation within the Restricted Buffer Area must be limited to the following:

      (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees" is defined as maintaining a minimum rating score of 24 points in any 25 foot by 50 foot rectangle (1,250 square feet) area, as determined by the rating scheme in Table 11:

Table 11.
Point System for Determining an Evenly Distributed Stand of Trees

Diameter of tree at 4½ feet above ground level	Points
2 - 4 inches	1
4 - 8 inches	2
8 - 12 inches	4
>12 inches	8

      Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, windblown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

      (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;

   c. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole (whether constructed of wood, steel or other materials) and appurtenant equipment such as guys and guy anchors, or fence;

   d. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

   e. Any level lip spreader directing flow to the Restricted Buffer Area must be regularly inspected and adequately maintained to preserve the function of the level spreader.

Any activity on or use of the Restricted Buffer Area inconsistent with the purpose of these Restrictions is prohibited. Any future alterations or changes in use of the Restricted Buffer Area must receive prior approval in writing from the MDEP. The MDEP may approve such alterations and changes in use if such alterations and uses do not impede the stormwater control and treatment capability of the Restricted Buffer Area or if adequate and appropriate alternative means of stormwater control and treatment are provided.

2. **Enforcement**. The MDEP may enforce any of the Restrictions set forth in Section 1 above.

3. **Binding Effect**. The restrictions set forth herein shall be binding on any present or future owner of the Restricted Buffer Area. If the Restricted Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Restricted Buffer Area is included within such owner's property.

4. **Amendment**. Any provision contained in this Declaration may be amended or revoked only by the recording of a written instrument or instruments specifying the amendment or the revocation signed by the owner or owners of the Restricted Buffer Area and by the MDEP.

5. **Effective Provisions of Declaration**. Each provision of this Declaration, and any agreement, promise, covenant and undertaking to comply with each provision of this Declaration, shall be deemed a land use restriction running with the land as a burden and upon the title to the Restricted Buffer Area.

6. **Severability**. Invalidity or unenforceability of any provision of this Declaration in whole or in part shall not affect the validity or enforceability of any other provision or any valid and enforceable part of a provision of this Declaration.

7. **Governing Law**. This Declaration shall be governed by and interpreted in accordance with the laws of the State of Maine.

_____
(NAME)

STATE OF MAINE_____ County, _____, 20__.
(County) (date)

Personally appeared before me the above named _____, who swore to the truth of the foregoing to the best of (his/her) knowledge, information and belief and acknowledged the foregoing instrument to be (his/her) free act and deed.

_____
Notary Public

_____

DECLARATION OF PROTECTIVE COVENANTS, RESERVATIONS, RESTRICTIONS AND EASEMENTS OF SANCTUARY ESTATES SUBDIVISION

WITNESS THIS DECLARATION OF PROTECTIVE COVENANTS, RESERVATIONS, RESTRICTIONS AND COMMON EASEMENTS, made this _____ .day of _____, 2018, by **CHASE CUSTOM HOMES & FINANCE, INC.,** a Maine Corporation, with principal place of business at 290 Bridgton Road, Westbrook, Maine, hereinafter referred to as "Declarant".

WHEREAS, Declarant has acquired a certain lot or parcel of land situated in the City of Lewiston, County of Androscoggin and the State of Maine, by virtue of a deed recorded in the Androscoggin County Registry of Deeds in Book 9503, Page 150; and

WHEREAS, Declarant is in the business of developing and selling real estate situated in said City of Lewiston, which is the above-referenced land acquired by said deed which development is known as Sanctuary Estates Subdivision, and is more particularly described in a Plan entitled "Final Subdivision Plan of Sanctuary Estates, Hogan Road, Lewiston, Maine, for Chase Custom Homes & Finance, Inc. prepared by Terradyn Consultants, LLC dated _____ as approved by the City of Lewiston Planning Board on _____ and recorded in the Androscoggin County Registry of Deeds in Plan Book _____, Page _____, (hereinafter collectively referred to as the "Subdivision"); and

WHEREAS, Declarant desires to provide for the improvement of the Subdivision in accordance with a harmonious plan for the relative location of residential structures, garages, rights-of way easements, roads, common areas, and general land use, all to assure the purchasers of lots in the Subdivision, their heirs and assign, owning such lots, that the use benefit and enjoyment of the individual lots, common amenities, facilities, easements and roads will not conflict with the harmonious plan: and

WHEREAS, The Declarant desires to create a residential area of the subdivision providing for the greatest possible degree of health, safety, environmental beauty, and amenity for the property owners and inhabitants thereof, and to effect the foregoing purposes, desires to subject the property to protective covenants and common easements and to the provision for a homeowners association for the administration and enforcement of same, the maintenance and improvement of certain common facilities, and the establishment, collection and disbursement of assessments, all as set forth hereinafter, each and all of which are for the benefit of the property and of each lot subject to the protective covenants and casements hereinafter set forth, maintaining and improving certain rights of way and other common facilities, and otherwise carrying out the functions of a homeowners association and the provisions and objectives of this Declaration.

NOW, THEREFORE, Declarant hereby declares that the property shall be held, occupied, improved, transferred, sold, leased and conveyed subject to the protective covenants and restrictions, the reservations and exceptions, the common rights and casements, and the

provisions of a homeowners association hereinafter set forth, all of which are declared to be in furtherance of a uniform scheme for the development of the property and that said protective covenants, reservations, common easements, and provisions for a homeowners association are intended to enhance and protect the value and desirability of the property as a whole, to mutually benefit each of the parcels located thereon, to create mutual equitable servitudes upon each of the parcels in favor for each and all other parcels therein and to create reciprocal rights and privities of contract and estate between all persons acquiring or owning any interest in any portion of the property including Declarant, and Declarant's grantees, successors, administrators, and assign and shall be deemed to run with the land and be a burden and benefit to and enforceable by all such persons, including Declarant, and Declarant's grantees, successors, administrators, and assigns, and by the homeowners association.

ARTICLE I
Definitions

The following words, shall, as used herein, have the following meanings, unless the context plainly requires otherwise:

Road. All roads and ways as shown on the Subdivision Plan.

Association. The homeowners association named "Sanctuary Estates Homeowners Association", which Declarant shall organize as a nonprofit corporation for the purpose of administering and enforcing the protective covenants and easements hereinafter set forth, maintaining and improving certain rights of way and other common facilities, and otherwise carrying out the functions of homeowners association and the provisions and objectives of this Declaration. Absent the creation of such Association, the lot owners shall have all powers hereunder granted to the Association.

Declarant. Chase Custom Homes & Finance Inc., as aforesaid, and any successor to all of Declarant's rights, title and interest in and to the property.

Owner. The record owners, whether one or more persons or entities, of the fee simple title lo any parcel, but not including Declarant.

Lot or Parcel. Any one of the numbered lots within the property as shown upon the Plan, which may hereafter by conveyed by Declarant.

Plan. That Plan labeled "Final Subdivision Plan of Sanctuary Estates, Hogan Road, Lewiston, Maine, for Chase Custom Homes & Finance, Inc., prepared by Terradyn Consultants, LLC, dated _____ as approved by the City of Lewiston Planning Board on _____ and recorded in the Androscoggin County Registry of Deeds in Plan Book ____, Page _____.

Subdivision. Sanctuary Estates Subdivision as shown on the above-referenced Plan.

ARTICLE II
Supplemental Declarations

This Declaration may be amended from time to time by Supplemental Declarations duly executed by Declarant, or by the Sanctuary Estates Homeowners Association, pursuant to a vote of the owners in accordance with the Bylaws, if any, of the Sanctuary Estates Homeowners Association, and recorded in the Androscoggin County Registry of Deeds. No such amendment shall render invalid any use of subdivision land within the property existing in accordance with this Declaration at the time of recording such Supplemental Declaration, and any such amendment shall be reasonably consistent with the uniform scheme of development established by this Declaration.

ARTICLE III
Reservations and Easements

There is hereby excepted and reserved to the Declarant, for so long as it owns any portion of the numbered parcels, and thereafter to the Association the following:

Roads. A right of way for all purposes over, across and through the roads, together with the right to install maintains utility poles and lines and water and sewer lines adjacent to, within or under the traveled portion of said roads. The Declarant specifically reserves the right to convey the roads to the City of Lewiston.

Underground Utilities. Declarant reserves the right to grant easements for utility purposes to enter onto any lot within fifteen (20) feet of the road lot line for the purpose of construction, reconstruction, installing, replacing, and maintaining an underground or previously installed utility by the lot owner providing that promptly after such entry, the surface of the ground shall be restored to substantially the same condition as it was in prior to such entry.

Other. The right to exercise through the property any rights or powers hereinafter conferred upon the Association by amended Declaration.

ARTICLE IV
Common Rights and Easements

Each conveyance of a parcel shall be deemed to include as appurtenant to said parcel, subject to such reasonable regulations as may be established from time to time by the Association, the following:

Access. A right of way for all purposes over and along the road(s), in the subdivision, as said is shown on the Plan of the Subdivision, in common with Declarant and in common with the owners of the other parcels.

Membership in Homeowners Association. Any owner, by virtue of his or her acceptance of a deed to a lot on the Plan, becomes a member of the Association and shall be bound by the

action of such Associations. Each lot, however, shall have only one vote in each association despite ownership of the lot being in the name of more than one person or entity.

ARTICLE V
Undisturbed Buffers

The conveyance of each lot shall be deemed to include the conveyance of a 1/31 interest, in common and undivided with the owners of the remaining lots in the subdivision, in and to all real estate shown on the plan and designated as "Forested Buffers and Perimeter Buffers". Each lot owner acknowledges the City of Lewiston's right to assess the same as a taxable interest.

Purpose. The establishment of the" Forested Buffers and Perimeter Buffers" is to ensure that such areas will be retained forever in its natural undeveloped condition and to protect and conserve the natural values and scenic condition of such areas and the proper drainage of stormwater from the subdivision.

Restrictive Use. Such Undisturbed Buffers shall remain in their natural, undeveloped condition and shall be subject to the use limitations hereinafter stated. Such Undisturbed Buffers shall be used for limited conservation purposed only. No commercial, industrial, quarrying or mining activity shall be permitted in the Undisturbed Buffers, except for walking paths designated in keeping with the natural scenic quality of the Undisturbed Buffers. No motor vehicles of any kind, including recreational vehicles, dirt bikes, and snowmobiles shall be permitted in the Undisturbed Buffers, except in emergency. No filling, paving, dumping, excavations or other alterations shall be made to the surface of the Undisturbed Buffer other than that caused by the forces of nature. Any activity on or use of the Undisturbed Buffer inconsistent with the uses designated herein is prohibited.

Timber and Vegetation. Any destruction or removal of standing trees, plants, shrubs or other vegetation shall not be permitted, except, however, the following:

The right to clear and restore forest cover and other vegetation that is damaged or destroyed by the forces of nature, such as fire or disease and when necessary, to prevent the spread of disease.

The right to clear and restore forest cover and other vegetation in the event of any emergency, when necessary, to prevent the spread of fire.

The right to gather, use or remove dead wood.

ARTICLE VI
Maintenance of Stormwater Collection and Detention facilities

The stormwater collection facilities, i.e., roadside swales, detention facilities, within the road right of ways, and/or grading and drainage easements, will be maintained by Declarant until acceptance of the road by the City of Lewiston. It is anticipated that the road be

constructed and turned over to the City for acceptance _____. Prior to the road being accepted, Declarant shall maintain the facilities in a clean operating condition by street sweeping, removing debris from catch basin grates, sediment from sumps and flushing the storm drains as necessary to maintain flow. After the road is accepted, the City will maintain the facilities as dictated by their maintenance program.

The stormwater detention facilities shall be maintained by Declarant or the Homeowners Association for life as set forth in this Declaration.

The Grading and Drainage Easements as shown on the plan shall be deeded to the Homeowners Association. All drainage infrastructure is subject to the drainage infrastructure maintenance plan as approved by the Maine Department of Environmental Protection storm water permits _____ for Sanctuary Estates Subdivision.

Stormwater and drainage maintenance will be an ongoing responsibility of the Association. The specific responsibilities are set forth in the Maintenance Plan of Stormwater Management Facilities, attached hereto as Exhibit A. The Association shall be required to maintain a maintenance log as set forth within Exhibit A.

The City of Lewiston has the right to enter the facility for emergency repairs.

A maintenance log shall he maintained by the Declarant and the Homeowners Association and shall be provided to the Maine Department of Environmental Protection, upon request, for review.

ARTICLE VII
Protective Covenants and Restrictions

a. **Residential Use**. No lot shall be improved or used except for single family residential purposes with not more than one principal residence and said principal residence shall have a minimum of 1,400 square feet for two story structures and 900 square feet for one story structures of available living space as measured by the area above continuous foundation. No temporary structure or tent shall be used as a residence. A minimum of a two (2) car garage will be required within 2 years of completion.

b. **Structures.** No other buildings or structures of any nature or description shall be erected or maintained on said premises, provided, however, that nothing in this paragraph shall be construed to prevent the construction of a barn, storage shed, cabana, pergola, fence or in-ground swimming pool. Any such building or structure shall be consistent in design and materials with the single family dwelling constructed on the lot.

c. **Maintenance.** All lots and buildings thereon shall he maintained in a neat, attractive, manner and kept in good repair.

d. **Wood.** Cut wood shall be stacked neatly behind or on the side of the residence.

e. **Surface Water.** No owner of a lot, his agent or employees shall alter the natural course of surface water on any lot in a way which would materially alter the natural flow of such water across any other lot unless such alteration is approved by the owners of all lots affected. This provision shall not be construed to prevent the proper improvements or maintenance of drainage casements show on said plan.

f. **Compliance with Ordinance.** All construction activities, including the siting of buildings, shall be in accordance with all local and state laws, codes, ordinances and regulations.

g. **Animals.** No horses, cattle, sheep, goats, pigs, poultry, or other livestock, or other animals other than household pets shall be kept, maintained or owned on any of the lots. No boarding or breeding kennels may be kept or maintained on any of the lots.

h. **Vehicles.** No house trailers, business or commercial vehicles or vehicles of similar nature shall be brought upon, or be maintained or be permitted to remain on any lot except a business vehicle normally used by a lot owner in his or her occupation, provided said vehicle is parked in an enclosed garage. No unregistered vehicles may be kept upon any lot unless such vehicle is stored in a garage or other enclosed structure. No tractor trailers may be kept on any lot.

i. **Siding.** No dwelling or other building erected on any lot shall be covered with tar paper, asphalt siding or corrugated metal siding, but all dwellings and other building shall be covered with a natural wood, stone, brick or vinyl/composite siding.

j. **Professional Use**. The lots shall be used only for residential purposes, except for limited professional use by the owner/occupant providing that such use does not create traffic substantially greater than that of normal residential use and that said use be approved by the appropriate City official or board.

k. **Nuisances.** No owner of a lot shall do or permit to be done any act upon the lot which may be or is, or may become a nuisance as defined by state or local law, ordinances or regulation.

l. **Signs.** No sign of any nature or description shall be displayed or placed upon any part of the premises except for a "For Sale" sign referring only to a lot or residence, or a sign erected by Declarant to identify the subdivision or a sign not exceeding one square foot erected by a lot owner to identify his or her or their name.

m. **Time for Construction.** When the construction of the buildings on a lot is once begun, work thereon must be prosecuted diligently and must be completed within one (1) year from the date that construction (including excavation) begins. All disturbed areas not built upon or landscaped, shall be loamed and seeded at the close of construction, but, in any event, must be completed within six (6) months of occupancy. The prohibitions contained herein shall not be construed to prevent the use of trailers, vehicles or temporary structures during the period of actual construction.

n. **Satellite Dishes.** No satellite dishes larger than eighteen (18) inches in diameter or any related devices shall be erected or placed on the premises if visible from the road, right of way or other homes.

o. **Access to Abutting Land.** None of the lots numbered 1-31 as shown on said Plan shall be utilized for access to abutting land.

p. **DEP Order**. In accordance with the terms and conditions of the Department of Environmental Protection Site Stormwater Permit Findings of Fact and Order Permit _____, all lots conveyed by the Declarant are subject to said terms and conditions. This shall be binding upon the heirs, successors and assigns of all such lot purchasers.

q. **Wetlands**. In accordance with Municipal and State approvals, there shall be no filling of any wetlands as are currently delineated.

ARTICLE VIII
Severability and Enforcement

Each and every provision contained herein shall be considered to be independent and separate and in the event that any one or more shall for any reason be held to be invalid and unenforceable, all the remainder here of shall, nevertheless, remain in full force and effect.

Any lot owners shall have the right, individually or through the Association, to enforce the above covenants and restrictions against any other lot owner.

IN WITNESS WHEREOF, _____ has caused this instrument to be executed on this _____ day of _____, 2018, by _____, its _____ thereunto duly authorized.

CHASE CUSTOM HOMES & FINANCE, INC.

By:_____
Its:

STATE OF MAINE
COUNTY OF _____

Personally appeared before me on this _____ day of _____, 2018, the above-named _____, _____ of CHASE CUSTOM HOMES & FINANCE, INC., as aforesaid, and acknowledged the foregoing instrument to be his/her free act and deed, in his/her said capacity, and the free act and deed of said Corporation.

_____
Notary Public/Attorney at Law

Printed Name:_____
Commission Expires:

Section 1 – Development Description

Narrative

On behalf of Chase Custom Homes & Finance, we are pleased to submit this Subdivision/Site Location of Development Act Application for the proposed Sanctuary Estates Subdivision off Hogan Road in Lewiston, Maine. The development is proposed to be a clustered subdivision with a total of 31 single family house lots with related public roadways, underground utilities, stormwater management features, landscaping and open space.

Existing Conditions

The development parcel is located on the southeast side of Hogan Road in Lewiston, Maine. The property is approximately 35.3 acres. The site is bounded to the south by Seville Place and Amos Court, to the east by the Thorncrag Bird Sanctuary, to the north by Stetson Road and to the west by Hogan Road. The site is currently an undisturbed forest. The property is shown as lot 54 on the City of Lewiston Tax Map 115. The parcel is located in the Suburban Residential (SR) zoning district with a minimum lot size requirement of 40,000 square feet and 125 feet of street frontage without service from public sewer.

Proposed Development

Sanctuary Estates is a proposed 31-unit residential subdivision with approximately 11 acres of common open space. The applicant is proposing a single-family cluster development which allows individual lot sizes to be reduced to 50 percent of that required by the district requirements and reduces the minimum street frontage to 50 ft. The applicant is therefore proposing a single-family clustered subdivision with a minimum lot size of 20,000 sf and 50 feet of street frontage. Each lot will be served by public water, underground electric & private subsurface septic systems.

The project will be accessed by a new set of roads. Approximately 3,579' of new public roadway will be created. Two of the four proposed roads will be designed to the public street standard and will have a 24' wide driving surface and 2' wide shoulders. The other two proposed roads will be classified as public courts and will have a 24' wide driving surface with no shoulders.

Stormwater runoff will be conveyed to a variety of BMPs that will provide the necessary water quantity control & water quality treatment. The stormwater management system features two gravel wetlands, one under-drained filter basin, a series of level lip spreader/forested buffer combinations, forested buffers & roof drain filter strips.

Wetlands

Dale Brewer, CSS of Statewide Surveys, Inc. performed the project wetland delineation. Approximately 14,289 SF of wetlands are proposed to be permanently altered. We have submitted a NRPA Tier 1 Wetland Alteration Permit to the MDEP. We attempted to minimize the wetland impacts by crossing the wetlands at relatively narrow points and as near to 90 degrees as practicable. The wetland delineation can be seen on the attached plans. There are no significant vernal pools located on the property.

High Intensity Soil Survey

Dale Brewer, CSS of Statewide Surveys, Inc. completed a Class B High Intensity Soil Survey for the project area. The report can be seen in Section 11 - Soils.

Topographic Map

Aerial survey data obtained from the State of Maine GIS system. The topographic information can be seen on the attached construction plans. A copy of the U.S.G.S. Quadrangle Map is attached to this submittal.

The project area features topography that is relatively steep in areas. The site falls from elevation 350 at the south corner of the parcel to 274 at the Hogan Road entrance and to as low as 250 at the east corner of the parcel. There are several areas within the parcel with grades exceeding 10%. The parcel consists of large networks of forested wetlands.

Construction Plan

The site work is estimated to take between 6 & 8 months to complete and would generally correspond to the following table:

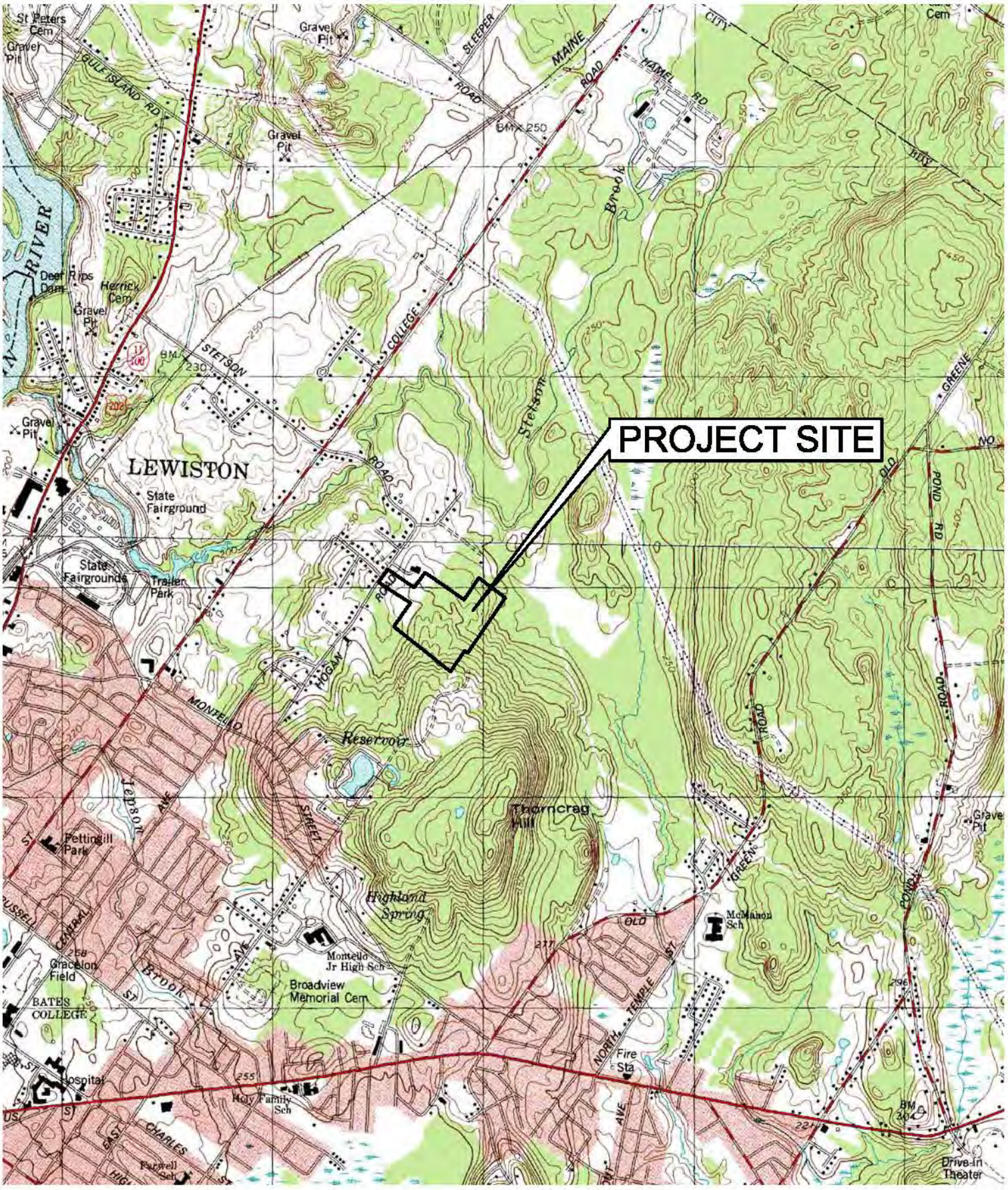
	Start	Finish
1. Estimated construction time: 6 months	May 1, 2018	October 1, 2018
2 Erosion control measures placed	May 1, 2018	May 15, 2018
3. Site clearing, grubbing, excavation, filling and construction stormwater facilities	May 1, 2018	August 1, 2018
4. Excavation & construction of roads, parking lots and underground utilities.	May 1, 2018	August 1,2018
5. Mulch spread for winter erosion control. (if necessary)	November 15, of construction year	May 1 the next year
6. Start progressive final seeding on prepared areas.	Within 24 hours of loam placement	September 15 of construction year
7. Bi-weekly monitoring of vegetative growth.	August 22, 2018	November 1, 2018
8. Re-seed, if necessary, and continue monitoring of growth until established.	August 22, 2018	November 1, 2018
9. Progressive removal of erosion control devices, based on field inspection.	August 22, 2018	November 1, 2018

Dates are subject to change at the discretion of the engineer depending on construction progress.

Drawings

A full set of construction plans have been attached with this submittal, including:

- Existing Condition Plans
- Subdivision Plans
- Site Plans
- Grading & Erosion Control Plans
- Utility Plans
- Profile Sheets
- Detail Sheets



SHEET DESCRIPTION		JOB NO.	FIGURE
U.S.G.S. QUADRANGLE MAP SANCTUARY ESTATES, LEWISTON	TERRADYN CONSULTANTS, LLC P.O. Box 339 111 Elderberry Lane New Gloucester, ME 04260 Office: (207) 926-5111 Fax: (207) 221-1317 www.terradynconsultants.com	1660	1
PREPARED FOR		DATE	OF
CHASE CUSTOM HOMES & FINANCE 290 BRIDGTON ROAD WESTBROOK, ME 04092	Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting	10/4/2017	1
		SCALE	
		1"=2000'	

Section 2 – Title, Right or Interest

A copy of the property deed is attached.

QUITCLAIM DEED WITHOUT COVENANT

KNOW ALL MEN BY THESE PRESENTS, that **200 ELM REALTY, LLC**, a Maine limited liability company, having a mailing address of 500 Canal Street, Lewiston, Maine 04240 ("Grantor"), in consideration of One Hundred Fifteen Thousand and 00/100 Dollars ($115,000.00) and other valuable consideration paid by **CHASE CUSTOM HOMES & FINANCE, INC.**, with a mailing address of 200 Bridgton Road, Westbrook, Maine 04092 ("Grantee"), the receipt whereof is hereby acknowledged, does hereby remise, release and forever quitclaim unto the said Grantee its successors and assigns forever, whatever right, title and interest the Grantor has, if any, in and to the following described premises more commonly known as 131 Hogan Road, Lewiston, Maine:

A certain lot or parcel of land in Lewiston, County of Androscoggin and State of Maine, bounded and described as follows:

1. Parcel

A certain piece or parcel of land situated in said Lewiston with the buildings thereon bounded and described as follows, viz: northwesterly by the Hogan Road, so-called; northeasterly by land now owned or formerly owned by Jerry Clifford; southeasterly by land now or formerly owned by William B. Kilbourne; and southwesterly by land now or formerly owned by the Windsor Mineral Spring Company, and known as the Samuel Given Farm, being fifty-seven (57) acres, more or less.

2. Additional Rights

Included herewith are all rights, easements, privileges and appurtenances belonging to the above granted estate including especially, but without limiting the generality of the foregoing, (1) the rights reserved by John G. Mendros and Florence J. Mendros in the three deeds to the Holy Trinity Greek Orthodox Church, one recorded in Book 1383, Page 326, a second recorded in Book 1444, Page 38, and the third recorded in Book 2034, Page 314, to the extent the same benefit the above described real estate; and (2) the right reserved to the Servlet Parcel to locate and relocate from time to time the right of way granted in the deed from Florence J. Mendros to Olympic Heights LLC dated December 14, 2006 and recorded in Book 7003, Page 82.

3. Outconveyances

Excepted herefrom are previously conveyed parcels and rights in the following deeds but reserving any rights reserved in said deeds:

1) Deed from John G. Mendros and Florence J. Mendros to the Holy Trinity Greek Orthodox Church of Lewiston dated December 19, 1978 and recorded in Book 1383, Page 326;

2) Deed from John G. Mendros and Florence J. Mendros to the Holy Trinity Greek Orthodox Church of Lewiston undated but acknowledged December 11, 1979 and recorded January 8, 1980 in Book 1444, Page 38;

3) Deed from John G. Mendros and Florence J. Mendros to the Holy Trinity Greek Orthodox Church of Lewiston dated December 29, 1986 and recorded December 31, 1986 in Book 2034, Page 314;

4) Deed from John G. Mendros and Florentia J. Mendros to Ronald N. Goulet and Jaye R. Goulet dated June 7, 1990 and recorded June 8, 1990 in Book 2562, Page 245;

5) Deed from John G. Mendros and Florentia J. Mendros to the Holy Trinity Greek Orthodox Church of Lewiston dated December 31, 1990 and recorded January 2, 1991 in Book 2642, Page 1;

6) Deed from John G. Mendros and Florence J. Mendros to George Stamboules, Sr., and Janet Lee Stamboules dated July 11, 1995 and recorded August 9, 1995 in Book 3461, Page 129; and

7) Deed from John G. Mendros and Florence J. Mendros to Jean A. Pleau and Constance J. Pleau dated December 8, 2000 and recorded December 18, 2000 in Book 4559, Page 331.

4. Reserved Parcel

Excepted from the foregoing is the following described parcel of land as reserved in the deed from Florentia J. Mendros to Olympic Heights, LLC dated December 21, 2006 and recorded in Book 7011, Page 327;

Beginning on the southeasterly line of Hogan Road at a point located two hundred ninety (290) feet southwesterly of the westerly corner of the land conveyed by John G. Mendros and Florence J. Mendros to Ronald N. Goulet and Jaye R. Goulet dated June 7, 1990 and recorded in Book 2562, Page 245, as measured along said line of Hogan Road;

Thence northeasterly along said line of Hogan Road a distance of two hundred ninety (290) feet to said land conveyed to said Goulets in said deed recorded in Book 2562, Page 245;

Thence southeasterly along said land conveyed to said Goulets in said deed recorded in Book 2562, Page 245 a distance of five hundred (500) feet;

Thence southwesterly on a line parallel to said southeasterly line of Hogan Road a distance of two hundred ninety (290) feet;

Thence northwesterly a distance of five hundred (500) feet to the point of beginning.

Included with this reserved parcel are all rights; easements, privileges and appurtenances belonging to the above described parcel, but subject to all rights and easements encumbered the same.

5. Exceptions

EXCEPTED herefrom are the following:

1) In Book 1046, Page 190, an easement dated September 30, 1971 from John G. Mendros and Florence J. Mendros to Central Maine Power Company and New England Telephone and Telegraph Company.

2) In Book 1046, Page 191, an easement dated September 13, 1971 from John G. Mendros and Florence J. Mendros to Central Maine Power Company.

3) A right of way reserved to Harry Stetson as set forth in the deed from Charles Dube to David Bourget dated April 30, 1928 and recorded in May 8, 1928 in Book 381, Page 406 which provides as follows: "subject to a certain right of way reserved to Harry Stetson to get to the wood lot in the rear of the above described premises during the winter season only and not during the planting seasons. The said privilege and right of way to Harry Stetson to reach his wood lot in the rear of the above described premises to be for the winter months of each year while the snow is on the ground and not otherwise."

4) In Book 3440, Page 56, an easement dated June 21, 1995 and recorded June 29, 1995 from Florentia J. Mendros and John G. Mendros to New England Telephone and Telegraph Company and Central Maine Power Company.

5) The easement for a right of way fifty (50) feet in width as described in the deed from Florence J. Mendros to Olympic Heights LLC dated December 14, 2006 and recorded in Book 7003, Page 82.

6. Source of Title

For source of title, see the deed from Florentia J. Mendros (aka Florence J. Mendros) to Olympic Heights LLC, dated December 21, 2006 and recorded in Androscoggin County Registry of Deeds in Book 7011, Page 327.

To have and to hold the same, together with all the privileges and appurtenances thereunto belonging, to the said Grantee, its successors and assigns to his use and behoof forever.

Being the same premises conveyed to the Grantor by Foreclosure Deed dated 6/2/16 and recorded in Book 7379, Page 76 with the Androscoggin County Registry of Deeds.

THE PROPERTY HEREBY CONVEYED IS SOLD **"AS IS, WHERE IS AND WITH ALL FAULTS."** GRANTOR, AND ITS AGENTS, MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OF ANY STATEMENT AS TO THE BOUNDARIES OR ACREAGE OF THE PROPERTY, OR AS TO ANY OF THE MATTERS

CONTAINED IN ANY DESCRIPTION OF THE PROPERTY, OR AS TO THE FITNESS OF THE PROPERTY FOR A PARTICULAR PURPOSE, OR AS TO DEVELOPMENT RIGHTS, MERCHANTABILITY, HABITABILITY, OR AS TO ANY OTHER MATTER, INCLUDING WITHOUT LIMITATION, LAND USE, ZONING AND SUBDIVISION ISSUES.

Subject to all municipal liens and encumbrances, including but not limited to real property taxes, whether or not of record in the Androscoggin County Registry of Deeds. Further subject to all real estate transfer taxes.

IN WITNESS WHEREOF, Grantor has caused this deed to be executed by its duly authorized signatory, this 1 day of November, 2016.

SIGNED, SEALED AND DELIVERED
in the presence of

Witness

200 ELM REALTY, LLC

By: Christopher P. Hickey
Its: Authorized Signatory

COMMONWEALTH OF MASSACHUSETTS
COUNTY OF SUFFOLK, ss.

On November 1, 2016, personally appeared the above named Christopher P. Hickey, Authorized Signatory of 200 Elm Realty, LLC in his said capacity, and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of said Company.

KELLY ANN CUNNIFF
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
October 31, 2019

Before me,

Kelly Ann Cunniff

Notary Public:

My Commission Expires:

(W5834341.1)

Maine Real Estate Transfer Tax Paid
TINA M. CHOUINARD, REGISTER
ANDROSCOGGIN COUNTY MAINE E-RECORDED

Section 3 – Financial Capacity

Chase Custom Homes & Finance is proposing to develop a new 31-lot clustered subdivision to be named Sanctuary Estates. The site will contain new public roadways open space, underground utilities, landscaping, two gravel wetland stormwater features and one underdrained soil filter stormwater feature. The site will be served by public water and underground power, cable and telephone lines.

The project infrastructure is estimated to cost approximately $900,000. The applicant has a revolving line of credit well in excess of the project cost. Please see attached letter.

Machias
Savings Bank

Experienced people. Exceptional service.

March 27, 2018

City of Lewiston
27 Pine Street
Lewiston, ME 04240

RE: Chase Custom Homes - John Chase

To Whom it May Concern:

Please use this letter as confirmation that Chase Custom Homes, located in Westbrook, Maine has an ongoing business relationship with Machias Savings Bank and is in good standing.

Our records indicate that Chase Custom Homes has been a customer of the Bank since 2006. Over this period, they have operated a seven figure line of credit and a moderate six figure checking account in a satisfactory manner. All existing relationships are handled as agreed.

Chase Custom Homes has demonstrated the ability, in the past, to complete projects of this nature.

If you have any questions or need any additional information, please do not hesitate to give me a call at 207-989-8370.

Sincerely,

Jillian Saucier
Regional Vice President
Machias Savings Bank
1126 Hammond Street
Bangor, ME 04401

TERRADYN CONSULTANTS, LLC
P.O. Box 339
New Gloucester, ME 04260
(207) 926-5111

JOB NO.	1660		
SHEET NO.	1	OF	1
CALCULATED BY	KJB	DATE	1/8/2018

BUDGETARY COST ESTIMATE - SITE WORK
SANCTUARY ESTATES - LEWISTON

ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	AMOUNT
	EARTHWORK				
1	GRUB OPEN AREA	AC	$2,000	6.5	$13,000.00
2	COMMON EXCAVATION	CY	$12.00	3690	$44,285.81
3	SITE FILLS WITH ONSITE MATERIAL	CY	$4.00	3500	$14,000.00
4	GRAVEL WETLANDS	EA	$45,000	2	$90,000.00
5	STORMWWATER POND	LS	$35,000.00	1	$35,000.00
6	STORMWATER IMPOUNDMENT	LS	$5,000.00	1	$5,000.00
	PARKING, ACCESS AND SIDEWALKS				
7	HOT BITUMINOUS SURFACE PAVEMENT	TON	$100.00	544	$54,356.50
8	HOT BITUMINOUS BINDER PAVEMENT	TON	$90.00	1087	$97,841.70
9	BASE GRAVEL MDOT TYPE A	CY	$30.00	824	$24,707.50
10	SUBBASE GRAVEL MDOT TYPE D	CY	$18.00	4118	$74,122.50
	SITE IMPROVEMENTS				
11	SIGNS	EA	$200.00	4	$800.00
	DRAINAGE				
12	15" DIAMETER STORM DRAIN	LF	$40.00	481	$19,240.00
13	12" DIAMETER STORM DRAIN	LF	$35.00	110	$3,850.00
14	4' DIAMETER CATCH BASIN	EA	$3,000.00	5	$15,000.00
	UTILITIES				
15	WATER SERVICE	LF	$35.00	902	$31,570.00
16	8" WATER LINES	LF	$60.00	3248	$194,880.00
17	HYDRANT ASSEMBLY	EA	$5,000.00	1	$5,000.00
18	TRANSFORMER PAD	EA	$2,500.00	9	$22,500.00
19	LIGHT POLE BASES	EA	$800.00	3	$2,400.00
20	SITE ELECTRICAL	LF	$20.00	4318	$86,360.00
	EROSION & SEDIMENT CONTROL				
21	STABILIZED CONSTRUCTION ENTRANCE	EA	$2,000.00	1	$2,000.00
22	RIPRAP	CY	$40.00	750	$30,000.00
24	SILT FENCE	LF	$5.00	5502	$27,510.00
25	LOAM & SEED	CY	$8.00	2300	$18,400.00

SITE WORK TOTAL= $911,824.01

NOTES

1. THE OPINION OF PROBABLE CONSTRUCTION COST IS BASED UPON THE PERMITTING PLANS FOR TUSCAN WAY DEVELOPMENT DATED OCTOBER 10, 2017, PREPARED BY TERRADYN CONSULTANTS, LLC. AND ONLY INCLUDES COSTS FOR PUBLIC IMPROVEMENTS INCLUDING THE ROADWAY, SIDEWALKS, STORMWATER MANAGEMENT FACILITIES, PUBLIC UTILITIES, AND SEPTIC SYSTEMS. THIS ESTIMATE IS IN NO WAY, IMPLIED OR EXPRESSED OTHERWISE, A WARRANTEE THAT THE PROJECT CAN BE CONSTRUCTED FOR THE ABOVE COSTS. THIS ESTIMATE IS INTENDED TO BE USED AS A SITE WORK ALLOWANCE FOR PERFORMANCE GUARANTEE PURPOSES ONLY AND IS LIMITED TO THE SITE WORK INVOLVED TO CONSTRUCT THE PUBLIC IMPROVEMENT COMPONENTS OF THE PROJECT. IT DOES NOT INCLUDE COST ASSOCIATED WITH THE BUILDING CONSTRUCTION, ENGINEERING DESIGN FEES, LAND ACQUISITION, LEGAL FEES, PERMITING FEES, TESTING SERVICES OR CONSTRUCTION PHASE SERVICES.

2. THE ONSITE PAVEMENT AND GRANULAR MATERIAL QUANTITIES FOR TUSCAN WAY ARE BASED UPON THE FOLLOWING SECTION:

MATERIAL DESCRIPTION	PAVEMENT BUILDUP (IN)
BITUMINOUS CONCRETE SURFACE COURSE (INCHES)	1
BITUMINOUS CONCRETE BINDER COURSE (INCHES)	2
AGGREGATE BASE GRAVEL (INCHES)	3
AGGREGATE SUBBASE GRAVEL (INCHES)	15

Section 4 - Technical Ability

Terradyn Consultants, LLC has been retained to obtain the Maine Department of Environmental Protection (MDEP) Site Location of Development Act Permit on behalf of Chase Custom Homes & Finance for the Sanctuary Estates Subdivision.

The technical phase of the project includes the preparation of detailed site plans, project details, site grading, stormwater management, erosion and sediment control and utility layout. The permitting phase of this project consists of the preparation of all state and local application permits required for the City of Lewiston Subdivision Approval, including the MDEP Site Location of Development Act Permit.

Terradyn Consultants, LLC was established in 2005 and currently has four professional engineers on staff, Jeffrey D. Amos, P.E., Michael E. Tadema-Wielandt, P.E., Adrienne Fine, P.E. and Katy J. Bouchard, P.E.. Terradyn Consultants, LLC provides land planning, stormwater management design and environmental permitting technical assistance to developers, contractors and municipalities in the areas of commercial, residential and industrial developments. The principal owners have previously been involved in the successful design and permitting of many projects of similar size and scope. See attached resumes.

Terradyn Consultants, LLC was assisted by CADmaster Drafting, Land Surveying & Septic Designs (Boundary Survey) and Statewide Surveys, Inc. (High Intensity Soil Survey and Wetland Delineation).

Section 5 - Noise

The anticipated noise generated by the project will be minor in nature since the project is completely residential. Short-term noise effects may occur during construction because of the use of normal construction equipment on the site. This noise is limited and would be expected to reduce to the minor residential levels once the construction phase is complete.

Section 6 - Visual Quality and Scenic Character

The visual quality and scenic character will be maintained to the extent practicable for the development. Approximately 11 acres will be preserved as open space. These areas will be maintained as natural wooded areas and will maintain a natural scenic and visual buffer.

Section 7 - Wildlife and Fisheries

The Maine Department of Inland Fisheries and Wildlife was contacted on October 4, 2017 to determine whether there were any significant wildlife/fisheries habitats associated with the proposed Sanctuary Estates project.

They reviewed the project and concluded that there were no known fisheries resources on site and that there are no known essential or significant wildlife habitats, nor any documented occurrences of rare, threatened or endangered species at or adjacent to this property. See attached correspondence.

PAUL R. LEPAGE
GOVERNOR

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
284 STATE STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041

CHANDLER E. WOODCOCK
COMMISSIONER

October 19, 2017

Katy Bouchard
Terradyn Consultants, LLC
P.O. Box 339
New Gloucester, ME 04260

RE: Information Request - Sanctuary Estates, Lewiston

Dear Katy:

Per your request received October 05, 2017, we have reviewed current Maine Department of Inland Fisheries and Wildlife (MDIFW) information for known locations of Endangered, Threatened, and Special Concern species; designated Essential and Significant Wildlife Habitats; and fisheries habitat concerns within the vicinity of the *Sanctuary Estates Project* in Lewiston.

Our Department has not mapped any Essential Habitats or fisheries habitats that would be directly affected by your project.

Endangered, Threatened, and Special Concern Species

Bats

Of the eight species of bats that occur in Maine, the three *Myotis* species are protected under Maine's Endangered Species Act (MESA) and are afforded special protection under 12 M.R.S §12801 - §12810. The three *Myotis* species include little brown bat (*M. lucifugus*, State Endangered); northern long-eared bat (*M. septentrionalis*, State Endangered); and eastern small-footed bat (*M. leibii*, State Threatened). The five remaining bat species are listed as Special Concern: big brown bat (*Eptesicus fuscus*); red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and tri-colored bat (*Perimyotis subflavus*).

While a comprehensive statewide inventory for bats has not been completed, it is likely that several of these species occur within the project area during migration and/or the breeding season. We recommend that you contact the U.S. Fish and Wildlife Service--Maine Fish and Wildlife Complex (Wende Mahaney, 207-902-1569) for further guidance, as the northern long-eared bat is also listed as a Threatened Species under the Federal Endangered Species Act. Otherwise, our Agency does not anticipate significant impacts to any of the bat species as a result of this project.

Significant Wildlife Habitat

Significant Vernal Pools

At this time, MDIFW Significant Wildlife Habitat (SWH) maps indicate no known presence of SWHs within the project area, which include Waterfowl and Wading Bird Habitats, Seabird Nesting Islands, Shorebird Areas, and Significant Vernal Pools. However, a comprehensive statewide inventory for Significant Vernal Pools has not been completed. Therefore, we strongly recommend that surveys for vernal pools be conducted within the project boundary by qualified wetland scientists prior to final project design to determine whether there are Significant Vernal Pools present in the area. These surveys should extend up to 250 feet beyond the anticipated project footprint because of potential performance standard requirements for off-site Significant Vernal Pools, assuming such pools are located on land owned or controlled by the applicant. Once surveys are completed, our Department will need to review and verify any vernal pool data prior to final determination of significance.

This consultation review has been conducted specifically for known MDIFW jurisdictional features and should not be interpreted as a comprehensive review for the presence of other regulated features that may occur in this area. Prior to the start of any future site disturbance we recommend additional consultation with the municipality, and other state resource agencies including the Maine Natural Areas Program and Maine Department of Environmental Protection in order to avoid unintended protected resource disturbance.

Please feel free to contact my office if you have any questions regarding this information, or if I can be of any further assistance.

Best regards,

John Perry
Environmental Review Coordinator

Section 8 - Historic Sites

On October 5, 2017, the Maine Historic Preservation Commission (MHPC) was contacted regarding the presence of any areas of historic, architectural or archaeological significance on the property or in the immediate vicinity.

Upon review, they then stamped our original letter with their approval block that states that they have concluded that there will be no historic properties affected by the proposed undertaking. That letter is attached.

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

PAUL R. LEPAGE
GOVERNOR

KIRK F. MOHNEY
DIRECTOR

October 11, 2017

Ms. Katy J. Bouchard
Terradyn Consultants, Inc
PO Box 339
New Gloucester, ME 04260

Project: MHPC #1396-17 Chase Custom Homes & Finance; Sanctuary Estates; Hogan Rd Residential Development

Town: Lewiston, ME

Dear Ms. Bouchard:

In response to your recent request, I have reviewed the information received October 10, 2017 to intiate consultation on the above referenced project in accordance with the requirements of the Maine Department of Environmental Protection.

Based on the information submitted, I have concluded that there will be no historic properties (archaeological or architectural) affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act.

Please contact Megan Hopkin at (207) 287-2992 or megan.m.hopkin@maine.gov if we can be of further assistance in this matter.

Sincerely,

Kirk F. Mohney

Kirk F. Mohney
State Historic Preservation Officer

PHONE: (207) 287-2132 FAX: (207) 287-2335

Section 9 - Unusual Natural Areas

The Maine Natural Areas Program was contacted regarding the presence of rare vascular plants, natural communities, registered critical areas, or other natural features of special concern on the property or in the immediate vicinity. We have attached the October 4, 2017 letter and supporting documents from the Department that states that there are no known rare botanical features documented specifically within the project area.

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

October 10, 2017

Katy Bouchard
Terradyn Consultants
PO Box 339
New Gloucester, ME 04260

Via email: katy@terradynconsultants.com

Re: Rare and exemplary botanical features in proximity to: #1660, Sanctuary Estates Housing Development, Lewiston, Maine

Dear Ms. Bouchard:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request received October 4, 2017 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Lewiston, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM

PHONE: (207) 287-8044
FAX: (207) 287-8040
WWW.MAINE.GOV/DACF/MNAP

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $150.00 for two hours of our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Kristen Puryear | Ecologist | Maine Natural Areas Program
207-287-8043 | kristen.puryear@maine.gov

Rare and Exemplary Botanical Features within 4 miles of
Project: #1660, Sanctuary Estates Housing Development, Lewiston, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Fern-leaved False Foxglove						
	SC	S3	G5	1938-08-18	11	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)

STATE RARITY RANKS

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
S3 Rare in Maine (20-100 occurrences).
S4 Apparently secure in Maine.
S5 Demonstrably secure in Maine.
SU Under consideration for assigning rarity status; more information needed on threats or distribution.
SNR Not yet ranked.
SNA Rank not applicable.
S#? Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines State Rarity Ranks for animals.

GLOBAL RARITY RANKS

G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
G3 Globally rare (20-100 occurrences).
G4 Apparently secure globally.
G5 Demonstrably secure globally.
GNR Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
PE Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Visit our website for more information on rare, threatened, and endangered species!
http://www.maine.gov/dacf/mnap

Section 10 - Buffers

Approximately 11 acres of naturally wooded Open Space area will be maintained at the rear of the site. Additionally, a minimum 30' yard area will be maintained where the proposed development directly abuts existing residential use lots. The open space will largely be undeveloped.

See the attached subdivision plan for location of exterior yards and open space areas.

Section 11 - Soils

Dale Brewer, CSS of Statewide Surveys, Inc completed a Class “B” High Intensity Soils Survey & Wetland Delineation for the project area in February of 2017. A copy of the report and related soil map has been included with this submission. Wetlands are shown on the construction plans.

CLASS B HIGH-INTENSITY SOIL SURVEY

PROPOSED RESIDENTIAL SUBDIVISION
LEWISTON, MAINE

Prepared for

TERRADYN CONSULTANTS, LLC
CHASE CUSTOM HOMES

Prepared by

STATEWIDE SURVEYS, INC
SOIL SCIENTISTS & LAND SURVEYORS
35 Eastman Rd., Cape Elizabeth, ME 04107
Website: www.statewidesurveys.com
Phone: 207 767 4200

STATEWIDE SURVEYS, INC
SOIL SCIENTISTS & LAND SURVEYORS
35 Eastman Road, Cape Elizabeth, ME 04107
Website: www.statewidesurveys.com
Phone: 207-767-4200

August 1, 2017

Mr. Jeff Amos, P.E.
Terradyn Consultants, LLC
111 Elderberry lane
New Gloucester, ME. 04260

Class B High-Intensity Soil Survey
Proposed Residential Subdivision
Lewiston, Maine

Dear Jeff,

We initially visited the proposed subdivision site in Lewiston on February 14, 2017 to determine the approximate soil survey limits. As you know the property lines were approximate as provided and we understand the property is being surveyed at this time. We determined access to test pit locations for this Class B High-Intensity Soil Survey and observed some hand borings to determine the underlying soils in "remote" areas of the proposed project. We returned to the site on February 20 and 21 2017 to observe test pits and the underlying soils with an excavator. We were also onsite throughout the months of April and May delineating wetlands and surveying Vernal Pools. We understand the following soils information will be used in the Stormwater Design of the project and the permit requirements for the Site Location of Development Act (*SLODA*) Soils *Section 11.A.2*.

We used *GPS* to "locate" the test pit locations. We documented twenty-six (*26*) test pits with a machine and eight (*8*) hand borings within the Project Area. The test pits were excavated with a large excavator to approximately sixty (± *60*) inches or bedrock with some being "deeper" at various accessible locations within the project area. We also observed the underlying soils with hand tools to shallower depths where the locations were inaccessible or environmentally sensitive for the excavator travel. From these test pits, we documented the soil's morphology and related the soil characteristics to the *State of Maine Catena Key* identified in the *Guidelines of Maine Certified Soil Scientists for Soil Identification and Mapping* adopted be the Maine Association of Professional Soil Scientists (*MAPSS-2004*) found the Abram, Becket, Boothbay, Elmwood, Lyman, Scantic, Swanton and Tunbridge soils underlying the site.

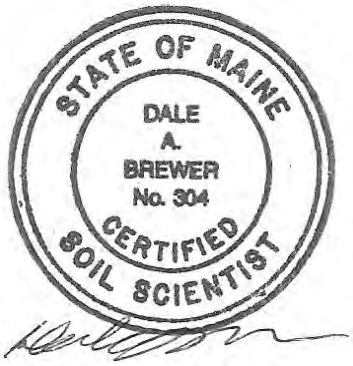
Generally, the underlying upland soils formed in glacial till with the wetlands in lacustrine and/or marine sediments. The Abram, Lyman and Tunbridge soils have a

thin glacial till layer over bedrock. The Becket and Skerry soils have loamy materials over glacial till. The Elmwood and Swanton soils have thin outwash mantle over clayey sediments and the Boothbay and Scantic soils formed in glaciomarine or glaciolacustrine materials overlying marine and/or lacustrine sediments. The site generally drains downslope in a northeasterly direction via drainage routes and wetlands and eventually into a low lying forested wetlands southeasterly of the approximate property line. The soils have varying amounts and sizes of fieldstones, cobbles and gravel. A few soils are "very deep" (*>60″ over bedrock*), whereas the majority of test pits have bedrock closer to the surface. We found soils in all soil depth classes including: very shallow (<7″), shallow (*10″ to* <*20″*), moderately deep (*20″ to* <*40″*) and deep (*40″ to* <*60″*). We noted that the soils found in the steeper sloping areas have less topsoil and are "shallower" to the "firm" or "very firm" underlying subsoils. The "thin" topsoil layers are likely a result from historic erosion where the upper soils have been moved down slope over time. This is common where land was cleared and used as pastureland in years past. We also observed a number of above surface bedrock outcroppings across the property.

In summary, the site can be suitable for the proposed residential subdivision when considering the site's limitations and designing for them. We suggest considerations to include: shallow soils, boulders, wetlands, streams and slopes. These limitations could cause extensive efforts for excavating and grading and will likely require "blasting" for subsurface piping. The poorly and very poorly drained soils (*wetlands*) will likely require permitting for any impacts resulting from the proposed development. Some ditching in addition to underground pipes may need to be installed to augment the existing topography for stormwater control. The steeper slopes may promote soil erosion and we recommend implementing the Best Management Practices to reduce opportunity for erosion during site construction.

Please see the following pages for more detailed soil information including the Soil Report, Soil Conditions Summary Table (*Form-E*), Soil Narratives, Soil Test Pit Logs (*Form F*) and a Class B High-Intensity Soil Map. Please contact us should questions arise or if further assistance is needed.

Respectfully submitted,
STATEWIDE SURVEYS, INC



Dale A. Brewer ***CSS #304***

CLASS B HIGH-INTENSITY SOIL SURVEY
CHASE CUSTOM HOMES PROJECT
LEWISTON, ME

SOIL NARRATIVE REPORT

Date: Soil profiles observed: **February 20, 21, 2017 (*May & June*)**.

Base Map: Topographic Survey: **Maine G.I.S. (*Provided*).**
Provided by: **Terradyn Consultants, L.L.C.**
Contour Interval: **Two foot (2 ').**
Map Scale: **1 inch = 80 feet (*1″ = 80′*)**.

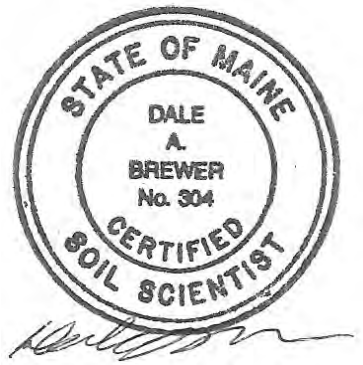
Ground Control: Test pits located by: **GPS, (*Mapping grade*).**

The Maine Association of Professional Soil Scientists (*MAPSS*) has adopted standards for soil surveys. Soil surveys are divided into four classes of survey, which are dependent upon the amount of information required for the project. The Class B High-Intensity Soil Survey Standards are as follows:

Minimum Class B High-Intensity Soil Survey Standards:

1. Map units will not contain dissimilar limiting inclusions larger than 1 acre. Dissimilar limiting inclusions may total more than 5 acres per map unit delineation in the aggregate, if not contiguous.
2. Scale of 1 inch = 200 feet or larger. (*Soil Map 1″ = 80′*)
3. Ground control – Test pits located by means of compass, chaining, pacing or taping from known survey points, *GPS* or other methods of equal accuracy. (*GPS*)
4. Base map with 5-foot contour intervals. (*2-foot contours*).

This Soil Survey was prepared for a proposed residential subdivision. Some soil map units may be smaller than 1 acre and therefore more intensive than Standards for a Class B High-Intensity Soil Survey. However, the smaller map units were deemed useful for planning purposes. The accompanying Soil Narratives (*profile descriptions*) and Soil Map were completed in general accordance with the standards adopted by the Maine Association of Soil Scientists and the Board of Certification of Geologists and Soil Scientists.



Dale A. Brewer, ***August 1, 2017.***

SOIL NARRATIVES

TYPICAL SOIL DESCRIPTIONS

ABRAM

(*Frigid Typic Haplorthods*)

SETTING

Parent Material:	Glacial till
Landform:	Ridges and mountains.
Position in Landscape:	Nearly level to very steep soils.
Slope Gradient Ranges:	(A) 0-3% (B) 3-8%, (C) 8-15% (D) 15-30%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Excessively drained
Typical Profile Description:	Surface layer: Black organic material, 0-1 inch Subsurface layer: Pinkish gray sandy loam, 1-2 inches Subsoil layer: Very dusky red and brown sandy loam, 2-5 inches Substratum: Bedrock at 5 inches
Hydrologic Group:	HSG - D.
Surface Runoff:	Moderate.
Permeability:	Moderately.
Depth to Bedrock:	Very shallow (<10”).
Hazard to Flooding:	None.

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Lyman, Tunbridge
Contrasting:	

USE AND MANAGEMENT

Development has limitations especially with subsurface utilities as this soil is very shallow to bedrock and typically involves ripping or blasting the underlying bedrock for use.

BECKET

(*Frigid Typic Haplorthods*)

SETTING

Parent Material:	Sandy glacial till.
Landform:	Drumlins and glaciated uplands.
Position in Landscape:	Upper portions of landform, crests and upper sideslopes.
Slope Gradient Ranges:	(B) 3-8%, (C) 8-15%, (D) 15-30%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Well drained, with a perched water table 2.0 to 3.5 feet beneath the soil surface, through spring run-off and during periods of heavy precipitation.
Typical Profile Description:	Surface layer: Pinkish gray and dark reddish brown fine sandy loam, 0-3 inches. Subsurface layer: Reddish brown and strong brown fine sandy loam, 3-12 inches. Subsoil layer: Yellowish brown and light olive brown gravelly sandy loam, 12-31 inches. Substratum: Mixed olive gravelly sandy loam and sand, 31-65 inches.
Hydrologic Group:	HSG - C.
Permeability:	Moderate in the solum, and moderately slow to slow in the substratum.
Depth to Bedrock:	Deep, greater than 40-inches.
Hazard to Flooding:	None.

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Skerry
Contrasting:	Tunbridge, Boulders

USE AND MANAGEMENT

The limiting factor for building site development is wetness due to the presence of a perched water table 2.0 to 3.5 feet beneath the soil surface in the spring of the year. Proper foundation drainage is recommended for construction. There are a few areas with large boulders that will require effort to move if required.

BOOTHBAY

(*Frigid Aquic Dystric Eutrochrepts*)

SETTING

Parent Material:	Lacustrine and marine sediments.
Landform:	Gently sloping to steep soils on lake or marine plains.
Position in Landscape:	Usually occupies intermediate to upper portions of landform.
Slope Gradient Ranges:	(B) 3-8%, (C) 8-15%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Moderately well to somewhat poorly drained, with an apparent water table 1.0 to 2.0 feet beneath the soil surface from March through May and during spring and periods of heavy precipitation.
Typical Profile	Surface layer: Dark brown silt loam, 0-5 inches. Subsurface layer: Olive and light brown silt loam, 5-16 inches.
Description:	Subsoil layer: Olive silt loam, 16-22 inches. Substratum: Olive silty clay loam, 22-65 inches.
Hydrologic Group:	HSG - C.
Surface Runoff:	Medium to rapid, depending on slopes.
Permeability:	Moderate in the surface horizon and moderately slow to slow in the underlying materials.
Depth to Bedrock:	Deep, greater than 40-inches.
Hazard to Flooding:	None.

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Scantic
Contrasting:	Skerry, Elmwood

USE AND MANAGEMENT

Development with subsurface wastewater disposal is limited for building site development by wetness, due to the presence of a seasonal high ground water table 1.0 to 2.0 feet beneath the soil surface for some portion of the year. Proper foundation drainage is recommended for construction.

ELMWOOD

(*Frigid Aquic Dystric Eutrochrepts*)

TYPICAL SETTING

Parent Material:	Loamy outwash or lacustrine materials over clayey sediments.
Landform:	Glaciolacustrine, marine or outwash plains and deltas.
Position in Landscape:	Nearly level to moderately steep.
Slope Gradient Ranges:	A (0-3%), B (3-8%), C (8-15%)

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Moderately well drained.
Typical Profile Description:	Surface layer: Brown to dark brown, fine sandy loam, 0 to 9 inches. Subsoil layer: Yellowish brown, mottled light olive brown and mottled olive gray sandy loam, from 23 to 31 inches pale olive silty clay loam. Substratum: Olive silty clay loam from 23 to 60 inches.
Hydrologic Group:	HSG - C.
Surface Runoff:	Slow to medium depending on slope.
Permeability:	Moderately rapid in the loamy material and slow to very slow in the clayey material.
Depth to Bedrock:	Very deep, greater than 60-inches.
Hazard to Flooding:	None.

POTENTIAL INCLUSIONS
(*Within Mapping Unit*)

Similar:	Swanton.
Contrasting:	Skerry, Tunbridge.

USE AND MANAGEMENT

Development with subsurface wastewater disposal is rated severe due to a seasonal high-water table. A limiting factor for building site development is wetness with the presence of shallow water tables November through May. Proper foundation drainage and/or site modification is recommended for construction. Use of this soil for roadways is poor due to wetness and low strength. Underground piping has severe limitations due to wetness.

LYMAN (Hollis)
(*Frigid Lithic Haplorthods*)

SETTING

Parent Material:	Glacial till.
Landform:	Rocky hills and high plateaus.
Position in Landscape:	Higher positions in the landscape on knolls, hills and mountains.
Slope Gradient Ranges:	(A) 0-3%, (B) 3-8%, (C) 8-15%, (D) >15%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat excessively drained. Water table usually not present but may exist on top of the underlying bedrock in concave pockets in places during prolonged wet periods.
Typical Profile	Surface layer: Black loam, 0-2 inches. Subsurface layer: Reddish gray fine sandy loam. 2-4 inches.
Description:	Subsoil layer: Very dusky red, dark red to brown loam, 10-20 inches.
Hydrologic Group:	HSG - C: When bedrock is known to be cracked or impervious. HSG - D: When bedrock is impervious or if soil is in the extremely rocky class.
Surface Runoff:	Slow to rapid depending on slope and bedrock exposure.
Permeability:	Moderately rapid.
Depth to Bedrock:	Shallow, 8-20 inches.
Hazard to Flooding:	None.

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Tunbridge (20-40 inches to bedrock), Bedrock Outcrop
Contrasting:	Becket, Elmwood, Skerry

USE AND MANAGEMENT

Development may be limited by shallow depths to bedrock, which is generally less than 20 inches. Blasting or ripping of the more fractured and weathered bedrock is required for deep excavation. Development with public sewer and water is limited by shallow depth to bedrock, which is generally less than 20 inches. Blasting or ripping of the more fractured and weathered bedrock is required for deep excavation. Proper foundation drainage is recommended for construction.

SCANTIC

(Frigid Typic Haplaquepts)

TYPICAL SETTING

Parent Material:	Marine or lacustrine sediments.
Landform:	Level or gently sloping marine or lake plains.
Position in Landscape:	Lower to intermediate positions.
Slope Gradient Ranges:	(A) 0-3%, (B) 3-8%

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Poorly drained, with a perched water table 0.5 to 1.0 feet beneath the soil surface.	
Typical Profile Description:	Surface layer:	Dark grayish brown silt loam, 0-9”
	Subsurface layer:	Olive gray silt loam, 9-11”
	Subsoil layer:	Olive gray, silty clay loam, 11-16”
	Substratum:	Olive gray clay, 16-65”
Hydrologic Group:	HSG – D.	
Surface Run Off:	Slow.	
Permeability:	Moderate or moderately slow in upper profile, slow to very slow in dense substratum.	
Depth to Bedrock:	Very deep, greater than 60”. Some areas are deep (<40”).	
Hazard to Flooding:	May flood occasionally on lowest fringes during spring and periods of excessive precipitation.	

POTENTIAL INCLUSIONS

(***Within Mapping Unit***)

Similar:	Boothbay.
Contrasting:	Skerry.

USE AND MANAGEMENT

Development is limited for building site development with wetness due to the presence of shallow water table throughout most of the year. Proper foundation drainage or site modification is recommended for construction. Most Scantic soils are in wetlands that may need to be permitted for alteration.

SKERRY

(*Frigid Aquic Haplorthods*)

SETTING

Parent Material:	Loamy glacial till underlain by sandy textured denser till.
Landform:	Drumlins and glaciated uplands.
Position in Landscape:	Usually occupies upper components of landform.
Slope Gradient Ranges:	(A) 0-3%, (B) 3-8% (C) 8-15%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Moderately well-drained, with a perched water table 1.5-3.5 feet below the soil surface from November through May.
Typical Profile Description:	Surface layer: Light gray fine sandy loam, 0-4”. Subsurface layer: Dark reddish brown fine sandy loam, 4-20”. Subsoil layer: Yellowish brown fine sandy loam, 20-25”. Substratum layer: Mixed brown and light olive brown fine sandy loam and sand, 25-65”.
Hydrologic Group:	HSG - C.
Surface Runoff:	Moderate.
Permeability:	Moderately in the solum, and slow or moderately slow in the compact substratum.
Depth to Bedrock:	Deep, greater than 40”.
Hazard to Flooding:	None.

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Becket
Contrasting:	Tunbridge, Lyman (less than 40” to bedrock)

USE AND MANAGEMENT

Development with subsurface wastewater disposal is limited, due to the presence of a groundwater table 1.5-3.5 feet below the soils surface for some portion of the year. Proper foundation drainage is recommended for construction.

SWANTON

(*Frigid Aeric Haplaquepts*)

TYPICAL SETTING

Parent Material:	Formed from a thin mantle of sandy outwash materials over clayey marine or lacustrine sediments.
Landform:	Nearly level, gently sloping areas on marine, lake, or outwash plains or deltas.
Position in Landscape:	Usually occupies lower positions on landform.
Slope Gradient Ranges:	(A) 0-3% (B) 3-8%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat poorly to poorly drained, with a perched water table 0.5-1.5 feet beneath the soil surface.
Typical Profile	Surface layer: Very dark gray sandy loam, loamy sand, 0-7".
	Subsurface layer: Grayish brown sandy loam, loamy sand, or sand, 7-22".
Description:	Subsoil layer: Olive silty clay loam, 22-30". Substratum layer: Olive silty clay, 30-60".
Hydrologic Group:	HSG - C/D.
Surface Runoff:	Slow or medium.
Permeability:	Moderately rapid to rapid in the sandy mantle, slow to very slow in the dense clay substratum.
Depth to Bedrock:	Deep, greater than 40".
Hazard to Flooding:	None.

INCLUSIONS

(***Within Mapping Unit***)

Similar:	Elmwood.
Contrasting:	Scantic.

USE AND MANAGEMENT

Development with subsurface wastewater disposal is "severe" due to a persistent high-water table in Swanton soils. Swanton soils are "hydric" and typically in wetland areas requiring environmental permits to alter. A limiting factor for site development is "wetness" due to the persistent "high" water table throughout most of the year. Proper foundation drainage is necessary for construction.

TUNBRIDGE

(*Frigid Typic Haplorthods*)

TYPICAL SETTING

Parent Material:	Loamy glacial till.
Landform:	Glaciated uplands.
Position in Landscape:	Upper positions on landform.
Slope Gradient Ranges:	(A) 0-3%, (B) 3-8% (C) 8-15% (D) >15%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat excessively to well drained, with no evidence of a water table, or only inches from the bedrock surface during spring and periods of heavy precipitation.
Typical Profile Description:	Surface layer: Black and reddish brown loam and fine sandy loam, 0-4”. Subsurface layer: Very dusky red loam, 4-6”. Subsoil layer: Dark red loam, 6-10”. Substratum layer: Dark brown to brown loam, 10-25”, Bedrock at 25”.
Hydrologic Group:	HSG - C/D.
Permeability:	Rapid.
Depth to Bedrock:	Moderately deep, 20-40”.
Hazard to Flooding:	None.

INCLUSIONS

(*Within Mapping Unit*)

Similar:	Lyman
Contrasting:	Becket, Elmwood, Skerry

USE AND MANAGEMENT

Development with subsurface wastewater disposal is limited, due to shallow bedrock. The shallow to bedrock is also a limitation for foundations. Proper foundation drainage or other site modification is recommended for construction.

PHOTOGRAPHS

Photograph 1. Test Pit #1, Tunbridge soils near an existing woods road and clearing. Bedrock is at 27″ from the surface.

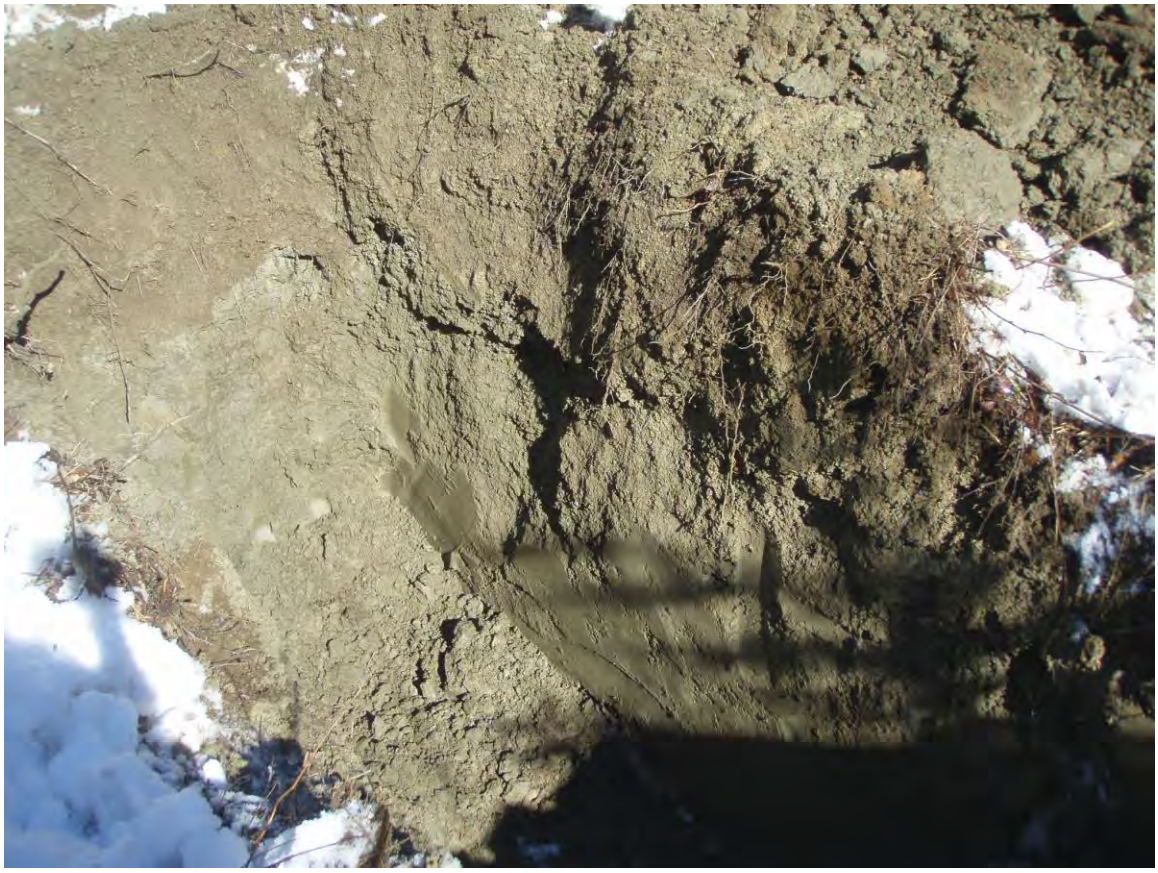
Photograph 2. Test Pit 2, Swanton soils found in low-lying Wetland "A". These soils vary from the "typical" Swanton series with a silt loam "cap" over sandy materials of a clayey substratum.

Photograph 3. Test Pit 3, representing the Becket soils. These soils are considered very deep (>60″) well drained soils, however there are shallow soils nearby.

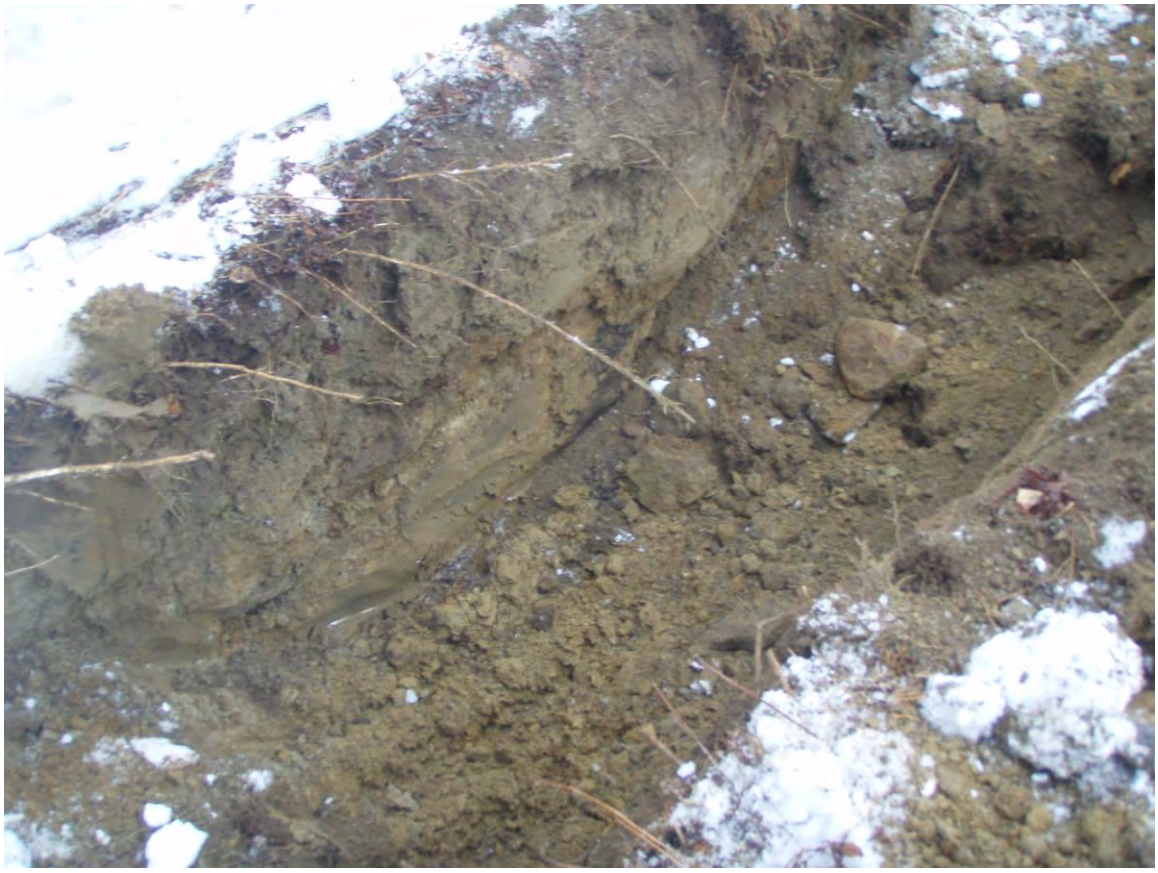
Photograph 4. Test Pit 4, picture of the Elmwood series with a sandy surface over underlying clayey sediments.

Photograph 5. Test Pit 5, of the Tunbridge soils. This Test Pit has undulating bedrock surface at 36″ and 60″ from the surface.

Photograph 6. Test Pit 6, is an example of the Skerry Series. These moderately well drained soils have coarse textured sandy subsoils.



Photograph 7. Test Pit 9, representing the Boothbay Soils. This test pit is slightly higher and on-slope from a large low-lying wetland.



Photograph 8. Test Pit 24, representing the Swanton Variant. This test pit is in delineated wetlands and is atypical of the series with bedrock at 46″

CLASS B HIGH-INTENSITY SOIL SURVEY
CHASE CUSTOM HOMES PROJECT
LEWISTON, ME

SOIL LEGEND

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
AbC	**ABRAM**	SL	8 to 15%	ED[1]	D
AbD	**ABRAM**	SL	> 15%	ED[1]	D
BeA	**BECKET**	FSL[4]	0-3%	WD[2]	C
BeB	**BECKET**	FSL[4]	3-8%	WD[2]	C
ByA	**BOOTHBAY**	SiL[9]	0-3%	SWPD[5]	C
ByB	**BOOTHBAY**	SiL[9]	3-8%	SWPD[5]	C
ElA	**ELMWOOD**	FSL[4]	0 to 3%	MWD[3]	C
ElB	**ELMWOOD**	FSL[4]	3 to 8%	MWD[3]	C
ElC	**ELMWOOD**	FSL[4]	8 to 15%	MWD[3]	C
LyA	**LYMAN**	LOAM	0-3%	SWED[8]	C/D
LyB	**LYMAN**	LOAM	3-8%	SWED[8]	C/D
LTA	**LYMAN/TUNBRIDGE**	L/FSL	0-3%	SWED/WD	C/D-C
LTB	**LYMAN/TUNBRIDGE**	L/FSL	3-8%	SWED/WD	C/D-C
LTC	**LYMAN/TUNBRIDGE**	L/FSL	8-15%	SWED/WD	C/D-C
LTD	**LYMAN/TUNBRIDGE**	L/FSL	>15%	SWED/WD	C/D-C
ScA	**SCANTIC**	SiL[9]	0 to 3%	PD[6]	D
SkA	**SKERRY**	FSL[4]	0-3%	MWD[3]	C
SkB	**SKERRY**	FSL[4]	3-8%	MWD[3]	C
SkC	**SKERRY**	FSL[4]	8-15%	MWD[3]	C
SwA	**SWANTON**	FSL[4]	0 to 3%	SWPD[5]	C/D
SwB	**SWANTON**	FSL[4]	3 to 8%	SWPD[5]	C/D
TuA	**TUNBRIDGE**	FSL[4]	0 to 3%	WD[2]	C
TuB	**TUNBRIDGE**	FSL[4]	3 to 8%	WD[2]	C
UdB	**UDORTHENTS**	VARIABLE	3 to 8%	VARIABLE	VAR

ED[1] is Excessively Well Drained.
WD[2] is Well Drained.
MWD[3] is Moderately Well Drained.
FSL[4] is Fine Sandy Loam.
SWPD[5] is Somewhat Poorly Drained.
PD[6] is Poorly Drained.
VPD[7] is Very Poorly Drained.
SWED[8] is Somewhat Excessively drained.
SiL[9] is Silt Loam

M.D.E.P. FORM – E

SOIL CONDITIONS SUMMARY TABLE

FORM E Rev. 07/11

SOIL CONDITIONS SUMMARY TABLE

SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality):
PROPOSED SUBDIVISION (RES.)	CHASE CUSTOM HOMES	LEWISTON

Lot No.	Exploration Symbol (TP 1, B 2, etc.)	✘ if at SSWD Field	Description of subsurface materials by: • Soil profile/condition (if by S.E.), • Soil series name (if by C.S.S.), or by • Geologic unit (if by C.G.)	Depths to (inches): Redoximorphic Features	Bedrock	Hydraulically Restrictive Layer	Limit of Exploration	Ground Surface Slope (%)	Ground Surface Elevation
	TP #1	☐	TUNBRIDGE	N.O.	28"	N.O.	28"	3-8%	N.O.
	TP #2	☐	SWANTON (VARIANT)	<6""	N.O.	28"	50"	0-3%	N.O.
	TP #3	☐	BECKET	44"	72"	>30"	72"	0-3%	N.O.
	TP #4	☐	ELMWOOD	26"	65"	30"	65"	3-8%	N.O.
	TP #5	☐	TUNBRIDGE	N.O.	36" & 60"	22"	60"	3-8%	N.O.
	TP #6	☐	SKERRY STONY	34"	N.O.	34"	70"	0-3%	N.O.
	TP #7	☐	LYMAN	N.O.	8"	8"	8"	0-3%	N.O.
	TP #8	☐	SKERRY (VARIANT)	22"	56"	22"	56"	3-8%	N.O.
	TP #9	☐	BOOTHBAY (VARIANT)	8"	60"	18"	60"	3-8%	N.O.
	TP #10	☐	SKERRY	24"	63"	24"	63"	3-8%	N.O.
	TP #11	☐	SCANTIC (VARIANT)	6"	46"	12"	46"	0-3%	N.O.
	TP #12	☐	TUNBRIDGE	N.O.	36"	36"	36"	0-3%	N.O.
	TP #13	☐	TUNBRIDGE	N.O.	40"	N.O.	40"	8-15%	N.O.
	TP #14	☐	SCANTIC (VARIANT)	4"	22"	N.O.	22"	0-3%	N.O.
	TP #15	☐	TUNBRIDGE (VARIANT)	26"	50"	38"	50"	0-3%	N.O.
	TP #16	☐	SKERRY (VARIANT)	20"	42"	30"	42"	0-3%	N.O.
	TP #17	☐	TUNBRIDGE	24"	46"	24"	46"	3-8%	N.O.
	TP #18	☐	SKERRY (VARIANT)	24"	58"	18"	58"	0-3%	N.O.
	TP #19	☐	TUNBRIDGE	N.O.	26"	N.O.	26"	0-3%	N.O.
	TP #20	☐	TUNBRIDGE	N.O.	34"	N.O.	34"	8-15%	N.O.
	TP #21	☐	TUNBRIDGE (VARIANT)	24"	44"	24"	44"	8-15%	N.O.
	TP #22	☐	SCANTIC (VARIANT)	6"	60"	10"	60"	0-3%	N.O.
	TP #23	☐	TUNBRIDGE	N.O.	24" & 50"	14"	50"	0-3%	N.O.
	TP #24	☐	SWANTON (VARIANT)	6"	48"	10"	48"	0-3%	N.O.
	TP #25	☐	LYMAN	N.O.	8"	8"	8"	3-8%	N.O.
	TP #26	☐	TUNBRIDGE (VARIANT)	18"	40"	20"	40"	0-3%	N.O.
		☐							
		☐							
		☐							
		☐							
		☐							
		☐							

INVESTIGATOR INFORMATION AND SIGNATURE

Signature	Date 08/01/2017
Name Printed DALE A. BREWER	Cert/Lic/Reg. # CSS #304

Qualification ☐ Licensed Site Evaluator ☒ Certified Soil Scientist ☐ Certified Geologist ☐ Other:

STATE OF MAINE DALE A. BREWER No. 304 CERTIFIED SOIL SCIENTIST

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FORM E Rev. 07/11

SOIL CONDITIONS SUMMARY TABLE

SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality):
PROPOSED SUBDIVISION (RES.)	CHASE CUSTOM HOMES	LEWISTON

Lot No.	Exploration Symbol (TP 1, B 2, etc.)	✘ if at SSWD Field	Description of subsurface materials by: • Soil profile/condition (if by S.E.), • Soil series name (if by C.S.S.), or by • Geologic unit (if by C.G.)	Depths to (inches): Redoximorphic Features	Bedrock	Hydraulically Restrictive Layer	Limit of Exploration	Ground Surface Slope (%)	Ground Surface Elevation
	BOR #1	☐	LYMAN	N.O.	18"	18"	18"	3-8%	N.O.
	BOR #2	☐	SCANTIC	6"	N.O.	12"	32"	0-3%	N.O.
	BOR #3	☐	LYMAN	N.O.	21"	21"	21"	0-3%	N.O.
	BOR #4	☐	LYMAN (VARIANT)	4"	18"	18"	18"	3-8%	N.O.
	BOR #5	☐	SWANTON (VARIANT)	6"	N.O.	18"	30"	0-3%	N.O.
	BOR #6	☐	LYMAN	N.O.	14"	N.O.	14"	0-3%	N.O.
	BOR #7	☐	ABRAM	N.O.	4"	4"	4"	8-15%	N.O.
	BOR #8	☐	ELMWOOD (VARIANT)	18"	40"	24"	40"	3-8%	N.O.

INVESTIGATOR INFORMATION AND SIGNATURE

Signature		Date 08/01/2017
Name Printed	DALE A. BREWER	Cert/Lic/Reg. # C.S.S. #304
Qualification	☐ Licensed Site Evaluator ☐ Certified Geologist	☒ Certified Soil Scientist ☐ Other:

STATE OF MAINE DALE A. BREWER No. 304 CERTIFIED SOIL SCIENTIST

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M.D.E.P. FORM – F

SOIL PROFILE CLASSIFICATION INFORMATION
(TEST PIT LOGS)

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #1 ■ Test Pit ☐ Boring

<1" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 2/1	
VERY FINE SANDY LOAM	VERY FRIABLE	10YR 3/3	NONE OBSERVED
		5YR 3/3	
LOAM	FRIABLE	7.5YR 3/3	
BEDROCK	AT	27"	

Hydric	Slope %	Limiting Factor	Groundwater
☐ Non-Hydric	3-8% (B)	28"	☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #2 ■ Test Pit ☐ Boring

4" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		2.5Y 2.5/1	
SILT LOAM	FRIABLE		
		2.5Y 3/2	5Y 6/1
		2.5Y 4/2	
		2.5Y 4/3	
COARSE SAND	LOOSE	2.5Y 6/1	
		10YR 4/6	
	FIRM AND		
SILTY CLAY	VERY FIRM	5Y 5/1	5YR 3/3
		2.5Y 4/3	2.5Y 5/4
STRATIFIED LAYERS			
LIMIT	OF	TEST PIT	52"

Hydric	Slope %	Limiting Factor	Groundwater
■ Non-Hydric	0-3% (A)	<6"	☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SWANTON VARIANT FSL — Drainage: PD — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #3 ■ Test Pit ☐ Boring

4" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 2/1	
		10YR 4/4	
VERY FINE SANDY LOAM	VERY FRIABLE		
		10YR 3/6	
		10YR 4/4	
SANDY LOAM	FRIABLE	2.5Y 4/3	
FINE SANDY LOAM	FIRM	2.5Y 4/2	
			7.5YR 4/4
SANDY LOAM	VERY FIRM	2.5Y 5/3	
LOAMY SAND	LOOSE		
BEDROCK	AT	72"	

Hydric	Slope %	Limiting Factor	Groundwater
☐ Non-Hydric	0-3% (A)	30"	■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: BECKET STONY FSL — Drainage: WD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #4 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY FINE SANDYLOAM	VERY FRIABLE	10YR 2/1	
		10YR 3/6	
LOAM		10YR 4/4	
	FRIABLE		
VERY FINE SANDY LOAM			2.5Y 5/6
GRAVELLY SANDY LOAM	FIRM	2.5Y 5/3	
			7.5YR 4/4
SILTY CLAY LOAM	FIRM		
VFSL LAYERS	FRIABLE		
BEDROCK	AT	65"	

Hydric	Slope %	Limiting Factor	Groundwater
☐ Non-Hydric	3-8% (B)	26"	■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: ELMWOOD FSL — Drainage: MWD — H.S.G.: C

Professional Endorsements *(as applicable)*

C.S.S.				
	Signature:		Date:	8/1/2017
	Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #5 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 2/1	
VERY		10YR 3/3	
FINE	VERY		
SANDY	FRIABLE		
LOAM		10YR 4/6	
GRAVELLY			
FINE	FRIABLE	10YR 4/4	
SANDY			
LOAM			
			NONE
GRAVELLY			OBSERVED
SANDY	VERY	2.5Y 4/3	
LOAM	FIRM		
			UNDULATING
GRAVELLY	FRIABLE		BEDROCK
LOAMY	LOOSE	2.5Y 5/2	EDGE
SAND			TESTPIT
LOAMY	FIRM		
SAND	IN	2.5Y 5/3	
	PLACE		
BEDROCK	36"	AND	60"

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	3-8% (B)	22"	☐ Groundwater ■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #6 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAM	VERY	10YR 3/3	
	FRIABLE		
VERY		10YR 5/1	
FINE		7.5YR 2.5/2	
SANDY			
LOAM		7.5YR 4/6	
STONY	FRIABLE		
LOAM		10YR 4/4	
STONY			
SANDY			
LOAM		2.5Y 4/3	
			7.5YR 4/4
GRAVELLY			5Y 6/1
SANDY	FIRM	2.5Y 4/3	
LOAM			
COARSE		MIXED	
SAND			
LENSES	VERY		
	FIRM		
SANDY		2.5Y 4/3	
LOAM			
LIMIT	OF	TEST	PIT

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	0-3% (A)	36"	■ Groundwater ■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SKERRY STONY FSL — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #7 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
FINE		10YR 2/2	
SANDY	VERY	7.5YR 2.5/3	NONE
LOAM	FRIABLE		OBSERVED
LOAM		7.5YR 2.5/2	
BEDROCK	AT	8"	

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	0-3% (A)	8"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: LYMAN FSL — Drainage: SWED — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #8 ■ Test Pit ☐ Boring

1" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAM	VERY	10YR 3/2	
	FRIABLE		
VFSL		10YR 5/1	
		5YR 2.5/1	
	FRIABLE		
LOAM		7.5YR 3/3	
			7.5YR 3/3
STONY			
GRAVELLY	FIRM	10YR 5/3	
FINE			
SANDY			
LOAM			
SANDY	FRIABLE	2.5Y 4/3	
LOAM			
LOAMY			
SANDY	LOOSE	2.5Y 5/3	
BEDROCK	AT	56"	

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	3-8% (B)	21"	■ Groundwater ■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SKERRY VARIANT FSL — Drainage: MWD — H.S.G.: C

Professional Endorsements (as applicable)

C.S.S. Signature:		Date:	8/1/2017
Name:	DALE A. BREWER	License #:	C.S.S. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #9 ■ Test Pit ☐ Boring

1" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 3/2	
SILT LOAM	FRIABLE		5Y 6/1
		2.5Y 5/2	10YR 4/4
			2.5Y 4/3 5Y 6/1
SILTY CLAY LOAM	FIRM	5Y 4/2	
BEDROCK	AT	60"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
☐ Hydric ■ Non-Hydric	3-8% (B)	8"	■ Groundwater ■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: BOOTHBAY VARIANT SILT LOAM — Drainage: SWPD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #10 ■ Test Pit ☐ Boring

1" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VFSL		10YR 3/2	
	VERY FRIABLE	10YR 5/2	
		5YR 3/3	
FINE SANDY LOAM		7.5YR 4/4	
	FRIABLE	10YR 4/4	
LOAM			2.5Y 5/2 10YR 4/4
SILT LOAM SAND LENSES			
	FIRM	2.5Y 5/3	
GRAVELLY SANDY LOAM			
BEDROCK	AT	63"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
☐ Hydric ■ Non-Hydric	3-8% (B)	24"	■ Groundwater ■ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SKERRY VARIANT — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #11 ■ Test Pit ☐ Boring

1" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT LOAM	VERY FRIABLE	2.5Y 2.5/1	
		5Y 4/1	5Y 6/1
SILTY CLAY LOAM	FIRM	5Y 5/3	
SILTY CLAY	VERY FIRM	5Y 5/1	
BEDROCK	AT	46"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
■ Hydric ☐ Non-Hydric	0-3% (A)	6"	☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SCANTIC SILT LOAM VARIANT — Drainage: PD — H.S.G.: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #12 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
FSL	VERY FRIABLE	10YR 2/1	
LOAM	FRIABLE	7.5YR 3/4	
STONY FINE SANDY LOAM	FRIABLE LOOSE	7.5YR 3/2	
BEDROCK	AT	36"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
☐ Hydric ■ Non-Hydric	0-3% (A)	36"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C

Professional Endorsements *(as applicable)*

C.S.S.				
	Signature:		Date:	8/1/2017
	Name:	DALE A. BREWER	License #:	C.S.S. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #13 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0	FSL	VERY FRIABLE	10YR 2/1	
10	LOAM		7.5YR 3/4	
				NONE OBSERVED
20		FRIABLE		
	STONY FINE SANDY LOAM		7.5YR 3/2	
30				
40	BEDROCK	AT	40"	
50				
60				

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	8-15% C	40"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #14 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0		VERY FRIABLE	2.5Y 2.5/1	
10	SILT LOAM			5Y 5/1 10YR 4/4
		FRIABLE	2.5Y 3/3	5YR 3/4 2.5Y 3/1
20	BEDROCK RESTRICTION	OR AT	BOULDER 20"	
30				
40				
50				
60				

Hydric	Slope %	Limiting Factor	
■ Hydric ☐ Non-Hydric	0-3% (A)	4"	■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SCANTIC SILT LOAM — Drainage: PD — H.S.G.: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #15 ■ Test Pit ☐ Boring

_____ " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0	FSL	VERY FRIABLE	10YR 2/1	
10	LOAM		10YR 3/4	
		FRIABLE	7.5YR 3/4	
20				
30	LOAM GRADING TO SILT LOAM		2.5Y 4/3	5Y 6/1 5YR 4/4
40	SILT LOAM	FIRM VERY FIRM	2.5Y 4/3	5Y 6/1 7.5YR 4/4
50	BEDROCK	AT	50"	
60				

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	0-3% (A)	26"	■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE VARIANT FSL — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #16 ■ Test Pit ☐ Boring

3 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0		V FRIABLE	5YR 2.5/1 10YR 3/2	
10	LOAM		10YR 3/6	
		FRIABLE		
20				5Y 6/2 7.5YR 4/4
	FINE SANDY LOAM		10YR 4/4	
30	GRAVELLY SAND	LOOSE WEAK ORNSTEIN LAYER		
40	BEDROCK	AT	42"	
50				
60				

Hydric	Slope %	Limiting Factor	
☐ Hydric ■ Non-Hydric	0-3% (A)	20"	■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SKERRY VARIANT FSL — Drainage: MWD — H.S.G.: C

Professional Endorsements *(as applicable)*

C.S.S. Signature:		Date:	8/1/2017
Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #17 ■ Test Pit ☐ Boring

1" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0	FSL	VERY FRIABLE	10YR 2/1	
	LOAM		10YR 3/2	
10	FINE SANDY LOAM	FRIABLE	7.5YR 4/4	
20	LOAM		7.5YR 3/3	
				7.5YR 4/4
30	LOAMY SAND	FIRM	2.5Y 5/2	
40	SANDY LOAM	FRIABLE	2.5Y 5/2	
50	BEDROCK	AT	46"	
60				

☐ Hydric ■ Non-Hydric	Slope %	Limiting Factor	■ Groundwater ☐ Restrictive Layer ☐ Bedrock
	3-8% (B)	24"	

C.S.S. Soil Series / Phase Name: TUNBRIDGE VARIANT FSL — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #18 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0		VERY FRIABLE	10YR 3/2 7.5YR 3/3	
10	LOAM	FRIABLE	10YR 4/4	
20	GRAVELLY LOAM		10YR 4/4	
				2.5Y 4/1
30		FIRM		7.5YR 4/4
40	LOAM		2.5Y 4/2	
50	LOAMY SAND	VERY FIRM	2.5Y 4/2	
60	REFUSAL	AT	58"	

☐ Hydric ■ Non-Hydric	Slope %	Limiting Factor	■ Groundwater ☐ Restrictive Layer ☐ Bedrock
	0-3% (A)	24"	

C.S.S. Soil Series / Phase Name: SKERRY VARIANT FSL — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #19 ■ Test Pit ☐ Boring

2" " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0	VERY FINE SANDY LOAM	VERY FRIABLE	10YR 2/1 10YR 3/1 10YR 3/2	
10				NONE OBSERVED
	LOAM	FRIABLE	7.5YR 4/3	
20			10YR 4/4	
	BEDROCK	AT	26"	
30				
40				
50				
60				

☐ Hydric ■ Non-Hydric	Slope %	Limiting Factor	☐ Groundwater ☐ Restrictive Layer ■ Bedrock
	0-3% (A)	26"	

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #20 ■ Test Pit ☐ Boring

3 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Depth	Texture	Consistency	Color	Mottling
0	VERY FINE SANDY LOAM	VERY FRIABLE	10YR 2/1 10YR 3/1 10YR 3/2	
10			7.5YR 4/3	NONE OBSERVED
20	LOAM	FRIABLE	10YR 4/4	
30	BEDROCK	AT	34"	
40				
50				
60				

☐ Hydric ■ Non-Hydric	Slope %	Limiting Factor	☐ Groundwater ☐ Restrictive Layer ■ Bedrock
	8-15% C	34"	

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C

Professional Endorsements *(as applicable)*

C.S.S.				
	Signature:		Date:	8/1/2017
	Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE
DALE A BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #21 ■ Test Pit ☐ Boring

1 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY FINE SANDY LOAM	VERY FRIABLE	10YR 3/2	
		5YR 4/4	
LOAM	FRIABLE	10YR 4/1	
VFSL	FIRM	2.5Y 5/4	2.5Y 5/2 10YR 4/4
GRAVELLY LOAMY FINE SAND	FRIABLE	2.5Y 5/3	
BEDROCK	AT	44"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
■ Non-Hydric	8-15% C	24"	

C.S.S. Soil Series / Phase Name: TUNBRIDGE VARIANT FSL — Drainage: WD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #22 ■ Test Pit ☐ Boring

2 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 3/1	
SILT LOAM	VERY FRIABLE		
			5YR 3/3
		2.5Y 4/2	
SILTY CLAY LOAM	FIRM		
			5Y 4/3 5YR 3/3
SILTY CLAY	VERY FIRM	2.5Y 5/1	
SANDY LOAM MIXED LOAMY SAND	FRIABLE LOOSE	2.5Y 5/3	
BEDROCK	AT	60"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
■ Non-Hydric	0-3% (A)	<6"	

C.S.S. Soil Series / Phase Name: SCANTIC VARIANT SILT LOAM — Drainage: PD — H.S.G.: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #23 ■ Test Pit ☐ Boring

0 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY FRIABLE	10YR 3/3	
LOAM			
	FRIABLE	10YR 4/4	NONE OBSERVED
GRAVELLY LOAMY SAND	FIRM	10YR 4/4	
	LOOSE	2.5Y 4/3	
UNDULATING	BEDROCK	24" & 50"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
■ Non-Hydric	0-3% (A)	24"	■ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE FSL — Drainage: WD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP #24 ■ Test Pit ☐ Boring

3 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT LOAM	VERY FRIABLE	2.5Y 3/2	
	FRIABLE	2.5Y 4/2	5Y 6/1
FINE SANDY LOAM	FIRM IN PLACE	2.5Y 3/2 10YR 4/4	2.5Y 4/3 7.5YR 3/2
SILTY CLAY LOAM WITH MIXED SANDY LAYERS	FIRM	2.5Y 5/2	5Y 6/1 7.5YR 3/3
BEDROCK	AT	48"	

Hydric	Slope %	Limiting Factor	Groundwater / Restrictive Layer / Bedrock
■ Non-Hydric	0-3% (A)	6"	■ Bedrock

C.S.S. Soil Series / Phase Name: SWANTON VARIANT FSL — Drainage: PD — H.S.G.: C/D

Professional Endorsements *(as applicable)*

C.S.S.				
	Signature:		Date:	8/1/2017
	Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE DALE A. BREWER No. 304 CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #25 ■ Test Pit ☐ Boring

1 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VFSL	VERY	7.5YR 3/2	
LOAM	FRIABLE	7.5YR 3/3	
BEDROCK	AT	8"	

Hydric	Slope %	Limiting Factor	
☐ Non-Hydric	3-8% (B)	8"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: LYMAN LOAM — Drainage: SWED — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: TP #26 ■ Test Pit ☐ Boring

1 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAM	VERY FRIABLE	10YR 2/2	
SILT LOAM	FRIABLE	10YR 4/4	
			7.5YR 3/3
LOAM	FIRM	2.5Y 5/2	7.5YR 4/4 10YR 3/6
BEDROCK	@	40"	

Hydric	Slope %	Limiting Factor	
☐ Non-Hydric	0-3% (A)	18"	■ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: TUNBRIDGE VARIANT FSL — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: BOR #1 ☐ Test Pit ■ Boring

1 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY FINE SANDY LOAM	VERY FRIABLE	10YR 2/1 10YR 4/4	
FINE SANDY LOAM		7.5YR 3/4	
REFUSAL	AT	18"	

Hydric	Slope %	Limiting Factor	
☐ Non-Hydric	3-8% (B)	18"	☐ Groundwater ■ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: LYMAN LOAM — Drainage: SWED — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: BOR #2 ☐ Test Pit ■ Boring

2 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT LOAM	VERY FRIABLE	2.5Y 3/2	
			7.5YR 4/4 5Y 5/2
SILTY CLAY LOAM	FRIABLE	2.5Y 3/1	
SILTY CLAY	FIRM	5Y 4/1	
VERY FINE SANDY LOAM	FRIABLE	5Y 4/2	
SILTY CLAY	FIRM	5Y 5/2 5Y 5/1	
LIMIT	OF	BORING	

Hydric	Slope %	Limiting Factor	
■ Non-Hydric	0-3 (A)	<6"	■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SCANTIC SILT LOAM — Drainage: PD — H.S.G.: D

Professional Endorsements *(as applicable)*

C.S.S.				
Signature:		Date:	8/1/2017
Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: BOR #3 ☐ Test Pit ■ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VFSL	VERY FRIABLE	10YR 2/2	
FSL		7.5YR 3/4	
			N.O.
		10YR 4/4	
LOAM	FRIABLE		
		10YR 4/3	
REFUSAL	21"		

Hydric	Slope %	Limiting Factor	Groundwater
☐ Hydric ■ Non-Hydric	0-3% (A)	21"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: LYMAN LOAM — Drainage: SWED — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: BOR #4 ☐ Test Pit ■ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VFSL	VERY FRIABLE	10YR 3/2	
FSL		10YR 5/1	
		10YR 3/3	
		10YR 4/4	
SANDY LOAM	FRIABLE		
		10YR 3/6	
REFUSAL	18"		

Hydric	Slope %	Limiting Factor	Groundwater
☐ Hydric ■ Non-Hydric	3-8% (B)	18"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: LYMAN LOAM — Drainage: SWED — H.S.G.: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: BOR #5 ☐ Test Pit ■ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT LOAM	VERY FRIABLE	2.5Y 2.5/1	
VERY FINE SANDY LOAM	FRIABLE	2.5Y 4/2	5Y 4/1 5Y 4/3
SILTY CLAY LOAM	FIRM	5Y 4/2	7.5YR 3/3
LIMIT	OF	BORING	

Hydric	Slope %	Limiting Factor	Groundwater
■ Hydric ☐ Non-Hydric	0-3% (A)	6"	■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: SWANTON VARIANT FSL — Drainage: PD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: BOR #6 ☐ Test Pit ■ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VFSL	VERY FRIABLE	10YR 3/2 10YR 3/3	
FINE SANDY LOAM			NONE OBSERVED
	FRIABLE	7.5YR 3/3	
ASSUMED	BEDROCK	14"	

Hydric	Slope %	Limiting Factor	Groundwater
☐ Hydric ■ Non-Hydric	0-3% (A)	14"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: LYMAN LOAM — Drainage: SWED — H.S.G.: C/D

Professional Endorsements *(as applicable)*

C.S.S.				
	Signature:		Date:	8/1/2017
	Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE
DALE A BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM-F

SOIL PROFILE/CLASSIFICATION INFORMATION

DETAILED DESCRIPTIONS OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality)
CHASE CUSTOM HOMES	TERRADYN CONSULTANTS	LEWISTON

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: BOR #7 ☐ Test Pit ■ Boring

<1 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
FSL	VERY	10YR 2/1	NONE
S L	FRIABLE	10YR 4/4	OBSERVED
BEDROCK	4"	OR LESS	

Hydric	Slope %	Limiting Factor	
☐ Non-Hydric	8-15% (C)	4"	☐ Groundwater ☐ Restrictive Layer ■ Bedrock

C.S.S. Soil Series / Phase Name: ABRAM SANDY LOAM — Drainage: ED — H.S.G.: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Sym: BOR #8 ☐ Test Pit ■ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAM	VERY FRIABLE	10YR 2/2	
		10YR 4/6	
FINE SANDY LOAM	FRIABLE	10YR 4/4	
		2.5Y 4/3	7.5YR 4/4
		2.5Y 4/2	
LOAMY F SAND			
		2.5Y 4/2	
SILTY CLAY	FIRM AND VERY FIRM		
LIMIT POTENTIAL	OF BEDROCK	BORING BELOW	40"

Hydric	Slope %	Limiting Factor	
☐ Non-Hydric	3-8% (B)	18"	■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: ELMWOOD VARIANT (MOD DEEP) — Drainage: MWD — H.S.G.: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: ☐ Test Pit ☐ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling

Hydric	Slope %	Limiting Factor	
☐ Hydric ☐ Non-Hydric			☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: — Drainage: — H.S.G.:

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: ☐ Test Pit ☐ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling

Hydric	Slope %	Limiting Factor	
☐ Hydric ☐ Non-Hydric			■ Groundwater ☐ Restrictive Layer ☐ Bedrock

C.S.S. Soil Series / Phase Name: — Drainage: — H.S.G.:

Professional Endorsements *(as applicable)*

C.S.S.				
	Signature:		Date:	8/1/2017
	Name:	DALE A. BREWER	License#:	C.S.S. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

LOCATION MAP
NOT TO SCALE

SOIL SURVEY NOTES

1. THE WETLAND BOUNDARIES WERE DELINEATED IN APRIL AND MAY 2017 FOLLOWING THE U.S. ARMY CORPS OF ENGINEERS 1987 WETLAND MANUAL AND ITS UPDATED REGIONAL SUPPLEMENT.
2. THIS IS NOT A BOUNDARY PLAN AND DOES NOT REPRESENT ACCURATE PROPERTY BOUNDARIES. THE BASE MAP WAS PROVIDED FOR OUR USE AND THE WETLAND LINES SHOWN ARE REGISTERED TO THE PROVIDED MAP USING STATE PLANE COORDINATES AND "HOLDING" MONUMENTATION FOUND. A BOUNDARY SURVEY IS RECOMMENDED TO DEFINE THE PROPERTY BOUNDARIES AND ACCURATELY REGISTER THE WETLAND & SOIL BOUNDARIES.
3. A TRIMBLE GEO-XH GPS UNIT (SUB-METER) AND ZEPHYR ANTENNA WERE USED TO LOCATE TEST PIT LOCATIONS AND OTHER SITE FEATURES. THESE LOCATIONS COULD VARY FROM SURVEYED LOCATIONS.
4. FURTHER SOIL MAPPING MAY BE NEEDED DEPENDING ON THE PROPERTY LINE LIMITS.
5. FOR MORE INFORMATION PLEASE REFER TO THE CLASS B HIGH-INTENSITY SOIL SURVEY REPORT PREPARED FOR THIS PROJECT.
6. THIS SOIL SURVEY WAS COMPLETED DURING WINTER CONDITIONS AND CHECKED IN THE SPRING 2017.
7. PLEASE NOTE VARIABLE SOIL CONDITIONS MAY EXIST IN AREAS WHERE TEST PITS WERE NOT OBSERVED INCLUDING OUTCROPS, SHALLOW SOILS AND DRAINAGE. THE UNDERLYING BEDROCK IS UNDULATING AND MAY BE NEAR THE SURFACE IN AREAS THAT WERE NOT OR COULD NOT BE OBSERVED.

SOIL SURVEY LEGEND

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	H.S.G.
AbA	ABRAM	SANDY LOAM	0-3% (A)	ED (EXCESSIVE)	D
AbC	ABRAM	SANDY LOAM	8-15% (B)	ED (EXCESSIVE)	D
BeA	BECKET	FINE SANDY LOAM	0-3% (A)	WD (WELL)	C
BeC	BECKET	FINE SANDY LOAM	8-15% (C)	WD (WELL)	C
ByB	BOOTHBAY	SILT LOAM	3-8% (B)	SWPD (SOMEWHAT POORLY)	C
ElA	ELMWOOD	FINE SANDY LOAM	0-3% (A)	MWD (MODERATELY WELL)	C
ElB	ELMWOOD	FINE SANDY LOAM	3-8% (B)	MWD (MODERATELY WELL)	C
LyA	LYMAN	LOAM	0-3% (A)	SWED (SOMEWHAT EXCESSIVE)	C/D
LyB	LYMAN	LOAM	3-8% (B)	SWED (***)	C/D
LTA	LYMAN/TUNBRIDGE LOAM/FSL		0-3% (A)	SWED/WD	C/D-C
LTB	LYMAN/TUNBRIDGE LOAM/FSL		3-8% (B)	SWED/WD	C/D-C
LTC	LYMAN/TUNBRIDGE LOAM/FSL		8/15% (C)	SWED/WD	C/D-C
LTD	LYMAN/TUNBRIDGE LOAM/FSL		>15% (D)	SWED/WD	C/D-C
ScA	SCANTIC SILT LOAM		0-3% (A)	PD (POORLY)	D
SkA	SKERRY FINE SANDY LOAM		0-3% (A)	MW (MODERATELY WELL)	C
SkB	SKERRY FINE SANDY LOAM		3-8% (B)	MW (MODERATELY WELL0	C
SkC	SKERRY FINE SANDY LOAM		8-15% (C)	MW	C
SwA	SWANTON FINE SANDY LOAM		0-3% (A)	SWPD/PD (SW POORLY/POORLY	C/D
SwB	SWANTON FINE SANDY LOAM		3-8% (B)	SWPD/PD	C/D
SwC	SWANTON FINE SANDY LOAM		8-15% (C)	SWPD/PD	C/D
TuA	TUNBRIDGE FINE SANDY LOAM		0-3% (A)	WD (WELL)	C
TuC	TUNBRIDGE FINE SANDY LOAM		8-15% (C)	WD (WELL)	C
UdB	UDORTHENTS VARIABLE		3-8% (B)	VARIABLE	VARIABLE

SOIL SURVEY LEGEND

- IRON ROD OR PIPE FOUND
- TP #15 — TEST PIT
- BOR #7 — BORING
- STREAM OR DRAINAGE
- BEDROCK OUTCROP
- BOULDERY AREA
- POOL
- WETLAND BOUNDARY ±
- STONEWALL

GRAPHIC SCALE

0 40' 80' 160' 320'

THIS PLAN IS NOT TO BE ALTERED WITHOUT PERMISSION FROM STATEWIDE SURVEYS, INC AND ANY MODIFICATIONS WILL BE AT THE SOLE RESPONSIBILITY OF THE USER WITHOUT LIABILITY TO STATEWIDE SURVEYS, INC.

DALE A. BREWER
CERTIFIED SOIL SCIENTIST
C.S.S. #304

STATE OF MAINE — DALE A. BREWER No. 304 — CERTIFIED SOIL SCIENTIST

CLASS B HIGH-INTENSITY SOIL SURVEY

HOGAN ROAD, LEWISTON, MAINE
FOR
TERRADYN CONSULTANTS, LLC

STATEWIDE SURVEYS, INC.
LAND SURVEYORS & SOIL SCIENTISTS
35 EASTMAN ROAD, CAPE ELIZABETH, ME 04107
PHONE: (207) 767-4200

DRAWN BY: ECB	DATE:	JOB#	
TRACE BY: ECB	AUGUST, 2017	16027W	
CHECK BY: DAB	SCALE:	DRAWING #	
FIELD BOOK: WET	1"= 80'	ONE	

Revised 3/27/2018

STORMWATER MANAGEMENT PLAN

Lewiston Subdivision
Lewiston, Maine

The following Stormwater Management Plan has been prepared for the Hogan Road Subdivision Project to evaluate stormwater runoff and erosion control for the proposed 32 single family homes located on Hogan Road, in Lewiston, Maine.

Site Calculations

Total Property Area	35.3 Ac (+/-)
Re-Development Area	10.36 Ac
Total Project Impervious Area	5.27 Ac
Total New Impervious Area	5.27Ac
Total Developed Area	15.62 Ac

Existing Conditions

The development parcel is located on the southeast side of Hogan Road, in the City of Lewiston. The property is undeveloped. The majority of the site is forested. The site is located just upstream of Stetson Brook. Stetson Brook drains into the Androscoggin River. A copy of the composite U.S.G.S. Quadrangle Map (Lewiston) is attached to this submittal.

The existing area is located along a ridge line in Thorncrag Hill. Approximately 2/3 of the property drains toward Hogan Road with the remaining 1/3 draining to the rear of the property. The site is traversed by a series of forested wetlands that were delineated by Statewide Surveys, Inc. The site undulates in elevation and features a variety of slope conditions.

Proposed Development

The applicant proposes to create a subdivision with 32 single family homes. The roads will be accessed via a series of new roads. The roads were located to reduce wetland disturbance. Stormwater treatment will be provided by a series of stormwater ponds, roof drain filter strips & forested buffers.

Flooding

The development area is not located within an area of flood hazard according to the Federal Insurance Rate Map 230048 0015 B. See attached map.

Modeling Assumptions

The onsite stormwater facilities were sized utilizing the USDA Soil Conservation Service (SCS) TR-20 Runoff Simulation Model, as contained in the HydroCAD computer software program (Version 9.0). Runoff curve numbers were determined for each direct watershed by measuring the area of each hydrologic soil group within each type of land cover. Weighted curve numbers were then calculated using curve numbers for various cover types and hydrologic soil groups, assuming "good" conditions as defined in U.S Soil Conservation Service (SCS) publications. Times of concentration and travel times were determined from site topographic maps in accordance with SCS procedures. A maximum length of 150 feet was used for sheet flow.

All of the watersheds' peak runoff rates were analyzed for the 2, 10, and 25-year frequency, 24-hour duration storm events. A Type III rainfall distribution was applied to these storms. The rainfall amounts for Androscoggin County are as follows:

Storm Frequency Precipitation (in./24 hr)	
2-year	3.0
10-year	4.3
25-year	5.4

Soil delineation

The onsite soils were delineated from a Class A High Intensity Soil Survey that was conducted by Statewide Surveys, Inc. See Section 11 – Soils for the HISS. The offsite soils were found from the Androscoggin County Medium Intensity Soil Survey as shown on the Soil Data Viewer on the NRCS website (See attached map). The soil survey reports the watershed soils are generally hydrologic group C soils with relatively small inclusions of group B soils. We've taken the conservative approach of modeling all non-wetland soils as HSG C soils and all wetlands as HSG D. See attached map.

Water Quantity (Flooding Standard)

The following table summarizes the results of stormwater calculations for the design storm events for the project areas. Calculations and computer modeling sheets are provided with this report.

Table 1 - Stormwater Runoff Summary Table Pre-Development vs. Post-Development						
Study Point #	2Yr/24Hr (cfs)		10Yr/24Hr (cfs)		25Yr/24Hr (cfs)	
	Pre	Post	Pre	Post	Pre	Post
1	1.8	1.6	4.0	3.7	6.0	5.1
2	3.0	2.0	6.4	5.9	9.7	9.1
3	9.2	8.8	18.4	17.2	26.7	24.9
4	3.9	3.8	9.0	8.5	13.9	13.2
5	2.9	2.1	6.5	4.7	9.9	7.1

As the above result table shows, the post-development flow rates for the 2, 10, and 25-year/24 hour design storm events do not exceed the pre-development conditions.

Water Quality (BMP Standard)

The water quality requirements will be met by a series of forested buffers & the construction of two gravel wetlands & and underdrained filter basin. Additionally, roof drain filter strips will be used on lots 3-14, 19, 20, 22 & 23.

The impervious and developed treatment percentages are detailed below:

New Impervious Area: The project will result in the creation of approximately 223,065 SF of impervious area in the form of roadway, walkways, driveways & roof. A combination different BMPs will result in the treatment of approximately 211,965 SF of impervious area resulting in a treatment percentage of (211,965/223,065) x 100%= 95.02%.

Percentage of Treatment of the Impervious Area =95.02% (95% req'd)

Project Developed Area: The project will result in the creation of approximately 701,872 SF of developed area. The combination of BMPs will result in the treatment of approximately 576,219 SF of the developed area resulting in a treatment percentage of (576,219/701,872) x 100%= 82.10%

Percentage of Treatment of the Developed Area = 82.10% (80% required)

Housekeeping and Maintenance & Inspection guidelines are attached to this report.

BMP Sizing

Roof Dripline Filter Bed

We propose to provide treatment for some of the development roof runoff on select lots. The bed is required to provide volume for 1" of runoff from the contributing area and store it within a reservoir bed. The bed sizing per foot of roof length is as follows:

Area of Watershed: = 15 SF (assuming 15' to ridge line)
Treatment Volume Required: Area x runoff depth: 15 SF x 1/12 FT = 1.25 CF
Bed Sizing:
Porosity = 40% Bed Length = 1' Bed Width = 3' Bed Depth = 1.5
Available Volume= 1' x 3' x 1.5' x 0.40 = 1.8 CF.

Proposed Filter Beds will all be 3' wide x 1.5' deep.

Gravel Wetland #1

Forebay

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	440	0
276.5	670	278
277	900	670

Cell #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
273.1	2570	0
274	3173	2584
274.1	3240	2905

Cell #2

STAGE (FT)	AREA (SF)	STORAGE (CF)
273.1	2450	0
274	3035	2468
274.1	3100	2775

Total Pond

STAGE (FT)	AREA (SF)	STORAGE (CF)
273.1	5020	0
274	6208	5053
274.1	6300	5680
274.11	7500	5680
275	8245	12686
276.5	9500	24688

WATERSHED IMPERVIOUS AREA=	47143	SF
WATERSHED LANDSCAPED AREA=	50158	SF
REQUIRED WATER QUALITY VOLUME=	5601	CF
PROVIDED WATER QUALITY VOLUME=	5680	CF

Gravel Wetland #2

Forebay

STAGE (FT)	AREA (SF)	STORAGE (CF)
288.8	440	0
289.3	727	292
289.8	900	536

Cell #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
288.3	2150	0
289.3	2700	2425
289.6	2865	3260

Cell #2

STAGE (FT)	AREA (SF)	STORAGE (CF)
288.3	2150	0
289.3	2700	2425
289.6	2865	3260

Total Pond

STAGE (FT)	AREA (SF)	STORAGE (CF)
288.3	4740	0
289.3	6127	5142
289.6	6630	7056
289.61	7000	7056
290.3	8037	12017
292.4	11200	32845

WATERSHED IMPERVIOUS AREA=	37795	SF
WATERSHED LANDSCAPED AREA=	91927	SF
REQUIRED WATER QUALITY VOLUME=	6214	CF
PROVIDED WATER QUALITY VOLUME=	7056	CF

The required water quality volume was calculated by multiplying the impervious area by 1.0” and the landscaped area by 0.4”.

Filter Basin #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
287.75	2550	0
288	2782	667
289.25	3941	4868
290	4636	8085
290.6	5200	11044

WATERSHED IMPERVIOUS AREA=	36738	SF
WATERSHED LANDSCAPED AREA=	53817	SF
REQUIRED WATER QUALITY VOLUME=	4855	CF
PROVIDED WATER QUALITY VOLUME=	4868	CF

<u>Forested Buffer with Level Lip Spreader</u>

Level Spreader #1:
The buffer contains soils that are consistent with Soil Group C sandy loam or loamy sand. Half of the level spreader outlets to a forested buffer with a flow path of 150' and slope <8%. The other half outlets to a buffer with a flow path of 100' and slope >9%. *Table 5.5– Berm and Flow Path Length per Acre of Impervious Area* of the BMP manual shows that standard sizing for each half is 120' & 75', respectively per acre of impervious area and 36' & 33', respecticely per acre of lawn. We will use the averages of 97.5' per acre of impervious area & 33' per acre of pervious area. Evaluation of the watershed shows that it contains the following:

Impervious area = 0.718 Ac
Lawn area = 0.818 Ac

97.5'(0.718) + 33'(0.818)=70.0+27.0=97'. Proposed Level Spreader L=100'.

Level Spreader #2:
The buffer contains soils that are consistent with Soil Group C sandy loam or loamy sand. *Table 5.5– Berm and Flow Path Length per Acre of Impervious Area* of the BMP manual shows that standard sizing for a 75' flow path with slope >8% requires that the berm length for a forested buffer must be 125' per acre of impervious area and 35' per acre of lawn. Evaluation of the watershed shows that it contains the following:

Impervious area = 0.200 Ac
Lawn area = 0.292 Ac

Standard sizing: 125(0.200) + 35(0.292)=25.0' + 10.2'=35.2'. Proposed Length=36'.

Level Spreader #3:
The buffer contains soils that are consistent with Soil Group C sandy loam or loamy sand. *Table 8– Sizing Requirements for Buffer Based on Length of Road or Ditch* of the BMP manual shows that standard sizing for up to 200' of road & ditch is a 60' long flow path below a standard 20' long leve spreader. The flow path of the proposed level spreader/buffer combination equals 60'.

Level Spreader #4:
The buffer contains soils that are consistent with Soil Group C sandy loam or loamy sand. *Table 5.5– Berm and Flow Path Length per Acre of Impervious Area* of the BMP manual shows that standard sizing for a 100' flow path with slope >8% requires that the berm length for a forested buffer must be 100' per acre of impervious area and 30' per acre of lawn. Evaluation of the watershed shows that it contains the following:

Impervious area = 0.184 Ac
Lawn area = 0.505 Ac

Standard sizing: 100(0.184) + 30(0.505)=18.4'+15.2'=33.6'. Proposed Length=35'.

<u>Forested Buffer Adjacent to Residential Lot</u>

Adjacent to Lots 15-18 & 31
The buffer contains soils that are consistent with Soil Group C sandy loam or loamy sand. *Table 5.3 – Buffer Flow Path Length Downgradient of a Single Family Residential Lot of the BMP manual* shows that standard sizing requires that the standard length of flow path for a forested buffer to be 50'. The buffers adjacent to Lots #15-18 & 31 all meet or exceed this minimum standard.

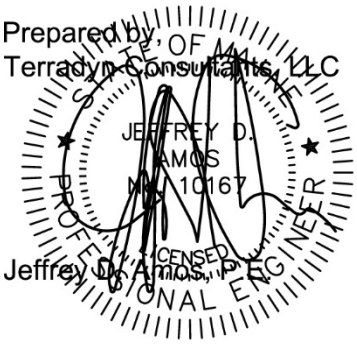
<u>Forested Buffer Adjacent to Road</u>

Moody Road from Intersection of Hallee's Way to Chase Road
Table 7 – Required Flow Path Length of a Buffer Receiving Road Runoff shows that the minimum length of flow path for this type of forested buffer shall be 35'. All buffers of this type meet or exceed this minimum standard.

Summary

Based on the results of this evaluation, the proposed stormwater design is not expected to cause flooding, erosion or other significant adverse effects downstream of the site.

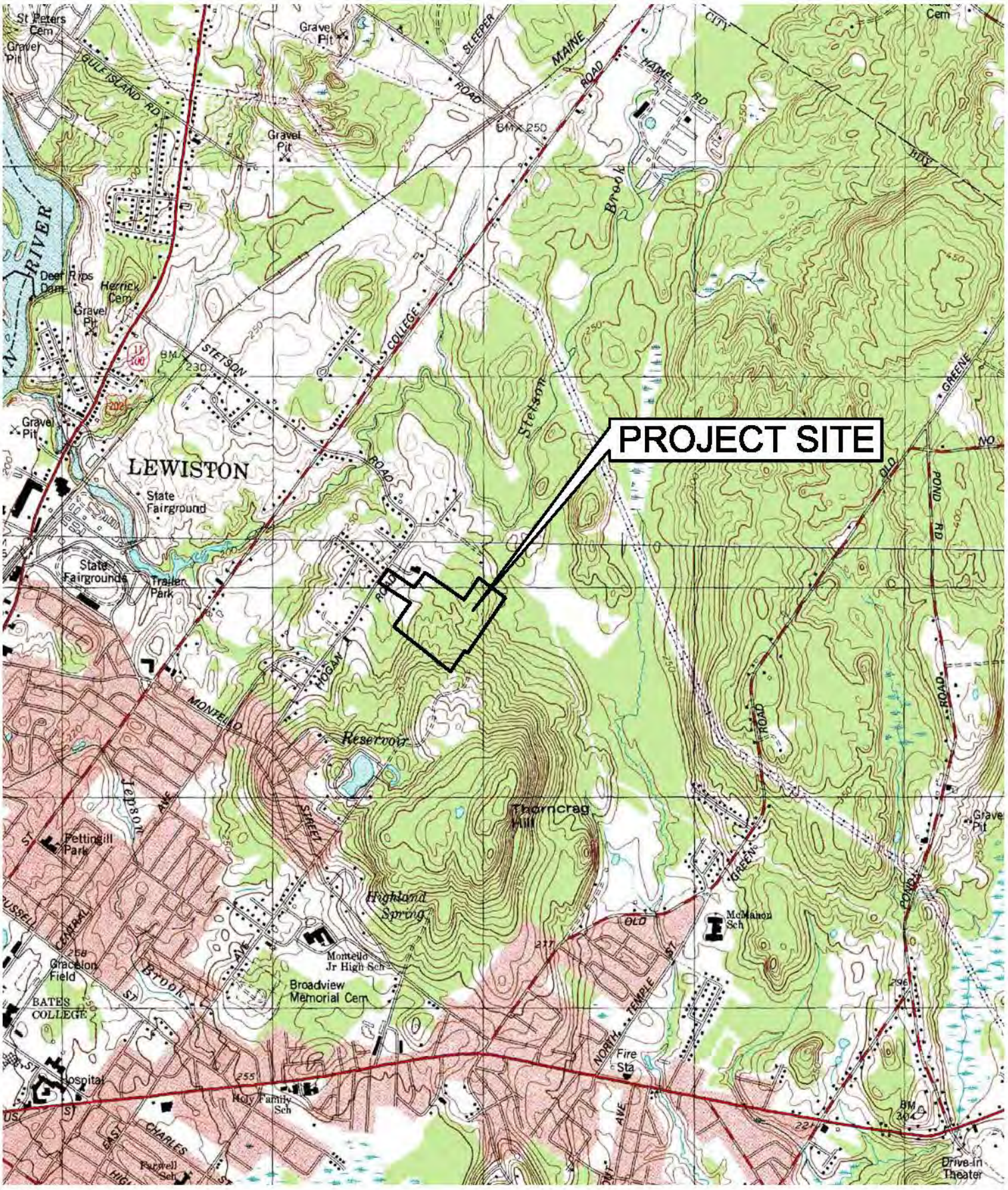
Prepared by:
Terradyn Consultants, LLC



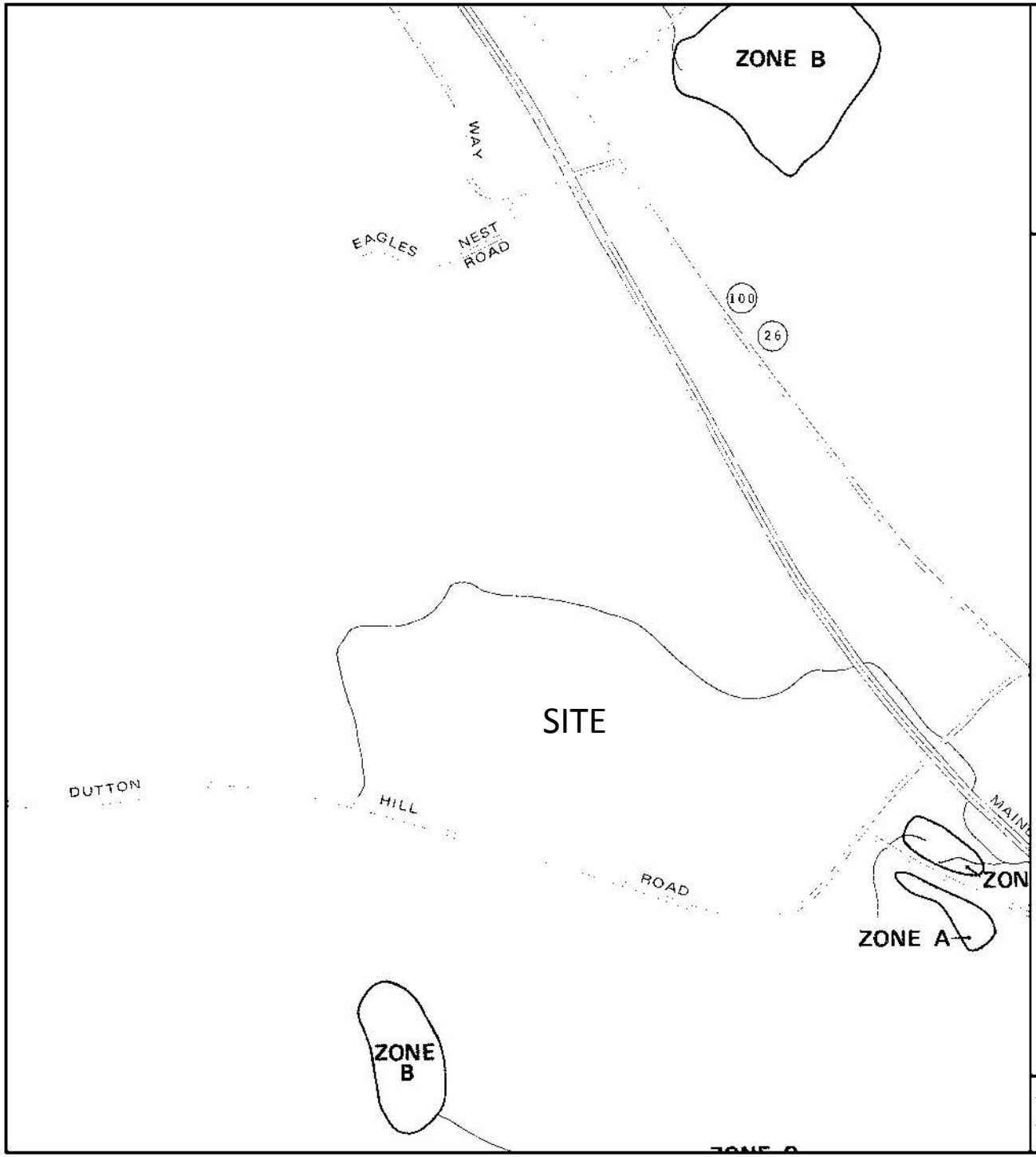
Jeffrey D. Amos, P.E.

Attached:

U.S.G.S. Quadrangle Map
FEMA Floodmap
NRCS Medium Intensity Soil Map
Water Quality Worksheet
Maintenance & Inspection of Stormwater Facilities
General Housekeeping Plan
Suggested Deed Restriction for Forested Buffer Language
Pre-Development HydroCAD Calculations
Post Development Hydrocad Calculations
Spillway Calculations – 25 & 100 year storms
Pre Development Watershed Map
Post Development Watershed Map



SHEET DESCRIPTION		JOB NO.	FIGURE
U.S.G.S. QUADRANGLE MAP SANCTUARY ESTATES, LEWISTON	TERRADYN CONSULTANTS, LLC P.O. Box 339 111 Elderberry Lane New Gloucester, ME 04260 Office: (207) 926-5111 Fax: (207) 221-1317 www.terradynconsultants.com	1660	1
PREPARED FOR		DATE	OF
CHASE CUSTOM HOMES & FINANCE 290 BRIDGTON ROAD WESTBROOK, ME 04092	Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting	10/4/2017	1
		SCALE	
		1"=2000'	



APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
GRAY, MAINE
CUMBERLAND COUNTY

PANEL 15 OF 15
(SEE MAP INDEX FOR PANELS NOT PRINTED)

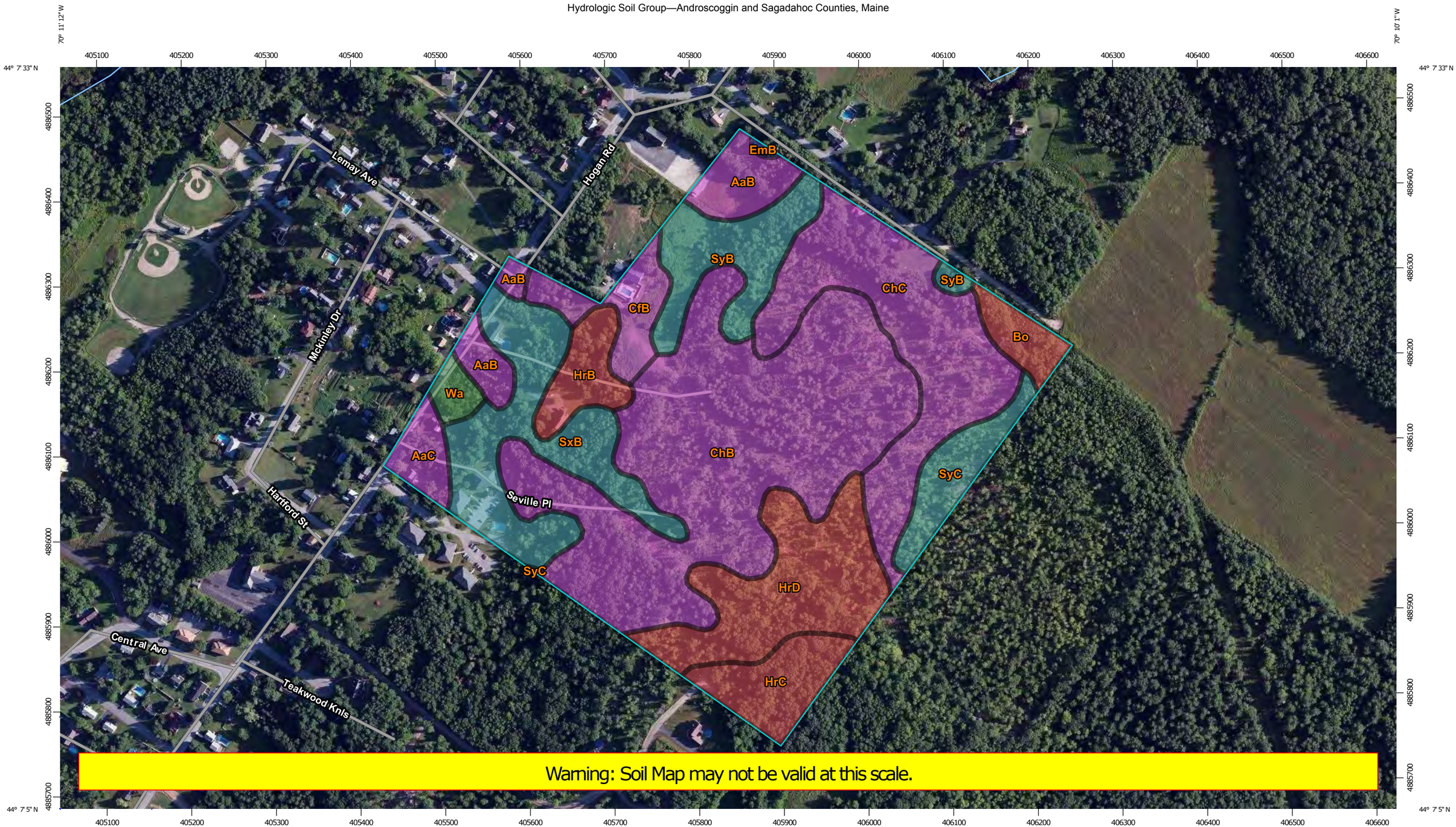
COMMUNITY-PANEL NUMBER
230048 0015 A

EFFECTIVE DATE:
JANUARY 6,1982

federal emergency management agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Hydrologic Soil Group—Androscoggin and Sagadahoc Counties, Maine



Map Scale: 1:4,250 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Androscoggin and Sagadahoc Counties, Maine
Survey Area Data: Version 17, Sep 15, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 20, 2010—Aug 29, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Androscoggin and Sagadahoc Counties, Maine (ME606)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AaB	Adams loamy sand, 0 to 8 percent slopes	A	3.4	4.5%
AaC	Adams loamy sand, 8 to 15 percent slopes	A	1.5	1.9%
Bo	Biddeford mucky peat, 0 to 3 percent slopes	D	1.5	2.0%
CfB	Charlton fine sandy loam, 0 to 8 percent slopes	A	2.6	3.4%
ChB	Charlton very stony fine sandy loam, 0 to 8 percent slopes	A	25.1	33.0%
ChC	Charlton very stony fine sandy loam, 8 to 15 percent slopes	A	11.3	14.9%
EmB	Elmwood fine sandy loam, 2 to 8 percent slopes	B	0.1	0.1%
HrB	Hollis fine sandy loam, 0 to 8 percent slopes	D	2.3	3.0%
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	D	3.2	4.2%
HrD	Hollis fine sandy loam, 15 to 45 percent slopes	D	8.1	10.7%
SxB	Sutton loam, 0 to 8 percent slopes	C	8.4	11.1%
SyB	Sutton very stony loam, 0 to 8 percent slopes	C	4.9	6.5%
SyC	Sutton very stony loam, 8 to 15 percent slopes	C	2.6	3.5%
Wa	Walpole fine sandy loam	A/D	0.8	1.1%
Totals for Area of Interest			**75.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Sanctuary Estates Water Quality Calculations

New Impervious Area (SF) =	223065
Total New Landscaped Area (SF)=	472758
Total Developed Area (SF) =	695823

Watershed	Lot #	New Impervious Area (SF)	Total Impervious Area Treated (SF)	New Landscaped Area	Total Landscaped Area Treated (SF)	Developed Area (SF)	Total Developed Area Treated (SF)	Incremental Treatment % (Impervious)	Incremental Treatment % (Developed)	BMP
S1-1	Roadway & Pond	0	0	20000	20000	20000	20000	0.00%	2.87%	Gravel Wetland #1
S1-2	Roadway	17500	17500	18484	18484	35984	35984	7.85%	5.17%	Gravel Wetland #1
S1-3	Roadway	10059	10059	12023	12023	22082	22082	4.51%	3.17%	Gravel Wetland #1
S1-4	Roadway	2433	2433	0	0	2433	2433	1.09%	0.35%	Gravel Wetland #1
S1-5	Roadway	3100	0	3000	0	6100	0	0.00%	0.00%	None
S2-1	Roadway & Pond	17200	17200	25927	25927	43127	43127	7.71%	6.20%	Gravel Wetland #2
S2-2	Roadway	10260	10260	10792	10792	21052	21052	4.60%	3.03%	Perimeter Buffer
S2-3	Roadway	2690	2690	2728	2728	5418	5418	1.21%	0.78%	Level Spreader #2
S3-1	Roadway	0	0	0	0	0	0	0.00%	0.00%	n/a
S3-2	Roadway	0	0	0	0	0	0	0.00%	0.00%	n/a
S4-1	Roadway	7609	7609	8119	8119	15728	15728	3.41%	2.26%	Level Spreader #1
S4-2	Roadway	4520	4520	3040	3040	7560	7560	2.03%	1.09%	Level Spreader #1
S4-3	Roadway	0	0	3053	0	3053	0	0.00%	0.00%	None
S4-4	Roadway	3561	3561	4000	4000	7561	7561	1.60%	1.09%	Level Spreader #1
S4-5	Roadway	3485	3485	0	0	3485	3485	1.56%	0.50%	Level Spreader #1
S4-6	Roadway	1952	1952	0	0	1952	1952	0.88%	0.28%	Level Spreader #1
S4-7	Roadway	5157	5157	9455	9455	14612	14612	2.31%	2.10%	Level Spreader #1
S5-1	Roadway	5246	5246	3815	3815	9061	9061	2.35%	1.30%	Filter Basin
S5-2	Roadway	3643	3643	0	0	3643	3643	1.63%	0.52%	Filter Basin
S5-3	Roadway & Pond	3150	3150	7322	7322	10472	10472	1.41%	1.50%	Filter Basin
S5-4	Roadway	0	0	0	0	0	0	0.00%	0.00%	n/a
	Lot 1	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #1
	Lot 2	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #1
	Lot 3	4000	4000	11000	5000	15000	9000	1.79%	1.29%	GW #1 & RDFS
	Lot 4	4000	4000	11000	5000	15000	9000	1.79%	1.29%	GW #1 & RDFS
	Lot 5	4000	3000	11000	5000	15000	8000	1.34%	1.15%	GW #1 & RDFS
	Lot 6	4000	1500	11000	0	15000	1500	0.67%	0.22%	Roof Drain Filter
	Lot 7	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Filter Basin
	Lot 8	4000	4000	11000	7500	15000	11500	1.79%	1.65%	Filter Basin & RDFS
	Lot 9	4000	4000	11000	7500	15000	11500	1.79%	1.65%	Filter Basin & RDFS
	Lot 10	4000	4000	11000	7500	15000	11500	1.79%	1.65%	Filter Basin & RDFS
	Lot 11	4000	2500	11000	2500	15000	5000	1.12%	0.72%	Filter Basin & RDFS
	Lot 12	4000	1500	11000	0	15000	1500	0.67%	0.22%	Roof Drain Filter
	Lot 13	4000	4000	11000	5000	15000	9000	1.79%	1.29%	LS #1 RDFS
	Lot 14	4000	4000	11000	5000	15000	9000	1.79%	1.29%	LS #1 RDFS
	Lot 15	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Perimeter Buffer
	Lot 16	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Perimeter Buffer
	Lot 17	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Perimeter Buffer
	Lot 18	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Perimeter Buffer
	Lot 19	4000	1500	11000	0	15000	1500	0.67%	0.22%	Roof Drain Filter
	Lot 20	4000	2000	11000	2500	15000	4500	0.90%	0.65%	Roof Drain Filter
	Lot 21	5500	5500	11000	11000	16500	16500	2.47%	2.37%	Level Spreader #4
	Lot 22	4000	4000	11000	5000	15000	9000	1.79%	1.29%	Level Spreader #4
	Lot 23	4000	4000	11000	5000	15000	9000	1.79%	1.29%	LS#2 & RDFS
	Lot 24	4000	4000	11000	5000	15000	9000	1.79%	1.29%	LS#2 & RDFS
	Lot 25	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #2
	Lot 26	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #2
	Lot 27	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #2

	Lot 28	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #2
	Lot 29	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #2
	Lot 30	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Gravel Wetland #2
	Lot 31	4000	4000	11000	11000	15000	15000	1.79%	2.16%	Perimeter Buffer
	Subtotal	223065	211965	472758	358205	699823	570170	95.02%	81.94%	

MAINTENANCE PLAN OF STORMWATER MANAGEMENT FACILITIES
FOR:
SANCTUARY ESTATES
LEWISTON, MAINE

Project Developer: Chase Custom Homes & Finance
290 Bridgton Road
Westbrook, ME 04092

Responsible Party: Sanctuary Estates Homeowners Association
290 Bridgton Road
Westbrook, ME 04092

Prepared By: Terradyn Consultants, LLC
PO Box 339
New Gloucester, ME 04260

LIST OF STORMWATER MEASURES:

Conveyance & Distribution System (Stormwater Channels & Culverts)
Level Spreaders
Roadways & Parking Surfaces
Catch Basin Systems
Stormwater Impoundment
Gravel Wetland
Underdrained Filter Basin
Buffers

INTRODUCTION:

The owner or operator of the proposed project will be responsible for the maintenance of all stormwater management structures except the rain gardens located on individual lots, the establishment of any contract services required to implement the program, and the keeping of records and maintenance log book. Records of all inspections and maintenance work accomplished must be kept on file and retained for a minimum 5 year time span. The maintenance log book will be made available to the DEP upon request. At a minimum, the appropriate and relevant activities for each of the stormwater management systems will be performed on the prescribed schedule.

INSPECTION & MAINTENANCE TASKS:

Inspections should be performed by qualified erosion control professional. NOTE: The following instruction are excerpts from the Maine Department of Environmental Protection's *Stormwater Management for Maine, Volume III BMPs Technical Design Manual*, dated January 2006.

CONVEYANCE & DISTRIBUTION SYSTEMS: (STORMWATER CHANNELS & CULVERTS, ETC.)

1. **Inspection schedule:**
   - **1.1.** Inspect ditches, swales and other open stormwater channels in the spring, in late fall, and after heavy rains to remove any obstructions to flow, remove accumulated sediments and debris, to control vegetated growth that could obstruct flow, and to repair any erosion of the ditch lining.

Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side-slopes.

1.2. Inspect culverts in the spring, in late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the culvert's inlet and outlet.

1.3. Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

2. **Mowing:** Grass should not be trimmed extremely short, as this will reduce the filtering effect of the swale (MPCA, 1989). The cut vegetation should be removed to prevent the decaying organic litter from adding pollutants to the discharge from the swale. The mowed height of the grass should be 2-4 inches taller than the maximum flow depth of the design water quality storm. A minimum mow height of 6 inches is generally recommended (Galli, 1993).

3. **Erosion:** It is important to install erosion and sediment control measures to stabilize this area as soon as possible and to retain any organic matter in the bottom of the trench.

4. **Fertilization:** Routine fertilization and/or use of pesticides is strongly discouraged. If complete re-seeding is necessary, half the original recommended rate of fertilizer should be applied with a full rate of seed.

5. **Sediment Removal:** The level of sediment deposition in the channel should be monitored regularly, and removed from grassed channels before permanent damage is done to the grassed vegetation, or if infiltration times are longer than 12 hours. Sediment should be removed from riprap channels when it reduces the capacity of the channel.

LEVEL SPREADERS:

1. **Inspections:** At least once a year and following major storms, the level spreader pool should be inspected for sand accumulation and debris that may reduce its capacity.

2. **Sediment Removal:** Sediment build-up within the swale should be removed when it has accumulated to approximately 25% of design volume or channel capacity. Dispose of the sediments appropriately.

3. **Debris:** Remove debris such as leaf litter, branches and tree growth from the spreader.

4. **Mowing***:* Vegetated spreaders may require mowing.

5. **Snow Storage:** Do not store snow within the area of the level spreader.

6. **Level Spreader Replacement:** The reconstruction of the level spreader may be necessary when sheet flow from the spreader channelize into the buffer.

ROADWAYS & PARKING SURFACES:

1. Paved surfaces shall be swept or vacuumed at least twice annually in the Spring to remove all Winter sand, and periodically during the year on an as-needed basis to minimize transportation of sediment during rainfall events.

CATCH BASIN SYSTEMS:

1. Catch basins are designed with a deep sump to trap larger sediment. Catch basins shall be inspected for sediment depth in the spring and fall, and accumulated sediment shall be removed and disposed of lawfully when it reaches 50% of the design capacity of the sump.

STORMWATER IMPOUNDMENT:

1. **Inspection schedule:** Inspect impoundment in the spring, in late fall, and after heavy rains to remove any obstructions to flow, remove accumulated sediments and debris, to control vegetated growth that could obstruct flow, and to repair any erosion to the bottom or sides of the impoundment. Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side-slopes.

   During the first year, the impoundment will be inspected semi-annually and following major storm events. Debris and sediment buildup shall be removed from the forebay and basin as needed. Mowing of a grassed basin can occur semiannually to a height no less than 6 inches. Any bare area or erosion rills shall be repaired with new sandy loam then seeded and mulched.

   Inspect culverts in the spring, in late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the culvert's inlet and outlet.

   Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

2. **Mowing:** Grass should not be trimmed extremely short. The cut vegetation should be removed to prevent the decaying organic litter from adding pollutants to the discharge from the swale. A minimum mow height of 6 inches is generally recommended.

3. **Fertilization:** Routine fertilization and/or use of pesticides is strongly discouraged. If complete re-seeding is necessary, half the original recommended rate of fertilizer should be applied with a full rate of seed.

4. **Sediment Removal:** The level of sediment deposition in the forebay and pond bottom should be monitored regularly, and removed before permanent damage is done to the grassed vegetation.

GRAVEL WETLANDS (FROM UNH SUBSURFACE GRAVEL WETLAND DESIGN SPECIFICATIONS MANUAL):

1ST YEAR POST-CONSTRUCTION: Inspection frequency should be after every major storm in the first year following construction.

1. Inspect to be certain system drains within 24-48 hours.
2. Watering plants as necessary during the first growing season
3. Re-vegetating poorly established areas as necessary
4. Quarterly inspection of soil and repairing eroded areas, especially on slopes & make timely repairs.
5. Checking inlets, outlets, and overflow spillway for blockage, structural integrity, and evidence of erosion. Risers may need to be cleaned.

POST-CONSTRUCTION: Inspection frequency should be at least every 6 months and after every major storm. Activities are expected to include:

1. Check the basin for a dense root mat establishment of wetland vegetation.
2. Check and clean the risers if there is evidence of standing water, discolored water or accumulated sediments in the cells.
3. Check and clean the forebay for sediments, trash and debris. When sediments have accumulated to a depth of 12 inches, standing water is persistent or wetland vegetation become established, the forebay will need to be excavated and reformed.
4. Verify that the cells drain within 24-48 hours. Sediment will need to be removed when an accumulation of 4 inches is evident over the wetland surface.
5. Check and clean all outlets and overflow spillway if blocked or there is evidence of structural damage or erosion.
6. Remove decaying vegetation, litter and debris.
7. Check for foreign species. Particular care must be used to avoid the unintended introduction of invasive species such as purple loosestrife (Lythrum salicaria) and common reed (Phragmites australis). It is recommended that a qualified wetland biologist be consulted when these are found in the area of the gravel wetland.

CLEANING CRITERIA FOR SEDIMENTATION FOREBAY: Sediment should be removed from the sedimentation chamber (forebay) when it accumulates to a depth of more than 12 inches (30 cm) or 10 percent of the pretreatment volume. The sedimentation forebay should be cleaned of vegetation if persistent standing water and wetland vegetation becomes dominant. The cleaning interval is approximately every 4 years. A dry sedimentation forebay is the optimal condition while in practice this condition is rarely achieved. The sedimentation chamber, forebay, and treatment cell outlet devices should be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however, this equipment should not track on the wetland surface. Revegetation of disturbed areas as necessary. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

CLEANING CRITERIA FOR GRAVEL WETLAND TREATMENT CELLS: Sediment should be removed from the gravel wetland surface when it accumulates to a depth of several inches (>10 cm) across the wetland

surface. Materials should be removed with rakes rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

Grassed Underdrained Soil Filter

During the first year, the basin will be inspected semi-annually and following major storm events. Debris and sediment buildup shall be removed from the forebay and basin as needed. Mowing of a grassed basin can occur semiannually to a height no less than 6 inches. Any bare area or erosion rills shall be repaired with new filter media or sandy loam then seeded and mulched. Maintaining good grass cover will minimize clogging with fine sediments and if ponding exceeds 48 hours, the top of the filter bed must be rototilled to reestablish the soil's filtration capacity.

Maintenance Agreement: A legal entity should be established with responsibility for inspecting and maintaining any underdrained filter. The legal agreement establishing the entity should list specific maintenance responsibilities (including timetables) and provide for the funding to cover long-term inspection and maintenance.

Soil Filter Inspection: The soil filter should be inspected after every major storm in the first year to be sure it is functioning properly. Thereafter, the filter should be inspected at least once every six months to ensure that it is draining within 48 hours following a one inch storm or greater. And that following a storms that fill the system to overflow, it drains in no less than 36 to 6o hours. If the system drains too fast, an orifice may need to be added on the underdrain outlet or, if already present, may need to be modified. Soil

Filter Replacement: The top several inches of the filter shall be replaced with fresh material when water ponds on the surface of the bed for more than 72 hours. The removed sediments should be disposed of in an acceptable manner.

Sediment Removal: Sediment and plant debris should be removed from the pretreatment structure at least annually.

Mowing: If mowing is desired, only hand held string trimmers or push-mowers are allowed on the filter (no tractor) and the grass bed should be mowed no more than 2 times per growing season to maintain grass heights of no less than 6 inches.

Fertilization: Fertilization of the underdrained filter area should be avoided unless absolutely necessary to establish vegetation.

Harvesting and Weeding: Harvesting and pruning of excessive growth will need to be done occasionally. Weeding to control unwanted or invasive plants may also be necessary. Add new mulch only as necessary for bioretention cell.

VEGETATED STORMWATER BUFFERS

Buffers should be inspected annually for evidence of erosion or concentrated flows through or around the buffer. All eroded areas should be repaired, seeded and mulched.

1. Mowing: Meadow buffers may be mown no more than twice per year. They may not be maintained as a lawn.

2. Access and Use: Buffers should not be traversed by all-terrain vehicles or other vehicles. Activities within buffers should be conducted so as not to damage vegetation, disturb any organic duff layer, or expose soil.

3. Inspections: Conduct periodic "buffer walks" to inspect the condition of the buffer network.

SAMPLE MAINTENANCE LOG SHEET:

Maintenance Log Sheet			
BMP's	**Date Inspected**	**Repairs Needed?**	**Date Repaired**
Example	8/17/2017	Y	8/27/2017
1. Conveyance & Distribution System			
2. Level Spreaders			
3. Roadways & Parking			
4. Catch Basin Systems			
5. Stormwater Impoundment			
6. Gravel Wetland			
7. Underdrained Filter Basin			
8. Vegetated Stormwater Buffer			

Detailed Repair Notes:		
BMP Type	**Date**	**Description of Repair Made**
3	8/27/2017	Removed sediment from sump

HOUSEKEEPING PERFORMANCE STANDARDS
FOR:
SANCTUARY ESTATES
LEWISTON, MAINE

Project Developer: Chase Custom Homes & Finance
290 Bridgton Road
Westbrook, ME 04092

Responsible Party: Sanctuary Estates Homeowners Association
290 Bridgton Road
Westbrook, ME 04092

Introduction:
The contractor shall be responsible for maintaining proper housekeeping standards throughout the construction phase of the project. After the construction phase has been completed, the owner or operator of the project will be responsible.

Standards:
In accordance with the housekeeping performance standards required by MDEP chapter 500 stormwater regulations, the following standards shall be met:

1. **Spill prevention.** Controls must be used to prevent pollutants from being discharged from materials on site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.
2. **Groundwater protection.** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

3. **Fugitive sediment and dust.** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

   Operations during wet months that experience tracking of mud off the site onto public roads should provide for sweeping of road areas at least once a week and prior to significant storm events. Where chronic mud tracking occurs, a stabilized construction entrance should be provided. Operations during dry months, that experience fugitive dust problems, should wet down the access roads once a week or more frequently as needed.

4. **Debris and other materials.** Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

   To prevent these materials from becoming a source of pollutants, construction and post-construction activities related to a project may be required to comply with applicable

provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

5. **Trench or foundation de-watering.** Trench de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the department.

6. **Non-stormwater discharges.** Identify and prevent contamination by non-stormwater discharges.

APPENDIX G. Suggested templates for deed restrictions and conservation easements for use under the Stormwater Management Law

1. Forested buffer, limited disturbance

DECLARATION OF RESTRICTIONS (Forested Buffer, Limited Disturbance)

THIS DECLARATION OF RESTRICTIONS is made this _____day of _____, 20___,
by _____ , _____,
(name) (street address)
_____, _____County, Maine, _____, (herein referred to as the
(city or town) (county) (zip code)
"Declarant"), pursuant to a permit received from the Maine Department of Environmental Protection under the Stormwater Management Law, to preserve a buffer area on a parcel of land near
_____,_____ .
(road name) (known feature and/or town)

WHEREAS, the Declarant holds title to certain real property situated in _____, Maine
(town)
described in a deed from_____ to _____dated
(name) (name of Declarant)
_____, 20____, and recorded in Book ____ Page ____ at the _____County Registry of Deeds, herein referred to as the "property"; and

WHEREAS, Declarant desires to place certain restrictions, under the terms and conditions herein, over a portion of said real property (hereinafter referred to as the "Restricted Buffer") described as follows: (Note: Insert description of restricted buffer area location here)

WHEREAS, pursuant to the Stormwater Management Law, 38 M.R.S. Section 420-D and Chapter 500 of rules promulgated by the Maine Board of Environmental Protection ("Stormwater Management Rules"), Declarant has agreed to impose certain restrictions on the Restricted Buffer Area as more particularly set forth herein and has agreed that these restrictions may be enforced by the Maine Department of Environmental Protection or any successor (hereinafter the "MDEP"),

NOW, THEREFORE, the Declarant hereby declares that the Restricted Buffer Area is and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth herein. The Restrictions shall run with the Restricted Buffer Area and shall be binding on all parties having any right, title or interest in and to the Restricted Buffer Area, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Restricted Buffer Area or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Covenant Area or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Restricted Buffer Area subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1. **Restrictions on Restricted Buffer Area**. Unless the owner of the Restricted Buffer Area, or any successors or assigns, obtains the prior written approval of the MDEP, the Restricted Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Restricted Buffer Area to filter and absorb stormwater, and to maintain compliance with the Stormwater Management Law and the permit issued thereunder to the Declarant, the use of the Restricted Buffer Area is hereinafter limited as follows.

   a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Restricted Buffer Area, nor may the topography of the area be altered or manipulated in any way;

   b. Any removal of trees or other vegetation within the Restricted Buffer Area must be limited to the following:

      (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees" is defined as maintaining a minimum rating score of 24 points in any 25 foot by 50 foot rectangle (1,250 square feet) area, as determined by the rating scheme in Table 11:

Table 11.
Point System for Determining an Evenly Distributed Stand of Trees

Diameter of tree at 4½ feet above ground level	Points
2 - 4 inches	1
4 - 8 inches	2
8 - 12 inches	4
>12 inches	8

      Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, windblown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

      (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;

   c. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole (whether constructed of wood, steel or other materials) and appurtenant equipment such as guys and guy anchors, or fence;

   d. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

   e. Any level lip spreader directing flow to the Restricted Buffer Area must be regularly inspected and adequately maintained to preserve the function of the level spreader.

Any activity on or use of the Restricted Buffer Area inconsistent with the purpose of these Restrictions is prohibited. Any future alterations or changes in use of the Restricted Buffer Area must receive prior approval in writing from the MDEP. The MDEP may approve such alterations and changes in use if such alterations and uses do not impede the stormwater control and treatment capability of the Restricted Buffer Area or if adequate and appropriate alternative means of stormwater control and treatment are provided.

2. **Enforcement**. The MDEP may enforce any of the Restrictions set forth in Section 1 above.

3. **Binding Effect**. The restrictions set forth herein shall be binding on any present or future owner of the Restricted Buffer Area. If the Restricted Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Restricted Buffer Area is included within such owner's property.

4. **Amendment**. Any provision contained in this Declaration may be amended or revoked only by the recording of a written instrument or instruments specifying the amendment or the revocation signed by the owner or owners of the Restricted Buffer Area and by the MDEP.

5. **Effective Provisions of Declaration**. Each provision of this Declaration, and any agreement, promise, covenant and undertaking to comply with each provision of this Declaration, shall be deemed a land use restriction running with the land as a burden and upon the title to the Restricted Buffer Area.

6. **Severability**. Invalidity or unenforceability of any provision of this Declaration in whole or in part shall not affect the validity or enforceability of any other provision or any valid and enforceable part of a provision of this Declaration.

7. **Governing Law**. This Declaration shall be governed by and interpreted in accordance with the laws of the State of Maine.

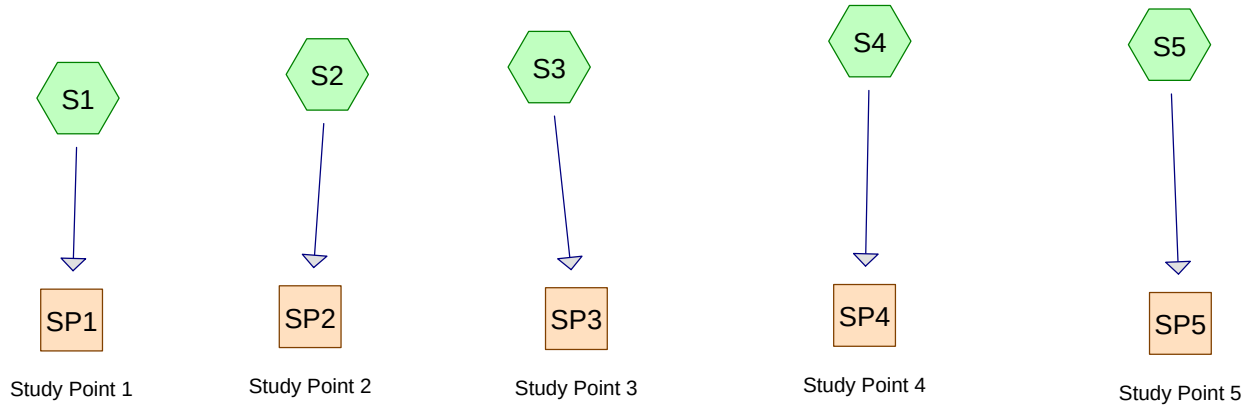
_____
(NAME)

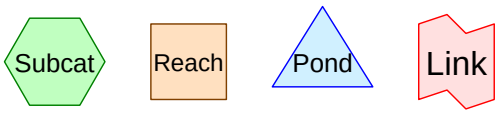
STATE OF MAINE_____ County, _____, 20__.
(County) (date)

Personally appeared before me the above named _____, who swore to the truth of the foregoing to the best of (his/her) knowledge, information and belief and acknowledged the foregoing instrument to be (his/her) free act and deed.

_____
Notary Public

_____





Drainage Diagram for 1660 Pre
Prepared by {enter your company name here}, Printed 1/14/2018
HydroCAD® 9.00 s/n 03654 © 2009 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: Runoff Area=175,926 sf 7.92% Impervious Runoff Depth>0.76"
Flow Length=603' Tc=39.8 min CN=73 Runoff=1.84 cfs 0.257 af

Subcatchment S2: Runoff Area=346,810 sf 5.67% Impervious Runoff Depth>0.76"
Flow Length=1,230' Tc=57.0 min CN=73 Runoff=2.96 cfs 0.503 af

Subcatchment S3: Runoff Area=913,604 sf 3.55% Impervious Runoff Depth>0.95"
Flow Length=2,234' Tc=67.3 min CN=77 Runoff=9.24 cfs 1.667 af

Subcatchment S4: Runoff Area=457,381 sf 0.10% Impervious Runoff Depth>0.67"
Flow Length=991' Tc=43.8 min CN=71 Runoff=3.90 cfs 0.589 af

Subcatchment S5: Runoff Area=360,584 sf 0.40% Impervious Runoff Depth>0.71"
Flow Length=1,034' Tc=55.7 min CN=72 Runoff=2.89 cfs 0.492 af

Reach SP1: Study Point 1 Inflow=1.84 cfs 0.257 af
Outflow=1.84 cfs 0.257 af

Reach SP2: Study Point 2 Inflow=2.96 cfs 0.502 af
Outflow=2.96 cfs 0.502 af

Reach SP3: Study Point 3 Inflow=9.24 cfs 1.665 af
Outflow=9.24 cfs 1.665 af

Reach SP4: Study Point 4 Inflow=3.90 cfs 0.587 af
Outflow=3.90 cfs 0.587 af

Reach SP5: Study Point 5 Inflow=2.89 cfs 0.491 af
Outflow=2.89 cfs 0.491 af

Total Runoff Area = 51.752 ac Runoff Volume = 3.508 af Average Runoff Depth = 0.81"
96.98% Pervious = 50.191 ac 3.02% Impervious = 1.561 ac

Summary for Subcatchment S1:

Runoff = 1.84 cfs @ 12.61 hrs, Volume= 0.257 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	123,980	70	Woods, Good, HSG C
*	8,742	98	Bedrock Surface
	43,204	77	2 acre lots, 12% imp, HSG C
	175,926	73	Weighted Average
	162,000		92.08% Pervious Area
	13,926		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
2.6	178	0.0510	1.13		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
4.8	275	0.0360	0.95		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
39.8	603	Total			

Summary for Subcatchment S2:

Runoff = 2.96 cfs @ 12.85 hrs, Volume= 0.503 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	62,276	77	Woods, Good, HSG D, Wetland
*	19,217	98	Bedrock
	3,824	82	2 acre lots, 12% imp, HSG D
	4,533	77	Woods, Good, HSG D
	8,252	71	Meadow, non-grazed, HSG C
	248,708	70	Woods, Good, HSG C
	346,810	73	Weighted Average
	327,134		94.33% Pervious Area
	19,676		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.6	150	0.0530	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
0.7	60	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
20.7	1,020	0.0270	0.82		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
57.0	1,230	Total			

Summary for Subcatchment S3:

Runoff = 9.24 cfs @ 12.96 hrs, Volume= 1.667 af, Depth> 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	11,411	98	Bedrock
*	337,450	77	Woods, Good, HSG D/Wetlands
	175,471	82	2 acre lots, 12% imp, HSG D
	169,559	78	Meadow, non-grazed, HSG D
	7,837	91	Gravel roads, HSG D
	211,876	70	Woods, Good, HSG C
	913,604	77	Weighted Average
	881,136		96.45% Pervious Area
	32,468		3.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.6	527	0.0510	1.58		**Shallow Concentrated Flow, B - C** Short Grass Pasture Kv= 7.0 fps
7.8	656	0.0780	1.40		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
5.9	449	0.0650	1.27		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
0.9	92	0.1080	1.64		**Shallow Concentrated Flow, E - F** Woodland Kv= 5.0 fps
4.1	360	0.0860	1.47		**Shallow Concentrated Flow, F - G** Woodland Kv= 5.0 fps
67.3	2,234	Total			

Summary for Subcatchment S4:

Runoff = 3.90 cfs @ 12.68 hrs, Volume= 0.589 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	87,010	77	Woods, Good, HSG D, Wetland
*	474	98	Bedrock
	369,897	70	Woods, Good, HSG C
	457,381	71	Weighted Average
	456,907		99.90% Pervious Area
	474		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	150	0.0900	0.09		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
7.9	271	0.0130	0.57		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
7.1	570	0.0720	1.34		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
43.8	991	Total			

Summary for Subcatchment S5:

Runoff = 2.89 cfs @ 12.83 hrs, Volume= 0.492 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	83,225	77	Woods, Good, HSG D, Wetland
*	1,442	98	Bedrock
	25,143	71	Meadow, non-grazed, HSG C
	250,774	70	Woods, Good, HSG C
	360,584	72	Weighted Average
	359,142		99.60% Pervious Area
	1,442		0.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	150	0.0570	0.07		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.5	142	0.0970	1.56		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
19.6	742	0.0160	0.63		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
55.7	1,034	Total			

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.039 ac, 7.92% Impervious, Inflow Depth > 0.76" for 2 year event
Inflow = 1.84 cfs @ 12.61 hrs, Volume= 0.257 af
Outflow = 1.84 cfs @ 12.66 hrs, Volume= 0.257 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.962 ac, 5.67% Impervious, Inflow Depth > 0.76" for 2 year event
Inflow = 2.96 cfs @ 12.85 hrs, Volume= 0.502 af
Outflow = 2.96 cfs @ 12.90 hrs, Volume= 0.502 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 20.973 ac, 3.55% Impervious, Inflow Depth > 0.95" for 2 year event
Inflow = 9.24 cfs @ 12.96 hrs, Volume= 1.665 af
Outflow = 9.24 cfs @ 13.01 hrs, Volume= 1.665 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.500 ac, 0.10% Impervious, Inflow Depth > 0.67" for 2 year event
Inflow = 3.90 cfs @ 12.68 hrs, Volume= 0.587 af
Outflow = 3.90 cfs @ 12.73 hrs, Volume= 0.587 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.278 ac, 0.40% Impervious, Inflow Depth > 0.71" for 2 year event
Inflow = 2.89 cfs @ 12.83 hrs, Volume= 0.491 af
Outflow = 2.89 cfs @ 12.88 hrs, Volume= 0.491 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: Runoff Area=175,926 sf 7.92% Impervious Runoff Depth>1.59"
Flow Length=603' Tc=39.8 min CN=73 Runoff=3.99 cfs 0.534 af

Subcatchment S2: Runoff Area=346,810 sf 5.67% Impervious Runoff Depth>1.57"
Flow Length=1,230' Tc=57.0 min CN=73 Runoff=6.43 cfs 1.044 af

Subcatchment S3: Runoff Area=913,604 sf 3.55% Impervious Runoff Depth>1.85"
Flow Length=2,234' Tc=67.3 min CN=77 Runoff=18.35 cfs 3.241 af

Subcatchment S4: Runoff Area=457,381 sf 0.10% Impervious Runoff Depth>1.45"
Flow Length=991' Tc=43.8 min CN=71 Runoff=8.95 cfs 1.266 af

Subcatchment S5: Runoff Area=360,584 sf 0.40% Impervious Runoff Depth>1.51"
Flow Length=1,034' Tc=55.7 min CN=72 Runoff=6.47 cfs 1.039 af

Reach SP1: Study Point 1 Inflow=3.99 cfs 0.533 af
Outflow=3.99 cfs 0.533 af

Reach SP2: Study Point 2 Inflow=6.43 cfs 1.043 af
Outflow=6.43 cfs 1.043 af

Reach SP3: Study Point 3 Inflow=18.35 cfs 3.237 af
Outflow=18.35 cfs 3.237 af

Reach SP4: Study Point 4 Inflow=8.95 cfs 1.264 af
Outflow=8.95 cfs 1.264 af

Reach SP5: Study Point 5 Inflow=6.47 cfs 1.038 af
Outflow=6.47 cfs 1.038 af

Total Runoff Area = 51.752 ac Runoff Volume = 7.124 af Average Runoff Depth = 1.65"
96.98% Pervious = 50.191 ac 3.02% Impervious = 1.561 ac

Summary for Subcatchment S1:

Runoff = 3.99 cfs @ 12.58 hrs, Volume= 0.534 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	123,980	70	Woods, Good, HSG C
*	8,742	98	Bedrock Surface
	43,204	77	2 acre lots, 12% imp, HSG C
	175,926	73	Weighted Average
	162,000		92.08% Pervious Area
	13,926		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
2.6	178	0.0510	1.13		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
4.8	275	0.0360	0.95		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
39.8	603	Total			

Summary for Subcatchment S2:

Runoff = 6.43 cfs @ 12.81 hrs, Volume= 1.044 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	62,276	77	Woods, Good, HSG D, Wetland
*	19,217	98	Bedrock
	3,824	82	2 acre lots, 12% imp, HSG D
	4,533	77	Woods, Good, HSG D
	8,252	71	Meadow, non-grazed, HSG C
	248,708	70	Woods, Good, HSG C
	346,810	73	Weighted Average
	327,134		94.33% Pervious Area
	19,676		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.6	150	0.0530	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
0.7	60	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
20.7	1,020	0.0270	0.82		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
57.0	1,230	Total			

Summary for Subcatchment S3:

Runoff = 18.35 cfs @ 12.93 hrs, Volume= 3.241 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	11,411	98	Bedrock
*	337,450	77	Woods, Good, HSG D/Wetlands
	175,471	82	2 acre lots, 12% imp, HSG D
	169,559	78	Meadow, non-grazed, HSG D
	7,837	91	Gravel roads, HSG D
	211,876	70	Woods, Good, HSG C
	913,604	77	Weighted Average
	881,136		96.45% Pervious Area
	32,468		3.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.6	527	0.0510	1.58		**Shallow Concentrated Flow, B - C** Short Grass Pasture Kv= 7.0 fps
7.8	656	0.0780	1.40		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
5.9	449	0.0650	1.27		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
0.9	92	0.1080	1.64		**Shallow Concentrated Flow, E - F** Woodland Kv= 5.0 fps
4.1	360	0.0860	1.47		**Shallow Concentrated Flow, F - G** Woodland Kv= 5.0 fps
67.3	2,234	Total			

Summary for Subcatchment S4:

Runoff = 8.95 cfs @ 12.64 hrs, Volume= 1.266 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	87,010	77	Woods, Good, HSG D, Wetland
*	474	98	Bedrock
	369,897	70	Woods, Good, HSG C
	457,381	71	Weighted Average
	456,907		99.90% Pervious Area
	474		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	150	0.0900	0.09		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
7.9	271	0.0130	0.57		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
7.1	570	0.0720	1.34		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
43.8	991	Total			

Summary for Subcatchment S5:

Runoff = 6.47 cfs @ 12.80 hrs, Volume= 1.039 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	83,225	77	Woods, Good, HSG D, Wetland
*	1,442	98	Bedrock
	25,143	71	Meadow, non-grazed, HSG C
	250,774	70	Woods, Good, HSG C
	360,584	72	Weighted Average
	359,142		99.60% Pervious Area
	1,442		0.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	150	0.0570	0.07		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.5	142	0.0970	1.56		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
19.6	742	0.0160	0.63		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
55.7	1,034	Total			

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.039 ac, 7.92% Impervious, Inflow Depth > 1.58" for 10-year event
Inflow = 3.99 cfs @ 12.58 hrs, Volume= 0.533 af
Outflow = 3.99 cfs @ 12.63 hrs, Volume= 0.533 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.962 ac, 5.67% Impervious, Inflow Depth > 1.57" for 10-year event
Inflow = 6.43 cfs @ 12.81 hrs, Volume= 1.043 af
Outflow = 6.43 cfs @ 12.86 hrs, Volume= 1.043 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 20.973 ac, 3.55% Impervious, Inflow Depth > 1.85" for 10-year event
Inflow = 18.35 cfs @ 12.93 hrs, Volume= 3.237 af
Outflow = 18.35 cfs @ 12.98 hrs, Volume= 3.237 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.500 ac, 0.10% Impervious, Inflow Depth > 1.44" for 10-year event
Inflow = 8.95 cfs @ 12.64 hrs, Volume= 1.264 af
Outflow = 8.95 cfs @ 12.69 hrs, Volume= 1.264 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.278 ac, 0.40% Impervious, Inflow Depth > 1.50" for 10-year event
Inflow = 6.47 cfs @ 12.80 hrs, Volume= 1.038 af
Outflow = 6.47 cfs @ 12.85 hrs, Volume= 1.038 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: Runoff Area=175,926 sf 7.92% Impervious Runoff Depth>2.38"
Flow Length=603' Tc=39.8 min CN=73 Runoff=6.03 cfs 0.801 af

Subcatchment S2: Runoff Area=346,810 sf 5.67% Impervious Runoff Depth>2.36"
Flow Length=1,230' Tc=57.0 min CN=73 Runoff=9.74 cfs 1.567 af

Subcatchment S3: Runoff Area=913,604 sf 3.55% Impervious Runoff Depth>2.70"
Flow Length=2,234' Tc=67.3 min CN=77 Runoff=26.70 cfs 4.718 af

Subcatchment S4: Runoff Area=457,381 sf 0.10% Impervious Runoff Depth>2.21"
Flow Length=991' Tc=43.8 min CN=71 Runoff=13.85 cfs 1.932 af

Subcatchment S5: Runoff Area=360,584 sf 0.40% Impervious Runoff Depth>2.28"
Flow Length=1,034' Tc=55.7 min CN=72 Runoff=9.90 cfs 1.572 af

Reach SP1: Study Point 1 Inflow=6.03 cfs 0.800 af
Outflow=6.03 cfs 0.800 af

Reach SP2: Study Point 2 Inflow=9.74 cfs 1.565 af
Outflow=9.74 cfs 1.565 af

Reach SP3: Study Point 3 Inflow=26.70 cfs 4.712 af
Outflow=26.70 cfs 4.712 af

Reach SP4: Study Point 4 Inflow=13.85 cfs 1.929 af
Outflow=13.85 cfs 1.929 af

Reach SP5: Study Point 5 Inflow=9.90 cfs 1.570 af
Outflow=9.90 cfs 1.570 af

Total Runoff Area = 51.752 ac Runoff Volume = 10.590 af Average Runoff Depth = 2.46"
96.98% Pervious = 50.191 ac 3.02% Impervious = 1.561 ac

Summary for Subcatchment S1:

Runoff = 6.03 cfs @ 12.57 hrs, Volume= 0.801 af, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	123,980	70	Woods, Good, HSG C
*	8,742	98	Bedrock Surface
	43,204	77	2 acre lots, 12% imp, HSG C
	175,926	73	Weighted Average
	162,000		92.08% Pervious Area
	13,926		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
2.6	178	0.0510	1.13		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
4.8	275	0.0360	0.95		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
39.8	603	Total			

Summary for Subcatchment S2:

Runoff = 9.74 cfs @ 12.79 hrs, Volume= 1.567 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	62,276	77	Woods, Good, HSG D, Wetland
*	19,217	98	Bedrock
	3,824	82	2 acre lots, 12% imp, HSG D
	4,533	77	Woods, Good, HSG D
	8,252	71	Meadow, non-grazed, HSG C
	248,708	70	Woods, Good, HSG C
	346,810	73	Weighted Average
	327,134		94.33% Pervious Area
	19,676		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.6	150	0.0530	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
0.7	60	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
20.7	1,020	0.0270	0.82		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
57.0	1,230	Total			

Summary for Subcatchment S3:

Runoff = 26.70 cfs @ 12.92 hrs, Volume= 4.718 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	11,411	98	Bedrock
*	337,450	77	Woods, Good, HSG D/Wetlands
	175,471	82	2 acre lots, 12% imp, HSG D
	169,559	78	Meadow, non-grazed, HSG D
	7,837	91	Gravel roads, HSG D
	211,876	70	Woods, Good, HSG C
	913,604	77	Weighted Average
	881,136		96.45% Pervious Area
	32,468		3.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.6	527	0.0510	1.58		**Shallow Concentrated Flow, B - C** Short Grass Pasture Kv= 7.0 fps
7.8	656	0.0780	1.40		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
5.9	449	0.0650	1.27		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
0.9	92	0.1080	1.64		**Shallow Concentrated Flow, E - F** Woodland Kv= 5.0 fps
4.1	360	0.0860	1.47		**Shallow Concentrated Flow, F - G** Woodland Kv= 5.0 fps
67.3	2,234	Total			

Summary for Subcatchment S4:

Runoff = 13.85 cfs @ 12.62 hrs, Volume= 1.932 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	87,010	77	Woods, Good, HSG D, Wetland
*	474	98	Bedrock
	369,897	70	Woods, Good, HSG C
	457,381	71	Weighted Average
	456,907		99.90% Pervious Area
	474		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	150	0.0900	0.09		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
7.9	271	0.0130	0.57		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
7.1	570	0.0720	1.34		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
43.8	991	Total			

Summary for Subcatchment S5:

Runoff = 9.90 cfs @ 12.78 hrs, Volume= 1.572 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	83,225	77	Woods, Good, HSG D, Wetland
*	1,442	98	Bedrock
	25,143	71	Meadow, non-grazed, HSG C
	250,774	70	Woods, Good, HSG C
	360,584	72	Weighted Average
	359,142		99.60% Pervious Area
	1,442		0.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	150	0.0570	0.07		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.5	142	0.0970	1.56		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
19.6	742	0.0160	0.63		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
55.7	1,034	Total			

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.039 ac, 7.92% Impervious, Inflow Depth > 2.38" for 25-year event
Inflow = 6.03 cfs @ 12.57 hrs, Volume= 0.800 af
Outflow = 6.03 cfs @ 12.62 hrs, Volume= 0.800 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.962 ac, 5.67% Impervious, Inflow Depth > 2.36" for 25-year event
Inflow = 9.74 cfs @ 12.79 hrs, Volume= 1.565 af
Outflow = 9.74 cfs @ 12.84 hrs, Volume= 1.565 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 20.973 ac, 3.55% Impervious, Inflow Depth > 2.70" for 25-year event
Inflow = 26.70 cfs @ 12.92 hrs, Volume= 4.712 af
Outflow = 26.70 cfs @ 12.97 hrs, Volume= 4.712 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.500 ac, 0.10% Impervious, Inflow Depth > 2.20" for 25-year event
Inflow = 13.85 cfs @ 12.62 hrs, Volume= 1.929 af
Outflow = 13.85 cfs @ 12.67 hrs, Volume= 1.929 af, Atten= 0%, Lag= 3.0 min

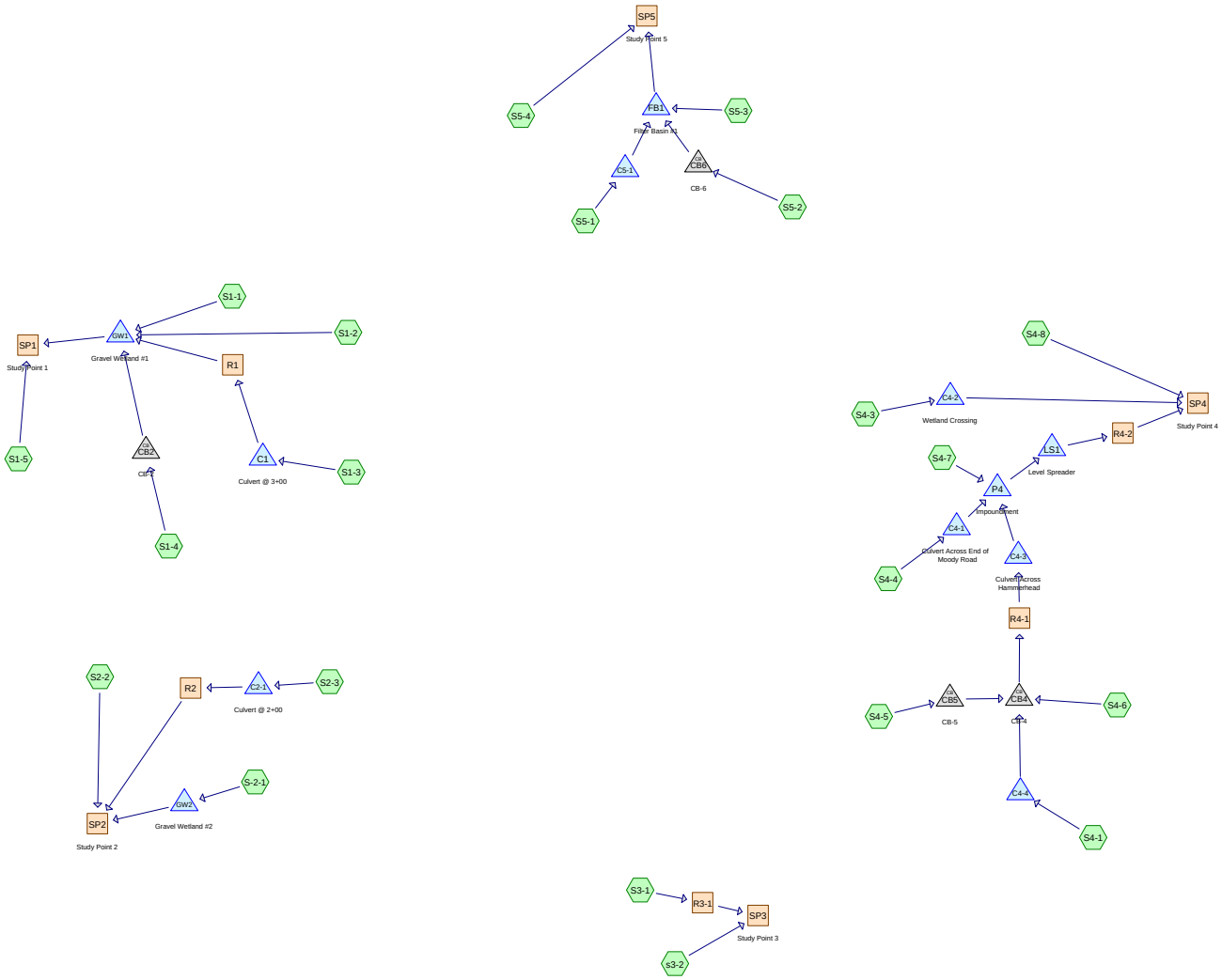
Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.278 ac, 0.40% Impervious, Inflow Depth > 2.28" for 25-year event
Inflow = 9.90 cfs @ 12.78 hrs, Volume= 1.570 af
Outflow = 9.90 cfs @ 12.83 hrs, Volume= 1.570 af, Atten= 0%, Lag= 3.0 min

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Subcat Reach Pond Link

Drainage Diagram for 1660 Post

Prepared by {enter your company name here}, Printed 3/28/2018

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Summary for Subcatchment S-2-1:

Runoff = 5.20 cfs @ 12.13 hrs, Volume= 0.385 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	18,900	74	Pond Area
	114,397	80	1/2 acre lots, 25% imp, HSG C
	20,822	92	Paved roads w/open ditches, 50% imp, HSG C
	20,767	70	Woods, Good, HSG C
	174,886	80	Weighted Average
	135,876		77.69% Pervious Area
	39,010		22.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	75	0.0900	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	720	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
9.1	795	Total			

Summary for Subcatchment S1-1:

Runoff = 1.48 cfs @ 12.62 hrs, Volume= 0.211 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	8,846	98	Bedrock
	24,959	79	Woods/grass comb., Good, HSG D
*	13,500	74	Pond Area
	45,007	80	1/2 acre lots, 25% imp, HSG C
	92,312	81	Weighted Average
	72,214		78.23% Pervious Area
	20,098		21.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.6	150	0.0530	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.1	90	0.0560	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.9	240	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
45.6	480	Total			

Summary for Subcatchment S1-2:

Runoff = 1.94 cfs @ 12.16 hrs, Volume= 0.155 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	0	98	Bedrock
	25,286	92	Paved roads w/open ditches, 50% imp, HSG C
	26,974	80	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	52,260	86	Weighted Average
	32,874		62.90% Pervious Area
	19,387		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	75	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	670	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
11.6	745	Total			

Summary for Subcatchment S1-3:

Runoff = 0.92 cfs @ 12.46 hrs, Volume= 0.111 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	0	98	Bedrock
	22,082	92	Paved roads w/open ditches, 50% imp, HSG C
	15,597	77	2 acre lots, 12% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	37,679	86	Weighted Average
	24,766		65.73% Pervious Area
	12,913		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
0.3	70	0.0530	3.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
32.7	220	Total			

Summary for Subcatchment S1-4:

Runoff = 0.16 cfs @ 12.03 hrs, Volume= 0.009 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	0	98	Bedrock
	2,433	92	Paved roads w/open ditches, 50% imp, HSG C
	0	80	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	2,433	92	Weighted Average
	1,217		50.00% Pervious Area
	1,217		50.00% Impervious Area

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

Summary for Subcatchment S1-5:

Runoff = 0.62 cfs @ 12.73 hrs, Volume= 0.097 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	0	98	Bedrock
	4,792	98	Paved roads w/curbs & sewers, HSG C
*	3,000	74	Pond Area
	27,607	77	2 acre lots, 12% imp, HSG C
	11,779	79	Woods/grass comb., Good, HSG D
	47,178	79	Weighted Average
	39,073		82.82% Pervious Area
	8,105		17.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.1	90	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.3	170	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
52.8	410	Total			

Summary for Subcatchment S2-2:

Runoff = 1.25 cfs @ 12.85 hrs, Volume= 0.211 af, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

Area (sf)	CN	Description
20,000	80	1/2 acre lots, 25% imp, HSG C
16,595	92	Paved roads w/open ditches, 50% imp, HSG C
100,587	70	Woods, Good, HSG C
137,182	74	Weighted Average
123,885		90.31% Pervious Area
13,298		9.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.8	150	0.0400	0.06		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
18.3	870	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
58.1	1,020	Total			

Summary for Subcatchment S2-3:

Runoff = 1.03 cfs @ 12.08 hrs, Volume= 0.065 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

Area (sf)	CN	Description
20,469	80	1/2 acre lots, 25% imp, HSG C
5,130	92	Paved roads w/open ditches, 50% imp, HSG C
1,224	70	Woods, Good, HSG C
26,823	82	Weighted Average
19,141		71.36% Pervious Area
7,682		28.64% Impervious Area

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

Summary for Subcatchment S3-1:

Runoff = 2.28 cfs @ 12.16 hrs, Volume= 0.183 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	97,850	77	1/2 acre lots, 25% imp, HSG C
	73,388		75.00% Pervious Area
	24,463		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	150	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.8	100	0.0900	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.2	250	Total			

Summary for Subcatchment s3-2:

Runoff = 8.16 cfs @ 12.94 hrs, Volume= 1.469 af, Depth> 0.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
*	11,411	98	Bedrock
*	267,231	77	Woods, Good, HSG D/Wetlands
	175,471	82	2 acre lots, 12% imp, HSG D
	169,559	78	Meadow, non-grazed, HSG D
	7,837	91	Gravel roads, HSG D
	151,867	70	Woods, Good, HSG C
*	22,150	77	1/2 acre lots, 25% imp, HSG C
	805,526	77	Weighted Average
	767,521		95.28% Pervious Area
	38,005		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.6	527	0.0510	1.58		**Shallow Concentrated Flow, B - C** Short Grass Pasture Kv= 7.0 fps
7.8	656	0.0780	1.40		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
5.9	449	0.0650	1.27		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
0.9	92	0.1080	1.64		**Shallow Concentrated Flow, E - F** Woodland Kv= 5.0 fps
4.1	360	0.0860	1.47		**Shallow Concentrated Flow, F - G** Woodland Kv= 5.0 fps
67.3	2,234	Total			

Summary for Subcatchment S4-1:

Runoff = 1.08 cfs @ 12.11 hrs, Volume= 0.074 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	15,728	92	Paved roads w/open ditches, 50% imp, HSG C
*	9,402	77	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	25,130	86	Weighted Average
	14,916		59.35% Pervious Area
	10,215		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.6	400	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.3	450	Total			

Summary for Subcatchment S4-3:

Runoff = 1.76 cfs @ 12.28 hrs, Volume= 0.176 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	3,053	74	Ditching
*	20,000	77	1/2 acre lots, 25% imp, HSG C
	66,009	70	Woods, Good, HSG C
	30,000	77	Woods, Good, HSG D
	119,062	73	Weighted Average
	114,062		95.80% Pervious Area
	5,000		4.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	90	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.3	480	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.2	570	Total			

Summary for Subcatchment S4-4:

Runoff = 0.67 cfs @ 12.11 hrs, Volume= 0.047 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	7,561	92	Paved roads w/open ditches, 50% imp, HSG C
*	8,000	77	1/2 acre lots, 25% imp, HSG C
	3,675	70	Woods, Good, HSG C
	19,236	82	Weighted Average
	13,456		69.95% Pervious Area
	5,781		30.05% Impervious Area

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

Summary for Subcatchment S4-5:

Runoff = 0.27 cfs @ 12.03 hrs, Volume= 0.018 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

Area (sf)	CN	Description
3,485	98	Paved roads w/curbs & sewers, HSG C
3,485		100.00% Impervious Area

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

Summary for Subcatchment S4-6:

Runoff = 0.15 cfs @ 12.03 hrs, Volume= 0.010 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

Area (sf)	CN	Description
1,952	98	Paved roads w/curbs & sewers, HSG C
1,952		100.00% Impervious Area

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

Summary for Subcatchment S4-7:

Runoff = 0.99 cfs @ 12.07 hrs, Volume= 0.064 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	14,612	92	Paved roads w/open ditches, 50% imp, HSG C
*	0	77	1/2 acre lots, 25% imp, HSG C
	3,386	79	Woods/grass comb., Good, HSG D
	17,998	90	Weighted Average
	10,692		59.41% Pervious Area
	7,306		40.59% Impervious Area

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

Summary for Subcatchment S4-8:

Runoff = 2.39 cfs @ 12.65 hrs, Volume= 0.350 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	30,000	77	1/2 acre lots, 25% imp, HSG C
	214,497	70	Woods, Good, HSG C
	27,010	77	Woods, Good, HSG D
	271,507	71	Weighted Average
	264,007		97.24% Pervious Area
	7,500		2.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	150	0.0600	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
7.5	500	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
41.4	650	Total			

Summary for Subcatchment S5-1:

Runoff = 2.36 cfs @ 12.12 hrs, Volume= 0.167 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	21,012	92	Paved roads w/open ditches, 50% imp, HSG C
*	43,000	77	1/2 acre lots, 25% imp, HSG C
	8,000	70	Woods, Good, HSG C
	72,012	81	Weighted Average
	50,756		70.48% Pervious Area
	21,256		29.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	70	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.7	240	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.9	310	Total			

Summary for Subcatchment S5-2:

Runoff = 0.28 cfs @ 12.03 hrs, Volume= 0.018 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

Area (sf)	CN	Description
3,643	98	Paved roads w/curbs & sewers, HSG C
3,643		100.00% Impervious Area

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

Summary for Subcatchment S5-3:

Runoff = 0.48 cfs @ 12.03 hrs, Volume= 0.027 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

Area (sf)	CN	Description
6,000	92	Paved roads w/open ditches, 50% imp, HSG C
5,152	70	Woods, Good, HSG C
11,152	82	Weighted Average
8,152		73.10% Pervious Area
3,000		26.90% Impervious Area

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

Summary for Subcatchment S5-4:

Runoff = 1.78 cfs @ 13.22 hrs, Volume= 0.379 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.00"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	95,000	77	1/2 acre lots, 25% imp, HSG C
	55,332	70	Woods, Good, HSG C
	83,225	77	Woods, Good, HSG D
*	1,442	98	Bedrock
	234,999	75	Weighted Average
	209,807		89.28% Pervious Area
	25,192		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.3	150	0.0100	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
13.3	400	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	40	0.0100	7.80	24.51	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.3	70	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
85.0	660	Total			

Summary for Reach R1:

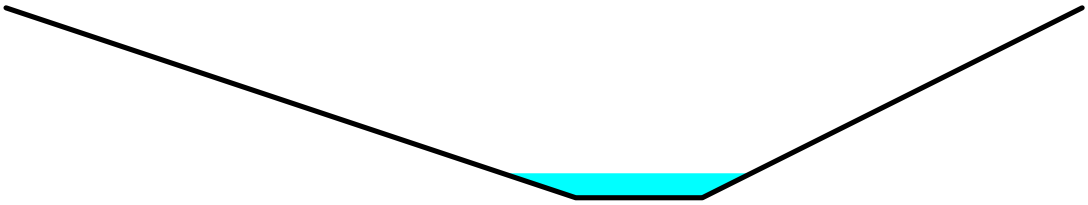
[79] Warning: Submerged Pond C1 Primary device # 1 OUTLET by 0.14'

Inflow Area = 0.865 ac, 34.27% Impervious, Inflow Depth > 1.53" for 2 year event
Inflow = 0.92 cfs @ 12.47 hrs, Volume= 0.111 af
Outflow = 0.92 cfs @ 12.49 hrs, Volume= 0.110 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.18 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 2.3 min

Peak Storage= 55 cf @ 12.48 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 71.16 cfs

1.00' x 1.50' deep channel, n= 0.030
Side Slope Z-value= 3.0 2.0 '/' Top Width= 8.50'
Length= 190.0' Slope= 0.0563 '/'
Inlet Invert= 285.70', Outlet Invert= 275.00'



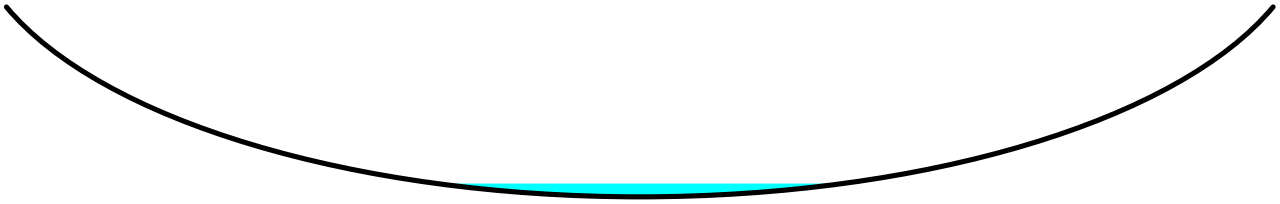
Summary for Reach R2:

Inflow Area = 0.616 ac, 28.64% Impervious, Inflow Depth > 1.24" for 2 year event
Inflow = 0.97 cfs @ 12.10 hrs, Volume= 0.064 af
Outflow = 0.53 cfs @ 12.57 hrs, Volume= 0.062 af, Atten= 45%, Lag= 28.1 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.90 fps, Min. Travel Time= 19.0 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 37.0 min

Peak Storage= 603 cf @ 12.26 hrs, Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 178.82 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 1,020.0' Slope= 0.0275 '/'
Inlet Invert= 316.00', Outlet Invert= 288.00'



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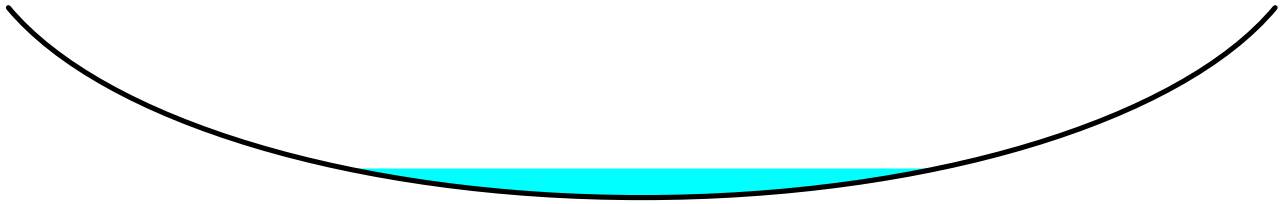
Summary for Reach R3-1:

Inflow Area = 2.246 ac, 25.00% Impervious, Inflow Depth > 0.98" for 2 year event
Inflow = 2.28 cfs @ 12.16 hrs, Volume= 0.183 af
Outflow = 1.84 cfs @ 12.40 hrs, Volume= 0.180 af, Atten= 19%, Lag= 14.4 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.93 fps, Min. Travel Time= 8.6 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 18.7 min

Peak Storage= 947 cf @ 12.26 hrs, Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 109.04 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 480.0' Slope= 0.0833 '/'
Inlet Invert= 304.00', Outlet Invert= 264.00'



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Summary for Reach R4-1:

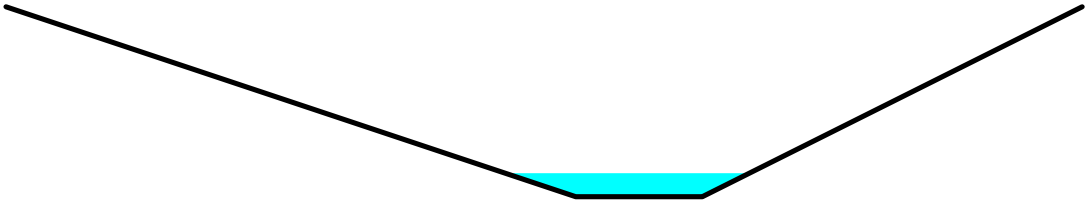
[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond CB4 Primary device # 1 OUTLET by 0.19'

Inflow Area = 0.702 ac, 51.20% Impervious, Inflow Depth > 1.74" for 2 year event
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.102 af
Outflow = 1.33 cfs @ 12.11 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.89 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 1.7 min

Peak Storage= 43 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 111.98 cfs

1.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 2.0 '/' Top Width= 8.50'
Length= 160.0' Slope= 0.0750 '/'
Inlet Invert= 286.00', Outlet Invert= 274.00'



Summary for Reach R4-2:

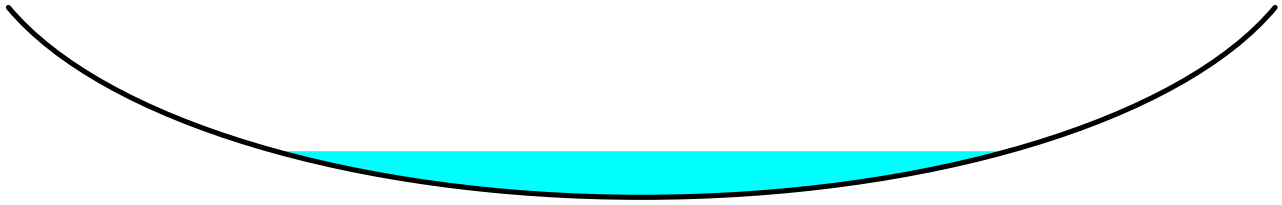
[81] Warning: Exceeded Pond LS1 by 0.22' @ 12.80 hrs

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 1.55" for 2 year event
Inflow = 1.21 cfs @ 12.37 hrs, Volume= 0.201 af
Outflow = 1.01 cfs @ 13.18 hrs, Volume= 0.193 af, Atten= 16%, Lag= 48.5 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.16 fps, Min. Travel Time= 26.1 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 44.7 min

Peak Storage= 1,585 cf @ 12.74 hrs, Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.91 cfs

80.00' x 1.00' deep Parabolic Channel, n= 0.800
Length= 250.0' Slope= 0.0840 '/'
Inlet Invert= 263.00', Outlet Invert= 242.00'



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Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.323 ac, 26.62% Impervious, Inflow Depth > 0.93" for 2 year event
Inflow = 1.62 cfs @ 13.04 hrs, Volume= 0.415 af
Outflow = 1.62 cfs @ 13.04 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.780 ac, 17.70% Impervious, Inflow Depth > 0.70" for 2 year event
Inflow = 1.97 cfs @ 12.84 hrs, Volume= 0.456 af
Outflow = 1.97 cfs @ 12.84 hrs, Volume= 0.456 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 20.739 ac, 6.91% Impervious, Inflow Depth > 0.95" for 2 year event
Inflow = 8.77 cfs @ 12.93 hrs, Volume= 1.649 af
Outflow = 8.77 cfs @ 12.93 hrs, Volume= 1.649 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.523 ac, 9.00% Impervious, Inflow Depth > 0.82" for 2 year event
Inflow = 3.83 cfs @ 12.60 hrs, Volume= 0.719 af
Outflow = 3.83 cfs @ 12.60 hrs, Volume= 0.719 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.388 ac, 16.50% Impervious, Inflow Depth > 0.78" for 2 year event
Inflow = 2.11 cfs @ 13.13 hrs, Volume= 0.478 af
Outflow = 2.11 cfs @ 13.13 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond C1: Culvert @ 3+00

Inflow Area = 0.865 ac, 34.27% Impervious, Inflow Depth > 1.54" for 2 year event
Inflow = 0.92 cfs @ 12.46 hrs, Volume= 0.111 af
Outflow = 0.92 cfs @ 12.47 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.3 min
Primary = 0.92 cfs @ 12.47 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 286.70' @ 12.47 hrs Surf.Area= 76 sf Storage= 28 cf

Plug-Flow detention time= 1.0 min calculated for 0.111 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (811.5 - 810.8)

Volume	Invert	Avail.Storage	Storage Description
#1	286.25'	1,575 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.25	50	0	0
288.00	150	175	175
290.00	500	650	825
291.00	1,000	750	1,575

Device	Routing	Invert	Outlet Devices
#1	Primary	286.25'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 285.75' S= 0.0100 '/' Cc= 0.900 n= 0.012
#2	Primary	290.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.91 cfs @ 12.47 hrs HW=286.70' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.91 cfs @ 2.29 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C2-1: Culvert @ 2+00

Inflow Area = 0.616 ac, 28.64% Impervious, Inflow Depth > 1.28" for 2 year event
Inflow = 1.03 cfs @ 12.08 hrs, Volume= 0.065 af
Outflow = 0.97 cfs @ 12.10 hrs, Volume= 0.064 af, Atten= 5%, Lag= 1.6 min
Primary = 0.97 cfs @ 12.10 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 320.87' @ 12.10 hrs Surf.Area= 381 sf Storage= 208 cf

Plug-Flow detention time= 18.4 min calculated for 0.064 af (97% of inflow)
Center-of-Mass det. time= 7.8 min (807.9 - 800.1)

Volume	Invert	Avail.Storage	Storage Description
#1	320.00'	1,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
320.00	100	0	0
322.00	750	850	850
323.00	1,500	1,125	1,975

Device	Routing	Invert	Outlet Devices
#1	Primary	320.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 318.80' S= 0.0320 '/' Cc= 0.900 n= 0.012
#2	Primary	322.30'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.97 cfs @ 12.10 hrs HW=320.87' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.97 cfs @ 2.32 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C4-1: Culvert Across End of Moody Road

Inflow Area = 0.442 ac, 30.05% Impervious, Inflow Depth > 1.27" for 2 year event
Inflow = 0.67 cfs @ 12.11 hrs, Volume= 0.047 af
Outflow = 0.67 cfs @ 12.12 hrs, Volume= 0.047 af, Atten= 1%, Lag= 0.6 min
Primary = 0.67 cfs @ 12.12 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.53' @ 12.12 hrs Surf.Area= 98 sf Storage= 32 cf

Plug-Flow detention time= 1.7 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (803.3 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	275.10'	1,015 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.10	50	0	0
276.00	150	90	90
278.00	350	500	590
279.00	500	425	1,015

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	**40.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	275.10'	**15.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.00' S= 0.0375 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.67 cfs @ 12.12 hrs HW=275.53' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Culvert** (Inlet Controls 0.67 cfs @ 1.77 fps)

Summary for Pond C4-2: Wetland Crossing

Inflow Area = 2.733 ac, 4.20% Impervious, Inflow Depth > 0.77" for 2 year event
Inflow = 1.76 cfs @ 12.28 hrs, Volume= 0.176 af
Outflow = 1.75 cfs @ 12.28 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.4 min
Primary = 1.75 cfs @ 12.28 hrs, Volume= 0.176 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 272.79' @ 12.28 hrs Surf.Area= 109 sf Storage= 63 cf

Plug-Flow detention time= 1.1 min calculated for 0.176 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (833.6 - 832.9)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	800 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
272.00	50	0	0
274.00	200	250	250
276.00	350	550	800

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 271.00' S= 0.0250 '/' Cc= 0.900 n= 0.040 Earth, cobble bottom, clean sides

Primary OutFlow Max=1.75 cfs @ 12.28 hrs HW=272.79' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.75 cfs @ 2.71 fps)

Summary for Pond C4-3: Culvert Across Hammerhead

[62] Warning: Exceeded Reach R4-1 OUTLET depth by 0.45' @ 12.12 hrs

Inflow Area =	0.702 ac,	51.20% Impervious,	Inflow Depth >	1.74"	for 2 year event
Inflow =	1.33 cfs @	12.11 hrs,	Volume=	0.102 af	
Outflow =	1.32 cfs @	12.11 hrs,	Volume=	0.102 af,	Atten= 0%, Lag= 0.4 min
Primary =	1.32 cfs @	12.11 hrs,	Volume=	0.102 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 274.63' @ 12.11 hrs Surf.Area= 82 sf Storage= 41 cf

Plug-Flow detention time= 1.3 min calculated for 0.102 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (776.9 - 776.0)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	700 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	50	0	0
276.00	150	200	200
278.00	350	500	700

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 271.50' S= 0.0357 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.32 cfs @ 12.11 hrs HW=274.63' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.32 cfs @ 2.13 fps)

Summary for Pond C4-4:

Inflow Area =	0.577 ac,	40.65% Impervious,	Inflow Depth >	1.55"	for 2 year event
Inflow =	1.08 cfs @	12.11 hrs,	Volume=	0.074 af	
Outflow =	1.07 cfs @	12.11 hrs,	Volume=	0.074 af,	Atten= 0%, Lag= 0.3 min
Primary =	1.07 cfs @	12.11 hrs,	Volume=	0.074 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.56' @ 12.11 hrs Surf.Area= 64 sf Storage= 32 cf

Plug-Flow detention time= 1.3 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (791.6 - 790.8)

Volume	Invert	Avail.Storage	Storage Description
#1	291.00'	638 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.00	50	0	0
292.00	75	63	63
294.00	500	575	638

Device	Routing	Invert	Outlet Devices
#1	Primary	291.00'	**15.0" Round Culvert** L= 162.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 287.60' S= 0.0210 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.07 cfs @ 12.11 hrs HW=291.56' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.07 cfs @ 2.01 fps)

Summary for Pond C5-1:

Inflow Area = 1.653 ac, 29.52% Impervious, Inflow Depth > 1.21" for 2 year event
Inflow = 2.36 cfs @ 12.12 hrs, Volume= 0.167 af
Outflow = 2.30 cfs @ 12.14 hrs, Volume= 0.167 af, Atten= 2%, Lag= 1.2 min
Primary = 2.30 cfs @ 12.14 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 290.44' @ 12.14 hrs Surf.Area= 287 sf Storage= 169 cf

Plug-Flow detention time= 1.7 min calculated for 0.167 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (806.2 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	289.50'	863 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
289.50	50	0	0
290.00	200	63	63
292.00	600	800	863

Device	Routing	Invert	Outlet Devices
#1	Primary	289.50'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.30 cfs @ 12.14 hrs HW=290.44' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.30 cfs @ 3.24 fps)

Summary for Pond CB2: CB-2

Inflow Area = 0.056 ac, 50.00% Impervious, Inflow Depth > 2.04" for 2 year event
Inflow = 0.16 cfs @ 12.03 hrs, Volume= 0.009 af
Outflow = 0.16 cfs @ 12.03 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.03 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.89' @ 12.03 hrs
Flood Elev= 278.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	275.71'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 275.21' S= 0.0100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.16 cfs @ 12.03 hrs HW=275.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.16 cfs @ 1.45 fps)

Summary for Pond CB4: CB-4

[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond C4-4 Primary device # 1 OUTLET by 0.21'
[81] Warning: Exceeded Pond CB5 by 0.17' @ 12.12 hrs

Inflow Area = 0.702 ac, 51.20% Impervious, Inflow Depth > 1.74" for 2 year event
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.102 af
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Primary = 1.33 cfs @ 12.09 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 287.81' @ 12.09 hrs
Flood Elev= 290.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.26'	**15.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 286.00' S= 0.0630 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.33 cfs @ 12.09 hrs HW=287.81' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.33 cfs @ 2.53 fps)

Summary for Pond CB5: CB-5

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.080 ac,100.00% Impervious, Inflow Depth > 2.63" for 2 year event
Inflow = 0.27 cfs @ 12.03 hrs, Volume= 0.018 af
Outflow = 0.27 cfs @ 12.03 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min
Primary = 0.27 cfs @ 12.03 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 287.71' @ 12.03 hrs
Flood Elev= 290.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.46'	**15.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 287.26' S= 0.0100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.27 cfs @ 12.03 hrs HW=287.71' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.27 cfs @ 2.36 fps)

Summary for Pond CB6: CB-6

[82] Warning: Early inflow requires earlier time span

Inflow Area =	0.084 ac,100.00% Impervious, Inflow Depth > 2.63" for 2 year event				
Inflow	=	0.28 cfs @	12.03 hrs, Volume=	0.018 af	
Outflow	=	0.28 cfs @	12.03 hrs, Volume=	0.018 af,	Atten= 0%, Lag= 0.0 min
Primary	=	0.28 cfs @	12.03 hrs, Volume=	0.018 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.85' @ 12.03 hrs
Flood Elev= 292.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.55'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 289.25' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.28 cfs @ 12.03 hrs HW=289.85' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.28 cfs @ 2.15 fps)

Summary for Pond FB1: Filter Basin #1

[79] Warning: Submerged Pond C5-1 Primary device # 1 OUTLET by 0.06'
[79] Warning: Submerged Pond CB6 Primary device # 1 OUTLET by 0.06'

Inflow Area =	1.993 ac, 32.14% Impervious, Inflow Depth > 1.28" for 2 year event				
Inflow	=	2.67 cfs @	12.12 hrs, Volume=	0.212 af	
Outflow	=	0.52 cfs @	12.65 hrs, Volume=	0.099 af,	Atten= 80%, Lag= 31.7 min
Primary	=	0.52 cfs @	12.65 hrs, Volume=	0.099 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.31' @ 12.65 hrs Surf.Area= 3,992 sf Storage= 5,088 cf

Plug-Flow detention time= 188.5 min calculated for 0.099 af (47% of inflow)
Center-of-Mass det. time= 100.1 min (898.6 - 798.5)

Volume	Invert	Avail.Storage	Storage Description
#1	287.75'	11,035 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.75	2,550	0	0
289.25	3,941	4,868	4,868
290.00	4,636	3,216	8,085
290.60	5,200	2,951	11,035

Device	Routing	Invert	Outlet Devices
#1	Primary	289.25'	**15.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=0.51 cfs @ 12.65 hrs HW=289.31' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.51 cfs @ 0.61 fps)

Summary for Pond GW1: Gravel Wetland #1

Inflow Area = 4.240 ac, 29.03% Impervious, Inflow Depth > 1.37" for 2 year event
Inflow = 3.08 cfs @ 12.46 hrs, Volume= 0.485 af
Outflow = 1.17 cfs @ 13.25 hrs, Volume= 0.318 af, Atten= 62%, Lag= 47.4 min
Primary = 1.17 cfs @ 13.25 hrs, Volume= 0.318 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 274.75' @ 13.25 hrs Surf.Area= 7,993 sf Storage= 10,560 cf

Plug-Flow detention time= 161.9 min calculated for 0.318 af (65% of inflow)
Center-of-Mass det. time= 91.4 min (906.7 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	273.10'	37,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
273.10	5,020	0	0
274.00	6,207	5,052	5,052
274.20	6,300	1,251	6,303
274.21	7,500	69	6,372
275.00	8,220	6,209	12,581
276.50	9,500	13,290	25,871
277.50	13,000	11,250	37,121

Device	Routing	Invert	Outlet Devices
#1	Primary	274.10'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.50' S= 0.0300 '/' Cc= 0.900 n= 0.012
#2	Primary	276.20'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.17 cfs @ 13.25 hrs HW=274.75' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.17 cfs @ 2.17 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond GW2: Gravel Wetland #2

Inflow Area = 4.015 ac, 22.31% Impervious, Inflow Depth > 1.15" for 2 year event
Inflow = 5.20 cfs @ 12.13 hrs, Volume= 0.385 af
Outflow = 0.47 cfs @ 13.79 hrs, Volume= 0.184 af, Atten= 91%, Lag= 99.1 min
Primary = 0.47 cfs @ 13.79 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.96' @ 13.79 hrs Surf.Area= 7,525 sf Storage= 9,994 cf

Plug-Flow detention time= 213.0 min calculated for 0.183 af (48% of inflow)
Center-of-Mass det. time= 126.7 min (935.2 - 808.5)

Volume	Invert	Avail.Storage	Storage Description
#1	288.30'	32,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
288.30	4,740	0	0
289.60	6,630	7,391	7,391
289.61	7,000	68	7,459
290.30	8,037	5,188	12,646
292.40	11,200	20,199	32,845

Device	Routing	Invert	Outlet Devices
#1	Primary	289.60'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.00' S= 0.0600 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	291.20'	**25.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=0.47 cfs @ 13.79 hrs HW=289.96' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.47 cfs @ 1.61 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond LS1: Level Spreader

[79] Warning: Submerged Pond P4 Primary device # 1 INLET by 0.03'

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 1.59" for 2 year event
Inflow = 1.21 cfs @ 12.37 hrs, Volume= 0.206 af
Outflow = 1.21 cfs @ 12.37 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.2 min
Primary = 1.21 cfs @ 12.37 hrs, Volume= 0.201 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 263.03' @ 12.37 hrs Surf.Area= 624 sf Storage= 243 cf

Plug-Flow detention time= 15.6 min calculated for 0.201 af (97% of inflow)
Center-of-Mass det. time= 6.5 min (819.2 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	262.50'	625 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.50	300	0	0
263.00	600	225	225
263.50	1,000	400	625

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**100.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.21 cfs @ 12.37 hrs HW=263.03' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.21 cfs @ 0.41 fps)

Summary for Pond P4: Impoundment

Inflow Area =	1.556 ac, 42.39% Impervious, Inflow Depth > 1.64" for 2 year event				
Inflow =	2.89 cfs @	12.10 hrs, Volume=	0.213 af		
Outflow =	1.21 cfs @	12.37 hrs, Volume=	0.206 af, Atten= 58%, Lag= 16.1 min		
Primary =	1.21 cfs @	12.37 hrs, Volume=	0.206 af		

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 264.16' @ 12.37 hrs Surf.Area= 2,382 sf Storage= 2,485 cf

Plug-Flow detention time= 42.1 min calculated for 0.206 af (97% of inflow)
Center-of-Mass det. time= 30.4 min (812.8 - 782.4)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	10,725 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
263.00	1,900	0	0
264.00	2,300	2,100	2,100
265.00	2,800	2,550	4,650
266.00	3,500	3,150	7,800
266.50	4,000	1,875	9,675
266.75	4,400	1,050	10,725

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**8.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 262.50' S= 0.0125 '/' Cc= 0.900 n= 0.012
#2	Primary	264.60'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 263.50' S= 0.0275 '/' Cc= 0.900 n= 0.012
#3	Primary	265.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.21 cfs @ 12.37 hrs HW=264.16' (Free Discharge)
- **1=Culvert** (Inlet Controls 1.21 cfs @ 3.47 fps)
- **2=Culvert** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment S-2-1:

Runoff = 9.70 cfs @ 12.13 hrs, Volume= 0.713 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	18,900	74	Pond Area
	114,397	80	1/2 acre lots, 25% imp, HSG C
	20,822	92	Paved roads w/open ditches, 50% imp, HSG C
	20,767	70	Woods, Good, HSG C
	174,886	80	Weighted Average
	135,876		77.69% Pervious Area
	39,010		22.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	75	0.0900	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	720	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
9.1	795	Total			

Summary for Subcatchment S1-1:

Runoff = 2.72 cfs @ 12.62 hrs, Volume= 0.386 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	8,846	98	Bedrock
	24,959	79	Woods/grass comb., Good, HSG D
*	13,500	74	Pond Area
	45,007	80	1/2 acre lots, 25% imp, HSG C
	92,312	81	Weighted Average
	72,214		78.23% Pervious Area
	20,098		21.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.6	150	0.0530	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.1	90	0.0560	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.9	240	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
45.6	480	Total			

Summary for Subcatchment S1-2:

Runoff = 3.28 cfs @ 12.16 hrs, Volume= 0.264 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	0	98	Bedrock
	25,286	92	Paved roads w/open ditches, 50% imp, HSG C
	26,974	80	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	52,260	86	Weighted Average
	32,874		62.90% Pervious Area
	19,387		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	75	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	670	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
11.6	745	Total			

Summary for Subcatchment S1-3:

Runoff = 1.55 cfs @ 12.46 hrs, Volume= 0.189 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	0	98	Bedrock
	22,082	92	Paved roads w/open ditches, 50% imp, HSG C
	15,597	77	2 acre lots, 12% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	37,679	86	Weighted Average
	24,766		65.73% Pervious Area
	12,913		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
0.3	70	0.0530	3.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
32.7	220	Total			

Summary for Subcatchment S1-4:

Runoff = 0.25 cfs @ 12.03 hrs, Volume= 0.015 af, Depth> 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	0	98	Bedrock
	2,433	92	Paved roads w/open ditches, 50% imp, HSG C
	0	80	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	2,433	92	Weighted Average
	1,217		50.00% Pervious Area
	1,217		50.00% Impervious Area

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

Summary for Subcatchment S1-5:

Runoff = 1.19 cfs @ 12.73 hrs, Volume= 0.182 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	0	98	Bedrock
	4,792	98	Paved roads w/curbs & sewers, HSG C
*	3,000	74	Pond Area
	27,607	77	2 acre lots, 12% imp, HSG C
	11,779	79	Woods/grass comb., Good, HSG D
	47,178	79	Weighted Average
	39,073		82.82% Pervious Area
	8,105		17.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.1	90	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.3	170	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
52.8	410	Total			

Summary for Subcatchment S2-2:

Runoff = 2.64 cfs @ 12.84 hrs, Volume= 0.431 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

Area (sf)	CN	Description
20,000	80	1/2 acre lots, 25% imp, HSG C
16,595	92	Paved roads w/open ditches, 50% imp, HSG C
100,587	70	Woods, Good, HSG C
137,182	74	Weighted Average
123,885		90.31% Pervious Area
13,298		9.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.8	150	0.0400	0.06		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
18.3	870	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
58.1	1,020	Total			

Summary for Subcatchment S2-3:

Runoff = 1.84 cfs @ 12.07 hrs, Volume= 0.118 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

Area (sf)	CN	Description
20,469	80	1/2 acre lots, 25% imp, HSG C
5,130	92	Paved roads w/open ditches, 50% imp, HSG C
1,224	70	Woods, Good, HSG C
26,823	82	Weighted Average
19,141		71.36% Pervious Area
7,682		28.64% Impervious Area

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

Summary for Subcatchment S3-1:

Runoff = 4.52 cfs @ 12.16 hrs, Volume= 0.355 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	97,850	77	1/2 acre lots, 25% imp, HSG C
	73,388		75.00% Pervious Area
	24,463		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	150	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.8	100	0.0900	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.2	250	Total			

Summary for Subcatchment s3-2:

Runoff = 16.22 cfs @ 12.94 hrs, Volume= 2.856 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
*	11,411	98	Bedrock
*	267,231	77	Woods, Good, HSG D/Wetlands
	175,471	82	2 acre lots, 12% imp, HSG D
	169,559	78	Meadow, non-grazed, HSG D
	7,837	91	Gravel roads, HSG D
	151,867	70	Woods, Good, HSG C
*	22,150	77	1/2 acre lots, 25% imp, HSG C
	805,526	77	Weighted Average
	767,521		95.28% Pervious Area
	38,005		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.6	527	0.0510	1.58		**Shallow Concentrated Flow, B - C** Short Grass Pasture Kv= 7.0 fps
7.8	656	0.0780	1.40		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
5.9	449	0.0650	1.27		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
0.9	92	0.1080	1.64		**Shallow Concentrated Flow, E - F** Woodland Kv= 5.0 fps
4.1	360	0.0860	1.47		**Shallow Concentrated Flow, F - G** Woodland Kv= 5.0 fps
67.3	2,234	Total			

Summary for Subcatchment S4-1:

Runoff = 1.81 cfs @ 12.10 hrs, Volume= 0.127 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	15,728	92	Paved roads w/open ditches, 50% imp, HSG C
*	9,402	77	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	25,130	86	Weighted Average
	14,916		59.35% Pervious Area
	10,215		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.6	400	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.3	450	Total			

Summary for Subcatchment S4-3:

Runoff = 3.83 cfs @ 12.26 hrs, Volume= 0.364 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	3,053	74	Ditching
*	20,000	77	1/2 acre lots, 25% imp, HSG C
	66,009	70	Woods, Good, HSG C
	30,000	77	Woods, Good, HSG D
	119,062	73	Weighted Average
	114,062		95.80% Pervious Area
	5,000		4.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	90	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.3	480	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.2	570	Total			

Summary for Subcatchment S4-4:

Runoff = 1.21 cfs @ 12.11 hrs, Volume= 0.085 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	7,561	92	Paved roads w/open ditches, 50% imp, HSG C
*	8,000	77	1/2 acre lots, 25% imp, HSG C
	3,675	70	Woods, Good, HSG C
	19,236	82	Weighted Average
	13,456		69.95% Pervious Area
	5,781		30.05% Impervious Area

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

Summary for Subcatchment S4-5:

Runoff = 0.39 cfs @ 12.03 hrs, Volume= 0.026 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

Area (sf)	CN	Description
3,485	98	Paved roads w/curbs & sewers, HSG C
3,485		100.00% Impervious Area

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

Summary for Subcatchment S4-6:

Runoff = 0.22 cfs @ 12.03 hrs, Volume= 0.014 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

Area (sf)	CN	Description
1,952	98	Paved roads w/curbs & sewers, HSG C
1,952		100.00% Impervious Area

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

Summary for Subcatchment S4-7:

Runoff = 1.57 cfs @ 12.07 hrs, Volume= 0.104 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	14,612	92	Paved roads w/open ditches, 50% imp, HSG C
*	0	77	1/2 acre lots, 25% imp, HSG C
	3,386	79	Woods/grass comb., Good, HSG D
	17,998	90	Weighted Average
	10,692		59.41% Pervious Area
	7,306		40.59% Impervious Area

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

Summary for Subcatchment S4-8:

Runoff = 5.48 cfs @ 12.60 hrs, Volume= 0.752 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	30,000	77	1/2 acre lots, 25% imp, HSG C
	214,497	70	Woods, Good, HSG C
	27,010	77	Woods, Good, HSG D
	271,507	71	Weighted Average
	264,007		97.24% Pervious Area
	7,500		2.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	150	0.0600	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
7.5	500	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
41.4	650	Total			

Summary for Subcatchment S5-1:

Runoff = 4.31 cfs @ 12.11 hrs, Volume= 0.305 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	21,012	92	Paved roads w/open ditches, 50% imp, HSG C
*	43,000	77	1/2 acre lots, 25% imp, HSG C
	8,000	70	Woods, Good, HSG C
	72,012	81	Weighted Average
	50,756		70.48% Pervious Area
	21,256		29.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	70	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.7	240	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.9	310	Total			

Summary for Subcatchment S5-2:

Runoff = 0.41 cfs @ 12.03 hrs, Volume= 0.027 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

Area (sf)	CN	Description
3,643	98	Paved roads w/curbs & sewers, HSG C
3,643		100.00% Impervious Area

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

Summary for Subcatchment S5-3:

Runoff = 0.85 cfs @ 12.03 hrs, Volume= 0.049 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

Area (sf)	CN	Description
6,000	92	Paved roads w/open ditches, 50% imp, HSG C
5,152	70	Woods, Good, HSG C
11,152	82	Weighted Average
8,152		73.10% Pervious Area
3,000		26.90% Impervious Area

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

Summary for Subcatchment S5-4:

Runoff = 3.72 cfs @ 13.13 hrs, Volume= 0.761 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.30"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	95,000	77	1/2 acre lots, 25% imp, HSG C
	55,332	70	Woods, Good, HSG C
	83,225	77	Woods, Good, HSG D
*	1,442	98	Bedrock
	234,999	75	Weighted Average
	209,807		89.28% Pervious Area
	25,192		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.3	150	0.0100	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
13.3	400	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	40	0.0100	7.80	24.51	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.3	70	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
85.0	660	Total			

Summary for Reach R1:

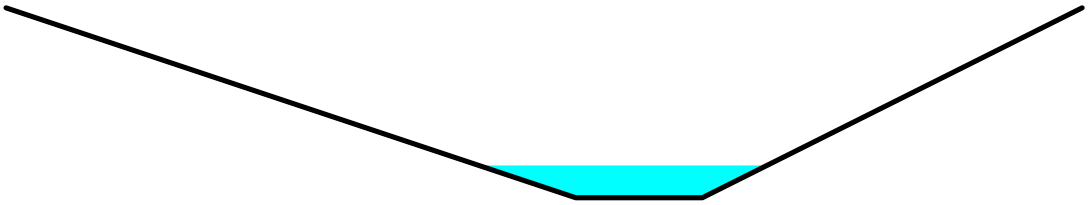
[79] Warning: Submerged Pond C1 Primary device # 1 OUTLET by 0.21'

Inflow Area = 0.865 ac, 34.27% Impervious, Inflow Depth > 2.62" for 10-year event
Inflow = 1.55 cfs @ 12.46 hrs, Volume= 0.189 af
Outflow = 1.55 cfs @ 12.48 hrs, Volume= 0.189 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.69 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 2.0 min

Peak Storage= 80 cf @ 12.47 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 71.16 cfs

1.00' x 1.50' deep channel, n= 0.030
Side Slope Z-value= 3.0 2.0 '/' Top Width= 8.50'
Length= 190.0' Slope= 0.0563 '/'
Inlet Invert= 285.70', Outlet Invert= 275.00'



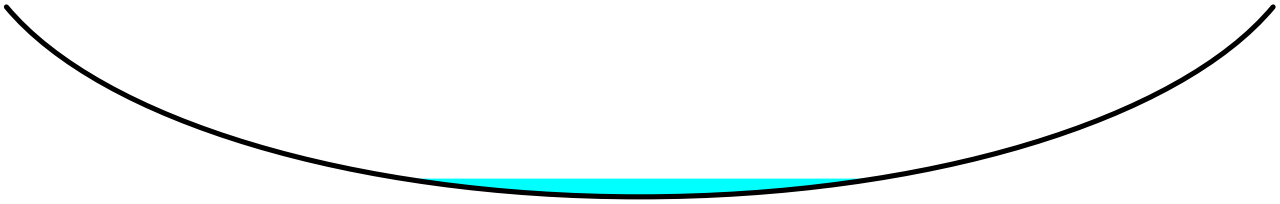
Summary for Reach R2:

Inflow Area = 0.616 ac, 28.64% Impervious, Inflow Depth > 2.26" for 10-year event
Inflow = 1.76 cfs @ 12.10 hrs, Volume= 0.116 af
Outflow = 1.08 cfs @ 12.46 hrs, Volume= 0.113 af, Atten= 38%, Lag= 21.8 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.12 fps, Min. Travel Time= 15.2 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 33.0 min

Peak Storage= 988 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 178.82 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 1,020.0' Slope= 0.0275 '/'
Inlet Invert= 316.00', Outlet Invert= 288.00'



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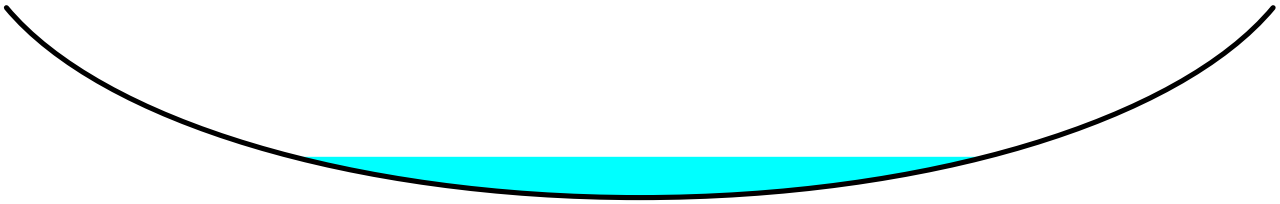
Summary for Reach R3-1:

Inflow Area = 2.246 ac, 25.00% Impervious, Inflow Depth > 1.89" for 10-year event
Inflow = 4.52 cfs @ 12.16 hrs, Volume= 0.355 af
Outflow = 3.86 cfs @ 12.35 hrs, Volume= 0.351 af, Atten= 14%, Lag= 11.2 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.17 fps, Min. Travel Time= 6.8 min
Avg. Velocity = 0.49 fps, Avg. Travel Time= 16.3 min

Peak Storage= 1,584 cf @ 12.23 hrs, Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 109.04 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 480.0' Slope= 0.0833 '/'
Inlet Invert= 304.00', Outlet Invert= 264.00'



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Summary for Reach R4-1:

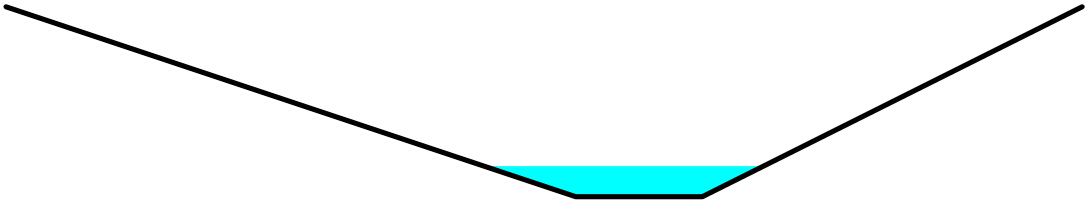
[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond CB4 Primary device # 1 OUTLET by 0.24'

Inflow Area = 0.702 ac, 51.20% Impervious, Inflow Depth > 2.86" for 10-year event
Inflow = 2.18 cfs @ 12.09 hrs, Volume= 0.167 af
Outflow = 2.18 cfs @ 12.11 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.63 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 1.4 min

Peak Storage= 62 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 111.98 cfs

1.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 2.0 '/' Top Width= 8.50'
Length= 160.0' Slope= 0.0750 '/'
Inlet Invert= 286.00', Outlet Invert= 274.00'



Summary for Reach R4-2:

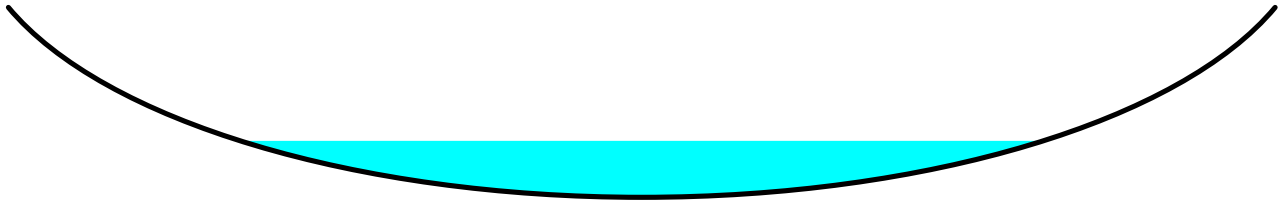
[81] Warning: Exceeded Pond LS1 by 0.26' @ 12.68 hrs

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 2.64" for 10-year event
Inflow = 1.89 cfs @ 12.38 hrs, Volume= 0.342 af
Outflow = 1.58 cfs @ 13.02 hrs, Volume= 0.332 af, Atten= 17%, Lag= 38.8 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.18 fps, Min. Travel Time= 22.8 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 40.0 min

Peak Storage= 2,155 cf @ 12.64 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.91 cfs

80.00' x 1.00' deep Parabolic Channel, n= 0.800
Length= 250.0' Slope= 0.0840 '/'
Inlet Invert= 263.00', Outlet Invert= 242.00'



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Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.323 ac, 26.62% Impervious, Inflow Depth > 1.94" for 10-year event
Inflow = 3.74 cfs @ 12.85 hrs, Volume= 0.859 af
Outflow = 3.74 cfs @ 12.85 hrs, Volume= 0.859 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.780 ac, 17.70% Impervious, Inflow Depth > 1.62" for 10-year event
Inflow = 5.87 cfs @ 12.65 hrs, Volume= 1.047 af
Outflow = 5.87 cfs @ 12.65 hrs, Volume= 1.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 20.739 ac, 6.91% Impervious, Inflow Depth > 1.86" for 10-year event
Inflow = 17.20 cfs @ 12.93 hrs, Volume= 3.207 af
Outflow = 17.20 cfs @ 12.93 hrs, Volume= 3.207 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.523 ac, 9.00% Impervious, Inflow Depth > 1.65" for 10-year event
Inflow = 8.53 cfs @ 12.55 hrs, Volume= 1.448 af
Outflow = 8.53 cfs @ 12.55 hrs, Volume= 1.448 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.388 ac, 16.50% Impervious, Inflow Depth > 1.67" for 10-year event
Inflow = 4.65 cfs @ 12.21 hrs, Volume= 1.028 af
Outflow = 4.65 cfs @ 12.21 hrs, Volume= 1.028 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond C1: Culvert @ 3+00

Inflow Area = 0.865 ac, 34.27% Impervious, Inflow Depth > 2.62" for 10-year event
Inflow = 1.55 cfs @ 12.46 hrs, Volume= 0.189 af
Outflow = 1.55 cfs @ 12.46 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.2 min
Primary = 1.55 cfs @ 12.46 hrs, Volume= 0.189 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 286.86' @ 12.46 hrs Surf.Area= 85 sf Storage= 41 cf

Plug-Flow detention time= 0.8 min calculated for 0.189 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (799.2 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	286.25'	1,575 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.25	50	0	0
288.00	150	175	175
290.00	500	650	825
291.00	1,000	750	1,575

Device	Routing	Invert	Outlet Devices
#1	Primary	286.25'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 285.75' S= 0.0100 '/' Cc= 0.900 n= 0.012
#2	Primary	290.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.55 cfs @ 12.46 hrs HW=286.86' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.55 cfs @ 3.84 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C2-1: Culvert @ 2+00

Inflow Area = 0.616 ac, 28.64% Impervious, Inflow Depth > 2.30" for 10-year event
Inflow = 1.84 cfs @ 12.07 hrs, Volume= 0.118 af
Outflow = 1.76 cfs @ 12.10 hrs, Volume= 0.116 af, Atten= 5%, Lag= 1.5 min
Primary = 1.76 cfs @ 12.10 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 321.05' @ 12.10 hrs Surf.Area= 440 sf Storage= 283 cf

Plug-Flow detention time= 12.8 min calculated for 0.116 af (98% of inflow)
Center-of-Mass det. time= 6.3 min (793.1 - 786.8)

Volume	Invert	Avail.Storage	Storage Description
#1	320.00'	1,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
320.00	100	0	0
322.00	750	850	850
323.00	1,500	1,125	1,975

Device	Routing	Invert	Outlet Devices
#1	Primary	320.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 318.80' S= 0.0320 '/' Cc= 0.900 n= 0.012
#2	Primary	322.30'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.75 cfs @ 12.10 hrs HW=321.05' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.75 cfs @ 2.74 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C4-1: Culvert Across End of Moody Road

Inflow Area = 0.442 ac, 30.05% Impervious, Inflow Depth > 2.30" for 10-year event
Inflow = 1.21 cfs @ 12.11 hrs, Volume= 0.085 af
Outflow = 1.20 cfs @ 12.12 hrs, Volume= 0.084 af, Atten= 1%, Lag= 0.5 min
Primary = 1.20 cfs @ 12.12 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.70' @ 12.12 hrs Surf.Area= 116 sf Storage= 50 cf

Plug-Flow detention time= 1.4 min calculated for 0.084 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (789.8 - 788.8)

Volume	Invert	Avail.Storage	Storage Description
#1	275.10'	1,015 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.10	50	0	0
276.00	150	90	90
278.00	350	500	590
279.00	500	425	1,015

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	**40.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	275.10'	**15.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.00' S= 0.0375 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.20 cfs @ 12.12 hrs HW=275.70' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Culvert** (Inlet Controls 1.20 cfs @ 2.08 fps)

Summary for Pond C4-2: Wetland Crossing

Inflow Area = 2.733 ac, 4.20% Impervious, Inflow Depth > 1.60" for 10-year event
Inflow = 3.83 cfs @ 12.26 hrs, Volume= 0.364 af
Outflow = 3.83 cfs @ 12.27 hrs, Volume= 0.364 af, Atten= 0%, Lag= 0.4 min
Primary = 3.83 cfs @ 12.27 hrs, Volume= 0.364 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 273.25' @ 12.27 hrs Surf.Area= 144 sf Storage= 121 cf

Plug-Flow detention time= 0.9 min calculated for 0.364 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (817.4 - 816.8)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	800 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
272.00	50	0	0
274.00	200	250	250
276.00	350	550	800

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 271.00' S= 0.0250 '/' Cc= 0.900 n= 0.040 Earth, cobble bottom, clean sides

Primary OutFlow Max=3.82 cfs @ 12.27 hrs HW=273.25' (Free Discharge)
└─**1=Culvert** (Barrel Controls 3.82 cfs @ 3.30 fps)

Summary for Pond C4-3: Culvert Across Hammerhead

[62] Warning: Exceeded Reach R4-1 OUTLET depth by 0.60' @ 12.12 hrs

Inflow Area =	0.702 ac,	51.20% Impervious,	Inflow Depth >	2.86"	for 10-year event
Inflow =	2.18 cfs @	12.11 hrs,	Volume=	0.167 af	
Outflow =	2.17 cfs @	12.11 hrs,	Volume=	0.167 af,	Atten= 0%, Lag= 0.4 min
Primary =	2.17 cfs @	12.11 hrs,	Volume=	0.167 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 274.84' @ 12.11 hrs Surf.Area= 92 sf Storage= 60 cf

Plug-Flow detention time= 1.1 min calculated for 0.167 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (767.7 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	700 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	50	0	0
276.00	150	200	200
278.00	350	500	700

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 271.50' S= 0.0357 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.17 cfs @ 12.11 hrs HW=274.84' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.17 cfs @ 2.47 fps)

Summary for Pond C4-4:

Inflow Area =	0.577 ac,	40.65% Impervious,	Inflow Depth >	2.65"	for 10-year event
Inflow =	1.81 cfs @	12.10 hrs,	Volume=	0.127 af	
Outflow =	1.81 cfs @	12.11 hrs,	Volume=	0.127 af,	Atten= 0%, Lag= 0.3 min
Primary =	1.81 cfs @	12.11 hrs,	Volume=	0.127 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.75' @ 12.11 hrs Surf.Area= 69 sf Storage= 45 cf

Plug-Flow detention time= 1.1 min calculated for 0.127 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (779.1 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
#1	291.00'	638 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.00	50	0	0
292.00	75	63	63
294.00	500	575	638

Device	Routing	Invert	Outlet Devices
#1	Primary	291.00'	**15.0" Round Culvert** L= 162.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 287.60' S= 0.0210 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.81 cfs @ 12.11 hrs HW=291.75' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.81 cfs @ 2.33 fps)

Summary for Pond C5-1:

Inflow Area = 1.653 ac, 29.52% Impervious, Inflow Depth > 2.21" for 10-year event
Inflow = 4.31 cfs @ 12.11 hrs, Volume= 0.305 af
Outflow = 4.15 cfs @ 12.14 hrs, Volume= 0.305 af, Atten= 4%, Lag= 1.6 min
Primary = 4.15 cfs @ 12.14 hrs, Volume= 0.305 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 290.92' @ 12.14 hrs Surf.Area= 384 sf Storage= 330 cf

Plug-Flow detention time= 1.5 min calculated for 0.304 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (792.6 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	289.50'	863 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
289.50	50	0	0
290.00	200	63	63
292.00	600	800	863

Device	Routing	Invert	Outlet Devices
#1	Primary	289.50'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=4.15 cfs @ 12.14 hrs HW=290.92' (Free Discharge)
└─**1=Culvert** (Barrel Controls 4.15 cfs @ 3.73 fps)

Summary for Pond CB2: CB-2

Inflow Area = 0.056 ac, 50.00% Impervious, Inflow Depth > 3.23" for 10-year event
Inflow = 0.25 cfs @ 12.03 hrs, Volume= 0.015 af
Outflow = 0.25 cfs @ 12.03 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 12.03 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.94' @ 12.03 hrs
Flood Elev= 278.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	275.71'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 275.21' S= 0.0100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.25 cfs @ 12.03 hrs HW=275.94' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.25 cfs @ 1.62 fps)

Summary for Pond CB4: CB-4

[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond C4-4 Primary device # 1 OUTLET by 0.39'
[81] Warning: Exceeded Pond CB5 by 0.31' @ 12.12 hrs

Inflow Area = 0.702 ac, 51.20% Impervious, Inflow Depth > 2.86" for 10-year event
Inflow = 2.18 cfs @ 12.09 hrs, Volume= 0.167 af
Outflow = 2.18 cfs @ 12.09 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min
Primary = 2.18 cfs @ 12.09 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 287.99' @ 12.09 hrs
Flood Elev= 290.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.26'	**15.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 286.00' S= 0.0630 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.18 cfs @ 12.09 hrs HW=287.99' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.18 cfs @ 2.92 fps)

Summary for Pond CB5: CB-5

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.080 ac,100.00% Impervious, Inflow Depth > 3.85" for 10-year event
Inflow = 0.39 cfs @ 12.03 hrs, Volume= 0.026 af
Outflow = 0.39 cfs @ 12.03 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.03 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 287.76' @ 12.03 hrs
Flood Elev= 290.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.46'	**15.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 287.26' S= 0.0100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.39 cfs @ 12.03 hrs HW=287.76' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.39 cfs @ 2.57 fps)

Summary for Pond CB6: CB-6

[82] Warning: Early inflow requires earlier time span

Inflow Area =	0.084 ac,100.00% Impervious, Inflow Depth > 3.85" for 10-year event				
Inflow	=	0.41 cfs @	12.03 hrs, Volume=	0.027 af	
Outflow	=	0.41 cfs @	12.03 hrs, Volume=	0.027 af, Atten= 0%, Lag= 0.0 min	
Primary	=	0.41 cfs @	12.03 hrs, Volume=	0.027 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.91' @ 12.03 hrs
Flood Elev= 292.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.55'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 289.25' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.40 cfs @ 12.03 hrs HW=289.91' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.40 cfs @ 2.36 fps)

Summary for Pond FB1: Filter Basin #1

[79] Warning: Submerged Pond C5-1 Primary device # 1 OUTLET by 0.22'
[79] Warning: Submerged Pond CB6 Primary device # 1 OUTLET by 0.22'

Inflow Area =	1.993 ac, 32.14% Impervious, Inflow Depth > 2.29" for 10-year event				
Inflow	=	4.73 cfs @	12.12 hrs, Volume=	0.381 af	
Outflow	=	4.01 cfs @	12.20 hrs, Volume=	0.267 af, Atten= 15%, Lag= 4.8 min	
Primary	=	4.01 cfs @	12.20 hrs, Volume=	0.267 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.47' @ 12.20 hrs Surf.Area= 4,144 sf Storage= 5,754 cf

Plug-Flow detention time= 115.0 min calculated for 0.267 af (70% of inflow)
Center-of-Mass det. time= 47.8 min (834.5 - 786.7)

Volume	Invert	Avail.Storage	Storage Description
#1	287.75'	11,035 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.75	2,550	0	0
289.25	3,941	4,868	4,868
290.00	4,636	3,216	8,085
290.60	5,200	2,951	11,035

Device	Routing	Invert	Outlet Devices
#1	Primary	289.25'	**15.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=4.00 cfs @ 12.20 hrs HW=289.47' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 4.00 cfs @ 1.22 fps)

Summary for Pond GW1: Gravel Wetland #1

[62] Warning: Exceeded Reach R1 OUTLET depth by 0.26' @ 13.13 hrs
[79] Warning: Submerged Pond CB2 Primary device # 1 OUTLET by 0.19'

Inflow Area = 4.240 ac, 29.03% Impervious, Inflow Depth > 2.42" for 10-year event
Inflow = 5.39 cfs @ 12.46 hrs, Volume= 0.854 af
Outflow = 2.67 cfs @ 13.05 hrs, Volume= 0.677 af, Atten= 50%, Lag= 35.5 min
Primary = 2.67 cfs @ 13.05 hrs, Volume= 0.677 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.40' @ 13.05 hrs Surf.Area= 8,563 sf Storage= 15,951 cf

Plug-Flow detention time= 124.9 min calculated for 0.677 af (79% of inflow)
Center-of-Mass det. time= 72.6 min (876.0 - 803.3)

Volume	Invert	Avail.Storage	Storage Description
#1	273.10'	37,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
273.10	5,020	0	0
274.00	6,207	5,052	5,052
274.20	6,300	1,251	6,303
274.21	7,500	69	6,372
275.00	8,220	6,209	12,581
276.50	9,500	13,290	25,871
277.50	13,000	11,250	37,121

Device	Routing	Invert	Outlet Devices
#1	Primary	274.10'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.50' S= 0.0300 '/' Cc= 0.900 n= 0.012

#2	Primary	276.20'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.67 cfs @ 13.05 hrs HW=275.40' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.67 cfs @ 3.40 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond GW2: Gravel Wetland #2

Inflow Area = 4.015 ac, 22.31% Impervious, Inflow Depth > 2.13" for 10-year event
Inflow = 9.70 cfs @ 12.13 hrs, Volume= 0.713 af
Outflow = 2.64 cfs @ 12.54 hrs, Volume= 0.503 af, Atten= 73%, Lag= 24.9 min
Primary = 2.64 cfs @ 12.54 hrs, Volume= 0.503 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 290.55' @ 12.54 hrs Surf.Area= 8,420 sf Storage= 14,740 cf

Plug-Flow detention time= 139.4 min calculated for 0.503 af (71% of inflow)
Center-of-Mass det. time= 73.2 min (867.9 - 794.7)

Volume	Invert	Avail.Storage	Storage Description
#1	288.30'	32,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
288.30	4,740	0	0
289.60	6,630	7,391	7,391
289.61	7,000	68	7,459
290.30	8,037	5,188	12,646
292.40	11,200	20,199	32,845

Device	Routing	Invert	Outlet Devices
#1	Primary	289.60'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.00' S= 0.0600 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	291.20'	**25.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=2.64 cfs @ 12.54 hrs HW=290.55' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.64 cfs @ 2.63 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond LS1: Level Spreader

[79] Warning: Submerged Pond P4 Primary device # 1 INLET by 0.04'

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 2.68" for 10-year event
Inflow = 1.89 cfs @ 12.37 hrs, Volume= 0.347 af
Outflow = 1.89 cfs @ 12.38 hrs, Volume= 0.342 af, Atten= 0%, Lag= 0.2 min
Primary = 1.89 cfs @ 12.38 hrs, Volume= 0.342 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 263.04' @ 12.38 hrs Surf.Area= 632 sf Storage= 250 cf

Plug-Flow detention time= 10.6 min calculated for 0.342 af (98% of inflow)
Center-of-Mass det. time= 4.9 min (808.1 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	262.50'	625 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.50	300	0	0
263.00	600	225	225
263.50	1,000	400	625

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**100.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.89 cfs @ 12.38 hrs HW=263.04' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.89 cfs @ 0.47 fps)

Summary for Pond P4: Impoundment

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 2.74" for 10-year event
Inflow = 4.81 cfs @ 12.10 hrs, Volume= 0.355 af
Outflow = 1.89 cfs @ 12.37 hrs, Volume= 0.347 af, Atten= 61%, Lag= 16.6 min
Primary = 1.89 cfs @ 12.37 hrs, Volume= 0.347 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 264.87' @ 12.37 hrs Surf.Area= 2,737 sf Storage= 4,301 cf

Plug-Flow detention time= 40.3 min calculated for 0.347 af (98% of inflow)
Center-of-Mass det. time= 31.2 min (803.1 - 771.9)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	10,725 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
263.00	1,900	0	0
264.00	2,300	2,100	2,100
265.00	2,800	2,550	4,650
266.00	3,500	3,150	7,800
266.50	4,000	1,875	9,675
266.75	4,400	1,050	10,725

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**8.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 262.50' S= 0.0125 '/' Cc= 0.900 n= 0.012
#2	Primary	264.60'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 263.50' S= 0.0275 '/' Cc= 0.900 n= 0.012
#3	Primary	265.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.89 cfs @ 12.37 hrs HW=264.87' (Free Discharge)
- **1=Culvert** (Inlet Controls 1.65 cfs @ 4.72 fps)
- **2=Culvert** (Inlet Controls 0.25 cfs @ 1.41 fps)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment S-2-1:

Runoff = 13.72 cfs @ 12.13 hrs, Volume= 1.014 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	18,900	74	Pond Area
	114,397	80	1/2 acre lots, 25% imp, HSG C
	20,822	92	Paved roads w/open ditches, 50% imp, HSG C
	20,767	70	Woods, Good, HSG C
	174,886	80	Weighted Average
	135,876		77.69% Pervious Area
	39,010		22.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	75	0.0900	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.8	720	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
9.1	795	Total			

Summary for Subcatchment S1-1:

Runoff = 3.82 cfs @ 12.62 hrs, Volume= 0.545 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	8,846	98	Bedrock
	24,959	79	Woods/grass comb., Good, HSG D
*	13,500	74	Pond Area
	45,007	80	1/2 acre lots, 25% imp, HSG C
	92,312	81	Weighted Average
	72,214		78.23% Pervious Area
	20,098		21.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.6	150	0.0530	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.1	90	0.0560	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.9	240	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
45.6	480	Total			

Summary for Subcatchment S1-2:

Runoff = 4.43 cfs @ 12.16 hrs, Volume= 0.361 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	0	98	Bedrock
	25,286	92	Paved roads w/open ditches, 50% imp, HSG C
	26,974	80	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	52,260	86	Weighted Average
	32,874		62.90% Pervious Area
	19,387		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	75	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.7	670	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
11.6	745	Total			

Summary for Subcatchment S1-3:

Runoff = 2.09 cfs @ 12.46 hrs, Volume= 0.259 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	0	98	Bedrock
	22,082	92	Paved roads w/open ditches, 50% imp, HSG C
	15,597	77	2 acre lots, 12% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	37,679	86	Weighted Average
	24,766		65.73% Pervious Area
	12,913		34.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
0.3	70	0.0530	3.45		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
32.7	220	Total			

Summary for Subcatchment S1-4:

Runoff = 0.32 cfs @ 12.03 hrs, Volume= 0.020 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	0	98	Bedrock
	2,433	92	Paved roads w/open ditches, 50% imp, HSG C
	0	80	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	2,433	92	Weighted Average
	1,217		50.00% Pervious Area
	1,217		50.00% Impervious Area

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

Summary for Subcatchment S1-5:

Runoff = 1.70 cfs @ 12.73 hrs, Volume= 0.261 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	0	98	Bedrock
	4,792	98	Paved roads w/curbs & sewers, HSG C
*	3,000	74	Pond Area
	27,607	77	2 acre lots, 12% imp, HSG C
	11,779	79	Woods/grass comb., Good, HSG D
	47,178	79	Weighted Average
	39,073		82.82% Pervious Area
	8,105		17.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	150	0.0670	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.1	90	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.3	170	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
52.8	410	Total			

Summary for Subcatchment S2-2:

Runoff = 3.95 cfs @ 12.79 hrs, Volume= 0.642 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
20,000	80	1/2 acre lots, 25% imp, HSG C
16,595	92	Paved roads w/open ditches, 50% imp, HSG C
100,587	70	Woods, Good, HSG C
137,182	74	Weighted Average
123,885		90.31% Pervious Area
13,298		9.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.8	150	0.0400	0.06		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
18.3	870	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
58.1	1,020	Total			

Summary for Subcatchment S2-3:

Runoff = 2.56 cfs @ 12.07 hrs, Volume= 0.165 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
20,469	80	1/2 acre lots, 25% imp, HSG C
5,130	92	Paved roads w/open ditches, 50% imp, HSG C
1,224	70	Woods, Good, HSG C
26,823	82	Weighted Average
19,141		71.36% Pervious Area
7,682		28.64% Impervious Area

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

Summary for Subcatchment S3-1:

Runoff = 6.57 cfs @ 12.16 hrs, Volume= 0.516 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	97,850	77	1/2 acre lots, 25% imp, HSG C
	73,388		75.00% Pervious Area
	24,463		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	150	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.8	100	0.0900	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.2	250	Total			

Summary for Subcatchment s3-2:

Runoff = 23.60 cfs @ 12.93 hrs, Volume= 4.158 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
*	11,411	98	Bedrock
*	267,231	77	Woods, Good, HSG D/Wetlands
	175,471	82	2 acre lots, 12% imp, HSG D
	169,559	78	Meadow, non-grazed, HSG D
	7,837	91	Gravel roads, HSG D
	151,867	70	Woods, Good, HSG C
*	22,150	77	1/2 acre lots, 25% imp, HSG C
	805,526	77	Weighted Average
	767,521		95.28% Pervious Area
	38,005		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.6	527	0.0510	1.58		**Shallow Concentrated Flow, B - C** Short Grass Pasture Kv= 7.0 fps
7.8	656	0.0780	1.40		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
5.9	449	0.0650	1.27		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
0.9	92	0.1080	1.64		**Shallow Concentrated Flow, E - F** Woodland Kv= 5.0 fps
4.1	360	0.0860	1.47		**Shallow Concentrated Flow, F - G** Woodland Kv= 5.0 fps
67.3	2,234	Total			

Summary for Subcatchment S4-1:

Runoff = 2.44 cfs @ 12.10 hrs, Volume= 0.174 af, Depth> 3.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	15,728	92	Paved roads w/open ditches, 50% imp, HSG C
*	9,402	77	1/2 acre lots, 25% imp, HSG C
	0	79	Woods/grass comb., Good, HSG D
	25,130	86	Weighted Average
	14,916		59.35% Pervious Area
	10,215		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.6	400	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.3	450	Total			

Summary for Subcatchment S4-3:

Runoff = 5.79 cfs @ 12.25 hrs, Volume= 0.546 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	3,053	74	Ditching
*	20,000	77	1/2 acre lots, 25% imp, HSG C
	66,009	70	Woods, Good, HSG C
	30,000	77	Woods, Good, HSG D
	119,062	73	Weighted Average
	114,062		95.80% Pervious Area
	5,000		4.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	90	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
11.3	480	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.2	570	Total			

Summary for Subcatchment S4-4:

Runoff = 1.68 cfs @ 12.11 hrs, Volume= 0.119 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	7,561	92	Paved roads w/open ditches, 50% imp, HSG C
*	8,000	77	1/2 acre lots, 25% imp, HSG C
	3,675	70	Woods, Good, HSG C
	19,236	82	Weighted Average
	13,456		69.95% Pervious Area
	5,781		30.05% Impervious Area

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

Summary for Subcatchment S4-5:

Runoff = 0.49 cfs @ 12.03 hrs, Volume= 0.033 af, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
3,485	98	Paved roads w/curbs & sewers, HSG C
3,485		100.00% Impervious Area

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

Summary for Subcatchment S4-6:

Runoff = 0.27 cfs @ 12.03 hrs, Volume= 0.018 af, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
1,952	98	Paved roads w/curbs & sewers, HSG C
1,952		100.00% Impervious Area

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

Summary for Subcatchment S4-7:

Runoff = 2.05 cfs @ 12.07 hrs, Volume= 0.139 af, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	14,612	92	Paved roads w/open ditches, 50% imp, HSG C
*	0	77	1/2 acre lots, 25% imp, HSG C
	3,386	79	Woods/grass comb., Good, HSG D
	17,998	90	Weighted Average
	10,692		59.41% Pervious Area
	7,306		40.59% Impervious Area

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

Summary for Subcatchment S4-8:

Runoff = 8.46 cfs @ 12.60 hrs, Volume= 1.147 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	30,000	77	1/2 acre lots, 25% imp, HSG C
	214,497	70	Woods, Good, HSG C
	27,010	77	Woods, Good, HSG D
	271,507	71	Weighted Average
	264,007		97.24% Pervious Area
	7,500		2.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	150	0.0600	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
7.5	500	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
41.4	650	Total			

Summary for Subcatchment S5-1:

Runoff = 6.05 cfs @ 12.11 hrs, Volume= 0.431 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	21,012	92	Paved roads w/open ditches, 50% imp, HSG C
*	43,000	77	1/2 acre lots, 25% imp, HSG C
	8,000	70	Woods, Good, HSG C
	72,012	81	Weighted Average
	50,756		70.48% Pervious Area
	21,256		29.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	70	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
2.7	240	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.9	310	Total			

Summary for Subcatchment S5-2:

Runoff = 0.51 cfs @ 12.03 hrs, Volume= 0.034 af, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
3,643	98	Paved roads w/curbs & sewers, HSG C
3,643		100.00% Impervious Area

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

Summary for Subcatchment S5-3:

Runoff = 1.19 cfs @ 12.03 hrs, Volume= 0.069 af, Depth> 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

Area (sf)	CN	Description
6,000	92	Paved roads w/open ditches, 50% imp, HSG C
5,152	70	Woods, Good, HSG C
11,152	82	Weighted Average
8,152		73.10% Pervious Area
3,000		26.90% Impervious Area

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

Summary for Subcatchment S5-4:

Runoff = 5.55 cfs @ 13.13 hrs, Volume= 1.126 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	95,000	77	1/2 acre lots, 25% imp, HSG C
	55,332	70	Woods, Good, HSG C
	83,225	77	Woods, Good, HSG D
*	1,442	98	Bedrock
	234,999	75	Weighted Average
	209,807		89.28% Pervious Area
	25,192		10.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.3	150	0.0100	0.04		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
13.3	400	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	40	0.0100	7.80	24.51	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.3	70	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
85.0	660	Total			

Summary for Reach R1:

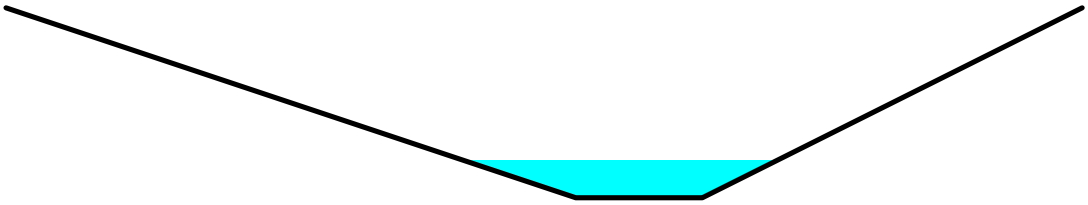
[79] Warning: Submerged Pond C1 Primary device # 1 OUTLET by 0.25'

Inflow Area = 0.865 ac, 34.27% Impervious, Inflow Depth > 3.59" for 25-year event
Inflow = 2.09 cfs @ 12.46 hrs, Volume= 0.259 af
Outflow = 2.09 cfs @ 12.48 hrs, Volume= 0.258 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.01 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 1.9 min

Peak Storage= 99 cf @ 12.46 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 71.16 cfs

1.00' x 1.50' deep channel, n= 0.030
Side Slope Z-value= 3.0 2.0 '/' Top Width= 8.50'
Length= 190.0' Slope= 0.0563 '/'
Inlet Invert= 285.70', Outlet Invert= 275.00'



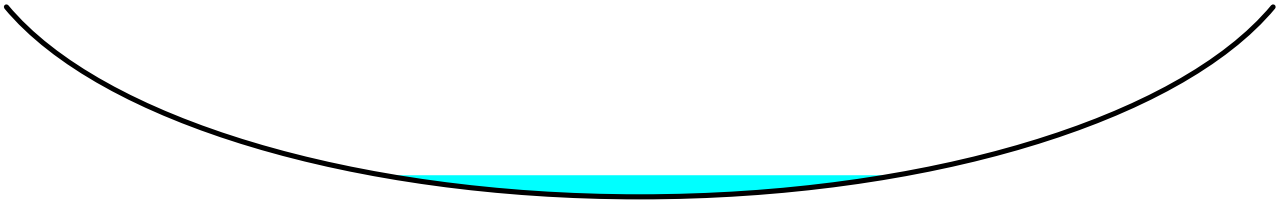
Summary for Reach R2:

Inflow Area = 0.616 ac, 28.64% Impervious, Inflow Depth > 3.19" for 25-year event
Inflow = 2.44 cfs @ 12.10 hrs, Volume= 0.163 af
Outflow = 1.59 cfs @ 12.42 hrs, Volume= 0.160 af, Atten= 35%, Lag= 19.3 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.26 fps, Min. Travel Time= 13.5 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 30.7 min

Peak Storage= 1,292 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 178.82 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 1,020.0' Slope= 0.0275 '/'
Inlet Invert= 316.00', Outlet Invert= 288.00'



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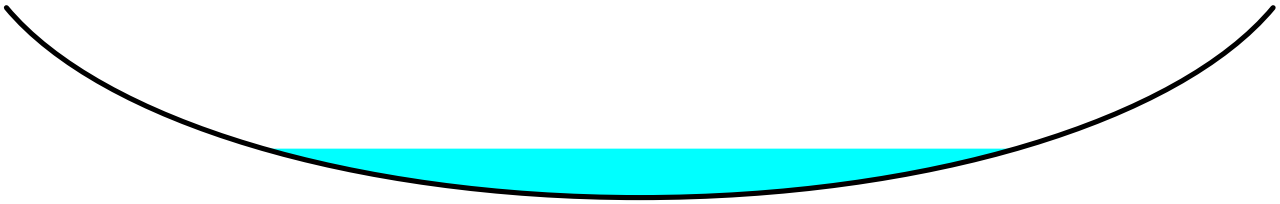
Summary for Reach R3-1:

Inflow Area = 2.246 ac, 25.00% Impervious, Inflow Depth > 2.75" for 25-year event
Inflow = 6.57 cfs @ 12.16 hrs, Volume= 0.516 af
Outflow = 5.76 cfs @ 12.32 hrs, Volume= 0.511 af, Atten= 12%, Lag= 9.9 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 6.0 min
Avg. Velocity = 0.53 fps, Avg. Travel Time= 15.1 min

Peak Storage= 2,089 cf @ 12.22 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 109.04 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 480.0' Slope= 0.0833 '/'
Inlet Invert= 304.00', Outlet Invert= 264.00'



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Summary for Reach R4-1:

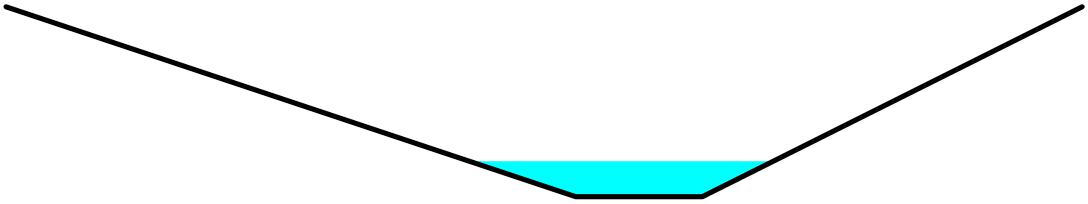
[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond CB4 Primary device # 1 OUTLET by 0.28'

Inflow Area = 0.702 ac, 51.20% Impervious, Inflow Depth > 3.84" for 25-year event
Inflow = 2.91 cfs @ 12.09 hrs, Volume= 0.225 af
Outflow = 2.90 cfs @ 12.10 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.11 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 1.3 min

Peak Storage= 76 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 111.98 cfs

1.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 2.0 '/' Top Width= 8.50'
Length= 160.0' Slope= 0.0750 '/'
Inlet Invert= 286.00', Outlet Invert= 274.00'



Summary for Reach R4-2:

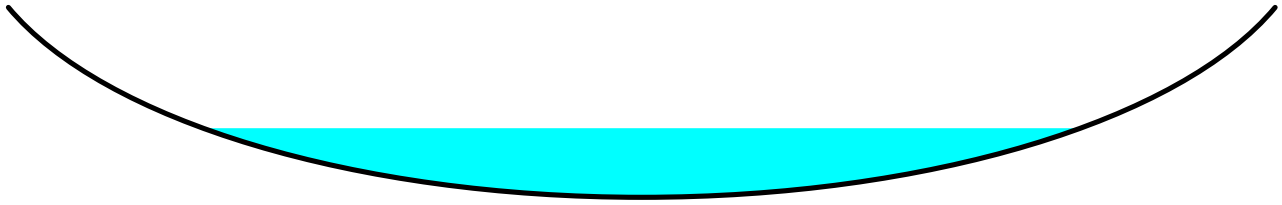
[81] Warning: Exceeded Pond LS1 by 0.32' @ 12.59 hrs

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 3.60" for 25-year event
Inflow = 3.07 cfs @ 12.30 hrs, Volume= 0.467 af
Outflow = 2.44 cfs @ 12.87 hrs, Volume= 0.456 af, Atten= 21%, Lag= 34.5 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.21 fps, Min. Travel Time= 19.9 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 37.5 min

Peak Storage= 2,916 cf @ 12.54 hrs, Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.91 cfs

80.00' x 1.00' deep Parabolic Channel, n= 0.800
Length= 250.0' Slope= 0.0840 '/'
Inlet Invert= 263.00', Outlet Invert= 242.00'



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Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.323 ac, 26.62% Impervious, Inflow Depth > 2.84" for 25-year event
Inflow = 5.13 cfs @ 12.83 hrs, Volume= 1.262 af
Outflow = 5.13 cfs @ 12.83 hrs, Volume= 1.262 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.780 ac, 17.70% Impervious, Inflow Depth > 2.47" for 25-year event
Inflow = 9.09 cfs @ 12.64 hrs, Volume= 1.601 af
Outflow = 9.09 cfs @ 12.64 hrs, Volume= 1.601 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 20.739 ac, 6.91% Impervious, Inflow Depth > 2.70" for 25-year event
Inflow = 24.91 cfs @ 12.87 hrs, Volume= 4.669 af
Outflow = 24.91 cfs @ 12.87 hrs, Volume= 4.669 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.523 ac, 9.00% Impervious, Inflow Depth > 2.45" for 25-year event
Inflow = 13.19 cfs @ 12.56 hrs, Volume= 2.148 af
Outflow = 13.19 cfs @ 12.56 hrs, Volume= 2.148 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Reach SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.388 ac, 16.50% Impervious, Inflow Depth > 2.51" for 25-year event
Inflow = 7.14 cfs @ 12.19 hrs, Volume= 1.545 af
Outflow = 7.14 cfs @ 12.19 hrs, Volume= 1.545 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond C1: Culvert @ 3+00

Inflow Area = 0.865 ac, 34.27% Impervious, Inflow Depth > 3.59" for 25-year event
Inflow = 2.09 cfs @ 12.46 hrs, Volume= 0.259 af
Outflow = 2.09 cfs @ 12.46 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.1 min
Primary = 2.09 cfs @ 12.46 hrs, Volume= 0.259 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 286.97' @ 12.46 hrs Surf.Area= 91 sf Storage= 51 cf

Plug-Flow detention time= 0.8 min calculated for 0.258 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (791.8 - 791.3)

Volume	Invert	Avail.Storage	Storage Description
#1	286.25'	1,575 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.25	50	0	0
288.00	150	175	175
290.00	500	650	825
291.00	1,000	750	1,575

Device	Routing	Invert	Outlet Devices
#1	Primary	286.25'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 285.75' S= 0.0100 '/' Cc= 0.900 n= 0.012
#2	Primary	290.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.09 cfs @ 12.46 hrs HW=286.97' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.09 cfs @ 4.09 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C2-1: Culvert @ 2+00

Inflow Area = 0.616 ac, 28.64% Impervious, Inflow Depth > 3.22" for 25-year event
Inflow = 2.56 cfs @ 12.07 hrs, Volume= 0.165 af
Outflow = 2.44 cfs @ 12.10 hrs, Volume= 0.163 af, Atten= 5%, Lag= 1.5 min
Primary = 2.44 cfs @ 12.10 hrs, Volume= 0.163 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 321.18' @ 12.10 hrs Surf.Area= 485 sf Storage= 346 cf

Plug-Flow detention time= 10.5 min calculated for 0.163 af (99% of inflow)
Center-of-Mass det. time= 5.6 min (784.4 - 778.9)

Volume	Invert	Avail.Storage	Storage Description
#1	320.00'	1,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
320.00	100	0	0
322.00	750	850	850
323.00	1,500	1,125	1,975

Device	Routing	Invert	Outlet Devices
#1	Primary	320.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 318.80' S= 0.0320 '/' Cc= 0.900 n= 0.012
#2	Primary	322.30'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.44 cfs @ 12.10 hrs HW=321.18' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.44 cfs @ 3.01 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C4-1: Culvert Across End of Moody Road

Inflow Area = 0.442 ac, 30.05% Impervious, Inflow Depth > 3.22" for 25-year event
Inflow = 1.68 cfs @ 12.11 hrs, Volume= 0.119 af
Outflow = 1.67 cfs @ 12.12 hrs, Volume= 0.118 af, Atten= 1%, Lag= 0.5 min
Primary = 1.67 cfs @ 12.12 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.82' @ 12.12 hrs Surf.Area= 130 sf Storage= 65 cf

Plug-Flow detention time= 1.3 min calculated for 0.118 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (781.8 - 780.9)

Volume	Invert	Avail.Storage	Storage Description
#1	275.10'	1,015 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.10	50	0	0
276.00	150	90	90
278.00	350	500	590
279.00	500	425	1,015

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	**40.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	275.10'	**15.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.00' S= 0.0375 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.67 cfs @ 12.12 hrs HW=275.82' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Culvert** (Inlet Controls 1.67 cfs @ 2.28 fps)

Summary for Pond C4-2: Wetland Crossing

Inflow Area = 2.733 ac, 4.20% Impervious, Inflow Depth > 2.40" for 25-year event
Inflow = 5.79 cfs @ 12.25 hrs, Volume= 0.546 af
Outflow = 5.77 cfs @ 12.27 hrs, Volume= 0.546 af, Atten= 0%, Lag= 1.0 min
Primary = 5.77 cfs @ 12.27 hrs, Volume= 0.546 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 273.73' @ 12.27 hrs Surf.Area= 179 sf Storage= 198 cf

Plug-Flow detention time= 0.8 min calculated for 0.545 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (808.4 - 807.9)

Volume	Invert	Avail.Storage	Storage Description
#1	272.00'	800 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
272.00	50	0	0
274.00	200	250	250
276.00	350	550	800

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 271.00' S= 0.0250 '/' Cc= 0.900 n= 0.040 Earth, cobble bottom, clean sides

Primary OutFlow Max=5.77 cfs @ 12.27 hrs HW=273.73' (Free Discharge)
└─**1=Culvert** (Barrel Controls 5.77 cfs @ 3.56 fps)

Summary for Pond C4-3: Culvert Across Hammerhead

[62] Warning: Exceeded Reach R4-1 OUTLET depth by 0.74' @ 12.11 hrs

Inflow Area =	0.702 ac,	51.20% Impervious,	Inflow Depth >	3.84"	for 25-year event
Inflow =	2.90 cfs @	12.10 hrs,	Volume=	0.224 af	
Outflow =	2.90 cfs @	12.11 hrs,	Volume=	0.224 af,	Atten= 0%, Lag= 0.4 min
Primary =	2.90 cfs @	12.11 hrs,	Volume=	0.224 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.02' @ 12.11 hrs Surf.Area= 101 sf Storage= 77 cf

Plug-Flow detention time= 1.0 min calculated for 0.224 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (762.0 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	700 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	50	0	0
276.00	150	200	200
278.00	350	500	700

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 271.50' S= 0.0357 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.90 cfs @ 12.11 hrs HW=275.02' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.90 cfs @ 2.71 fps)

Summary for Pond C4-4:

Inflow Area =	0.577 ac,	40.65% Impervious,	Inflow Depth >	3.62"	for 25-year event
Inflow =	2.44 cfs @	12.10 hrs,	Volume=	0.174 af	
Outflow =	2.44 cfs @	12.11 hrs,	Volume=	0.174 af,	Atten= 0%, Lag= 0.3 min
Primary =	2.44 cfs @	12.11 hrs,	Volume=	0.174 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.91' @ 12.11 hrs Surf.Area= 73 sf Storage= 56 cf

Plug-Flow detention time= 1.0 min calculated for 0.174 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (771.5 - 770.9)

Volume	Invert	Avail.Storage	Storage Description
#1	291.00'	638 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.00	50	0	0
292.00	75	63	63
294.00	500	575	638

Device	Routing	Invert	Outlet Devices
#1	Primary	291.00'	**15.0" Round Culvert** L= 162.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 287.60' S= 0.0210 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.43 cfs @ 12.11 hrs HW=291.91' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.43 cfs @ 2.56 fps)

Summary for Pond C5-1:

Inflow Area = 1.653 ac, 29.52% Impervious, Inflow Depth > 3.13" for 25-year event
Inflow = 6.05 cfs @ 12.11 hrs, Volume= 0.431 af
Outflow = 5.50 cfs @ 12.15 hrs, Volume= 0.430 af, Atten= 9%, Lag= 2.5 min
Primary = 5.50 cfs @ 12.15 hrs, Volume= 0.430 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.51' @ 12.15 hrs Surf.Area= 503 sf Storage= 595 cf

Plug-Flow detention time= 1.5 min calculated for 0.430 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (784.7 - 783.4)

Volume	Invert	Avail.Storage	Storage Description
#1	289.50'	863 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
289.50	50	0	0
290.00	200	63	63
292.00	600	800	863

Device	Routing	Invert	Outlet Devices
#1	Primary	289.50'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=5.49 cfs @ 12.15 hrs HW=291.51' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.49 cfs @ 4.48 fps)

Summary for Pond CB2: CB-2

Inflow Area = 0.056 ac, 50.00% Impervious, Inflow Depth > 4.25" for 25-year event
Inflow = 0.32 cfs @ 12.03 hrs, Volume= 0.020 af
Outflow = 0.32 cfs @ 12.03 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.03 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 275.97' @ 12.03 hrs
Flood Elev= 278.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	275.71'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 275.21' S= 0.0100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.32 cfs @ 12.03 hrs HW=275.97' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.32 cfs @ 1.73 fps)

Summary for Pond CB4: CB-4

[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond C4-4 Primary device # 1 OUTLET by 0.53'
[81] Warning: Exceeded Pond CB5 by 0.42' @ 12.12 hrs

Inflow Area = 0.702 ac, 51.20% Impervious, Inflow Depth > 3.84" for 25-year event
Inflow = 2.91 cfs @ 12.09 hrs, Volume= 0.225 af
Outflow = 2.91 cfs @ 12.09 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min
Primary = 2.91 cfs @ 12.09 hrs, Volume= 0.225 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 288.13' @ 12.09 hrs
Flood Elev= 290.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.26'	**15.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 286.00' S= 0.0630 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.91 cfs @ 12.09 hrs HW=288.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.91 cfs @ 3.18 fps)

Summary for Pond CB5: CB-5

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.080 ac,100.00% Impervious, Inflow Depth > 4.88" for 25-year event
Inflow = 0.49 cfs @ 12.03 hrs, Volume= 0.033 af
Outflow = 0.49 cfs @ 12.03 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.03 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 287.80' @ 12.03 hrs
Flood Elev= 290.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	287.46'	**15.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 287.26' S= 0.0100 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.49 cfs @ 12.03 hrs HW=287.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.49 cfs @ 2.70 fps)

Summary for Pond CB6: CB-6

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.084 ac,100.00% Impervious, Inflow Depth > 4.88" for 25-year event
Inflow = 0.51 cfs @ 12.03 hrs, Volume= 0.034 af
Outflow = 0.51 cfs @ 12.03 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.51 cfs @ 12.03 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.96' @ 12.03 hrs
Flood Elev= 292.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	289.55'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 289.25' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=0.51 cfs @ 12.03 hrs HW=289.96' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.51 cfs @ 2.51 fps)

Summary for Pond FB1: Filter Basin #1

[79] Warning: Submerged Pond C5-1 Primary device # 1 INLET by 0.04'
[79] Warning: Submerged Pond CB6 Primary device # 1 OUTLET by 0.29'

Inflow Area = 1.993 ac, 32.14% Impervious, Inflow Depth > 3.21" for 25-year event
Inflow = 6.23 cfs @ 12.15 hrs, Volume= 0.533 af
Outflow = 6.09 cfs @ 12.18 hrs, Volume= 0.420 af, Atten= 2%, Lag= 1.9 min
Primary = 6.09 cfs @ 12.18 hrs, Volume= 0.420 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.54' @ 12.18 hrs Surf.Area= 4,208 sf Storage= 6,044 cf

Plug-Flow detention time= 92.8 min calculated for 0.420 af (79% of inflow)
Center-of-Mass det. time= 37.5 min (817.1 - 779.6)

Volume	Invert	Avail.Storage	Storage Description
#1	287.75'	11,035 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.75	2,550	0	0
289.25	3,941	4,868	4,868
290.00	4,636	3,216	8,085
290.60	5,200	2,951	11,035

Device	Routing	Invert	Outlet Devices
#1	Primary	289.25'	**15.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=6.09 cfs @ 12.18 hrs HW=289.54' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 6.09 cfs @ 1.41 fps)

Summary for Pond GW1: Gravel Wetland #1

[62] Warning: Exceeded Reach R1 OUTLET depth by 0.88' @ 13.13 hrs
[81] Warning: Exceeded Pond CB2 by 0.27' @ 13.06 hrs

Inflow Area =	4.240 ac,	29.03% Impervious,	Inflow Depth >	3.35"	for 25-year event
Inflow =	7.42 cfs @	12.44 hrs,	Volume=	1.185 af	
Outflow =	3.58 cfs @	13.05 hrs,	Volume=	1.001 af,	Atten= 52%, Lag= 36.9 min
Primary =	3.58 cfs @	13.05 hrs,	Volume=	1.001 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 276.04' @ 13.05 hrs Surf.Area= 9,109 sf Storage= 21,605 cf

Plug-Flow detention time= 116.7 min calculated for 1.000 af (84% of inflow)
Center-of-Mass det. time= 73.7 min (869.7 - 796.0)

Volume	Invert	Avail.Storage	Storage Description
#1	273.10'	37,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
273.10	5,020	0	0
274.00	6,207	5,052	5,052
274.20	6,300	1,251	6,303
274.21	7,500	69	6,372
275.00	8,220	6,209	12,581
276.50	9,500	13,290	25,871
277.50	13,000	11,250	37,121

Device	Routing	Invert	Outlet Devices
#1	Primary	274.10'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.50' S= 0.0300 '/' Cc= 0.900 n= 0.012

#2	Primary	276.20'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.58 cfs @ 13.05 hrs HW=276.04' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.58 cfs @ 4.56 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond GW2: Gravel Wetland #2

Inflow Area = 4.015 ac, 22.31% Impervious, Inflow Depth > 3.03" for 25-year event
Inflow = 13.72 cfs @ 12.13 hrs, Volume= 1.014 af
Outflow = 4.40 cfs @ 12.49 hrs, Volume= 0.799 af, Atten= 68%, Lag= 21.9 min
Primary = 4.40 cfs @ 12.49 hrs, Volume= 0.799 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.11' @ 12.49 hrs Surf.Area= 9,263 sf Storage= 19,685 cf

Plug-Flow detention time= 117.7 min calculated for 0.798 af (79% of inflow)
Center-of-Mass det. time= 63.0 min (849.6 - 786.6)

Volume	Invert	Avail.Storage	Storage Description
#1	288.30'	32,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
288.30	4,740	0	0
289.60	6,630	7,391	7,391
289.61	7,000	68	7,459
290.30	8,037	5,188	12,646
292.40	11,200	20,199	32,845

Device	Routing	Invert	Outlet Devices
#1	Primary	289.60'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.00' S= 0.0600 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	291.20'	**25.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=4.40 cfs @ 12.49 hrs HW=291.11' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.40 cfs @ 3.58 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond LS1: Level Spreader

[79] Warning: Submerged Pond P4 Primary device # 1 INLET by 0.06'

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 3.64" for 25-year event
Inflow = 3.07 cfs @ 12.30 hrs, Volume= 0.472 af
Outflow = 3.07 cfs @ 12.30 hrs, Volume= 0.467 af, Atten= 0%, Lag= 0.1 min
Primary = 3.07 cfs @ 12.30 hrs, Volume= 0.467 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 263.06' @ 12.30 hrs Surf.Area= 644 sf Storage= 259 cf

Plug-Flow detention time= 8.4 min calculated for 0.467 af (99% of inflow)
Center-of-Mass det. time= 4.1 min (799.2 - 795.0)

Volume	Invert	Avail.Storage	Storage Description
#1	262.50'	625 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.50	300	0	0
263.00	600	225	225
263.50	1,000	400	625

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**100.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.06 cfs @ 12.30 hrs HW=263.06' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 3.06 cfs @ 0.56 fps)

Summary for Pond P4: Impoundment

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 3.71" for 25-year event
Inflow = 6.45 cfs @ 12.10 hrs, Volume= 0.482 af
Outflow = 3.07 cfs @ 12.30 hrs, Volume= 0.472 af, Atten= 52%, Lag= 12.0 min
Primary = 3.07 cfs @ 12.30 hrs, Volume= 0.472 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 265.27' @ 12.30 hrs Surf.Area= 2,987 sf Storage= 5,424 cf

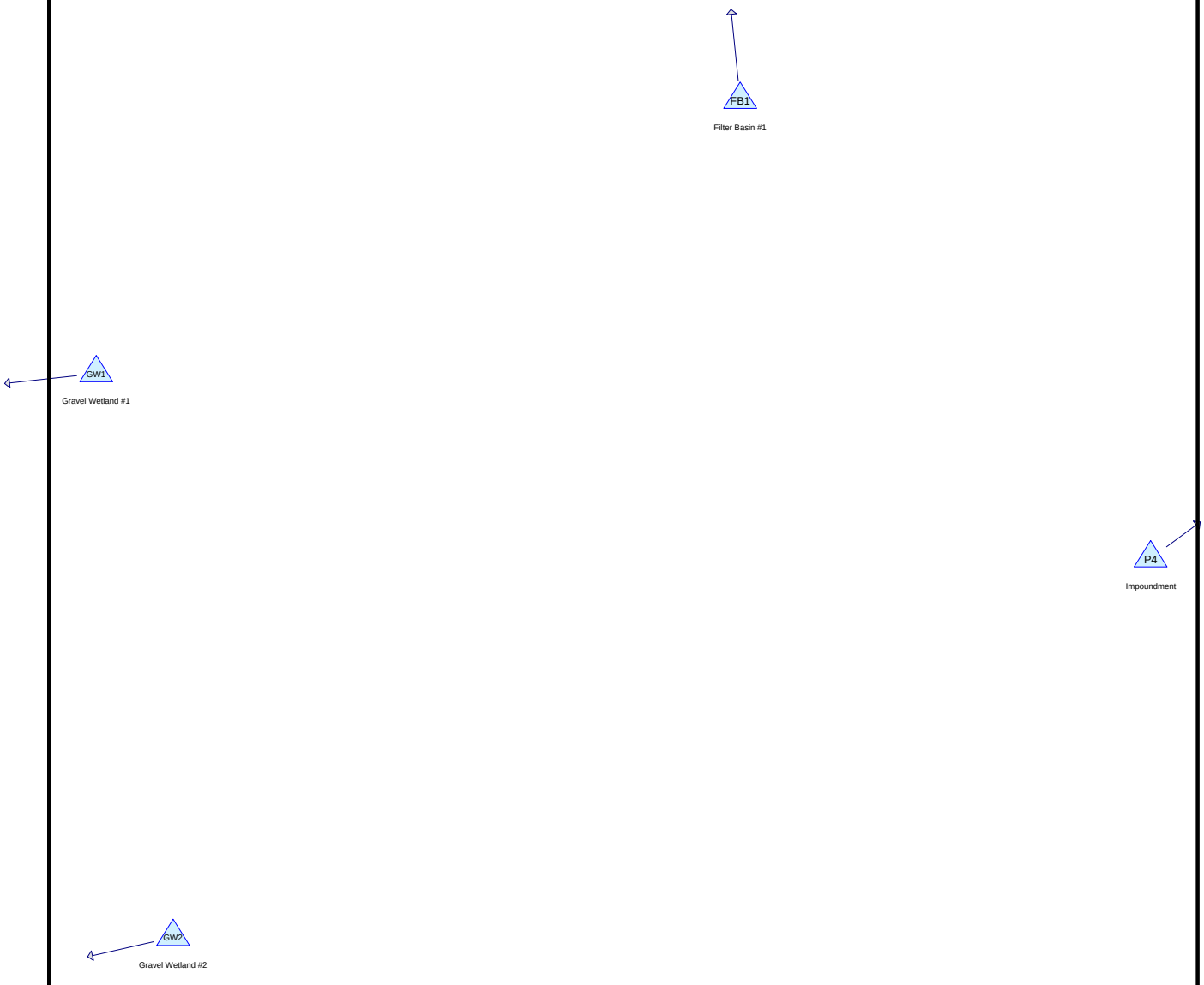
Plug-Flow detention time= 37.3 min calculated for 0.472 af (98% of inflow)
Center-of-Mass det. time= 29.5 min (795.0 - 765.5)

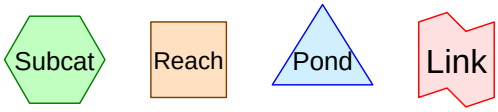
Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	10,725 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
263.00	1,900	0	0
264.00	2,300	2,100	2,100
265.00	2,800	2,550	4,650
266.00	3,500	3,150	7,800
266.50	4,000	1,875	9,675
266.75	4,400	1,050	10,725

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**8.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 262.50' S= 0.0125 '/' Cc= 0.900 n= 0.012
#2	Primary	264.60'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 263.50' S= 0.0275 '/' Cc= 0.900 n= 0.012
#3	Primary	265.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=3.07 cfs @ 12.30 hrs HW=265.27' (Free Discharge)
- **1=Culvert** (Inlet Controls 1.85 cfs @ 5.29 fps)
- **2=Culvert** (Inlet Controls 1.22 cfs @ 2.20 fps)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)





Drainage Diagram for 1660 Post

Prepared by {enter your company name here}, Printed 3/28/2018

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Summary for Pond FB1: Filter Basin #1

[79] Warning: Submerged Pond C5-1 Primary device # 1 INLET by 0.04'
[79] Warning: Submerged Pond CB6 Primary device # 1 OUTLET by 0.29'

Inflow Area =	1.993 ac,	32.14% Impervious,	Inflow Depth >	3.21"	for 25-year event
Inflow =	6.23 cfs @	12.15 hrs,	Volume=	0.533 af	
Outflow =	6.09 cfs @	12.18 hrs,	Volume=	0.420 af,	Atten= 2%, Lag= 1.9 min
Primary =	6.09 cfs @	12.18 hrs,	Volume=	0.420 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.54' @ 12.18 hrs Surf.Area= 4,208 sf Storage= 6,044 cf

Plug-Flow detention time= 92.8 min calculated for 0.420 af (79% of inflow)
Center-of-Mass det. time= 37.5 min (817.1 - 779.6)

Volume	Invert	Avail.Storage	Storage Description
#1	287.75'	11,035 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.75	2,550	0	0
289.25	3,941	4,868	4,868
290.00	4,636	3,216	8,085
290.60	5,200	2,951	11,035

Device	Routing	Invert	Outlet Devices
#1	Primary	289.25'	**15.0' long x 13.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=6.09 cfs @ 12.18 hrs HW=289.54' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 6.09 cfs @ 1.41 fps)

Summary for Pond GW1: Gravel Wetland #1

[62] Warning: Exceeded Reach R1 OUTLET depth by 1.25' @ 13.00 hrs
[81] Warning: Exceeded Pond CB2 by 0.67' @ 12.85 hrs

Inflow Area =	4.240 ac,	29.03% Impervious,	Inflow Depth >	3.35"	for 25-year event
Inflow =	7.42 cfs @	12.44 hrs,	Volume=	1.185 af	
Outflow =	5.14 cfs @	12.84 hrs,	Volume=	0.648 af,	Atten= 31%, Lag= 23.9 min
Primary =	5.14 cfs @	12.84 hrs,	Volume=	0.648 af	

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 276.45' @ 12.84 hrs Surf.Area= 9,460 sf Storage= 25,426 cf

Plug-Flow detention time= 160.6 min calculated for 0.648 af (55% of inflow)
Center-of-Mass det. time= 80.8 min (876.8 - 796.0)

Volume	Invert	Avail.Storage	Storage Description
#1	273.10'	37,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
273.10	5,020	0	0
274.00	6,207	5,052	5,052
274.20	6,300	1,251	6,303
274.21	7,500	69	6,372
275.00	8,220	6,209	12,581
276.50	9,500	13,290	25,871
277.50	13,000	11,250	37,121

Device	Routing	Invert	Outlet Devices
#1	Primary	274.10'	**12.0" Round Culvert X 0.00** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.50' S= 0.0300 '/' Cc= 0.900 n= 0.012
#2	Primary	276.20'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.13 cfs @ 12.84 hrs HW=276.45' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.13 cfs @ 1.35 fps)

Summary for Pond GW2: Gravel Wetland #2

Inflow Area = 4.015 ac, 22.31% Impervious, Inflow Depth > 3.03" for 25-year event
Inflow = 13.72 cfs @ 12.13 hrs, Volume= 1.014 af
Outflow = 5.36 cfs @ 12.43 hrs, Volume= 0.539 af, Atten= 61%, Lag= 18.2 min
Primary = 5.36 cfs @ 12.43 hrs, Volume= 0.539 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.39' @ 12.43 hrs Surf.Area= 9,677 sf Storage= 22,290 cf

Plug-Flow detention time= 159.0 min calculated for 0.539 af (53% of inflow)
Center-of-Mass det. time= 79.3 min (865.9 - 786.6)

Volume	Invert	Avail.Storage	Storage Description
#1	288.30'	32,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
288.30	4,740	0	0
289.60	6,630	7,391	7,391
289.61	7,000	68	7,459
290.30	8,037	5,188	12,646
292.40	11,200	20,199	32,845

Device	Routing	Invert	Outlet Devices
#1	Primary	289.60'	**15.0" Round Culvert X 0.00** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.00' S= 0.0600 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	291.20'	**25.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=5.33 cfs @ 12.43 hrs HW=291.39' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.33 cfs @ 1.13 fps)

Summary for Pond P4: Impoundment

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 3.71" for 25-year event
Inflow = 6.45 cfs @ 12.10 hrs, Volume= 0.482 af
Outflow = 6.27 cfs @ 12.12 hrs, Volume= 0.354 af, Atten= 3%, Lag= 1.4 min
Primary = 6.27 cfs @ 12.12 hrs, Volume= 0.354 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 265.56' @ 12.12 hrs Surf.Area= 3,191 sf Storage= 6,321 cf

Plug-Flow detention time= 111.1 min calculated for 0.354 af (73% of inflow)
Center-of-Mass det. time= 48.5 min (814.0 - 765.5)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	10,725 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
263.00	1,900	0	0
264.00	2,300	2,100	2,100
265.00	2,800	2,550	4,650
266.00	3,500	3,150	7,800
266.50	4,000	1,875	9,675
266.75	4,400	1,050	10,725

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**8.0" Round Culvert X 0.00** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 262.50' S= 0.0125 '/' Cc= 0.900 n= 0.012
#2	Primary	264.60'	**12.0" Round Culvert X 0.00** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 263.50' S= 0.0275 '/' Cc= 0.900 n= 0.012
#3	Primary	265.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.25 cfs @ 12.12 hrs HW=265.56' (Free Discharge)
- **1=Culvert** (Controls 0.00 cfs)
- **2=Culvert** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Weir Controls 6.25 cfs @ 1.21 fps)

Summary for Pond FB1: Filter Basin #1

[79] Warning: Submerged Pond C5-1 Primary device # 1 INLET by 0.16'
[79] Warning: Submerged Pond CB6 Primary device # 1 INLET by 0.11'

Inflow Area =	1.993 ac,	32.14% Impervious,	Inflow Depth >	5.14"	for	100-year event
Inflow =	12.87 cfs @	12.09 hrs,	Volume=	0.854 af		
Outflow =	10.34 cfs @	12.14 hrs,	Volume=	0.740 af,	Atten= 20%,	Lag= 2.9 min
Primary =	10.34 cfs @	12.14 hrs,	Volume=	0.740 af		

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 289.66' @ 12.14 hrs Surf.Area= 4,319 sf Storage= 6,554 cf

Plug-Flow detention time= 71.5 min calculated for 0.740 af (87% of inflow)
Center-of-Mass det. time= 30.8 min (800.0 - 769.3)

Volume	Invert	Avail.Storage	Storage Description
#1	287.75'	11,035 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.75	2,550	0	0
289.25	3,941	4,868	4,868
290.00	4,636	3,216	8,085
290.60	5,200	2,951	11,035

Device	Routing	Invert	Outlet Devices
#1	Primary	289.25'	**15.0' long x 13.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=10.33 cfs @ 12.14 hrs HW=289.66' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 10.33 cfs @ 1.69 fps)

Summary for Pond GW1: Gravel Wetland #1

[62] Warning: Exceeded Reach R1 OUTLET depth by 1.29' @ 12.83 hrs
[81] Warning: Exceeded Pond CB2 by 0.81' @ 12.56 hrs

Inflow Area =	4.240 ac,	29.03% Impervious,	Inflow Depth >	5.30"	for	100-year event
Inflow =	11.53 cfs @	12.44 hrs,	Volume=	1.874 af		
Outflow =	11.22 cfs @	12.53 hrs,	Volume=	1.335 af,	Atten= 3%,	Lag= 5.7 min
Primary =	11.22 cfs @	12.53 hrs,	Volume=	1.335 af		

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 276.62' @ 12.53 hrs Surf.Area= 9,937 sf Storage= 27,084 cf

Plug-Flow detention time= 118.1 min calculated for 1.334 af (71% of inflow)
Center-of-Mass det. time= 54.8 min (840.4 - 785.6)

Volume	Invert	Avail.Storage	Storage Description
#1	273.10'	37,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
273.10	5,020	0	0
274.00	6,207	5,052	5,052
274.20	6,300	1,251	6,303
274.21	7,500	69	6,372
275.00	8,220	6,209	12,581
276.50	9,500	13,290	25,871
277.50	13,000	11,250	37,121

Device	Routing	Invert	Outlet Devices
#1	Primary	274.10'	**12.0" Round Culvert X 0.00** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 273.50' S= 0.0300 '/' Cc= 0.900 n= 0.012
#2	Primary	276.20'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=11.21 cfs @ 12.53 hrs HW=276.62' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 11.21 cfs @ 1.76 fps)

Summary for Pond GW2: Gravel Wetland #2

Inflow Area = 4.015 ac, 22.31% Impervious, Inflow Depth > 4.93" for 100-year event
Inflow = 21.96 cfs @ 12.13 hrs, Volume= 1.651 af
Outflow = 19.34 cfs @ 12.18 hrs, Volume= 1.174 af, Atten= 12%, Lag= 3.3 min
Primary = 19.34 cfs @ 12.18 hrs, Volume= 1.174 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 291.64' @ 12.18 hrs Surf.Area= 10,055 sf Storage= 24,763 cf

Plug-Flow detention time= 113.2 min calculated for 1.174 af (71% of inflow)
Center-of-Mass det. time= 48.8 min (824.0 - 775.1)

Volume	Invert	Avail.Storage	Storage Description
#1	288.30'	32,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
288.30	4,740	0	0
289.60	6,630	7,391	7,391
289.61	7,000	68	7,459
290.30	8,037	5,188	12,646
292.40	11,200	20,199	32,845

Device	Routing	Invert	Outlet Devices
#1	Primary	289.60'	**15.0" Round Culvert X 0.00** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 289.00' S= 0.0600 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	291.20'	**25.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63

Primary OutFlow Max=19.32 cfs @ 12.18 hrs HW=291.64' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 19.32 cfs @ 1.76 fps)

Summary for Pond P4: Impoundment

Inflow Area = 1.556 ac, 42.39% Impervious, Inflow Depth > 5.71" for 100-year event
Inflow = 9.63 cfs @ 12.10 hrs, Volume= 0.741 af
Outflow = 9.45 cfs @ 12.12 hrs, Volume= 0.613 af, Atten= 2%, Lag= 1.2 min
Primary = 9.45 cfs @ 12.12 hrs, Volume= 0.613 af

Routing by Stor-Ind method, Time Span= 3.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 265.63' @ 12.12 hrs Surf.Area= 3,244 sf Storage= 6,565 cf

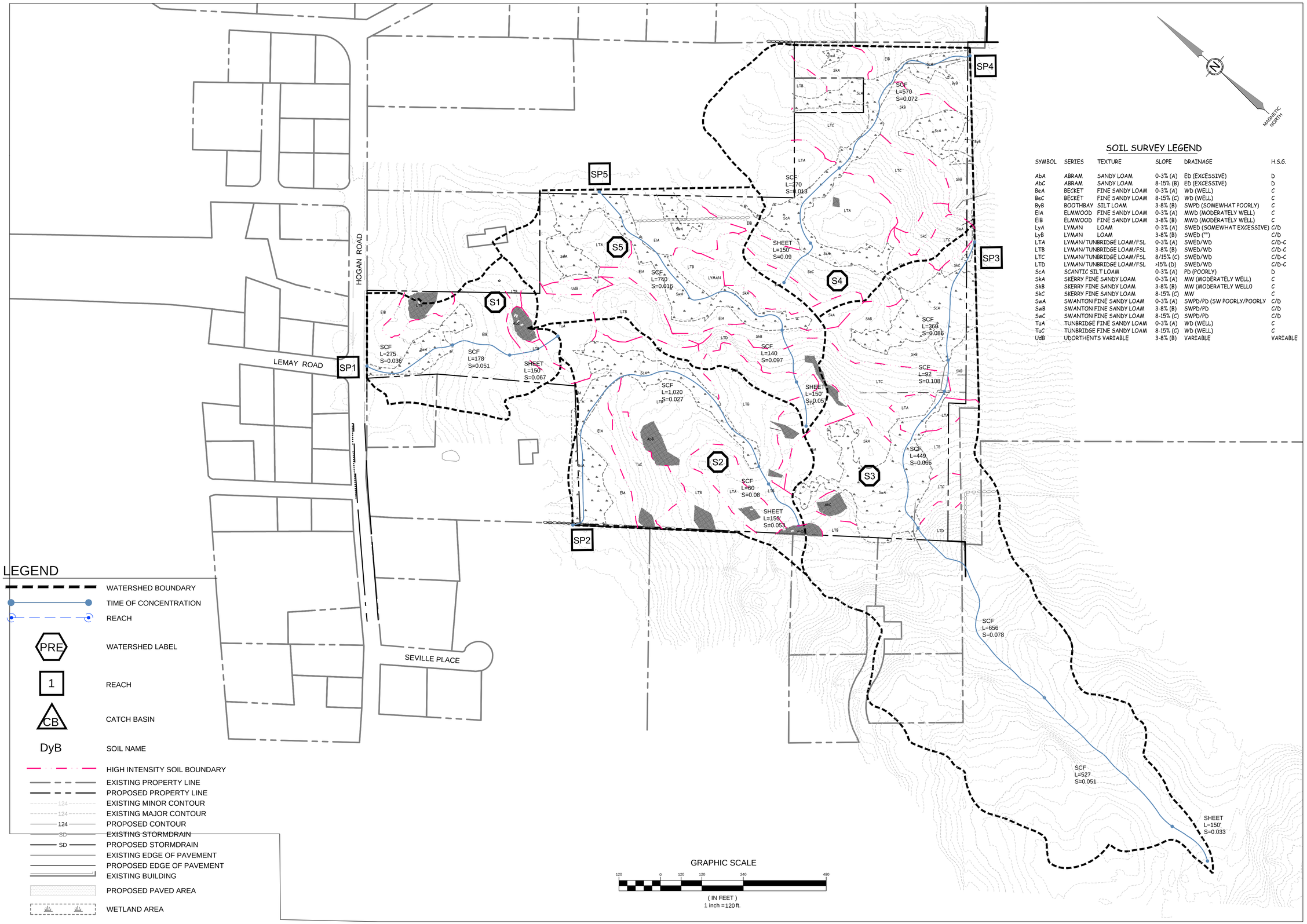
Plug-Flow detention time= 89.4 min calculated for 0.613 af (83% of inflow)
Center-of-Mass det. time= 40.4 min (796.7 - 756.2)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	10,725 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
263.00	1,900	0	0
264.00	2,300	2,100	2,100
265.00	2,800	2,550	4,650
266.00	3,500	3,150	7,800
266.50	4,000	1,875	9,675
266.75	4,400	1,050	10,725

Device	Routing	Invert	Outlet Devices
#1	Primary	263.00'	**8.0" Round Culvert X 0.00** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 262.50' S= 0.0125 '/' Cc= 0.900 n= 0.012
#2	Primary	264.60'	**12.0" Round Culvert X 0.00** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 263.50' S= 0.0275 '/' Cc= 0.900 n= 0.012
#3	Primary	265.30'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=9.43 cfs @ 12.12 hrs HW=265.63' (Free Discharge)
- **1=Culvert** (Controls 0.00 cfs)
- **2=Culvert** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Weir Controls 9.43 cfs @ 1.41 fps)



SOIL SURVEY LEGEND

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	H.S.G.
AbA	ABRAM	SANDY LOAM	0-3% (A)	Eb (EXCESSIVE)	D
AbC	ABRAM	SANDY LOAM	8-15% (B)	Eb (EXCESSIVE)	D
BeA	BECKET	FINE SANDY LOAM	0-3% (A)	WD (WELL)	C
BeC	BECKET	FINE SANDY LOAM	8-15% (C)	WD (WELL)	C
ByB	BOOTHBAY	SILT LOAM	3-8% (B)	SWPD (SOMEWHAT POORLY)	C
ElA	ELMWOOD	FINE SANDY LOAM	0-3% (A)	MWD (MODERATELY WELL)	C
ElB	ELMWOOD	FINE SANDY LOAM	3-8% (B)	MWD (MODERATELY WELL)	C
LyA	LYMAN	LOAM	0-3% (A)	SWED (SOMEWHAT EXCESSIVE)	C/D
LyB	LYMAN	LOAM	3-8% (B)	SWED (")	C/D
LTA	LYMAN/TUNBRIDGE LOAM/FSL		0-3% (A)	SWED/WD	C/D-C
LTB	LYMAN/TUNBRIDGE LOAM/FSL		3-8% (B)	SWED/WD	C/D-C
LTC	LYMAN/TUNBRIDGE LOAM/FSL		8/15% (C)	SWED/WD	C/D-C
LTD	LYMAN/TUNBRIDGE LOAM/FSL		>15% (D)	SWED/WD	C/D-C
ScA	SCANTIC SILT LOAM		0-3% (A)	PD (POORLY)	D
SkA	SKERRY FINE SANDY LOAM		0-3% (A)	MW (MODERATELY WELL)	C
SkB	SKERRY FINE SANDY LOAM		3-8% (B)	MW (MODERATELY WELL0	C
SkC	SKERRY FINE SANDY LOAM		8-15% (C)	MW	C
SwA	SWANTON FINE SANDY LOAM		0-3% (A)	SWPD/PD (SW POORLY/POORLY	C/D
SwB	SWANTON FINE SANDY LOAM		3-8% (B)	SWPD/PD	C/D
SwC	SWANTON FINE SANDY LOAM		8-15% (C)	SWPD/PD	C/D
TuA	TUNBRIDGE FINE SANDY LOAM		0-3% (A)	WD (WELL)	C
TuC	TUNBRIDGE FINE SANDY LOAM		8-15% (C)	WD (WELL)	C
UdB	UDORTHENTS VARIABLE		3-8% (B)	VARIABLE	VARIABLE

LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION
- REACH
- PRE — WATERSHED LABEL
- 1 — REACH
- CB — CATCH BASIN
- DyB — SOIL NAME
- HIGH INTENSITY SOIL BOUNDARY
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- 124 — EXISTING MINOR CONTOUR
- 124 — EXISTING MAJOR CONTOUR
- 124 — PROPOSED CONTOUR
- SD — EXISTING STORMDRAIN
- SD — PROPOSED STORMDRAIN
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- EXISTING BUILDING
- PROPOSED PAVED AREA
- WETLAND AREA

STATE OF MAINE
JEFFREY D. MILLS
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 12/22/2017

NO.	DATE	REVISIONS	APP'D BY

TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
PRE DEVELOPMENT W.S. MAP

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	12/22/2017
SCALE:	1" = 120'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660SWP.DWG	
SHEET	C-8.0

STATE OF MAINE
JEFFREY D. MILLS
No. 10167
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Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
POST DEVELOPMENT W.S. MAP

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	12/22/2017
SCALE:	1" = 80'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660SWP.DWG	
SHEET	C-8.0

Section 13 - Urban Impaired Stream Submissions

The property is not located within the watershed of an urban impaired stream. This section is not applicable.

Section 14 - Basic Standards

Temporary and Permanent Erosion and Sedimentation Control

Introduction

This Erosion and Sediment Control Plan has been prepared to provide guidelines for soil erosion and sedimentation control during the construction of Sanctuary Estates Subdivision for Maine Custom Homes & Finance. This plan has been developed using the Maine Department of Environmental Protection's Best Management Practices and the standards.

Pre-Construction Phase

A person who conducts, or causes to be conducted, an activity that involves filling, displacing or exposing soil or other earthen materials shall take measures to prevent unreasonable erosion of soil or sediment beyond the project site or into a protected natural resource as defined in 38 MRSA § 480-B. Erosion control measures must be in place before the activity begins. Measures must remain in place and functional until the site is permanently stabilized. Adequate and timely temporary and permanent stabilization measures must be taken. The site must be maintained to prevent unreasonable erosion and sedimentation. Minimize disturbed areas and protect natural downgradient buffer areas to the extent practicable.

BMP Construction Phase

A. Sediment Barriers. Prior to the beginning of any construction**,** properly install sediment barriers at the edge of any downgradient disturbed area and adjacent to any drainage channels within the proposed disturbed area. Maintain the sediment barriers until the disturbed area is permanently stabilized. At a minimum, silt fences shall be inspected and repaired once a week or immediately following any significant rainfall or snow melt. Sediment trapped behind these barriers shall be excavated and re-graded onto the site when it reaches a depth of 6 inches. All silt fences shall be installed where shown on the plans and according to the engineer's specifications.

B. Construction Entrance: Prior to any clearing or grubbing, a construction entrance shall be constructed at the intersection with the proposed access drive and the existing roadway to avoid tracking of mud, dust and debris from the site.

C. Riprap: Since riprap is used where erosion potential is high, construction must be sequenced so that the riprap is put in place with the minimum delay. Disturbance of areas where riprap is to be placed should be undertaken only when final preparation and placement of the riprap can follow immediately behind the initial disturbance. Where riprap is used for outlet protection, the riprap should be placed before or in conjunction with the construction of the pipe or channel so that it is in place when the pipe or channel begins to operate.

Maintain temporary riprap, such as temporary check dams until the disturbed area is permanently stabilized.

D. Temporary Stabilization. Stabilize with temporary seeding, mulch, or other non-erodible cover any exposed soils that will remain unworked for more than 14 days except, stabilize areas within 100 feet of a wetland or waterbody within 7 days or prior to a predicted storm event, whichever comes first. If hay or straw mulch is used, the application rate must be 2 bales (70-90 pounds) per 1000 SF or 1.5 to 2 tons (90-100 bales) per acre to cover 75 to 90% of the ground surface. Hay mulch must be kept moist or anchored to prevent wind blowing. An erosion control blanket or mat shall be used at the base of grassed waterways, steep slopes (15% or greater) and on any disturbed soil within 100 feet of lakes, streams and wetlands. Grading shall be planned so as to minimize the length of time between initial soil exposure and final grading. On large projects this should be accomplished by phasing the operation and completing the first phase up to final grading and seeding before starting the second phase, and so on.

E. Vegetated Waterway. Upon final grading, the disturbed areas shall be immediately seeded to permanent vegetation and mulched and will not be used as outlets until a dense, vigorous vegetative cover has been obtained. Once soil is exposed for waterway construction, it should be immediately shaped, graded and stabilized. Vegetated waterways need to be stabilized early during the growing season (prior to September 15). If final seeding of waterways is delayed past September 15, emergency provisions such as sod or riprap may be required to stabilize the channel. Waterways should be fully stabilized prior to directing runoff to them.

Permanent Stabilization Defined

Permanent stabilization for the following list of BMPs is defined as:

A. Seeded Areas. For seeded areas, permanent stabilization means a 90% cover of the disturbed area with mature, healthy plants with no evidence of washing or rilling of the topsoil.

B. Sodded Areas. For sodded areas, permanent stabilization means the complete binding of the sod roots into the underlying soil with no Slumping of the sod or die-off.

C. Permanent Mulch. For mulched areas, permanent mulching means total coverage of the exposed area with an approved mulch material. Erosion Control Mix may be used as mulch for permanent stabilization according to the approved application rates and limitations.

D. Riprap. For areas stabilized with riprap, permanent stabilization means that slopes stabilized with riprap have an appropriate backing of a well-graded gravel or approved geotextile to prevent soil movement from behind the riprap. Stone must be sized appropriately. It is recommended that angular stone be used.

E. Agricultural Use. For construction projects on land used for agricultural purposes, (e.g., pipelines across crop land) permanent stabilization may be accomplished by returning the disturbed land to agricultural use.

F. Paved areas. For paved areas, permanent stabilization means the placement of the compacted gravel subbase is completed.

G. Ditches, Channels, and Swales. For open channels, permanent stabilization means the channel is stabilized with mature vegetation at least three inches in height, with well-graded riprap, or with another non-erosive lining capable of withstanding the anticipated flow velocities and flow depths without reliance on check dams to slow flow. There must be no evidence of slumping of the lining, undercutting of the banks, or down-cutting of the channel.

General Construction Phase

The following erosion control measures shall be followed by the contractor throughout construction of this project:

A. All topsoil shall be collected, stockpiled, seeded with rye at 3 pounds/1,000 SF and mulched, and reused as required. Siltation fencing shall be placed down gradient from the stockpiled loam. Loam shall be stockpiled at location designated by the owner and inspecting engineer.

B. The inspecting engineer at his/her discretion, may require additional erosion control measures and/or supplemental vegetative provisions to maintain stability of earthworks and finish graded areas. The contractor shall be responsible for providing and installing any supplemental measures as directed by the inspecting engineer. Failure to comply with the engineer's directions will result in discontinuation of construction activities.

C. Erosion control mesh shall be applied in accordance with the plans over all finish seeded areas as specified on the design plans.

D. All graded or disturbed areas including slopes shall be protected during clearing and construction in accordance with the approved erosion and sediment control plan until they are adequately stabilized.

E. All erosion, and sediment control practices and measures shall be constructed, applied and maintained in accordance with the approved erosion and sediment control plan.

F. Areas to be filled shall be cleared, grubbed and stripped of topsoil to remove trees, vegetation, roots or other objectionable materials.

G. Unless otherwise authorized by the project engineer, any fill used on the site will meet M.D.O.T. Standard 703.08 for common borrow, 703.06(b) for subbase aggregate, and 703.06(a) for base.

H. Areas shall be scarified to a minimum depth of 3 inches prior to placement of topsoil.

I. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence or other related problems. Fill intended to support buildings, structures and conduits, etc., shall be compacted in accordance with local requirements or codes.

J. All fills shall be placed and compacted in layers not to exceed 8 inches in thickness.

K. Except for approved landfills or non-structural fills, fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris and other objectionable materials that would interfere with or prevent Construction of satisfactory lifts.

L. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

M. Fill shall not be placed on a frozen foundation.

M. Seeps or springs encountered during construction shall be handled appropriately.

O. All graded areas shall be permanently stabilized immediately following finished grading.

P. Remove any temporary control measures, such as silt fence, within 30 days after permanent stabilization is attained. Remove any accumulated sediments and stabilize.

Permanent Vegetation

Permanent vegetative cover should be established on disturbed areas where permanent, long lived vegetative cover is needed to stabilize the soil, to reduce damages from sediment and runoff, and to enhance the environment.

Seedbed Preparation

A. Grade as feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring, and maintenance.

B. Apply limestone and fertilizer according to soil tests such as those offered by the University of Maine Soil Testing Laboratory. Soil sample mailers are available from the local Cooperative Extension Service Office. If soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 800 pounds per acre or 18.4 pounds per 1,000 square feet using 10-20-20 (N-P2O5-K2O) or equivalent. Apply ground limestone (equivalent to 50% calcium plus magnesium oxide) at a rate of 3 tons per acre (138 lb. Per 1,000 sq. ft).

C. Work lime and fertilizer into the soil as nearly as practical to a depth of 4 inches with a disc, spring tooth harrow or other suitable equipment. The final harrowing operation should be on the general contour. Continue tillage until a reasonably uniform, fine seedbed is prepared. All but clay or silty soils and coarse sands should be rolled to firm the seedbed wherever feasible.

D. Remove from the surface all stones 2 inches or larger in any dimension. Remove all other debris, such as wire, cable, tree roots, concrete, clods, lumps or other unsuitable material.

E. Inspect seedbed just before seeding. If traffic has left the soil compacted; the area must be tilled and firmed as above.

F. Permanent seeding should be made 45 days prior to the first killing frost or as a dormant seeding with mulch after the first killing frost and before snowfall. When crown vetch is seeded in later summer, at least 35% of the seed should be hard seed (unscarified). If seeding cannot be done within the seeding dates, mulch according to the Temporary Mulching BMP and Over-winter Stabilization and Construction to protect the site and delay seeding until the next recommended seeding period.

G. Following seed bed preparation, swale areas, fill areas and back slopes shall be seeded at a rate of 3 lbs./1,000 S.F. with a mixture of 35% creeping red **h.** fescue, 6% red top, 24% Kentucky bluegrass, 10% perennial ryegrass, 20% annual ryegrass and 5% white dutch clover.

I. Areas which have been temporarily or permanently seeded shall be mulched immediately following seeding.

J. Areas which cannot be seeded within the growing season shall be mulched for over-winter protection and the area should be seeded at the beginning of the growing season.

Winter Construction phase

The winter construction period is from November 15 through April 15. If an area is not stabilized with temporary or permanent measures by November 15, then the site must be protected with additional stabilization measures.

A. Permanent stabilization consists of at least 90% vegetation, Pavement/gravel base or riprap.

B. Do not expose slopes or leave slopes exposed over the winter or for any other extended time of work suspension unless fully protected with Mulch.

C. Apply hay mulch at twice the standard rate (150 lbs. Per 1,000 sf). The mulch must be thick enough such that the ground surface will not be visible and must be anchored.

D. Use mulch and mulch netting or an erosion control mulch blanket or mix for all slopes greater than 8 % or other areas exposed to direct wind.

E. Install an erosion control blanket in all drainage ways (bottom and sides) with a slope greater than 3 %.

F. During frozen conditions, sediment barriers shall consist of wood-waste filter berms as frozen soil prevents the proper installation of hay bales and silt fences.

G. Between the dates of October 15th and April 1st, loam or seed will not be required. During periods of above freezing temperatures, finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched. Dormant seeding may be placed prior to the placement of mulch and fabric netting anchored with staples. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5lbs/1000 s.f. All areas seeded during the winter will be inspected in the spring for adequate catch. All areas not sufficiently vegetated (less than 75 % catch) shall be re-vegetated by replacing loam, seed and mulch.

H. Winter excavation and earthwork shall be completed as such that no more than 1 acre of the site is without stabilization at any one time.

I. An area within 100 feet of a protected natural resource must be protected with a double row of sediment barrier.

J. Temporary mulch must be applied within 7 days of soil exposure or prior to any storm event, but after every workday in areas within 100 feet from a protected natural resource.

K. Areas that have been brought to final grade must be permanently mulched that same day.

L. In the event of a snowfall greater than 1 inch (fresh or cumulative), the snow shall be removed from the areas due to be seeded and mulched.

M. Loam shall be free of frozen clumps before it is applied.

N. All vegetated ditch lines that have not been stabilized by November 1, or will be worked during the winter construction period, must be stabilized with an appropriate stone lining backed by an appropriate gravel bed or geotextile unless specifically released from this standard by the department.

O. Maintenance measures shall be applied as needed during the entire construction season. After each rainfall, snow storm or period of thawing and runoff, the site contractor shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to ensure their continuous function. Following the temporary and or final seeding

and mulching, the contractor shall in the spring inspect and repair any damages and/ or unestablished spots. Established vegetative cover means a minimum of 85 to 90% of areas vegetated with vigorous growth.

Construction Plan

The site work is estimated to take between 6 & 8 months to complete and would generally correspond to the following table:

	Start	Finish
1. Estimated construction time: 6 months	May 1, 2018	October 1, 2018
2 Erosion control measures placed	May 1, 2018	May 15, 2018
3. Site clearing, grubbing, excavation, filling and construction stormwater facilities	May 1, 2018	August 1, 2018
4. Excavation & construction of roads, parking lots and underground utilities.	May 1, 2018	August 1,2018
5. Mulch spread for winter erosion control. (if necessary)	November 15, of construction year	May 1 the next year
6. Start progressive final seeding on prepared areas.	Within 24 hours of loam placement	September 15 of construction year
7. Bi-weekly monitoring of vegetative growth.	August 22, 2018	November 1, 2018
8. Re-seed, if necessary, and continue monitoring of growth until established.	August 22, 2018	November 1, 2018
9. Progressive removal of erosion control devices, based on field inspection.	August 22, 2018	November 1, 2018

Dates are subject to change at the discretion of the engineer depending on construction progress.

Maintenance and Inspection Phase

A. Contractor shall inspect disturbed and impervious areas, and erosion and stormwater control measures, areas used for storage that are exposed to precipitation, and locations where vehicles enter or exit the parcel at least once a week and before and after a storm event, prior to completion of permanent stabilization. A person with knowledge of erosion and stormwater must conduct the inspection. This person must be identified in the inspection log. If best management practices (BMPs) need to be modified or if additional BMPs are necessary, implementation must be completed within 7 calendar days and prior to any storm event (rainfall). All measures must be maintained in effective operating condition until areas are permanently stabilized.

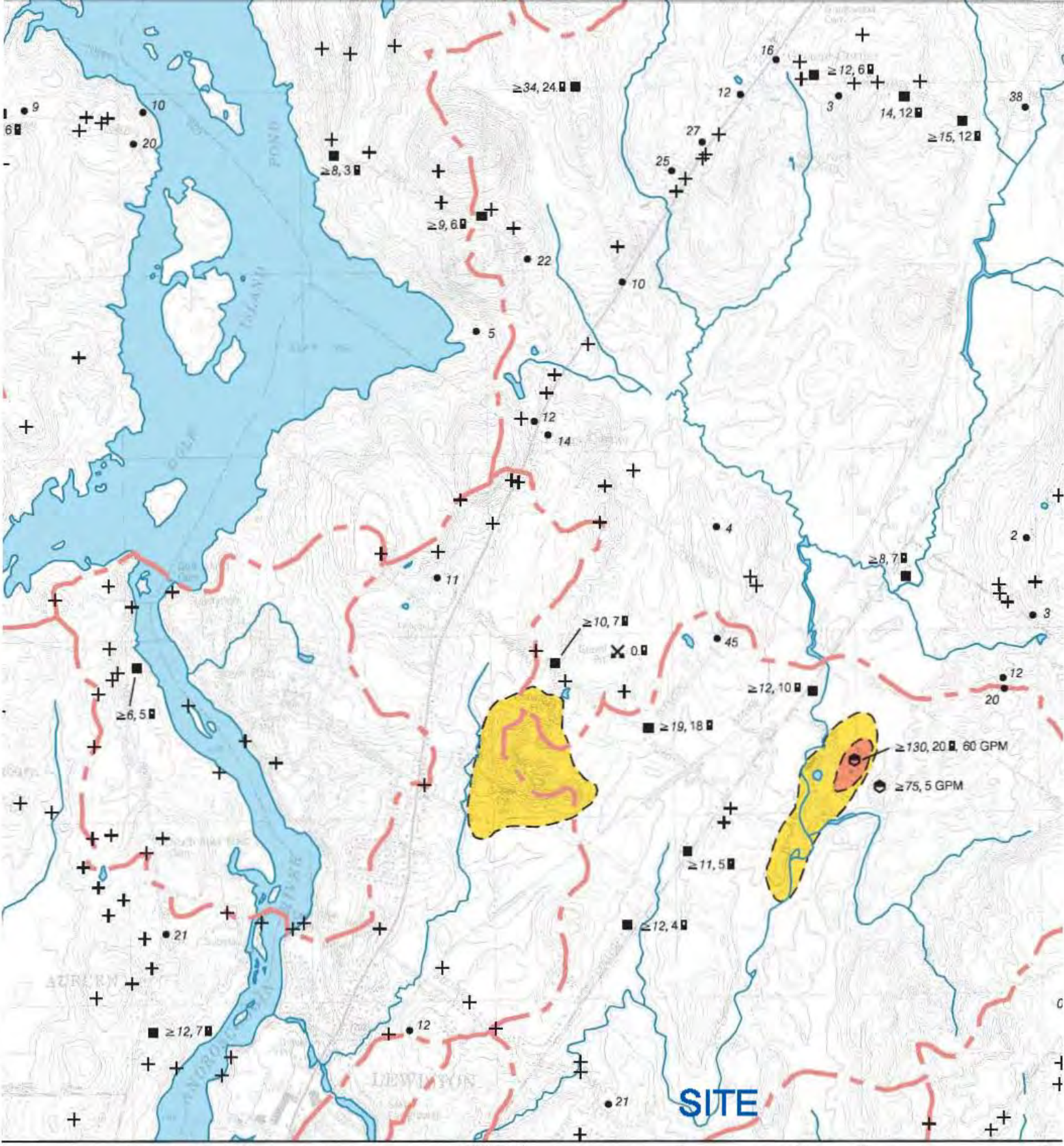
Following the final seedings, reseeding will be carried out, with follow-up inspections, in the event of any failures. All erosion control measures will be removed within 10 days after

vegetation is adequately established. The applicant shall be responsible for making arrangements for the inspections.

B. A log (report) must be kept summarizing the scope of the inspection, name(s) and qualifications of the personnel making the inspection, the date(s) of the inspection, and major observations relating to operation of erosion and sedimentation controls and pollution prevention measures. Major observations must include: BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. Follow-up to correct deficiencies or enhance controls must also be indicated in the log and dated, including what action was taken and when.

Section 15 - Groundwater

The project will not have any expected impact to the groundwater. The attached figure shows the site is not located on a sand and gravel aquifer. The project will be serviced by public water and a stormwater collection and treatment system, which reduces the development's potential to negatively impact groundwater in the area.



1985,
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#16:

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uring

Water
Level

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Section 16 - Water Supply

The Sanctuary Estates Subdivision will connect to Lewiston public water supply from the 12" water main on Hogan Road. The project will include an 8" water main that will extend through the development to provide both drinking water and fire protection. The City of Lewiston has ample capacity to serve the project.

Section 17 - Wastewater Disposal

Each lot in the Sanctuary Estates Subdivision will have its own septic system. George Bouchles of CadMaster Land Surveying & Septic Design performed a test pit evaluation for each lot. His report is attached. The test pits are shown on the attached construction plans.

CADmaster

586 Park Avenue - Auburn, Maine 04210
office - 207-689-3232 cell - 207-240-5567
e-mail - gsb@cadmasterr.com

Land Surveying and Septic Design

November 27, 2017

Mr. John Chase
c/o Chase Custom Homes & Finance, Inc.
290 Westbrook Road
Westbrook, Maine 04092

RE: Preliminary Soils Investigation Report
"Chase Custom Homes Property"
131 Hogan Road
Lewiston, Maine

Dear Mr. Chase:

At your request, preliminary Site/Soils Investigations were performed on thirty-one (31) possible lots of a subdivision you propose to create from a 33.17 acre parcel of land you own at 131 Hogan Road in the City of Lewiston, Maine. Reference is made to a plan entitled "Boundary Survey - Chase Custom Homes Property" dated November 27, 2017 by CADmaster Land Surveying and Septic Design for perimeter boundary information. Reference is also made to a Preliminary Plan prepared by Terradyn Consultants, Inc., located at 111 Elderberry Lane in New Gloucester, for the preliminary location of each lot tested.

The purpose of the preliminary investigation was to determine suitability for on-site Subsurface Waste Water Disposal Systems to accommodate a four (4) bedroom single family dwelling on each of the lots in accordance with the current ***Maine Subsurface Waste Water Disposal Rules*** (SWWDR), dated January 1, 1998, and as amended.

Date of Investigation: November 11, 2017

Method of Investigation: Backhoe test pits

Method of Ground Control: Test pits were located in relationship to boundary information observed in the field and boundary information as shown on the above referenced boundary survey plan as well as existing survey control stations in relationship to proposed lot lines also shown on the above referenced plan.

Findings: The site is, for the most part, partially tree covered with a mix of hardwood and softwood remaining after recent logging operations. The terrain is generally sloping down to Hogan Road for the front portion of the site and the remaining land slopes to the rear of the parcel.

Test pit results for the proposed thirty-one (31) lots tested indicate the underlying Parent Material, in the areas of the test pits, to be of a "Basal Glacial Till" type material, and designated as 3C & 3D, and a "Lacustrine Deposit" and designated as an 8D soils as defined in the current SWWDR referred to above.

Soil textures for these test pits consisted of approximately 1 to 2 inches of humus containing decaying leaves, twigs and sticks at the surface. The next 4 to 6 inches consisted of a brown to light brown fine sandy loam textured soils with roots present and angular rocks were observed. The next 10 to 20 inches consisted of a light yellowish brown fine sandy loam textured soils with roots present and angular rock fragments observed. The remainder of the profile consisted of a light yellowish brown to light olive gray fine sandy loam textured soil with no roots visible, angular rock fragments were still present with the soil textures being firm and difficult to excavate.

Pit depths were limited to 12 inches below the observed seasonal high water table or to refusal.

Recommendations: It is my recommendation that, based upon results of the test pits evaluated and site conditions observed, there is suitable soils and sufficient area for the thirty-one (31) new single-family dwelling sites proposed.

Test Pit Summary

Test Pit no.	Preliminary Soil	Mottling	Restrictive Layer	Bedrock/ Refusal	System Type	Size Recomm.
1	3 C	-24"	-26"	none	Enviro-Septic	10x50
2	3 C	-24"	-26"	none	Enviro-Septic	10x50
3	4 B	N/0	N/O	none	Enviro-Septic	10x50
4	3 D/AIII	-11"	-12"	-14"	Enviro-Septic	10x50
5	3 C	-16"	-18"	none	Enviro-Septic	10x50
6	3 C	-24"	-26"	none	Enviro-Septic	10x50
7	3 C	-18"	-20"	none	Enviro-Septic	10x50
8	3 C	-18"	-20"	none	Enviro-Septic	10x50
9	3 C	-30"	-32"	none	Enviro-Septic	10x50
10	3 C/AIII	-20"	-22"	-24"	Enviro-Septic	10x50
11	3 C	-18"	-20"	none	Enviro-Septic	10x50
12	3 C	-24"	-26"	none	Enviro-Septic	10x50
13	3 C/AIII	-20"	-22"	-24"	Enviro-Septic	10x50
14	8 D	-12"	-14"	none	Enviro-Septic	10x50
15	3 C	-20"	-22"	none	Enviro-Septic	10x50
16	3 C	-24"	-26"	none	Enviro-Septic	10x50
17	3 C	-24"	-26"	none	Enviro-Septic	10x50
18	3 C	-18"	-20"	none	Enviro-Septic	10x50
19	3 C/AIII	-26"	-28"	-30"	Enviro-Septic	10x50
20	3 C	-24"	-26"	none	Enviro-Septic	10x50
21	3 C	-24"	-26"	none	Enviro-Septic	10x50
22	3 C	-24"	-26"	none	Enviro-Septic	10x50
23	3 C/AIII	-24"	-26"	-28"	Enviro-Septic	10x50
24	3 C/AIII	-18"	-26"	-40"	Enviro-Septic	10x50
25	3 C/AIII	-22"	-24"	-26"	Enviro-Septic	10x50
26	3 C	-24"	-26"	-30	Enviro-Septic	10x50
27	3 C	-24"	-26"	-30	Enviro-Septic	10x50
28	3 C	-19"	-21"	none	Enviro-Septic	10x50
29	3 C	-28"	-30"	none	Enviro-Septic	10x50
30	3 C	-24"	-26"	-28"	Enviro-Septic	10x50

31	3 C	-20"	-22"	-24"	Enviro-Septic 10x50

The site and soils information contained within this report is preliminary and intended for the purpose of review and planning purposes only. Prior to the issuance of any municipal permits, a full site and soils evaluation of each lot will be required, and a complete design of the proposed subsurface waste water disposal system and location must be delineated on the State supplied HHE-200 soils design forms.

I trust the enclosed information will satisfy your immediate needs. Should you have any questions, feel free to give me a call.

Respectfully yours,
CADmaster Drafting & Septic Design

George S. Bouchles, LSE 338

Section 18 - Solid Waste

Construction of the Sanctuary Estates Subdivision, including the roads, lots & stormwater management system, will result in the clearing of approximately 16 acres. The existing parcel is an undeveloped forest. Limited debris is expected during the construction of the site (not including building construction).

The majority of the waste will be generated by the harvesting of the trees and the removal of the stumps. Marketable timber will be removed from the project site and sold. Smaller woody debris will be mulched and used as a soil amendment or as an erosion control measure. Stump grindings will be used to make erosion control mix berms, which will be used to augment or substitute for silt fence. Excess stumps and other organic debris may need to be disposed of at a licensed facility. An estimate of the amount of stumps/grinding waste can be calculated by assuming that 400 CY of material will be produced per acre of disturbance of mature forest. This approximation yields 6,400 CY over the 16 acres of disturbance, on a 35 acre site.

Any general construction debris associated with the Project, including packing or transportation materials, will be disposed of at appropriately licensed disposal facilities. We anticipate that construction and demolition debris will be transported to KTI Biofuels of Lewiston, ME., where it will be transported to the Juniper Ridge Landfill in West Old Town, ME.

Individual buildings will be constructed by Chase Custom Homes & Finance on a build to suit basis. Residential waste will be collected by the City of Lewiston once occupancy permits are granted.

Section 19 - Flooding

The development area is not located within an area of flood hazard according to the City of Lewiston GIS system data. See Section 12 for attached map and further information on stormwater flows.

Section 20 - Blasting

There are several areas of shallow ledge on site. However, the roads were designed as primarily fill sections to minimize the potential need for blasting. If blasting is required, it will most likely be minor areas of trench blasting for the installation of water lines. In these areas the contractor shall adhere to the following plan.

A professional (licensed in the State of Maine) blasting contractor will be employed to conduct any blasting work in accordance with applicable State and local laws. At a minimum, the blasting contractor shall conduct his work in accordance with the following criteria:

1. "Manual of Accident Prevention in Construction" issued by Associated General Contractors of America, Inc.
2. "Construction Safety Rules and Regulations" as adopted by the State Board of Construction Safety, Augusta, Maine.
3. Section 107.12 of the "Standard Specifications" Maine Department of Transportation.
4. 30 CMR 815.64.

The blasting contractor will be required to prepare and submit a blasting plan to the owner prior to construction. At a minimum, the plan shall outline his proposal for monitoring of blasts, sequencing of blasts, sketches of proposed drill patterns, and specified field procedures, including the hours of operation, use of blasting mats, safety procedures, security measures in the work zone, and warning sequences. Blasting mats or earth cover shall be used to limit peak air overpressures and to protect against uncontrolled blast rock. Blasting vibrations, frequencies and overpressures shall not exceed the limits established by State or local codes. The maximum Peak Particle Velocity (PPV) shall be based on Fig. B-1 of Appendix B from the U. S. Bureau of Mines RI 8507

The Contractor shall design his charges using the Scaled Distance Equation as follows:

$$W = (D/D_s)^2$$

Where:

W	=	Maximum allowable weight of explosives per delay of 8 milliseconds or greater.
D	=	The shortest distance between the blast area and any inhabitable structure not owned or controlled by the developer.
D_s	=	70 ft./lb$^{1/2}$

The contractor shall prepare and submit a blasting schedule which shall be presented to the owner, the municipality, and the MDEP prior to blasting. This schedule shall, at a minimum, include the following:

- Name, address and phone number of blaster;
- Identification of specific blasting areas;
- Dates and times of blasts;
- Methods to restrict access in the blast area and warning whistle announcements;
- All blasting work shall be the responsibility of the blasting contractor.

The blasting contractor shall maintain accurate and current blasting records which shall be submitted to the owner, the municipality, and the MDEP on a weekly basis during blasting operations. These records shall contain, at a minimum:

- General location of the blast
- Depth and number of drill holes
- Type and quantity of explosives used
  (including sizing calculations based on the scaled distance equation)
- Time of blast
- Seismographic record of each blast taken within 300' of the blast area

The blasting contractor shall retain an independent firm to provide a seismograph to be set up within a 300 foot radius of blasting activities. The seismograph shall have a Seismic Frequency Range of 2 to 150 Hertz and a sound frequency range of 1-500 Hz. It shall be capable to recording longitudinal, transverse, and vertical peak particle motion and frequency. The following information shall be printed out for each blast:

- Instrument Type
- Instrument Calibration Date
- Date and Time of Blast
- Instrument Location
- Distance to Blast
- Resultant Peak Particle Velocity (in/sec)
- Longitudinal, Vertical and Transverse Peak Particle Velocity (in/sec)
- Frequency (Hz)
- Seismograph Operator
- Airblast (dB)
- Stratum Directly Beneath Geophone

The seismograph shall be used to determine the air blast and peak particle velocity of each shot in the area where the seismograph is set. Peak particle velocities recorded with a 300'

radius which exceed the Frequency-Peak Particle Velocity Curve (Figure B from Appendix B of the US Bureau of Mines RI 8507) shall be documented and reported by the blaster to the owner's representative and a copy forwarded to the Department within 7 days of the record becoming available.

During the blasting operation, the blasting contractor shall be responsible for control of access in and around the general blast area. Equipment and traffic shall be stopped far enough away to ensure work area safety and shall not be released until the blast foreman issues the "all clear signal". Warning signals shall be issued prior to every shot as follows:

- 3 whistles at 5 minutes prior to blast
- 2 whistles at 1 minute prior to blast
- once the shot has been checked for any misfires, one whistle will issue the "all clear"

Blasting shall only occur as needed during the hours of 7:00 A.M. to 5:00 P.M. daily, Monday through Friday. Explosives shall be delivered to the job site on a daily basis. Only that amount necessary for the day's work shall be brought to the site. Explosives shall be transported and stored in approved magazines when not in use. No overnight storage of explosives on the site shall be permitted.

Section 21 - Air Emissions

No significant adverse air emissions are anticipated. The proposed roads will be paved. No stacks or expansive gravel areas are proposed. The estimated peak hour vehicle trips are not expected to be a significant source of air emissions. Temporary emissions may occur during the construction of the project due to earth moving activities and construction equipment. These emissions are expected to be limited in nature and of short duration. Provisions for dust control, if needed during construction, have been included in the Erosion and Sediment Control Plan attached to Section 14 of this application. Once the construction phase is complete, no undue air emissions are expected.

Section 22 - Odors

Odor generation is not expected to be significant and would be consistent with any normal residential use. Temporary limited odors may arise during constriction as a result of construction equipment working on the site. This short-term odor potential is also not expected to be significant.

Section 23 - Water Vapor

Due to the proposed residential use of the property, no large scale water vapor emissions are anticipated.

Section 24 - Sunlight

Due to the proposed residential use of the property, no sunlight exposure or deprivation problems are anticipated.

Section 25 - Notices

All public notifications will be performed by the City of Lewiston during the planning board public hearing process.

Lot #	Site Address	Owner	Co-Owner	Mailing Address	Address Line 2	City	State	Zip Code
115-54	131 Hogan Rd.	Olympic Heights, LLC		c/o 200 Elm Realty LLC	500 Canal Street	Lewiston	ME	04240
115-49	135 Hogan Rd.	Florentina J. Mendros	Ronald E. Chicoine	135 Hogan Rd.		Lewiston	ME	04240
115-48	149 Hogan Rd.	Ronald N. Goulet	Jaye R. Goulet	7 Old Webster Rd.		Lewiston	ME	04240
115-42	341 Stetson Rd.	Rejane L. Lemieux		342 Stetson Rd.		Lewiston	ME	04240
115-53	345 Stetson Rd.	Scott M. Merrill		345 Stetson Rd.		Lewiston	ME	04240
116-3	161 Hogan Rd. Rear	Richard S. Mack		750 Warren Ave.		Portland	ME	04103
116-7	27 Amos Ct.	Amber Berube		351 West Rd.		Gardiner	ME	04345
116-6	28 Amos Ct.	Michael N. Garant	Nicole J. Garant	28 Amos Ct.		Lewiston	ME	04240
143-53	71 Hogan Rd.	Lauriane B. Blouin	Constance H. Blouin	75 Hogan Rd.		Lewiston	ME	04240
143-49	10 Seville Pl.	Maurice R. Sasseville		10 Bonnallie Ave.		Lewiston	ME	04240
116-1	115 Hogan Rd.	Janet Stamboules		115 Hogan Rd.		Lewiston	ME	04240
115-52	125 Hogan Rd.	Matthew D. Martin	Kathy A. Martin	125 Hogan Rd.		Lewiston	ME	04240
115-2	124 Hogan Rd.	Jack A. Goodwin	Penny Goodwin	124 Hogan Rd.		Lewiston	ME	04240
115-4	130 Hogan Rd.	Kathleen A. Moore		130 Hogan Rd.		Lewiston	ME	04240
115-5	136 Hogan Rd.	Paul M. Varle	Emilie G. Varle	136 Hogan Rd.		Lewiston	ME	04240
115-6	140 Hogan Rd.	Wayne F. Sege	Marcia A. Sege	140 Hogan Rd.		Lewiston	ME	04240
118-4	314 Montello St.	Stanton Bird Club		P.O. Box 3172		Lewiston	ME	04240

SANCTUARY ESTATES

A 31 LOT RESIDENTIAL SUBDIVISION

HOGAN ROAD - LEWISTON, MAINE

PREPARED BY:

CIVIL ENGINEER:
TERRADYN CONSULTANTS, LLC
P.O. BOX 339
NEW GLOUCESTER, MAINE 04260
(207)926-5111

SURVEYOR:
LAND SURVEYING & SEPTIC DESIGNS CADMASTER DRAFTING
586 PARK AVENUE
AUBURN, MAINE 04210
(207) 240-5567

HIGH INTENSITY SOIL SURVEY & SEPTIC EVALUATION:
STATEWIDE SURVEYS, INC.
35 EASTMAN ROAD
CAPE ELIZABETH, MAINE 04107
(207) 767-4200

APPLICANT:

CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

OWNER:

CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

PROJECT PARCEL SITE

CITY OF LEWISTON TAX ASSESSOR'S MAP & LOT NUMBERS

MAP 115 LOT 54

GENERAL NOTES:

1. THE APPROVAL WILL EXPIRE IN ACCORDANCE WITH ARTICLE XIII, SECTION 11(a)(1) OF THE CITY OF LEWISTON CODE OF ORDINANCES. THAT SECTION STATES THAT IF DEVELOPMENT HAS NOT OCCURRED AS DEFINED WITHIN THE SCOPE OF THE CODE WITHIN TWO YEARS, DEVELOPMENT REVIEW APPROVAL SHALL EXPIRE. THE APPLICANT MAY NOT BEGIN CONSTRUCTION O ROPERATION OF THE DEVELOPMENT UNTIL A NEW APPROVAL IS GRANTED.

APPROVED: CITY OF LEWISTON
PLANNING BOARD

DATE

LOCATION MAP
1" = 250'

SHEET INDEX

C-0.0	COVER SHEET & LOCATION MAP
S-1.0	BOUNDARY & TOPOGRAPHIC SURVEY
C-1.0	SUBDIVISION PLAN
C-1.1	SUBDIVISION PLAN
C-2.0	SITE PLAN
C-2.1	SITE PLAN
C-2.2	SITE PLAN
C-3.0	GRADING & EROSION CONTROL PLAN
C-3.1	GRADING & EROSION CONTROL PLAN
C-3.2	GRADING & EROSION CONTROL PLAN
C-4.0	UTILITY PLAN
C-4.1	UTILITY PLAN
C-4.2	UTILITY PLAN
C-5.0	PROFILES
C-5.1	PROFILES
C-5.2	PROFILES
C-6.0	DETAILS & NOTES
C-6.1	DETAILS & NOTES
C-6.2	DETAILS & NOTES
C-6.3	DETAILS & NOTES
C-6.4	STORMWATER DETAILS & NOTES
C-6.5	STORMWATER DETAILS & NOTES
C-6.6	STORMWATER DETAILS & NOTES

LEGEND

EXISTING PROPERTY LINE
PROPOSED PROPERTY LINE
PROPOSED SETBACK LINE
EXISTING SETBACK LINE
EXISTING EASEMENT
PROPOSED EASEMENT
ROAD CENTERLINE
124 EXISTING MINOR CONTOUR
124 EXISTING MAJOR CONTOUR
124 PROPOSED CONTOUR
SD EXISTING STORMDRAIN
SD PROPOSED STORMDRAIN
S EXISTING SANITARY SEWER
S PROPOSED SANITRY SEWER
W EXISTING WATER LINE
W PROPOSED WATER LINE
UD EXISTING UNDERDRAIN
UD PROPSED UNDERDRAIN
OHE EXISTING OVERHEAD ELECTRIC & TELEPHONE
OHE PROPOSED OVERHEAD ELECTRIC & TELEPHONE
UGE EXISTING UNDERGROUND ELECTRIC & TELEPHONE
UGE PROPOSED UNDERGROUND ELECTRIC & TELEPHONE
EXISTING EDGE OF PAVEMENT
PROPOSED EDGE OF PAVEMENT
EXISTING EDGE OF GRAVEL
PROPOSED EDGE OF GRAVEL
EXISTING CURB
PROPOSED CURB
EDGE OF WATER
EXISTING TREE LINE
PROPOSED TREE LINE
CHAIN LINK FENCE
PROPOSED FENCE
EXISTING GUARDRAIL
PROPOSED GUARDRAIL
SF SILT FENCE
EXISTING VALVE
PROPOSED VALVE
EXISTING HYDRANT
PROPOSED HYDRANT
EXISTING TRANSFORMER
PROPOSED TRANSFORMER
EXISTING LIGHT POLE
PROPOSED LIGHT POLE
EXISTING UTILITY POLE
PROPOSED UTILITY POLE
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
EXISTING SEWER MANHOLE
PROPOSED SEWER MANHOLE
30.20 EXISTING SPOT GRADE
30.20 PROPOSED SPOT GRADE
EXISTING SIGN
PROPOSED SIGN
EXISTING BUILDING
PROPOSED BUILDING
WETLAND AREA
PROPOSED PAVEMENT
RIPRAP

STATE OF MAINE
JEFFREY D. ADAMS
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
1	3/27/2018	REVISED PER CITY REVIEW	

TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

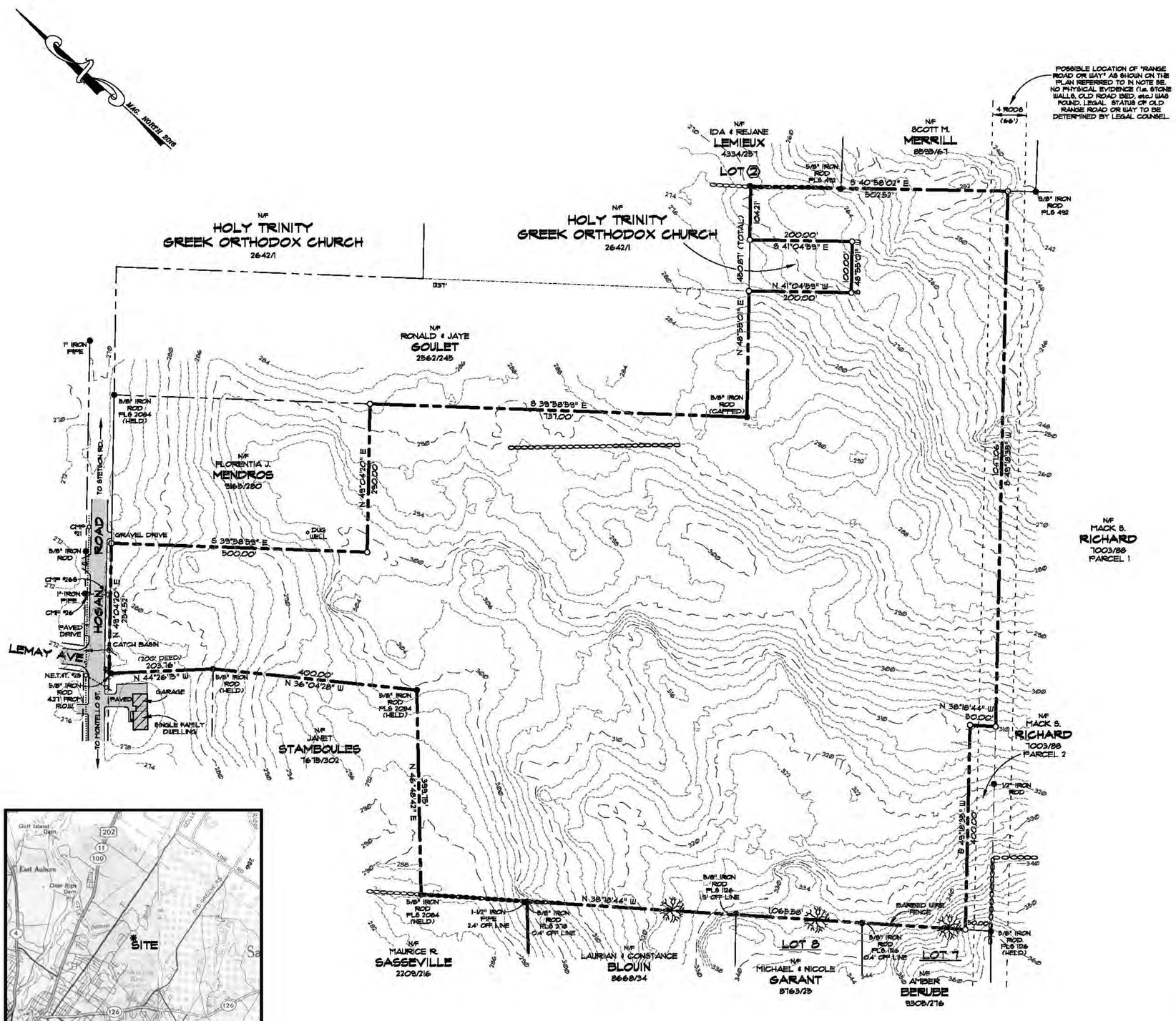
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
COVER/LOCATION MAP

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	12/22/2017
SCALE:	AS SHOWN
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 COVER.DWG	

SHEET C-0.0



LOCATION MAP
(NOT TO SCALE)

NOTES:

1) ALL BEARINGS REFER TO MAGNETIC NORTH AS OBSERVED IN JULY OF 2017 AND CALCULATED FROM ANGLES OF A TRAVERSE PERFORMED BY THIS SURVEYOR.

2) ALL BOOK AND PAGE NUMBERS REFER TO THE ANDROSCOGGIN COUNTY REGISTRY OF DEEDS.

3) TOTAL AREA OF PARCEL SURVEYED = 33.17 ACRES.

4) OWNER OF RECORD = "CHASE CUSTOM HOMES & FINANCE, INC." - SEE DEED OF 200 ELM REALTY, LLC TO CHASE CUSTOM HOMES & FINANCE, INC. DATED NOVEMBER 1, 2016, AND RECORDED AT SAID REGISTRY IN BOOK 9503, PAGE 150.

5) REFERENCE IS MADE TO THE FOLLOWING PLANS:
A) "SEVILLE PLACE" DATED OCTOBER 1986 BY VINCE LEBLANC, PLS NO. 318, RECORDED AT SAID REGISTRY IN PLAN FILE BOOK 33, PAGE 9.
B) "SECOND SUBDIVISION - PLAN OF LOTS - LAURENT LEMIEUX" DATED MAY 28, 1987, BY ARTHUR MONTANA, PLS NO. 492, RECORDED AT SAID REGISTRY IN PLAN FILE BOOK 33, PAGE 11.
C) "MOUNTAIN VIEW ESTATES" BY SEBAGO TECHNICS, DATED DECEMBER 19, 2002, REVISED TO DECEMBER 29, 2003, RECORDED AT SAID REGISTRY IN PLAN FILE BOOK 43, PAGE 138.
D) "PLAN OF A BOUNDARY SURVEY FOR THE HOLY TRINITY GREEK ORTHODOX CHURCH" DATED JUNE 3, 2010 BY ROBIN REDMOND PLS NO. 2084, RECORDED AT SAID REGISTRY IN PLAN FILE BOOK 49, PAGE 10.
E) "FROM A PLAN BY COL. GARCELON" DATED MARCH 1957, RECORDED AT SAID REGISTRY IN THE UNRECORDED PLAN FILES NO. "HLEW-1".

6) THE PARCEL IS LOCATED WITHIN THE "SUBURBAN RESIDENTIAL" ZONING DISTRICT. THE MINIMUM SPACE AND BULK REQUIREMENTS ARE:

MINIMUM AREA	40,000 SQ. FT. (WITHOUT SEWER)
MINIMUM ROAD FRONTAGE	125'
MINIMUM FRONT SETBACK	25'
MINIMUM SIDE SETBACK	15'
MINIMUM REAR SETBACK	15'

7) FOR INFORMATION WITH REGARDS TO THE APPARENT RIGHT OF WAY OF HOGAN ROAD, REFERENCE IS MADE TO THE CITY OF LEWISTON RECORD OF STREETS, VOLUME 1, PAGE 12 (3 RODS = 49.5' WIDE) DATED SEPTEMBER 12, 1842. SEE ALSO CITY OF LEWISTON STREET RECORD OF STREETS VOLUME 4, PAGE 71, DATED OCTOBER 6, 1987.

8) TOPOGRAPHIC INFORMATION AS SHOWN ON THIS PLAN WAS OBTAINED FROM THE CITY OF LEWISTON OFFICE OF GEOGRAPHIC INFORMATION AND IS BASED UPON 2 FOOT LIDAR CONTOURS. FIELD VERIFICATION OF THE INFORMATION OBTAINED FROM THE CITY OF LEWISTON WAS NOT PERFORMED BY THIS SURVEYOR.

9) THIS PLAN WAS PREPARED UNDER THE DIRECT SUPERVISION OF GEORGE S. BOUCHLES, PLS 2295.

LEGEND:

●	IRON PIPE OR ROD FOUND
O	IRON ROD SET WITH SURVEYOR'S I.D. CAP 2295
····O····	UTILITY POLES WITH OVERHEAD LINES
	FIRE HYDRANT
O	CATCH BASIN
OOOOOOOOOOOOOO	STONE WALL
	TREE WITH BARBED WIRE FENCE
N/F	NOW OR FORMERLY
7003/88	BOOK AND PAGE NUMBERS
— — —	PROPERTY LINES
---292---	EXISTING CONTOURS
	BUILDING
	PAVEMENT

SCALE : 1" = 100'

0 50' 100' 200' 300' 400'

STATE OF MAINE
GEORGE S. BOUCHLES
#2295
PROFESSIONAL LAND SURVEYOR

BOUNDARY & TOPOGRAPHIC SURVEY PLAN
CHASE CUSTOM HOMES PROPERTY

131 HOGAN ROAD - LEWISTON, ME

ANDROSCOGGIN COUNTY

PREPARED FOR AND OWNER OF RECORD

CHASE CUSTOM HOMES & FINANCE, INC.

290 WESTBROOK ROAD - WESTBROOK, ME 04092

prepared by
CADmaster Drafting, Land Surveying & Septic Designs
986 Park Avenue. - Auburn, ME 04210
tel./fax - 689-3232 cell-240-5567

DATE: NOVEMBER 27, 2017	SCALE: 1" = 100'	SHEET
JOB NUMBER: 17-064	CADD: 17-064.DWG	1

GENERAL NOTES:

1. THE RECORD OWNER OF THE PARCEL IS CHASE CUSTOM HOMES & FINANCE BY DEEDS RECORDED IN THE ANDROSCOGGIN COUNTY REGISTRY OF DEEDS IN BOOK 9,503/PAGE 150 RESPECTIVELY.

2. THE PROPERTY IS SHOWN AS LOT 54 ON THE CITY OF LEWISTON ASSESSOR'S MAP 115 AND IS LOCATED IN THE SUBURBAN RESIDENTIAL DISTRICT (SR).

3. BOUNDARY INFORMATION SHOWN HEREON IS BASED UPON A STANDARD BOUNDARY SURVEY BY LAND SURVEYING & SEPTIC DESIGNS CADMASTER DRAFTING ENTITLED "CHASE CUSTOM HOMES PROPERTY", DATED NOVEMBER 27, 2017.

4. TOPOGRAPHIC INFORMATION SHOWN HEREIN IS BASED UPON AN EXISTING CONDITIONS TOPOGRAPHIC SURVEY BY LAND SURVEYING & SEPTIC DESIGNS CADMASTER DRAFTING, PREPARED NOVEMBER 2017.

5. THE TOTAL AREA OF PARCEL = 33.17 ACRES

6. SPACE AND BULK CRITERIA:

SUBURBAN RESIDENTIAL DISTRICT (SR)

MIN. LOT SIZE:	40,000 SF (WITHOUT PUBLIC SEWER)
MIN. STREET FRONTAGE:	125'
MIN. FRONT SETBACK:	25'
MIN. SIDE SETBACK:	15'
MIN. REAR SETBACK:	15'
MAX. BUILDING HEIGHT:	35 FT
MAX. IMPERVIOUS SURFACE RATIO	20%
PROPOSED IMPERVIOUS SURFACE RATIO:	<20%

PROPOSED CLUSTER SPACE AND BULK CRITERIA

MIN LOT SIZE:	20,000 SF (WITHOUT PUBLIC SEWER)
MIN STREET FRONTAGE:	50'
MIN FRONT SETBACK:	12.5'
MIN SIDE SETBACK:	5'
MIN REAR SETBACK:	5'

THIS CLUSTER SUBDIVISION IS DESIGNED IN ACCORDANCE WITH ARTICLE XIII, SECTION 7 OF THE ZONING AND LAND USE CODE. AS SUCH, LOT SIZE, STREET FRONTAGE & ALL SETBACK DISTANCES ARE PERMITTED TO BE REDUCED TO THE VALUES PRESENTED IN THE ABOVE TABLE.

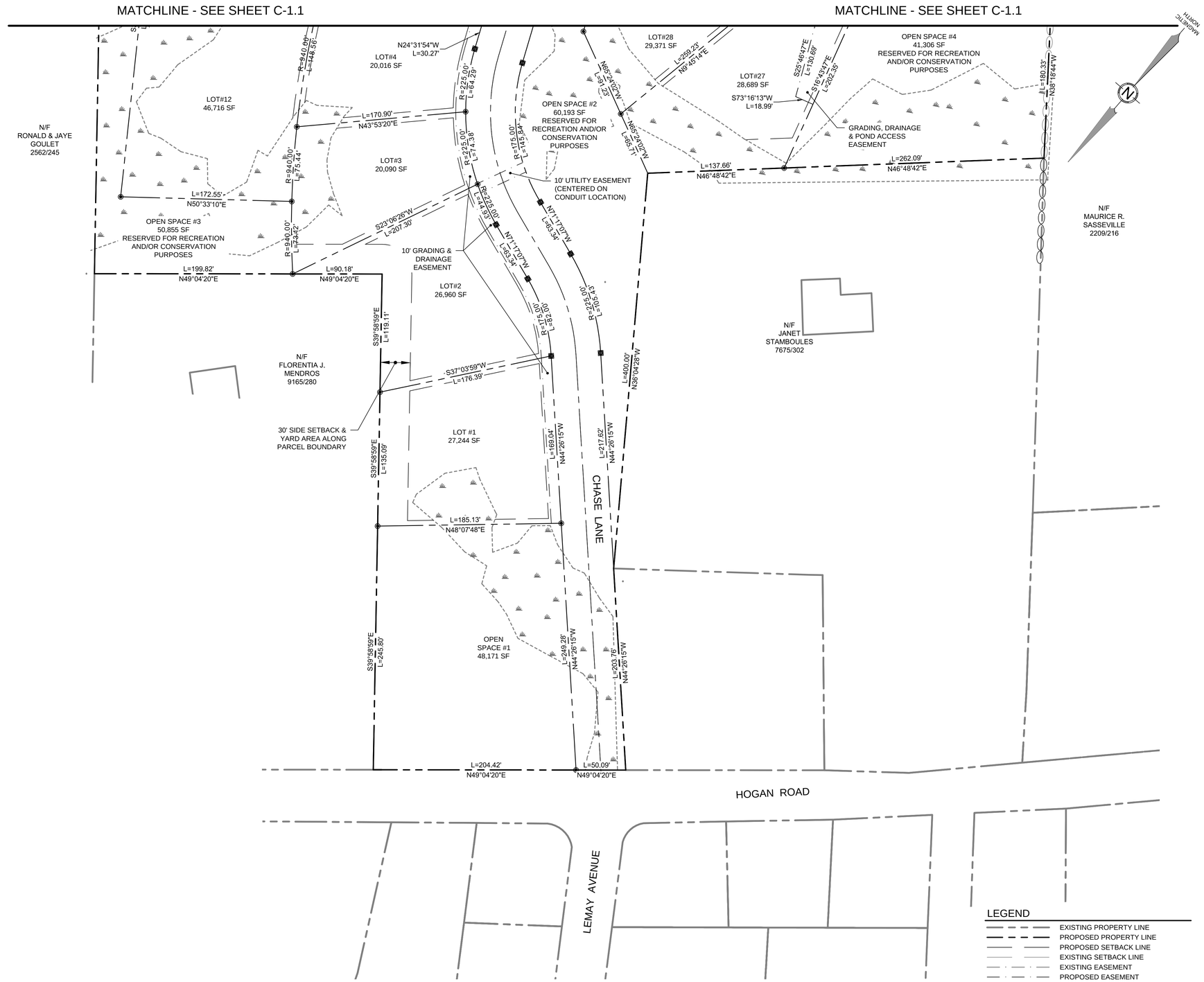
IT SHOULD BE NOTED THAT THERE IS A MINIMUM 30' YARD & SETBACK AREA EVERYWHERE THAT IS ADJACENT TO THE OVERALL PROPERTY BOUNDARY.

7. THE WETLANDS ON THIS PLAN WERE DELINEATED BY DALE BREWER OF STATEWIDE SURVEYS, INC.

8. THESE LOTS ARE TO BE SERVICED BY PUBLIC WATER, PRIVATE SEPTIC SYSTEMS AND UNDERGROUND UTILITIES.

9. THE FORESTED BUFFERS SHOWN ON THIS PLAN ARE INTENDED TO REMAIN IN A NATURAL VEGETATIVE STATE. ONLY DEAD OR DISEASED TREES MAY BE REMOVED. THESE BUFFERS SHALL BE MARKED OUT WITH PERMANENT SIGNAGE AND PROTECTED BY DISTURBANCE IN ACCORDANCE WITH THE MAINE DEP CHAPTER 500 SUGGESTED TEMPLATES FOR DEED RESTRICTIONS PRIOR TO CONSTRUCTION.

10. THE SANCTUARY ESTATES HOMEOWNERS ASSOCIATION WILL HAVE THE RESPONSIBILITY OF MAINTAINING THE COMMON OPEN SPACE.



APPROVED: CITY OF LEWISTON
PLANNING BOARD

_____ DATE

_____

_____

_____

_____

_____

_____

STATE OF MAINE

_____ COUNTY SS REGISTRY OF DEEDS
RECEIVED _____, 20___
AT ___h _____m _____M. AND RECORDED IN
PLAN BOOK _____ PAGE _____

ATTEST _____ REGISTRAR

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- PROPOSED SETBACK LINE
- EXISTING SETBACK LINE
- EXISTING EASEMENT
- PROPOSED EASEMENT
- ROAD CENTERLINE
- STONE WALL
- MATCH LINE
- STREAM
- EXISTING MONUMENT
- PROPOSED MONUMENT
- EXISTING IRON PIPE
- PROPOSED IRON PIPE
- WETLAND AREA
- STREAM SETBACK
- PROPOSED FORESTED BUFFER

STATE OF MAINE
JEFFREY D. JOHNSON
No. 11617
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
1	3/27/2018	REVISED PER CITY REVIEW	

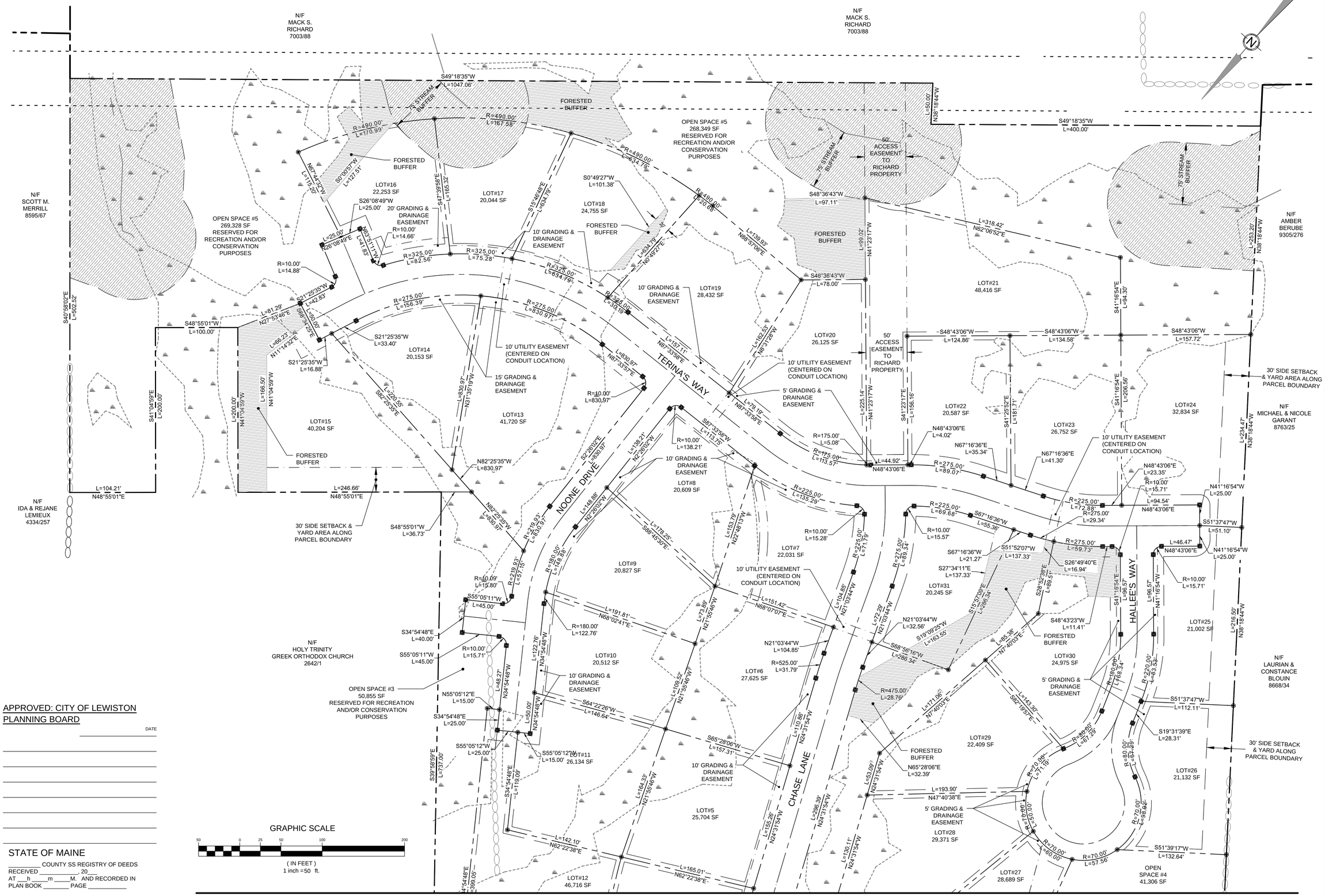
TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
SUBDIVISION PLAN

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 50'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 SB.DWG	

SHEET C-1.0



APPROVED: CITY OF LEWISTON
PLANNING BOARD

DATE

STATE OF MAINE

_____ COUNTY SS REGISTRY OF DEEDS
RECEIVED _____, 20____
AT ___h _____m _____M. AND RECORDED IN
PLAN BOOK _____ PAGE _____

ATTEST _____ REGISTRAR

STATE OF MAINE
JEFFREY D. MILLS
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
1	3/27/2018	REVISED PER CITY REVIEW	

TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
SUBDIVISION PLAN

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDSTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 50'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 SB.DWG	
SHEET	C-1.1

GENERAL NOTES:

1. THE RECORD OWNER OF THE PARCEL IS CHASE CUSTOM HOMES & FINANCE BY DEEDS RECORDED IN THE ANDROSCOGGIN COUNTY REGISTRY OF DEEDS IN BOOK 9,503/PAGE 150 RESPECTIVELY.

2. THE PROPERTY IS SHOWN AS LOT 54 ON THE CITY OF LEWISTON ASSESSOR'S MAP 115 AND IS LOCATED IN THE SUBURBAN RESIDENTIAL DISTRICT (SR).

3. BOUNDARY INFORMATION SHOWN HEREON IS BASED UPON A STANDARD BOUNDARY SURVEY BY LAND SURVEYING & SEPTIC DESIGNS CADMASTER DRAFTING ENTITLED "CHASE CUSTOM HOMES PROPERTY", DATED NOVEMBER 27, 2017.

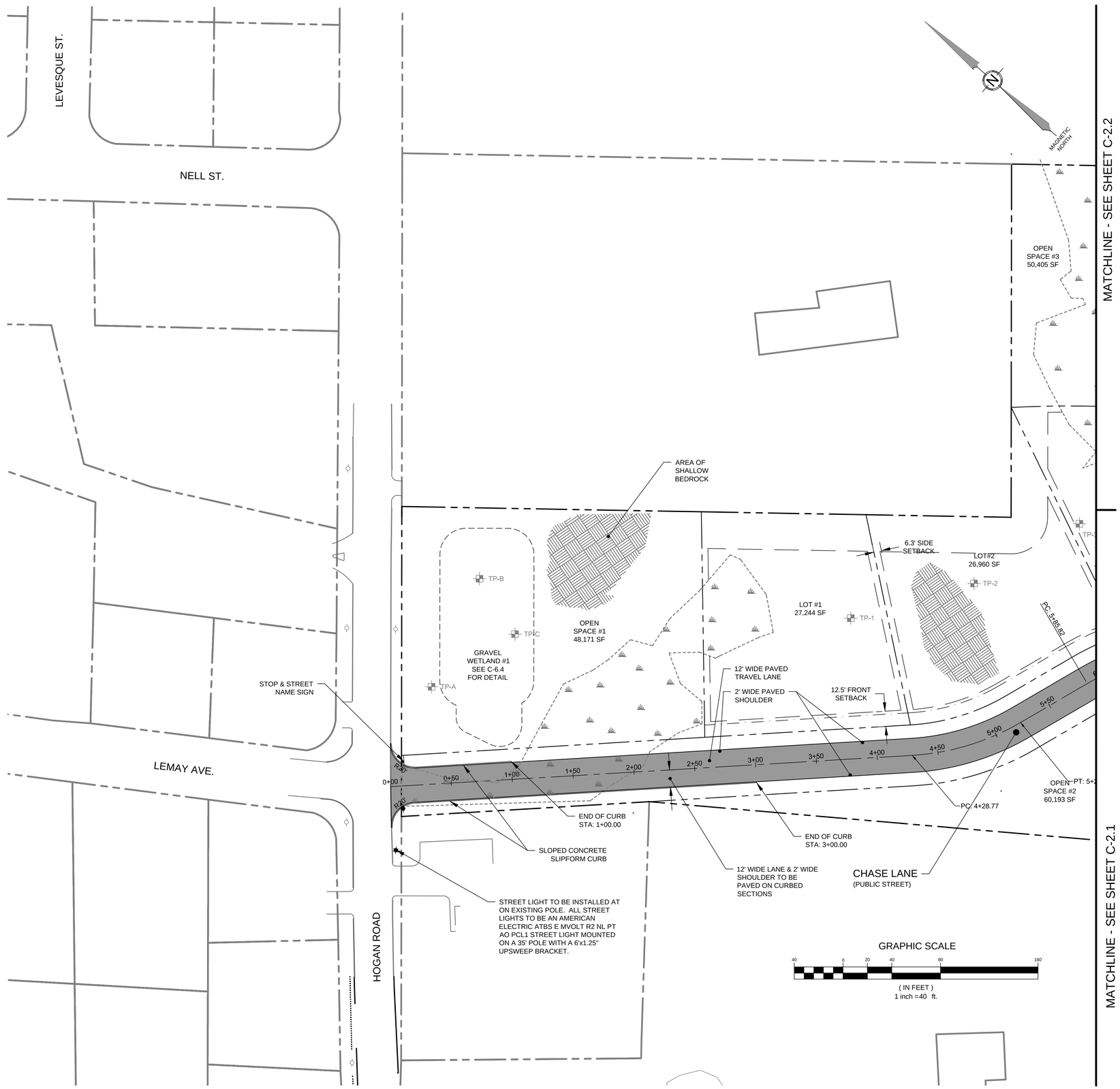
4. TOPOGRAPHIC INFORMATION SHOWN HEREIN IS BASED UPON AN EXISTING CONDITIONS TOPOGRAPHIC SURVEY BY LAND SURVEYING & SEPTIC DESIGNS CADMASTER DRAFTING, PREPARED NOVEMBER 2017.

5. THE TOTAL AREA OF PARCEL = 33.17 ACRES

6. SPACE AND BULK CRITERIA:

SUBURBAN RESIDENTIAL DISTRICT (SR)

MIN. LOT SIZE:	40,000 SF (WITHOUT PUBLIC SEWER)
MIN. LOT SIZE (CLUSTER DEVELOPMENT):	20,000 SF (WITHOUT PUBLIC SEWER)
MIN. STREET FRONTAGE:	125' (50' CLUSTER)
MIN. LOT DEPTH:	NA
MIN. FRONT SETBACK:	25' (12.5' CLUSTER)
MIN. SIDE SETBACK:	15' (5' CLUSTER)
MIN. REAR SETBACK:	15' (5' CLUSTER)
MAX. BUILDING HEIGHT:	35 FT
MAX. IMPERVIOUS SURFACE RATIO	20%
PROPOSED IMPERVIOUS SURFACE RATIO:	



STATE OF MAINE
JEFFREY D. JAMES
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
1	3/27/2018	REVISED PER CITY REVIEW	

TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
SITE LAYOUT PLAN

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660S.DWG	
SHEET	C-2.0

MATCHLINE - SEE SHEET C-2.2

MATCHLINE - SEE SHEET C-2.2

MATCHLINE - SEE SHEET C-2.0

LOT#3 20,090 SF
LOT#4 20,016 SF
LOT#5 25,704 SF
LOT#6 27,625 SF
LOT#7 21,851 SF
LOT#8 20,788 SF
LOT#19 28,432 SF
LOT#20 26,125 SF
LOT#21 48,416 SF
LOT#22 20,587 SF
LOT#23 26,752 SF
LOT#24 32,834 SF
LOT#25 20,165 SF
LOT#26 21,924 SF
LOT#27 28,689 SF
LOT#28 29,371 SF
LOT#29 22,409 SF
LOT#30 24,975 SF
LOT#31 20,245 SF
OPEN SPACE #2 60,193 SF
OPEN SPACE #4 41,306 SF
OPEN SPACE #5 268,349 SF
GRAVEL WETLAND #2 SEE C-6.5 FOR DETAIL

CHASE LANE (PUBLIC STREET)
TERINA'S WAY (PUBLIC STREET)
HALLEE'S WAY (PUBLIC COURT)

12' WIDE PAVED TRAVEL LANE
2' WIDE PAVED SHOULDER
5.0' SIDE SETBACK
12.5' FRONT SETBACK
12.5' SIDE SETBACK
STREET LIGHT
STREET LIGHT TO BE INSTALLED AT INTERSECTION
STOP & STREET NAME SIGN
FORESTED BUFFER
75' STREAM BUFFER
START OF GUARDRAIL STA: 4+40.00
END OF GUARDRAIL STA: 5+15.00
95' OF WOODEN 'GUARDRAIL'
AREA OF SHALLOW BEDROCK

PT: 7+49.02
PC: 10+45.42
PT: 10+75.69
PC: 11+80.54
PC: 4+05.41
PT: 12+68.76
EP: 12+95.80
PT: 3+56.47
PC: 2+75.50
PT: 1+98.86
PC: 1+17.88
PC: 1+31.57
PC: 2+35.82
PT: 2+07.51
EP: 6+45.22

R20' R60' R84' R100' R70' R58' R50'

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

MAGNETIC NORTH

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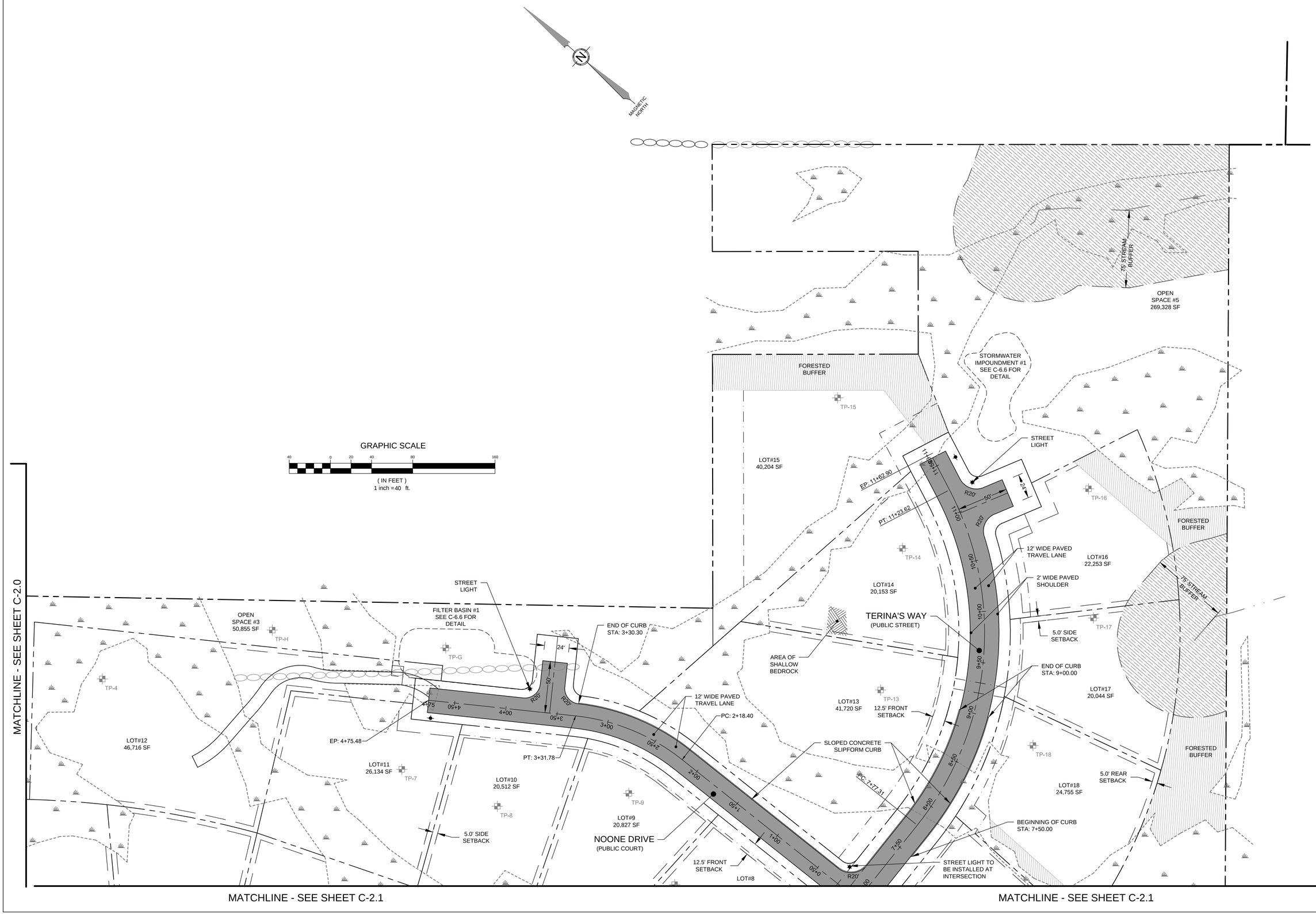

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CONSTRUCTION NOTES

1. ALL WORK SHALL CONFORM TO THE APPLICABLE CODES AND ORDINANCES.

2. CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIM OR HERSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIM OR HERSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

3. CONTRACTOR SHALL NOTIFY ENGINEER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND IN THE FIELD.

4. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND OWNER'S REQUIREMENTS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.

5. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE ENGINEER.

6. CONTRACTOR SHALL CLEAN AND REMOVE DEBRIS AND SEDIMENT DEPOSITED ON PUBLIC STREETS, SIDEWALKS, ADJACENT AREAS, OR OTHER PUBLIC WAYS DUE TO CONSTRUCTION.

7. CONTRACTOR SHALL INCORPORATE PROVISIONS AS NECESSARY IN CONSTRUCTION TO PROTECT EXISTING STRUCTURES, PHYSICAL FEATURES, AND MAINTAIN SITE STABILITY DURING CONSTRUCTION. CONTRACTOR SHALL RESTORE ALL AREAS TO ORIGINAL CONDITION AND AS DIRECTED BY DESIGN DRAWINGS.

8. SITE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.

9. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH "MAINE EROSION AND SEDIMENTATION CONTROL BMP'S" PUBLISHED BY THE MAINE DEP IN 2003.. A COPY OF THE MANUAL CAN BE FOUND AT HTTP://MAINE.GOV/DEP/BLWQ/DOCSTAND/ESCBMPS/INDEX.HTM. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO POSSESS A COPY OF THE EROSION CONTROL PLAN AT ALL TIMES.

10. THE CONTRACTOR IS HEREBY CAUTIONED THAT ALL SITE FEATURES SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS BY THE SURVEYOR AND BY INFORMATION PROVIDED BY UTILITY COMPANIES. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT DIG SAFE (1-888-DIGSAFE) AT LEAST THREE (3) BUT NOT MORE THAN THIRTY (30) DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION TO VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES. CONTRACTOR SHALL BE AWARE THAT DIG SAFE ONLY NOTIFIES ITS "MEMBER" UTILITIES ABOUT THE DIG. WHEN NOTIFIED, DIG SAFE WILL ADVISE CONTRACTOR OF MEMBER UTILITIES IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND CONTACTING NON-MEMBER UTILITIES DIRECTLY. NON-MEMBER UTILITIES MAY INCLUDE TOWN OR CITY WATER AND SEWER DISTRICTS AND SMALL LOCAL UTILITIES, AS WELL AS USG PUBLIC WORKS SYSTEMS.

11. CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE REQUIREMENTS OF 23 MRSA 3360-A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE APPROPRIATE UTILITIES TO OBTAIN AUTHORIZATION PRIOR TO RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS. IF A UTILITY CONFLICT ARISES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, THE MUNICIPALITY AND APPROPRIATE UTILITY COMPANY PRIOR TO PROCEEDING WITH ANY RELOCATION.

12. ALL PAVEMENT MARKINGS AND DIRECTIONAL SIGNAGE SHOWN ON THE PLAN SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS.

13. ALL PAVEMENT JOINTS SHALL BE SAWCUT PRIOR TO PAVING TO PROVIDE A DURABLE AND UNIFORM JOINT.

14. NO HOLES, TRENCHES OR STRUCTURES SHALL BE LEFT OPEN OVERNIGHT IN ANY EXCAVATION ACCESSIBLE TO THE PUBLIC OR IN PUBLIC RIGHTS-OF-WAY.

15. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL REQUIRE A M.D.O.T. PERMIT AS WELL AS PERMITS FROM THE TOWN AS APPLICABLE.

16. THE PROPOSED LIMITS OF CLEARING SHOWN HEREON ARE APPROXIMATE BASED UPON THE PROPOSED LIMITS OF SITE GRADING. THE APPLICANT RESERVES THE RIGHT TO PERFORM NORMAL FOREST MANAGEMENT ACTIVITIES OUTSIDE OF THE CLEARING LIMIT AS SHOWN. TREE REMOVAL OUTSIDE OF THE LIMITS OF CLEARING MAY BE NECESSARY TO REMOVE DEAD OR DYING TREES OR TREE LIMBS. THIS REMOVAL IS DUE TO POTENTIAL SAFETY HAZARDS AND TO PROMOTE PROPER FOREST GROWTH.

17. IMMEDIATELY UPON COMPLETION OF CUTS/FILLS, THE CONTRACTOR SHALL STABILIZE DISTURBED AREAS IN ACCORDANCE WITH EROSION CONTROL NOTES AND AS SPECIFIED ON PLANS.

18. THE CONTRACTOR SHALL BE FULLY AND SOLELY RESPONSIBLE FOR THE REMOVAL, REPLACEMENT AND RECTIFICATION OF ALL DAMAGED AND DEFECTIVE MATERIAL AND WORKMANSHIP IN CONNECTION WITH THE CONTRACT WORK. THE CONTRACTOR SHALL REPLACE OR REPAIR AS DIRECTED BY THE OWNER ALL SUCH DAMAGED OR DEFECTIVE MATERIALS WHICH APPEAR WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.

19. ALL WORK PERFORMED BY THE GENERAL CONTRACTOR AND/OR TRADE SUBCONTRACTOR SHALL CONFORM TO THE REQUIREMENTS OF LOCAL, STATE OR FEDERAL LAWS, AS WELL AS ANY OTHER GOVERNING REQUIREMENTS, WHETHER OR NOT SPECIFIED ON THE DRAWINGS.

21. WHERE THE TERMS "APPROVED EQUAL", "OTHER APPROVED", "EQUAL TO", "ACCEPTABLE" OR OTHER GENERAL QUALIFYING TERMS ARE USED IN THESE NOTES, IT SHALL BE UNDERSTOOD THAT REFERENCE IS MADE TO THE RULING AND JUDGMENT OF TERRADYN CONSULTANTS, LLC.

22. THE GENERAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FOR THE WORK UNTIL TURNED OVER TO THE OWNER. BEFORE THE FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND MATERIALS, REPAIR OR REPLACE PRIVATE OR PUBLIC PROPERTY WHICH MAY HAVE BEEN DAMAGED OR DESTROYED DURING CONSTRUCTION, CLEAN THE AREAS WITHIN AND ADJACENT TO THE PROJECT WHICH HAVE BEEN OBSTRUCTED BY HIS/HER OPERATIONS, AND LEAVE THE PROJECT AREA NEAT AND PRESENTABLE.

23. THE GENERAL CONTRACTOR SHALL MAINTAIN A CURRENT AND COMPLETE SET OF CONSTRUCTION DRAWINGS ON SITE DURING ALL PHASES OF CONSTRUCTION FOR USE OF ALL TRADES.

24. THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ANY CHANGES AND DEVIATION OF APPROVED PLANS NOT AUTHORIZED BY THE ARCHITECT/ENGINEER AND/OR CLIENT/OWNER.

25. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. ANY MODIFICATION TO SUIT FIELD DIMENSION AND CONDITION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY WORK.

26. THE APPLICANT WILL RETAIN THE SERVICES OF A PROFESSIONAL ENGINEER TO INSPECT THE CONSTRUCTION AND STABILIZATION OF ALL STORMWATER MANAGEMENT STRUCTURES. IF NECESSARY, THE INSPECTING ENGINEER WILL INTERPRET THE POND'S CONSTRUCTION PLAN FOR THE CONTRACTOR. ONCE ALL STORMWATER MANAGEMENT STRUCTURES ARE CONSTRUCTED AND STABILIZED, THE INSPECTING ENGINEER WILL NOTIFY THE DEPARTMENT IN WRITING WITHIN 30 DAYS TO STATE THAT THE POND HAS BEEN COMPLETED. ACCOMPANYING THE ENGINEER'S NOTIFICATION MUST BE A LOG OF THE ENGINEER'S INSPECTIONS GIVING THE DATE OF EACH INSPECTION, THE TIME OF EACH INSPECTION, AND THE ITEMS INSPECTED ON EACH VISIT, AND INCLUDE ANY TESTING DATA OR SIEVE ANALYSIS DATA OF EVERY MINERAL SOIL AND SOIL MEDIA SPECIFIED IN THE PLANS AND USED ON SITE.

27. ADS SANTITE TO BE USED FOR ALL STORMDRAIN PIPE. ADS N-12 TO BE USED FOR ALL UNDERDRAIN.

HOUSEKEEPING NOTES:

1. SPILL PREVENTION. CONTROLS MUST BE USED TO PREVENT POLLUTANTS FROM BEING DISCHARGED FROM MATERIALS ON SITE, INCLUDING STORAGE PRACTICES TO MINIMIZE EXPOSURE OF THE MATERIALS TO STORMWATER, AND APPROPRIATE SPILL PREVENTION, CONTAINMENT, AND RESPONSE PLANNING AND IMPLEMENTATION.

2. GROUNDWATER PROTECTION. DURING CONSTRUCTION, LIQUID PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUNDWATER MAY NOT BE STORED OR HANDLED IN AREAS OF THE SITE DRAINING TO AN INFILTRATION AREA. AN "INFILTRATION AREA" IS ANY AREA OF THE SITE THAT BY DESIGN OR AS A RESULT OF SOILS, TOPOGRAPHY AND OTHER RELEVANT FACTORS ACCUMULATES RUNOFF THAT INFILTRATES INTO THE SOIL. DIKES, BERMS, SUMPS, AND OTHER FORMS OF SECONDARY CONTAINMENT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORAGE AND HANDLING OF THESE MATERIALS.

3. FUGITIVE SEDIMENT AND DUST. ACTIONS MUST BE TAKEN TO ENSURE THAT ACTIVITIES DO NOT RESULT IN NOTICEABLE EROSION OF SOILS OR FUGITIVE DUST EMISSIONS DURING OR AFTER CONSTRUCTION. OIL MAY NOT BE USED FOR DUST CONTROL.

4. DEBRIS AND OTHER MATERIALS. LITTER, CONSTRUCTION DEBRIS, AND CHEMICALS EXPOSED TO STORMWATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.

5. TRENCH OR FOUNDATION DE-WATERING. TRENCH DE-WATERING IS THE REMOVAL OF WATER FROM TRENCHES, FOUNDATIONS, COFFER DAMS, PONDS, AND OTHER AREAS WITHIN THE CONSTRUCTION AREA THAT RETAIN WATER AFTER EXCAVATION. IN MOST CASES THE COLLECTED WATER IS HEAVILY SILTED AND HINDERS CORRECT AND SAFE CONSTRUCTION PRACTICES. THE COLLECTED WATER MUST BE REMOVED FROM THE PONDED AREA, EITHER THROUGH GRAVITY OR PUMPING, AND MUST BE SPREAD THROUGH NATURAL WOODED BUFFERS OR REMOVED TO AREAS THAT ARE SPECIFICALLY DESIGNED TO COLLECT THE MAXIMUM AMOUNT OF SEDIMENT POSSIBLE, LIKE A COFFERDAM SEDIMENTATION BASIN. AVOID ALLOWING THE WATER TO FLOW OVER DISTURBED AREAS OF THE SITE. EQUIVALENT MEASURES MAY BE TAKEN IF APPROVED BY THE DEPARTMENT.

6. NON-STORMWATER DISCHARGES. IDENTIFY AND PREVENT CONTAMINATION BY NON-STORMWATER DISCHARGES.

7. ADDITIONAL REQUIREMENTS. ADDITIONAL REQUIREMENTS MAY BE APPLIED ON A SITE-SPECIFIC BASIS.

ROAD OPENING NOTES:

1. TO MAINTAIN THE BEST TRAVEL SURFACE FEASIBLE, THERE SHALL BE NO EXCAVATION ON NEWLY PAVED OR SUBSTANTIALLY REPAIRED STREETS FOR A PERIOD OF FIVE (5) YEARS EXCEPT IN EMERGENCY SITUATIONS. IF A CITY STREET ABSOLUTELY MUST BE OPENED TO RESTORE AN EXISTING ESSENTIAL UTILITY SERVICE WITHIN THE FIVE (5) YEAR MORATORIUM, THE CITY MAY ISSUE A STREET OPENING THE FOLLOWING CONDITIONS FOR STREET RESTORATION SHALL APPLY:

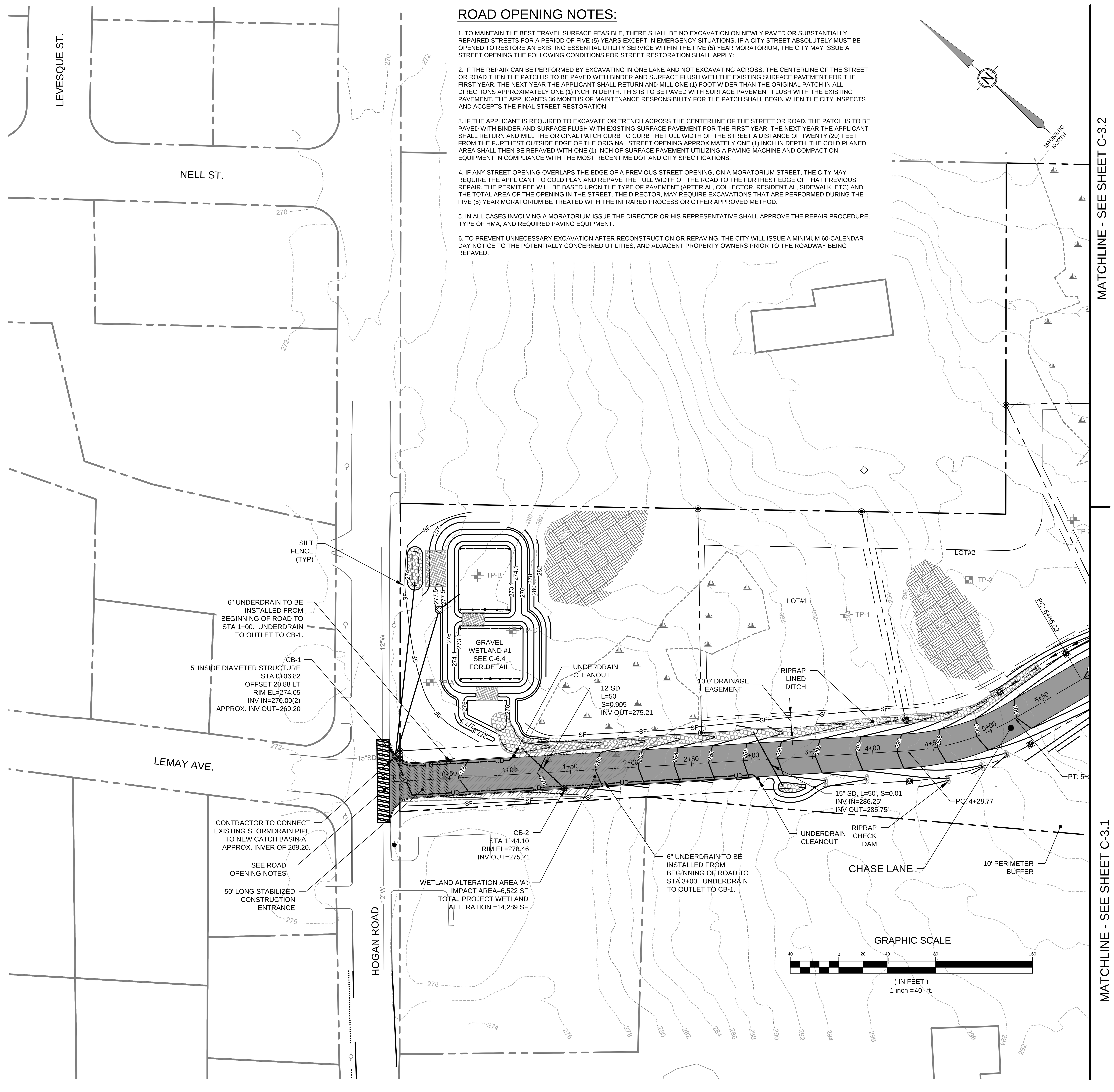
2. IF THE REPAIR CAN BE PERFORMED BY EXCAVATING IN ONE LANE AND NOT EXCAVATING ACROSS, THE CENTERLINE OF THE STREET OR ROAD THEN THE PATCH IS TO BE PAVED WITH BINDER AND SURFACE FLUSH WITH THE EXISTING SURFACE PAVEMENT FOR THE FIRST YEAR. THE NEXT YEAR THE APPLICANT SHALL RETURN AND MILL ONE (1) FOOT WIDER THAN THE ORIGINAL PATCH IN ALL DIRECTIONS APPROXIMATELY ONE (1) INCH IN DEPTH. THIS IS TO BE PAVED WITH SURFACE PAVEMENT FLUSH WITH THE EXISTING PAVEMENT. THE APPLICANTS 36 MONTHS OF MAINTENANCE RESPONSIBILITY FOR THE PATCH SHALL BEGIN WHEN THE CITY INSPECTS AND ACCEPTS THE FINAL STREET RESTORATION.

3. IF THE APPLICANT IS REQUIRED TO EXCAVATE OR TRENCH ACROSS THE CENTERLINE OF THE STREET OR ROAD, THE PATCH IS TO BE PAVED WITH BINDER AND SURFACE FLUSH WITH EXISTING SURFACE PAVEMENT FOR THE FIRST YEAR. THE NEXT YEAR THE APPLICANT SHALL RETURN AND MILL THE ORIGINAL PATCH CURB TO CURB THE FULL WIDTH OF THE STREET A DISTANCE OF TWENTY (20) FEET FROM THE FURTHEST OUTSIDE EDGE OF THE ORIGINAL STREET OPENING APPROXIMATELY ONE (1) INCH IN DEPTH. THE COLD PLANED AREA SHALL THEN BE REPAVED WITH ONE (1) INCH OF SURFACE PAVEMENT UTILIZING A PAVING MACHINE AND COMPACTION EQUIPMENT IN COMPLIANCE WITH THE MOST RECENT ME DOT AND CITY SPECIFICATIONS.

4. IF ANY STREET OPENING OVERLAPS THE EDGE OF A PREVIOUS STREET OPENING, ON A MORATORIUM STREET, THE CITY MAY REQUIRE THE APPLICANT TO COLD PLAN AND REPAVE THE FULL WIDTH OF THE ROAD TO THE FURTHEST EDGE OF THAT PREVIOUS REPAIR. THE PERMIT FEE WILL BE BASED UPON THE TYPE OF PAVEMENT (ARTERIAL, COLLECTOR, RESIDENTIAL, SIDEWALK, ETC) AND THE TOTAL AREA OF THE OPENING IN THE STREET. THE DIRECTOR, MAY REQUIRE EXCAVATIONS THAT ARE PERFORMED DURING THE FIVE (5) YEAR MORATORIUM BE TREATED WITH THE INFRARED PROCESS OR OTHER APPROVED METHOD.

5. IN ALL CASES INVOLVING A MORATORIUM ISSUE THE DIRECTOR OR HIS REPRESENTATIVE SHALL APPROVE THE REPAIR PROCEDURE, TYPE OF HMA, AND REQUIRED PAVING EQUIPMENT.

6. TO PREVENT UNNECESSARY EXCAVATION AFTER RECONSTRUCTION OR REPAVING, THE CITY WILL ISSUE A MINIMUM 60-CALENDAR DAY NOTICE TO THE POTENTIALLY CONCERNED UTILITIES, AND ADJACENT PROPERTY OWNERS PRIOR TO THE ROADWAY BEING REPAVED.



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JEFFREY D. AMOS
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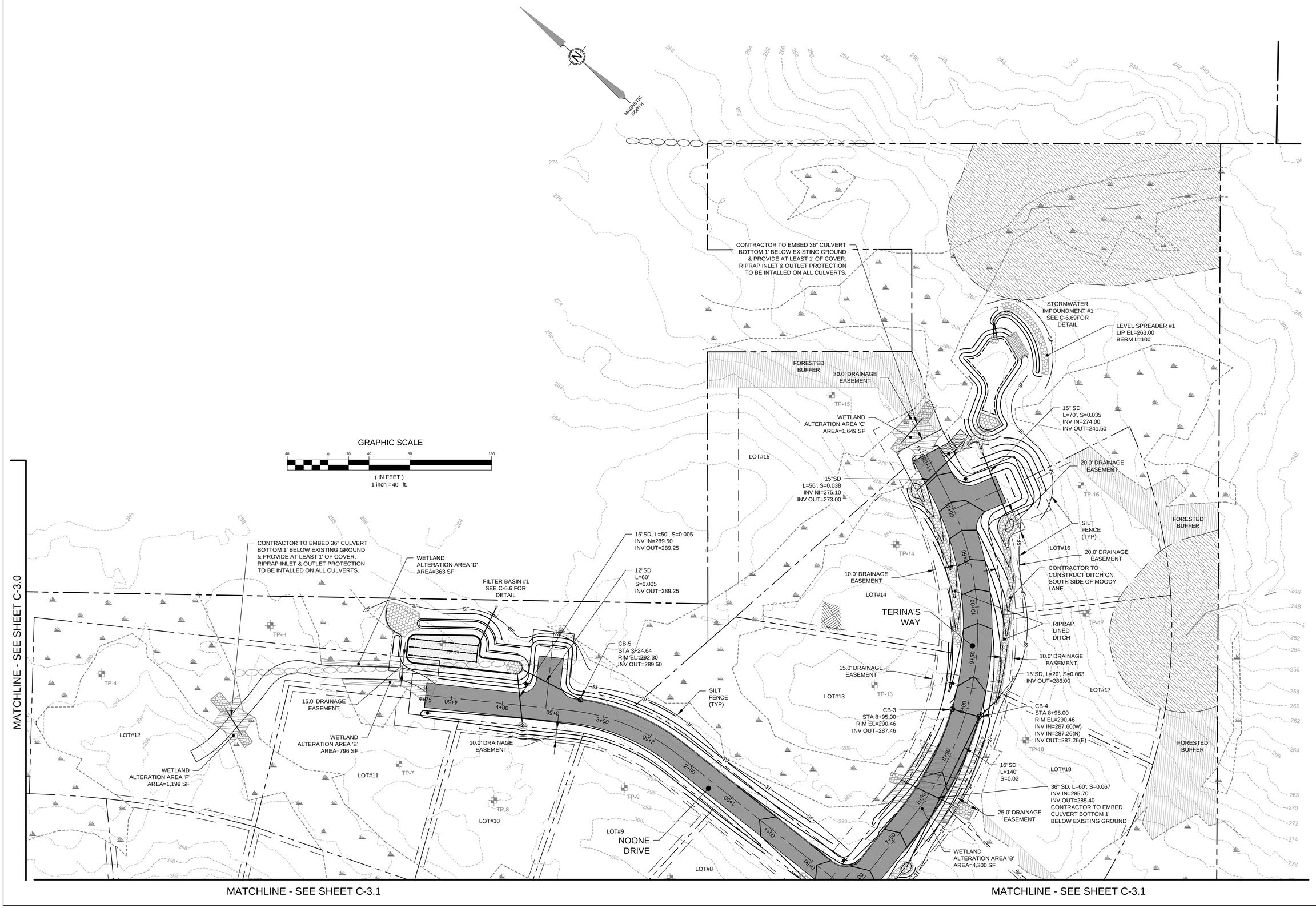

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7. CONTRACTOR SHALL INCORPORATE PROVISIONS AS NECESSARY IN CONSTRUCTION TO PROTECT EXISTING STRUCTURES, PHYSICAL FEATURES, AND MAINTAIN SITE STABILITY DURING CONSTRUCTION. CONTRACTOR SHALL RESTORE ALL AREAS TO ORIGINAL CONDITION AND AS DIRECTED BY DESIGN DRAWINGS.

8. SITE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.

9. THE CONTRACTOR IS HEREBY CAUTIONED THAT ALL SITE FEATURES SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS BY THE SURVEYOR AND BY INFORMATION PROVIDED BY UTILITY COMPANIES. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT DIG SAFE (1-888-DIGSAFE) AT LEAST THREE (3) BUT NOT MORE THAN THIRTY (30) DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION TO VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES.

10. CONTRACTOR SHALL BE AWARE THAT DIG SAFE ONLY NOTIFIES ITS "MEMBER" UTILITIES ABOUT THE DIG. WHEN NOTIFIED, DIG SAFE WILL ADVISE CONTRACTOR OF MEMBER UTILITIES IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND CONTACTING NON-MEMBER UTILITIES DIRECTLY. NON-MEMBER UTILITIES MAY INCLUDE TOWN OR CITY WATER AND SEWER DISTRICTS AND SMALL LOCAL UTILITIES, AS WELL AS USG PUBLIC WORKS SYSTEMS.

11. CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE REQUIREMENTS OF 23 MRSA 3360-A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE APPROPRIATE UTILITIES TO OBTAIN AUTHORIZATION PRIOR TO RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS. IF A UTILITY CONFLICT ARISES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, THE MUNICIPALITY AND APPROPRIATE UTILITY COMPANY PRIOR TO PROCEEDING WITH ANY RELOCATION.

12. ALL PAVEMENT JOINTS SHALL BE SAWCUT PRIOR TO PAVING TO PROVIDE A DURABLE AND UNIFORM JOINT.

13. NO HOLES, TRENCHES OR STRUCTURES SHALL BE LEFT OPEN OVERNIGHT IN ANY EXCAVATION ACCESSIBLE TO THE PUBLIC OR IN PUBLIC RIGHTS-OF-WAY.

14. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL REQUIRE A M.D.O.T. PERMIT AS WELL AS PERMITS FROM THE TOWN AS APPLICABLE.

WATERLINE INSTALLATION NOTES

1. ALL WATER MAIN MATERIALS SHALL CONFORM TO ALL SPECIFICATIONS OF THE LEWISTON WATER DISTRICT.

2. ALL DUCTILE IRON PIPE AND SERVICES SHALL BE WRAPPED IN POLYETHYLENE ENCASEMENT ONLY IF CORROSIVE SOILS ARE KNOWN TO BE PRESENT, PER AWWA STANDARDS AND DIPRA'S POLYETHYLENE ENCASEMENT INSTALLATION RECOMMENDATIONS.

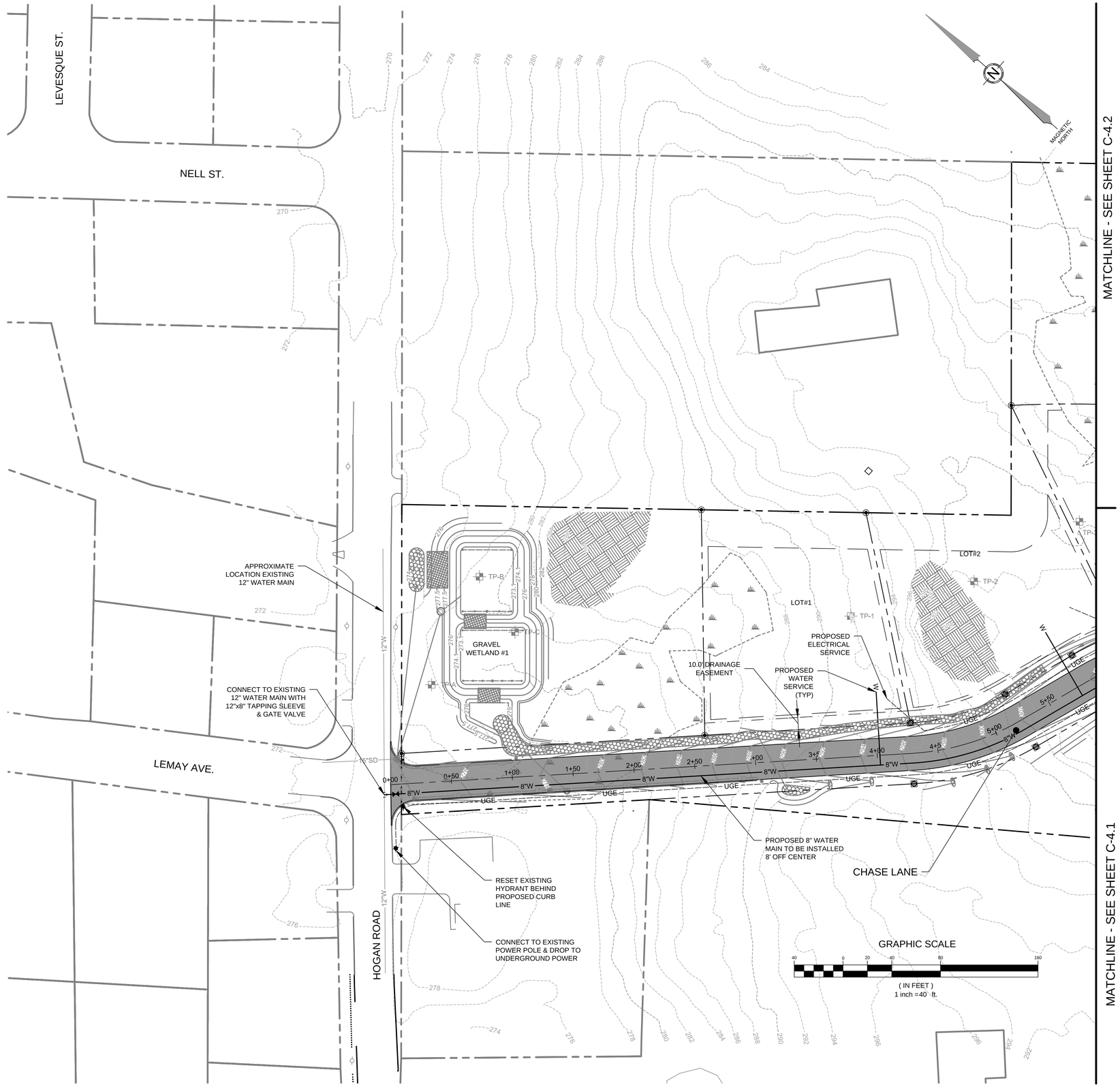
3. CURB STOPS TO BE INSTALLED ON WATER SERVICE AT THE PROPERTY LINE.

4. WATER PIPE SHALL BE LAID WITH A COVER OF SIX (6.0') FEET FROM ESTABLISHED FINISHED GRADE TO THE TOP OF THE PIPE.

5. THE CITY OF LEWISTON WILL COMPLETE THE TAP ON THE EXISTING WATER MAIN IN HOGAN ROAD. THE CONTRACTOR WILL BE RESPONSIBLE FOR EXCAVATING THE TRENCH, SHORING THE EXCAVATION, AND INSTALLING THE SLEEVE ON THE MAIN.

6. ALL WATER MATERIALS THAT WILL BE INSTALLED IN THE EXISTING RIGHT OF WAY AND FUTURE RIGHT OF WAY SHALL BE PURCHASED THROUGH THE CITY.

7. IN LOCATIONS WHERE STORM DRAINS CROSS THE WATER MAIN OR WATER SERVICES, 2" OF RIGID INSULATION SHOULD BE PLACED IN BETWEEN.



TERRADYN CONSULTANTS, LLC
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Fax: (207) 221-1317
www.terradynconsultants.com
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

STATE OF MAINE JEFFREY D. JAMES No. 11167 LICENSED PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
1	3/27/2018	REVISED PER CITY REVIEW	

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
UTILITY PLAN

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 U.DWG	
SHEET	C-4.0

MATCHLINE - SEE SHEET C-4.2

MATCHLINE - SEE SHEET C-4.2

MATCHLINE - SEE SHEET C-4.0

LOT#3
LOT#4
LOT#5
LOT#6
LOT#7
LOT#8
LOT#19
LOT#20
LOT#21
LOT#22
LOT#23
LOT#24
LOT#25
LOT#26
LOT#27
LOT#28
LOT#29
LOT#30
LOT#31

TP-5
TP-6
TP-10
TP-11
TP-12
TP-19
TP-20
TP-21
TP-22
TP-23
TP-24
TP-25
TP-26
TP-28
TP-29
TP-30
TP-31
TP-F
TP-D

10.0' ELECTRICAL EASEMENT
WATER SERVICE (TYP)
STREET LIGHT
8" WATER MAIN APPROX. L=1,314'
CHASE LANE
PROPOSED TRANFORMER
8" GATE VALVE
8" WATER MAIN APPROX. L=780'
RIPRAP LINED DITCH
HYDRANT ASSEMBLY
FORESTED BUFFER
8" CROSS
8" WATER MAIN APPROX. L=320'
TERINA'S WAY
PROPOSED ELECTRICAL SERVICE
GRAVEL WETLAND #2
HALLEE'S WAY
8" WATER MAIN APPROX. L=366'
8"x8" TEE
90° BEND
MAGNETIC NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

STATE OF MAINE
JEFFREY D. MAGEE
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
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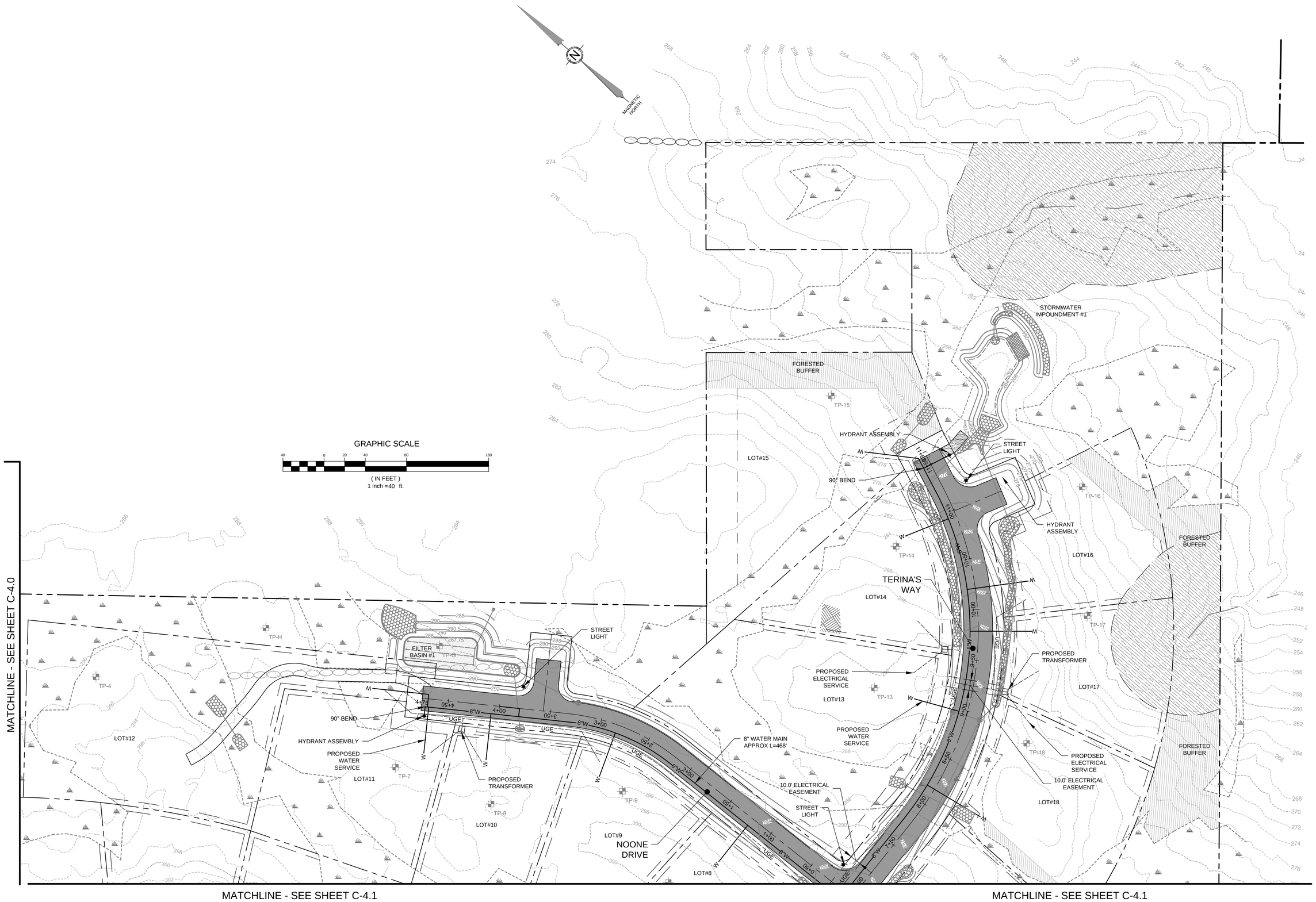
HOGAN ROAD, LEWISTON, ME
UTILITY PLAN

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 U.DWG	
SHEET	C-4.1



STATE OF MAINE
JEFFREY D. JAMES
No. 10167
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SIGNATURE DATE: 3/27/2018

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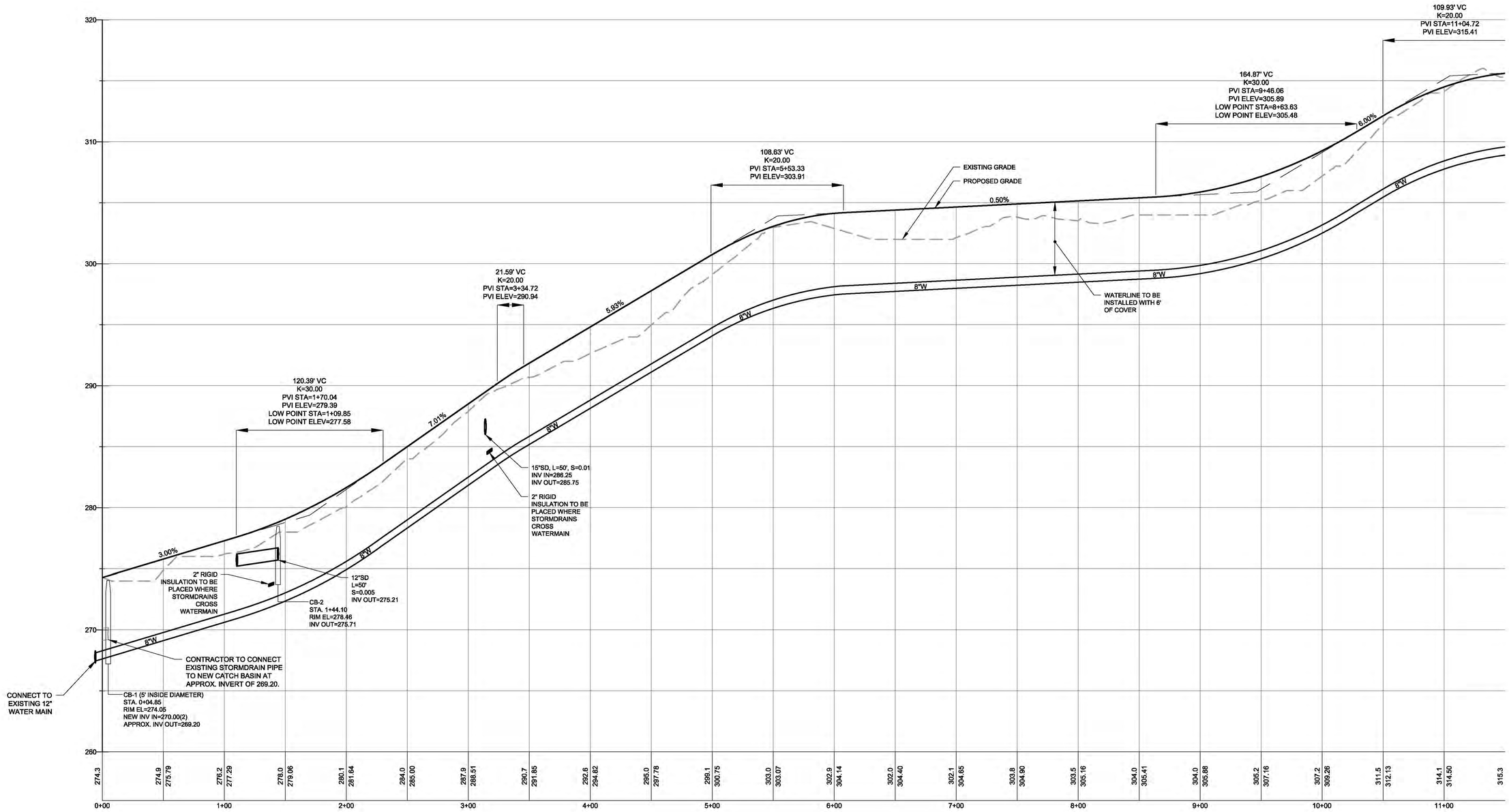
HOGAN ROAD, LEWISTON, ME
UTILITY PLAN

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	12/22/2017
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 U.DWG	
SHEET	C-4.2



PROFILE OF CHASE LANE STATION: 0+00 - 11+50

SCALE: 1"=40' HORIZONTAL
1"=4' VERTICAL

STATE OF MAINE
JEFFREY D. ADAMS
10416
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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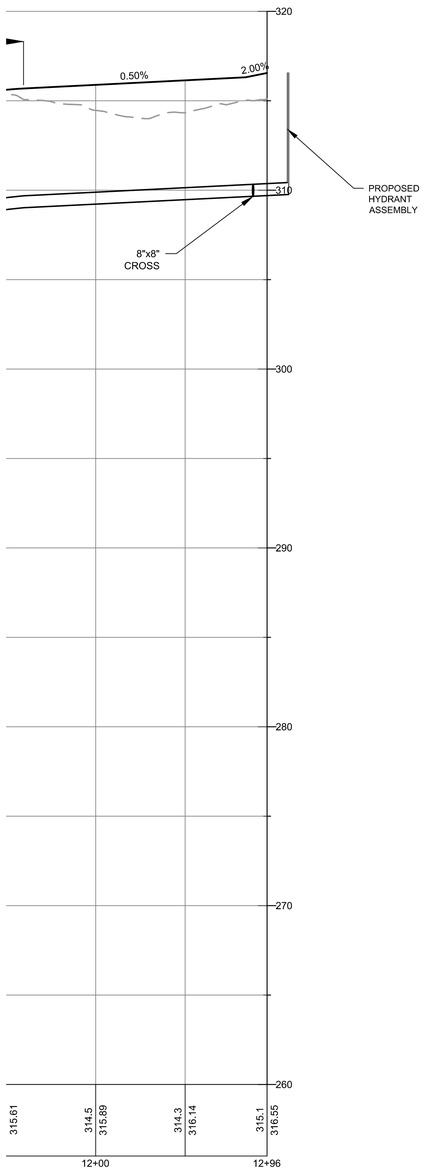
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
PROFILES

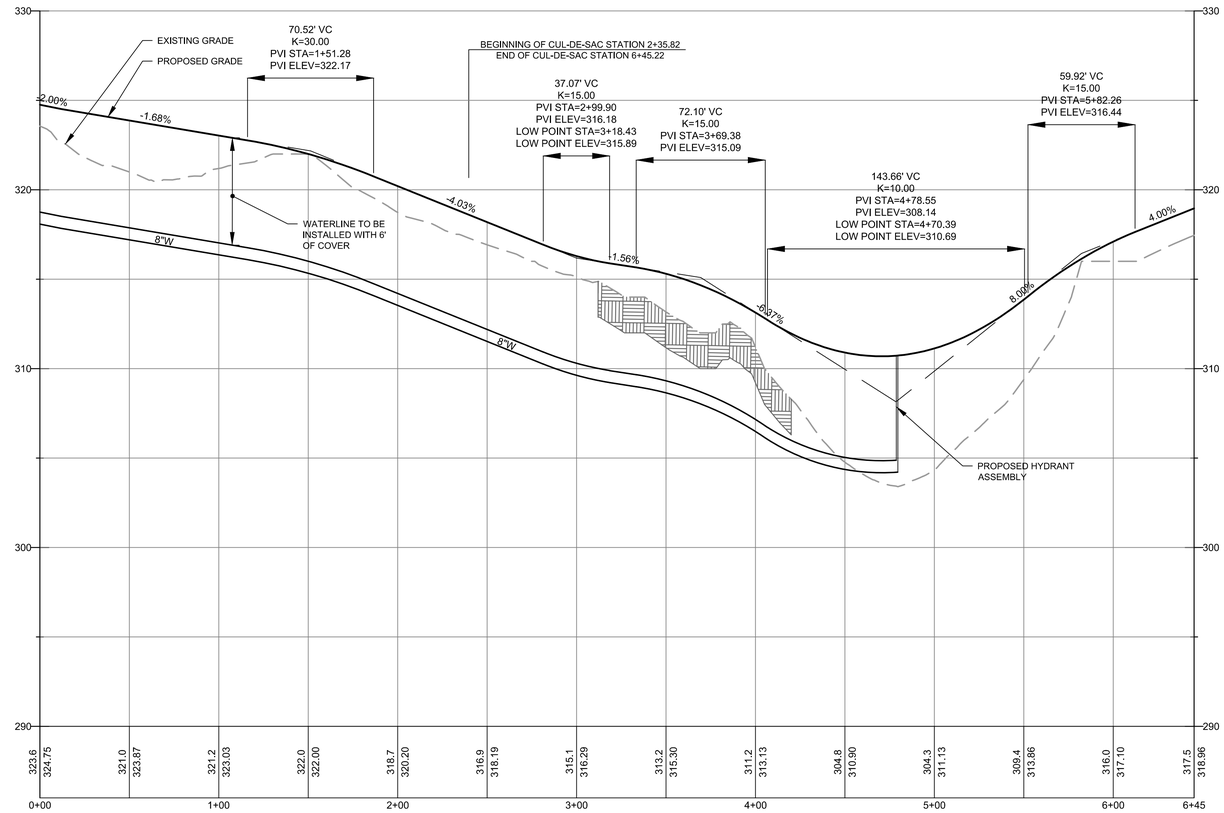
PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660S.DWG	
SHEET	C-5.0



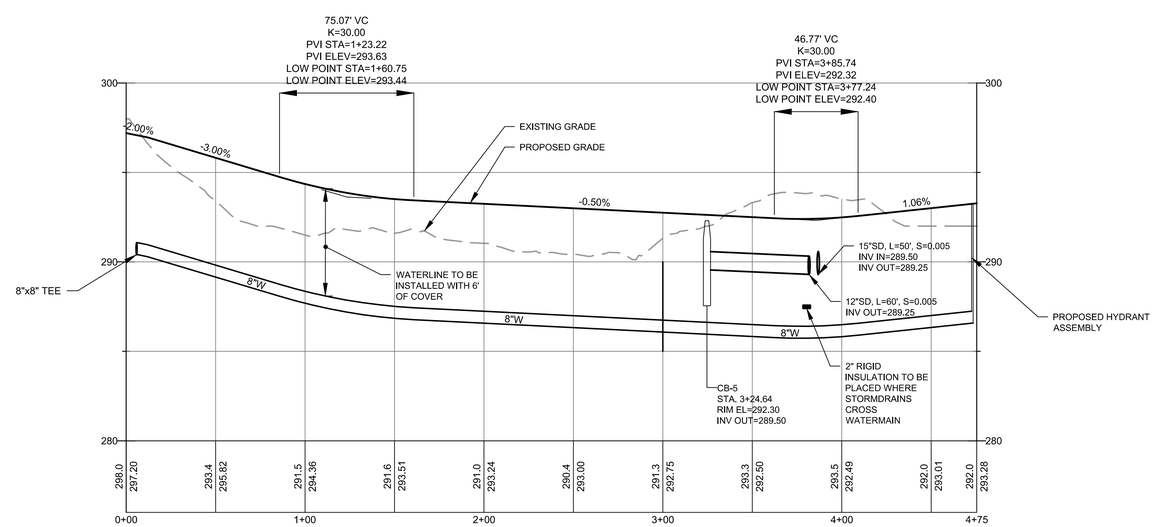
PROFILE OF CHASE LANE STATION: 11+50 - END

SCALE: 1"=40' HORIZONTAL
1"=4' VERTICAL



PROFILE OF HALLEE'S WAY

SCALE: 1"=40' HORIZONTAL
1"=4' VERTICAL



PROFILE OF NOONE DRIVE

SCALE: 1"=40' HORIZONTAL
1"=4' VERTICAL

STATE OF MAINE
JEFFREY D. JAMES
No. 11567
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PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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DATE:	1/19/2018
SCALE:	1" = 40'
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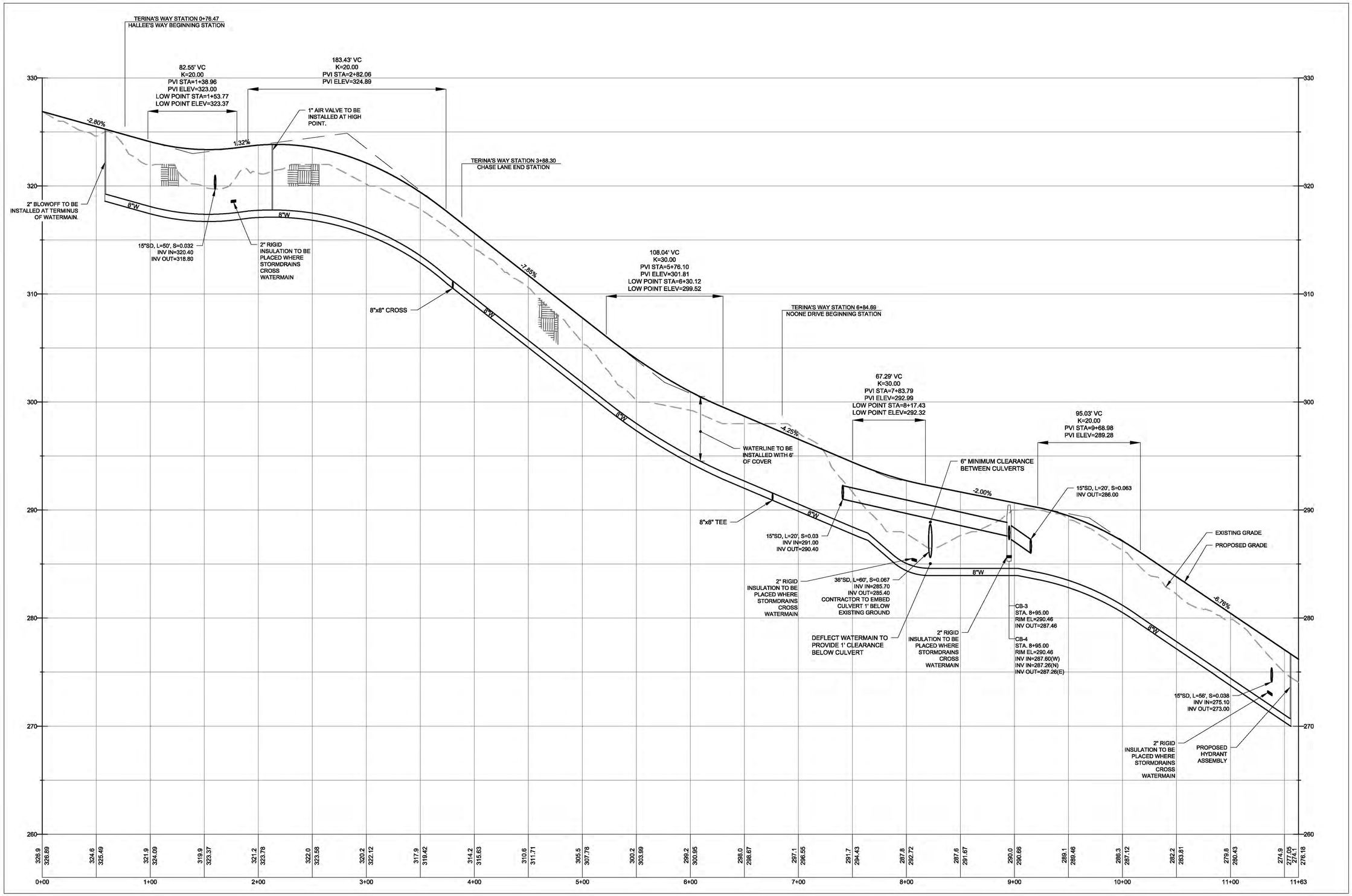
JOB NO:	1660
FILE: 1660S.DWG	
SHEET	C-5.1



PROFILE OF TERINA'S WAY

SCALE: 1"=40' HORIZONTAL
1"=4' VERTICAL

STATE OF MAINE
JEFFREY D. MAGEE
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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Permitting

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HOGAN ROAD, LEWISTON, ME
PROFILES

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660S.DWG	
SHEET	C-5.2

EROSION AND SEDIMENT CONTROL PLAN

Pre-Construction Phase

A person who conducts, or causes to be conducted, an activity that involves filling, displacing or exposing soil or other earthen materials shall take measures to prevent unreasonable erosion of soil or sediment beyond the project site or into a protected natural resource as defined in 38 mrsa § 480-b. Erosion control measures must be in place before the activity begins. Measures must remain in place and functional until the site is permanently stabilized. Adequate and timely temporary and permanent stabilization measures must be taken. The site must be maintained to prevent unreasonable erosion and sedimentation. Minimize disturbed areas and protect natural downgradient buffer areas to the extent practicable.

BMP Construction Phase

A. Sediment barriers. Prior to the beginning of any construction, properly install sediment barriers at the edge of any downgradient disturbed area and adjacent to any drainage channels within the proposed disturbed area. Maintain the sediment barriers until the disturbed area is permanently stabilized.

B. Construction entrance: Prior to any clearing or grubbing, a construction entrance shall be constructed at the intersection with the proposed access drive and the existing roadway to avoid tracking of mud, dust and debris from the site.

C. Riprap: Since riprap is used where erosion potential is high, construction must be sequenced so that the riprap is put in place with the minimum delay. Disturbance of areas where riprap is to be placed should be undertaken only when final preparation and placement of the riprap can follow immediately behind the initial disturbance. Where riprap is used for outlet protection, the riprap should be placed before or in conjunction with the construction of the pipe or channel so that it is in place when the pipe or channel begins to operate. Maintain temporary riprap, such as temporary check dams until the disturbed area is permanently stabilized.

D. Temporary stabilization. Stabilize with temporary seeding, mulch, or other non-erodable cover any exposed soils that will remain unworked for more than 14 days except, stabilize areas within 100 feet of a wetland or waterbody within 7 days or prior to a predicted storm event, whichever comes first. If hay or straw mulch is used, the application rate must be 2 bales (70-90 pounds) per 1000 sf or 1.5 to 2 tons (90-100 bales) per acre to cover 75 to 90% of the ground surface. Hay mulch must be kept moist or anchored to prevent wind blowing. An erosion control blanket or mat shall be used at the base of grassed waterways, steep slopes (15% or greater) and on any disturbed soil within 100 feet of lakes, streams and wetlands. Grading shall be planned so as to minimize the length of time between initial soil exposure and final grading. On large projects this should be accomplished by phasing the operation and completing the first phase up to final grading and seeding before starting the second phase, and so on.

E. Vegetated waterway. Upon final grading, the disturbed areas shall be immediately seeded to permanent vegetation and mulched and will not be used as outlets until a dense, vigorous vegetative cover has been obtained. Once soil is exposed for waterway construction, it should be immediately shaped, graded and stabilized. Vegetated waterways need to be stabilized early during the growing season (prior to september 15). If final seeding of waterways is delayed past september 15, emergency provisions such as sod or riprap may be required to stabilize the channel. Waterways should be fully stabilized prior to directing runoff to them.

Permanent stabilization defined

A. Seeded areas. For seeded areas, permanent stabilization means an 90% cover of the disturbed area with mature, healthy plants with no evidence of washing or rilling of the topsoil.

B. Sodded areas. For sodded areas, permanent stabilization means the complete binding of the sod roots into the underlying soil with no slumping of the sod or die-off.

C. Permanent mulch. For mulched areas, permanent mulching means total coverage of the exposed area with an approved mulch material. Erosion control mix may be used as mulch for permanent stabilization according to the approved application rates and limitations.

D. Riprap. For areas stabilized with riprap, permanent stabilization means that slopes stabilized with riprap have an appropriate backing of a well-graded gravel or approved geotextile to prevent soil movement from behind the riprap. Stone must be sized appropriately. It is recommended that angular stone be used.

E. Agricultural use. For construction projects on land used for agricultural purposes (e.G., pipelines across crop land), permanent stabilization may be accomplished by returning the disturbed land to agricultural use.

F. Paved areas. For paved areas, permanent stabilization means the placement of the compacted gravel subbase is completed.

G. Ditches, channels, and swales. For open channels, permanent stabilization means the channel is stabilized with mature vegetation at least three inches in height, with well-graded riprap, or with another non-erosive lining capable of withstanding the anticipated flow velocities and flow depths without reliance on check dams to slow flow. There must be no evidence of slumping of the lining, undercutting of the banks, or down-cutting of the channel.

General Construction Phase

The following erosion control measures shall be followed by the contractor throughout construction of this project:

A. All topsoil shall be collected, stockpiled, seeded with rye at 3 pounds/1,000 sf and mulched, and reused as required. Silt fencing shall be placed down gradient from the stockpiled loam. Stockpile to be located by designation of the owner and inspecting engineer.

B. The inspecting engineer at his/her discretion, may require additional erosion control measures and/or supplemental vegetative provisions to maintain stability of earthworks and finish graded areas. The contractor shall be responsible for providing and installing any supplemental measures as directed by the inspecting engineer. Failure to comply with the engineer's directions will result in discontinuation of construction activities.

C. Erosion control mesh shall be applied in accordance with the plans over all finish seeded areas as specified on the design plans.

D. All graded or disturbed areas including slopes shall be protected during clearing and construction in accordance with the approved erosion and sediment control plan until they are adequately stabilized.

E. All erosion, and sediment control practices and measures shall be constructed, applied and maintained in accordance with the approved erosion and sediment control plan.

F. Areas to be filled shall be cleared, grubbed and stripped of topsoil to remove trees, vegetation, roots or other objectionable materials.

G. Areas shall be scarified to a minimum depth of 3 inches prior to placement of topsoil.

H. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence or other related problems. Fill intended to support buildings, structures and conduits, etc., shall be compacted in accordance with local requirements or codes.

I. All fills shall be placed and compacted in layers not to exceed 8 inches in thickness.

J. Except for approved landfills or non-structural fills, fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris and other objectionable materials that would interfere with or prevent construction of satisfactory lifts.

K. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

L. Fill shall not be placed on a frozen foundation.

M. Seeps or springs encountered during construction shall be handled appropriately.

N. All graded areas shall be permanently stabilized immediately following finished grading.

O. Remove any temporary control measures, such as silt fence, within 30 days after permanent stabilization is attained. Remove any accumulated sediments and stabilize.

Permanent vegetation

Permanent vegetative cover should be established on disturbed areas where permanent, long lived vegetative cover is needed to stabilize the soil, to reduce damages from sediment and runoff, and to enhance the environment.

Seedbed preparation

A. Grade as feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring, and maintenance.

B. Apply limestone and fertilizer according to soil tests such as those offered by the university of maine soil testing laboratory. Soil sample mailers are available from the local cooperative extension service office. If soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 800 pounds per acre or 18.4 pounds per 1,000 square feet using 10-20-20 (n-p2o5-k2o) or equivalent. Apply ground limestone (equivalent to 50% calcium plus magnesium oxide) at
a rate of 3 tons per acre (138 lb. Per 1,000 sq. Ft).

C. Work lime and fertilizer into the soil as nearly as practical to a depth of 4 inches with a disc, spring tooth harrow or other suitable equipment. The final harrowing operation should be on the general contour. Continue tillage until a reasonably uniform, fine seedbed is prepared. All but clay or silty soils and coarse sands should be rolled to firm the seedbed wherever feasible.D. Remove from the surface all stones 2 inches or larger in any dimension. Remove all other debris, such as wire, cable, tree roots, concrete, clods, lumps or other unsuitable material.

E. Inspect seedbed just before seeding. If traffic has left the soil compacted; the area must be tilled and firmed as above.

F. Permanent seeding should be made 45 days prior to the first killing frost or as a dormant seeding with mulch after the first killing frost and before snowfall. When crown vetch is seeded in later summer, at least 35% of the seed should be hard seed (unscarified). If seeding cannot be done within the seeding dates, mulch according to the temporary mulching bmp and overwinter stabilization and construction to protect the site and delay seeding until the next recommended seeding period.

G. Following seed bed prepartation, swale areas, fill areas and back slopes shall be seeded at a rate of 3 lbs./1,000 s.F. With a mixture of 35% creeping red h. Fescue, 6% red top, 24% kentucky bluegrass, 10% perennial ryegrass, 20% annual ryegrass and 5% white dutch clover.

I. Areas which have been temporarily or permanently seeded shall be mulched immediately following seeding.

J. Areas which cannot be seeded within the growing season shall be mulched for over-winter protection and the area should be seeded at the beginning of the growing season.

Winter construction phase

If an area is not stabilized with temporary or permanent measures by november 15, then the site must be protected with additional stabilization measures.

A. Permanent stabilization consists of at least 90% vegetation, pavement/gravel base or riprap.

B. Do not expose slopes or leave slopes exposed over the winter or for any other extended time of work suspension unless fully protected with mulch.

C. Apply hay mulch at twice the standard rate (150 lbs. Per 1,000 sf). The mulch must be thick enough such that the ground surface will not be visible and must be anchored.

D. Use mulch and mulch netting or an erosion control mulch blanket or all slopes greater than 8 % or other areas exposed to direct wind.

E. Install an erosion control blanket in all drainageways (bottom and sides) with a slope greater than 3 %.

F. See the vegetation measures for more information on seeding dates and types.

G. Winter excavation and earthwork shall be completed so that no more than 1 acre of the site is without stabilization at any one time.

H. An area within 100 feet of a protected natural resource must be protected with a double row of sediment barrier.

I. Temporary mulch must be applied within 7 days of soil exposure or prior to any storm event, but after every workday in areas within 100 feet from a protected natural resource.

J. Areas that have been brought to final grade must be permanently mulched that same day.

K. If snowfall is greater than 1 inch (fresh or cumulative), the snow shall be removed from the areas due to be seeded and mulched.

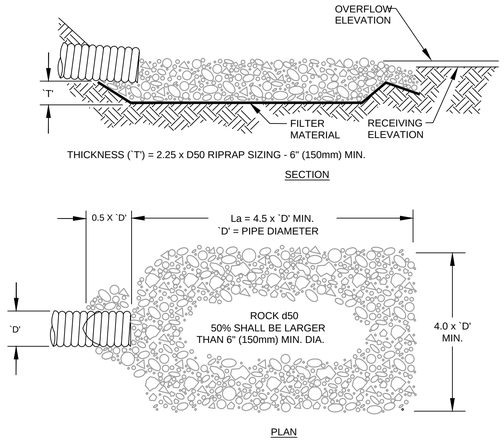
L. Loam shall be free of frozen clumps before it is applied.

M. All vegetated ditch lines that have not been stabilized by november 1, or will be worked during the winter construction period, must be stabilized with an appropriate stone lining backed by an appropriate gravel bed or geotextile unless specifically released from this standard by the department.

Maintenance and inspection phase

A. Contractor shall inspect disturbed and impervious areas, and erosion and stormwater control measures, areas used for storage that are exposed to precipitation, and locations where vehicles enter or exit the parcel at least once a week and before and after a storm event, prior to completion of permanent stabilization. A person with knowledge of erosion and stormwater must conduct the inspection. This person must be identified in the inspection log. If best management practices (bmps) need to be modified or if additional bmps are necessary, implementation must be completed within 7 calendar days and prior to any storm event (rainfall). All measures must be maintained in effective operating condition until areas are permanently stabilized.

B. A log (report) must be kept summarizing the scope of the inspection, name(s) and qualifications of the personnel making the inspection, the date(s) of the inspection, and major observations relating to operation of erosion and sedimentation controls and pollution prevention measures. Major observations must include: bmps that need to be maintained; location(s) of bmps that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional bmps are needed that did not exist at the time of inspection. Follow-up to correct deficiencies or enhance controls must also be indicated in the log and dated, including what action was taken and when.



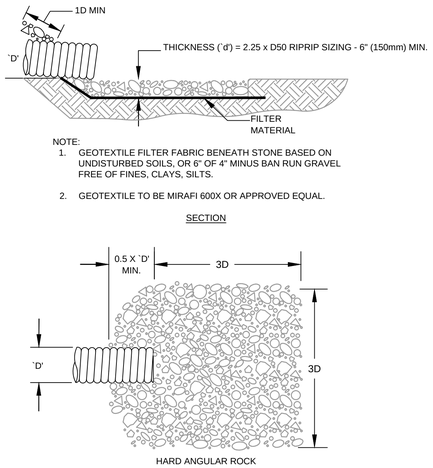
PIPE OUTLET PROTECTION SIZING TABLE

PIPE SIZE (IN)	RIP RAP SIZING (D50)	LENGTH (FT)	WIDTH (FT)
6	3	2.5	2.0
12	5	5.0	4.0
15	6	6.25	5.0
18	8	7.5	6.0
24	10	10.0	8.0
30	12	13.0	10.0
36	14	15.0	12.0

NOTES:
1. `La' = LENGTH OF APRON. DISTANCE `La' SHALL BE OF SUFFICIENT LENGTH TO DISSIPATE ENERGY.
2. APRON SHALL BE SET AT A ZERO GRADE AND ALIGNED STRAIGHT.
3. FILTER MATERIAL SHALL BE FILTER FABRIC (MIRAFI 600X OR APPROVED EQUAL) OR 6" (150mm) THICK MINIMUM GRADED GRAVEL LAYER.

PIPE OUTLET PROTECTION

NOT TO SCALE



NOTE:
1. GEOTEXTILE FILTER FABRIC BENEATH STONE BASED ON UNDISTURBED SOILS, OR 6" OF 4" MINUS BAN RUN GRAVEL FREE OF FINES, CLAYS, SILTS.
2. GEOTEXTILE TO BE MIRAFI 600X OR APPROVED EQUAL.

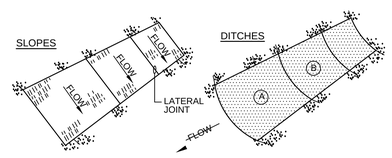
PIPE INLET PROTECTION SIZING TABLE

PIPE SIZE (IN)	RIRAP SIZING (D50)	LENGTH (FT)	WIDTH (FT)
6	3	2.0	1.5
12	5	3.5	3.0
15	6	4.5	3.75
18	8	5.25	4.5
24	10	7.0	6.0
30	12	8.75	7.5
36	14	10.5	9.0

NOTES:
1. IN DEFINED CHANNELS, APRON SHALL EXTEND FULL WIDTH OF BOTTOM AND ONE FOOT ABOVE MAX. HEADWATER OR UP TO BANK FULL, WHICHEVER IS LESS.

PIPE INLET PROTECTION

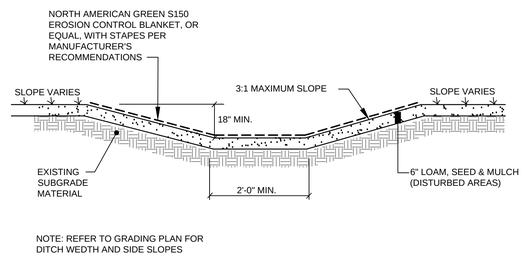
NOT TO SCALE



NOTES:
1. BURY THE TOP END OF THE MESH MATERIAL IN A 6" TRENCH AND BACKFILL AND TAMP TRENCHING SECURE END WITH STAPLES AT 6" SPACING, 4" DOWN FROM EXPOSED END.
2. FLOW DIRECTION JOINTS TO HAVE UPPER END OF LOWER STRIP BURIED WITH UPPER LAYERS OVERLAPPED 4" AND STAPLED. OVERLAP B OVER A.
3. LATERAL JOINTS TO HAVE 4" OVERLAP OF STRIPS. STAPLE 18" ON CENTER.
4. STAPLE OUTSIDE LATERAL EDGE 2' ON CENTER.
5. WIRE STAPLES TO BE MIN. OF #11 WIRE, 6" LONG & 1-1/2" WIDE.
6. USE NORTH AMERICAN GREEN DS 150 (OR APPROVED EQUAL) ON SLOPES BETWEEN 4:1-2:1. USE NORTH AMERICAN GREEN VMAX SC250 PERMANENT TURF REINFORCEMENT MAT (OR APPROVED EQUAL) ON SLOPES 2:1 AND STEEPER..

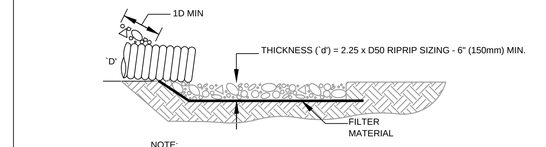
EROSION CONTROL BLANKET

NOT TO SCALE

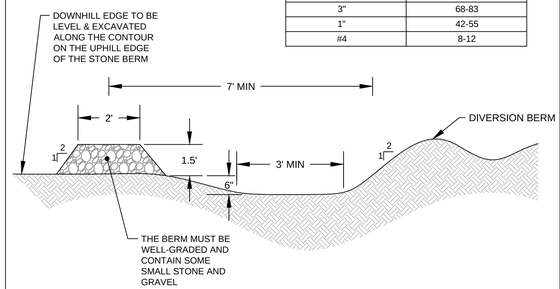


GRASSED SWALE

NOT TO SCALE

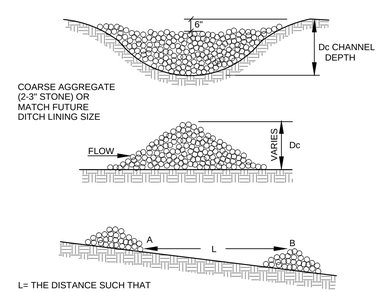


BERM STONE SIZE	
SIEVE DESIGNATION	% BY WEIGHT PASSING SQUARE MESH SIEVES
12"	100
6"	84-100
3"	68-83
1"	42-55
#4	8-12



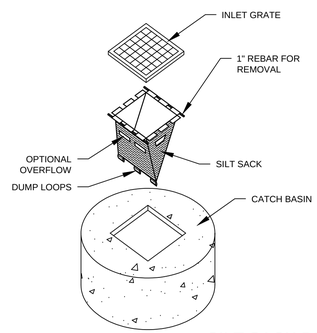
TYPICAL LEVEL LIP SPREADER

NOT TO SCALE



STONE CHECK DAM

NOT TO SCALE



NOTES:
1. SILT SACKS TO BE INSTALLED IN ALL CATCH BASINS RECEIVING RUNOFF FROM DISTURBED AREA
2. SILT SACK TO BE MAINTAINED UNTIL TRIBUTARY ARE IS FULLY STABILIZED

SILT SACK DETAIL

NOT TO SCALE

STATE OF MAINE
JEFFREY D. MABS
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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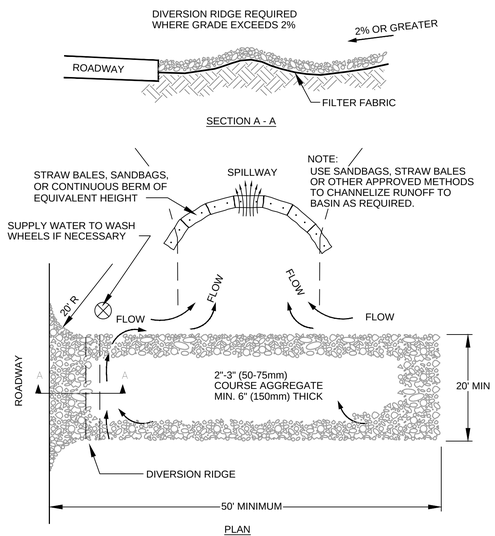
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
DETAILS & NOTES

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 D.DWG	

SHEET C-6.0

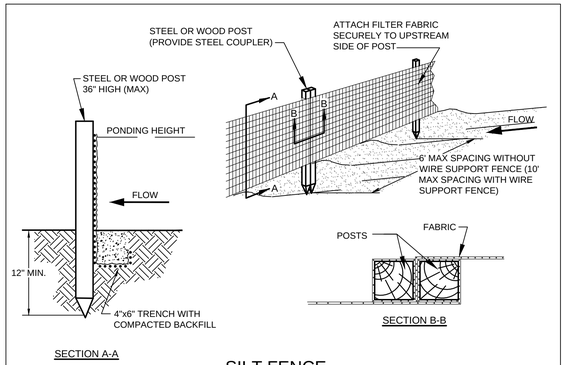


NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.

2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

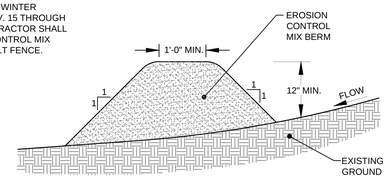
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



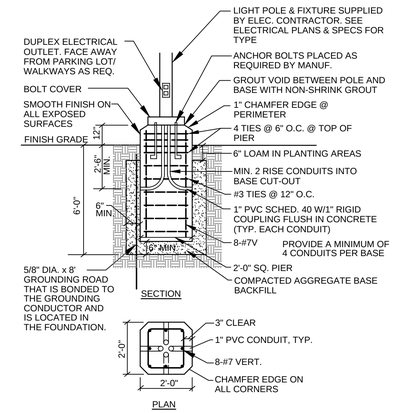
SILT FENCE
NOT TO SCALE

NOTE:
DURING PERIODS OF WINTER CONSTRUCTION (NOV. 15 THROUGH APRIL 15), THE CONTRACTOR SHALL INSTALL EROSION CONTROL MIX BERMS IN LIEU OF SILT FENCE.



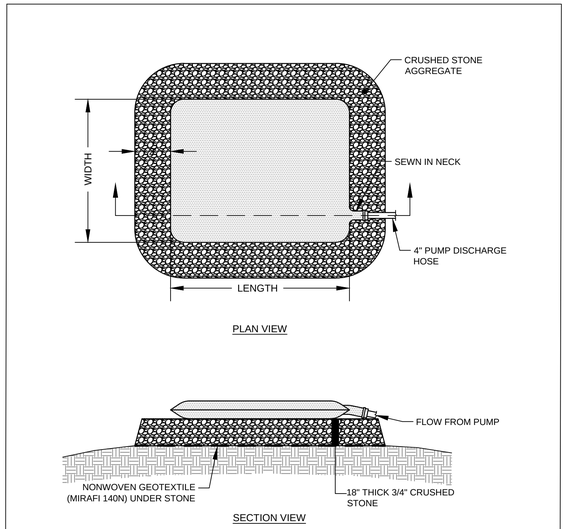
EROSION CONTROL MIX:
EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES & MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:
- THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80% - 100% DRY WEIGHT BASIS
- PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MINIMUM OF 70%, MAXIMUM OF 85% PASSING A 0.75" SCREEN
- THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED
- LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
- SOLUBLE SALTS CONTENT SHALL BE < 4.0 mmhos/cm.
- ph SHALL FALL BETWEEN 5.0 - 8.0.

EROSION CONTROL MIX BERM
NOT TO SCALE



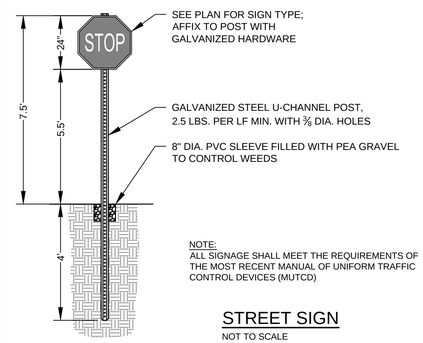
NOTES:
1. CONCRETE f'c=4000 psi.
2. REINF. STEEL GRADE 60 NEW BARS.
3. CONCRETE 3/4" AGG., 6 +/- 1% ENTRAINED AIR.
4. PROVIDE 2 COATS BITUMINOUS DAMPROOFING FOR ALL CONCRETE BELOW GRADE.
5. INSTALL BASE 3'-0" ABOVE FINISH GRADE IN LOCATIONS WHERE POLES ARE IN PARKING LOT PAVEMENT.
6. BID ALT.- CONTRACTOR MAY SUBSTITUTE PRECAST CONCRETE LIGHT POLE BASE EQUAL TO ABOVE SPEC.

LIGHT POLE BASE
NOT TO SCALE



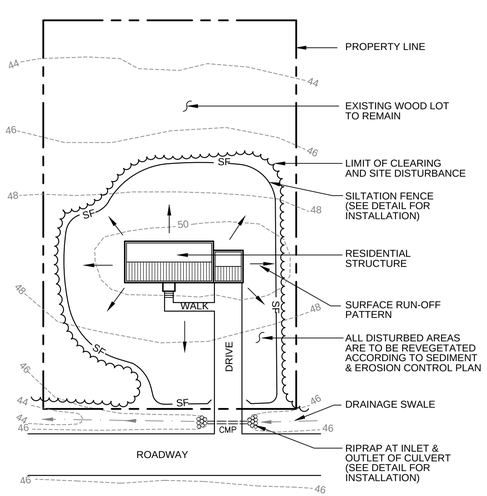
NOTES:
1. DIRTBAG BY ACF ENVIRONMENTAL
2. SEAMS MUST BE HIGH STRENGTH DOUBLE STITCHED "J" SEAMS.
3. CONSTRUCTION DEWATERING OF TURBID WATER SHALL BE PUMPED THROUGH A DIRTBAG AND RELEASED THROUGH A VEGETATED BUFFER AT LEAST 50' UPSTREAM OF WETLAND AREAS.
4. THE LOCATION OF THE DIRTBAG SHALL BE DETERMINED BY THE CONTRACTOR, BUT SHALL IT SHALL NOT BE SITED IN CRITICAL AREAS, SUCH AS WETLANDS.

DIRTBAG DETAIL
NOT TO SCALE



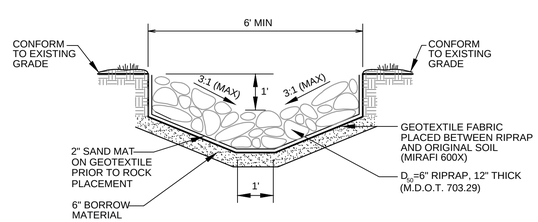
NOTE:
ALL SIGNAGE SHALL MEET THE REQUIREMENTS OF THE MOST RECENT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)

STREET SIGN
NOT TO SCALE

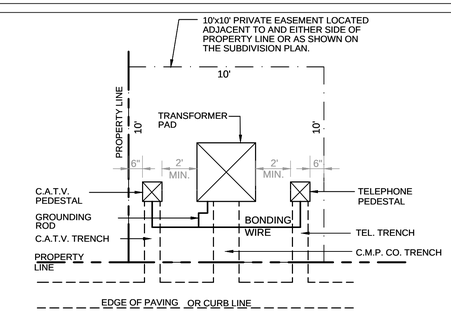


Inspection Notes for Lot Grading and Driveway location
Inspections by a professional engineer shall consist of a visit to the site prior to construction to consult with the earthwork contractor and a post construction meeting to confirm grading on lots and for all driveways to ensure runoff is directed according to plans and to oversee the re-stabilization of the lot into a vegetated cover.

TYPICAL EROSION CONTROL MEASURES FOR DWELLING UNITS
NOT TO SCALE

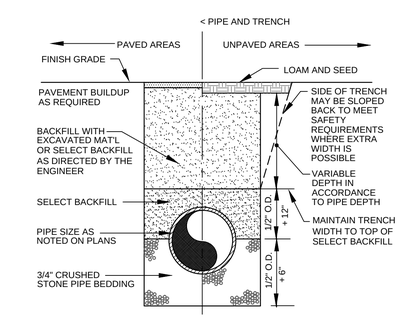


RIPRAP SWALE
NOT TO SCALE

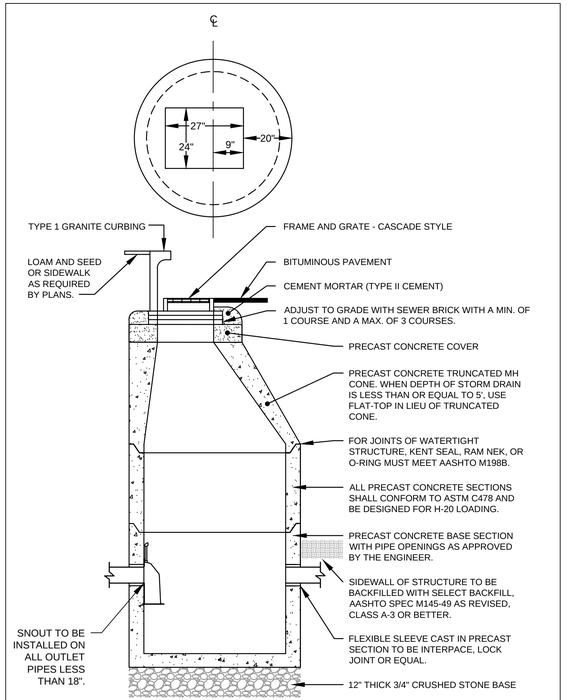


NOTE:
TRANSFORMER PAD AND COVER TO BE FIBERGLASS MEETING CENTRAL MAINE POWER SPECIFICATIONS.

TRANSFORMER DETAIL
NOT TO SCALE



TYPICAL TRENCH SECTION
NOT TO SCALE



CATCH BASIN - CURB INLET
NOT TO SCALE

STATE OF MAINE
JEFFREY D. MOSS
No. 11167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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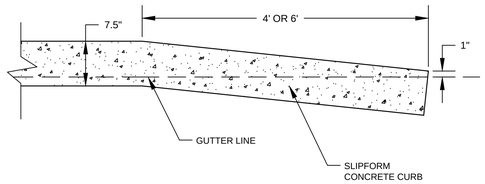
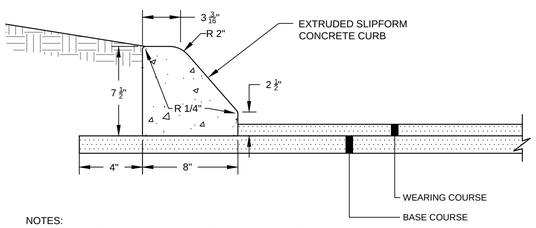
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	12/22/2017
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 D.DWG	
SHEET	C-6.1



SLIPFORM CURB TIPDOWN DETAIL

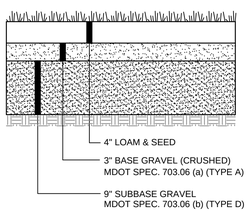
NOT TO SCALE



NOTES:
1. APPLY EPOXY BETWEEN BINDER PAVEMENT AND CURB
2. 1" TO 2" SLUMP
3. 5% TO 7% AIR ENTRAINMENT
4. 4,000 PSI CONCRETE WITH FIBER REINFORCEMENT

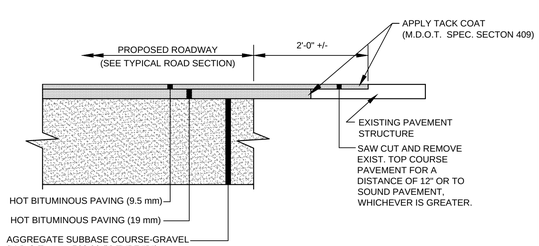
SLOPED SLIPFORM CONCRETE CURB DETAIL

NOT TO SCALE



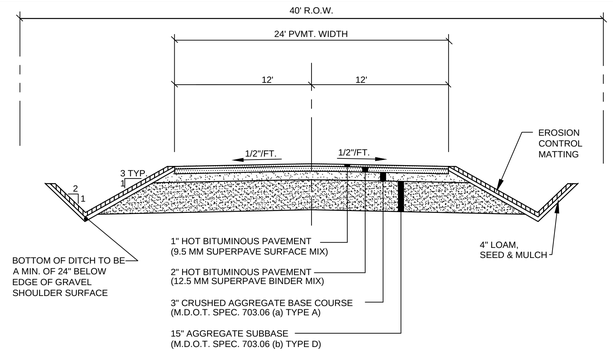
TYPICAL DETENTION BASIN ACCESS CROSS-SECTION

NOT TO SCALE



TYPICAL PAVEMENT JOINT

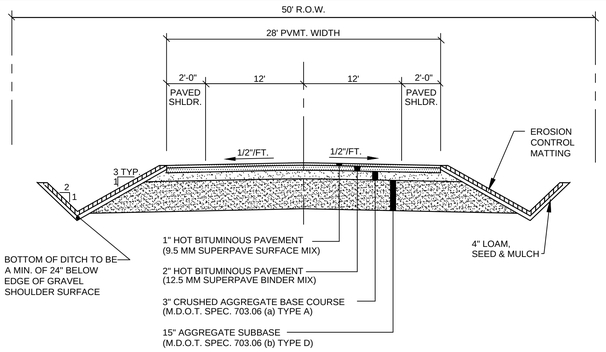
NOT TO SCALE



NOTE: FILL AREAS BENEATH DRIVING SURFACE SHALL BE GRANULAR BORROW. ALL OTHER FILL AREAS SHALL BE A COMMON BORROW MATERIAL SUITABLE FOR EMBANKMENT CONSTRUCTION, FREE FROM FROZEN MATERIAL, PERISHABLE RUBBLE, PEAT, ORGANICS, ROCKS LARGER THAN 12" IN DIAMETER, VEGETATION AND OTHER MATERIAL UNSUITABLE FOR ROADWAY AND SUB-GRADE CONSTRUCTION. EXCAVATED ONSITE MATERIALS MAY BE USED FOR FILL PROVIDED THE MATERIAL IS FREE FROM UNSUITABLE MATERIAL DESCRIBED IN THIS NOTE AND UPON APPROVAL OF THE ENGINEER. GRANULAR BORROW AND COMMON BORROW SHALL ADHERE TO MDOT SPECIFICATIONS 703.19 AND 703.18 RESPECTIVELY.

TYPICAL PUBLIC COURT SECTION

NOT TO SCALE



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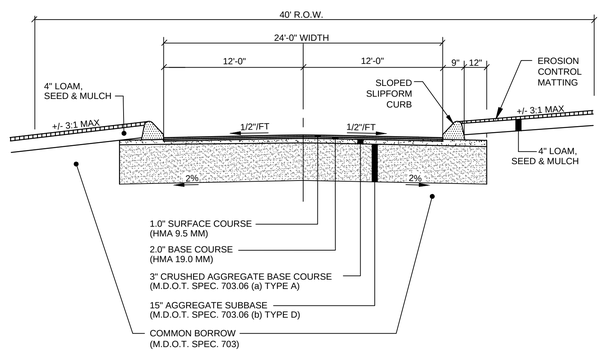
TYPICAL PUBLIC STREET SECTION

NOT TO SCALE



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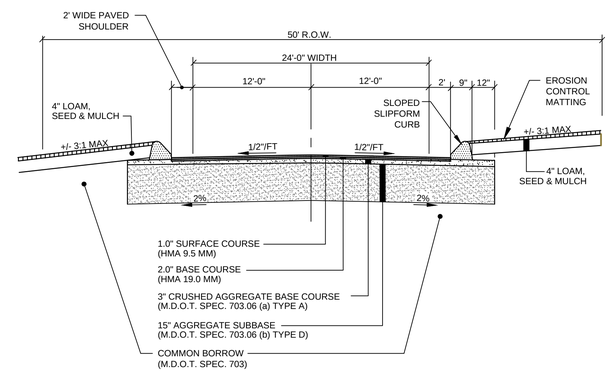
TYPICAL PUBLIC COURT WITH CURB SECTION

NOT TO SCALE



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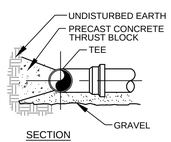
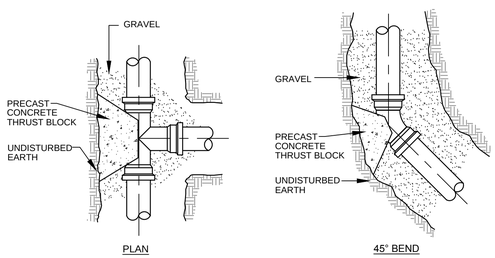
TYPICAL PUBLIC ROAD WITH CURB SECTION

NOT TO SCALE



SECTION

CONCRETE THRUST BLOCK SIZE REQUIREMENTS				
		SQ. FT. OF BEARING ON UNDISTURBED SOIL		
FITTINGS		90° BENDS	45° BENDS	TEES AND PLUGS
PIPE SIZE	6"	4.0	2.0	3.0
	8"	8.0	4.0	6.0
	12"	15	10	10

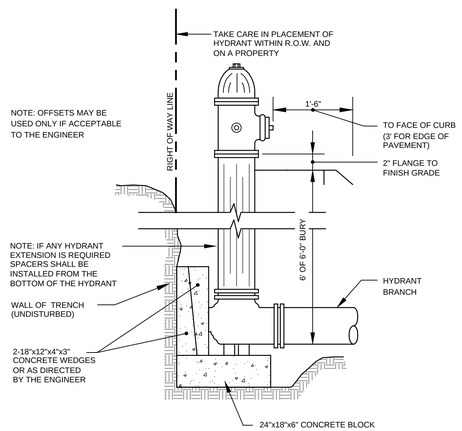


PLAN

45° BEND

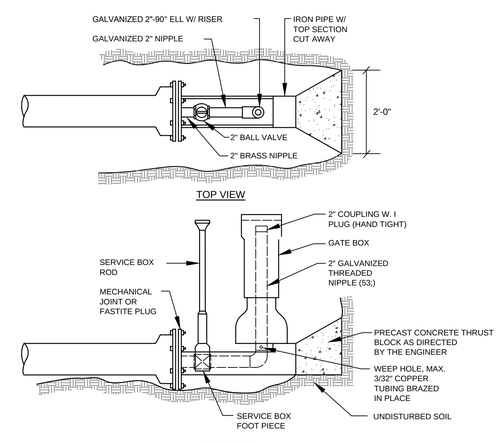
TEE & BEND DETAIL

NOT TO SCALE



TYP. HYDRANT BLOCKING & REPLACEMENT

NOT TO SCALE



STANDARD 2" BLOW-OFF

NOT TO SCALE

STATE OF MAINE
JEFFREY D. MOSS
No. 10167
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DATE:	1/19/2018
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DESIGNED:	JDA
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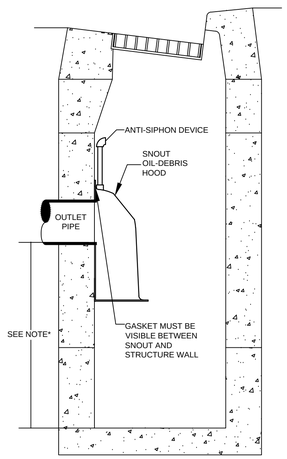
FILE: 1660 D.DWG	

SHEET C-6.2

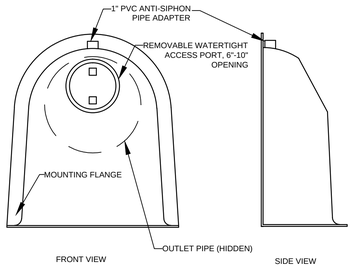
TYPICAL INSTALLATION



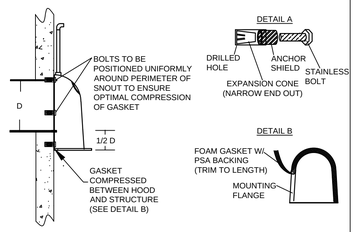
***NOTE-** SUMP DEPTH TO BE MIN. OF 2.5 TIMES THE OUTLET PIPE I.D. (E.G. 24" PIPE= 5' SUMP) 3' MIN FOR PIPES 12" I.D. OR LESS

CONFIGURATION DETAIL

SNOUT OIL-WATER DEBRIS SEPARATOR



INSTALLATION DETAIL



INSTALLATION NOTE:

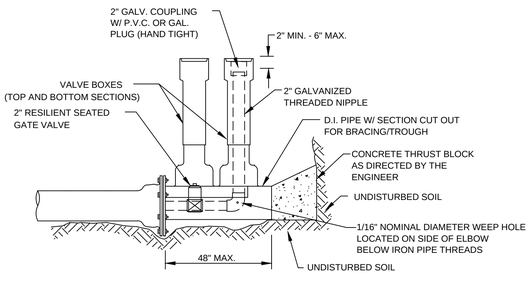
POSITION HOOD SUCH THAT BOTTOM FLANGE IS A DISTANCE OF 1/2 OUTLET PIPE DIAMETER (MIN.) BELOW THE PIPE INVERT. MINUMUM DISTANCE FOR PIPES < 12" I.D. IS 6".

CONSTRUCTION NOTES:

1. **CONFIGURATION:** ALL HOODS SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI-SIPHON VENT AS DRAWN. (SEE CONFIGURATION DETAIL)
2. **PIPE COVERAGE:** THE SIZE OF THE HOOD SHALL PERMIT THE O.D. OF THE OUTLET PIPE TO BE COVERED COMPLETELY.
3. **HOOD POSITION:** THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A MINIMUM DISTANCE EQUAL TO 1/2 THE OUTLET PIPE I.D. WITH A MINIMUM DISTANCE OF 6" FOR PIPES <12" I.D. GREATER INSERTION DEPTH IS PERMISSIBLE.
4. **ANTI-SIPHON VENT:** VENT WITH ELBOW AND FEMALE ADAPTER SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 24" ACCORDING TO STRUCTURE CONFIGURATION.
5. **MOUNTING SURFACE PREPARATION:** THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.
6. **SNOUT/SRUCTURE INTERFACE:** THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH 3/8" STAINLESS STEEL BOLTS. OIL-RESISTANT GASKET AS SUPPLIED BY MANUFACTURER **MUST BE INSTALLED** TO PROVIDE PROPER SEAL. (SEE DETAIL "B")
7. **INSTALLATION INSTRUCTIONS:** INSTRUCTIONS SHALL BE FURNISHED UPON REQUEST OF INSPECTOR WITH MANUFACTURER SUPPLIED INSTALLATION KIT. INSTALLATION KIT SHALL INCLUDE:
   A. INSTALLATION INSTRUCTIONS
   B. PVC ANTI-SIPHON VENT PIPE, FEMALE ADAPTER WITH NUT, O-RING GASKETS
   C. OIL-RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
   D. 3/8" STAINLESS STEEL BOLTS
   E. ANCHOR SHIELDS
   F. STAINLESS NUTS AND BOLTS PLUS GASKET TO SECURE TOP AND BOTTOM OF SNOUT.
8. THE CITY OF LEWISTON REQUIRES SNOUTS ON ALL OUTLET PIPES LESS THAN 18" IN DIAMETER.

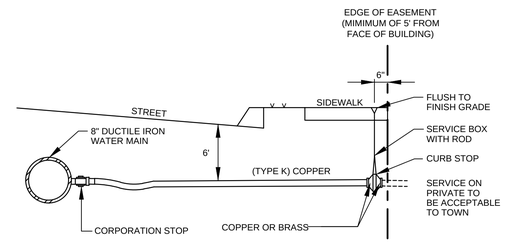
SNOUT HOOD DETAILS & NOTES

NOT TO SCALE



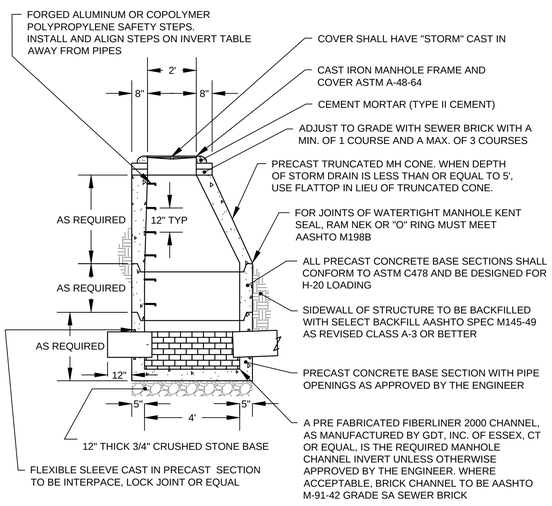
STANDARD 2" BLOW OFF

NOT TO SCALE



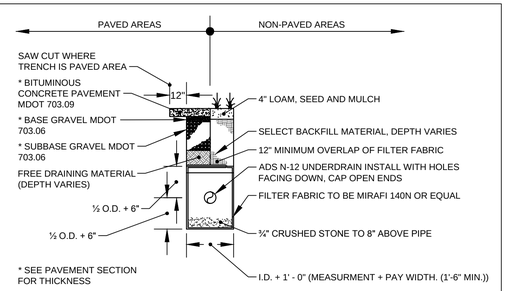
TYPICAL WATER SERVICE CONNECTION

NOT TO SCALE



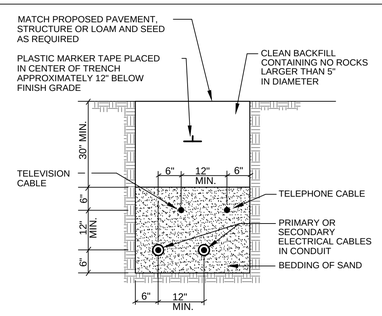
4' DIAMETER PRECAST STORM DRAIN MANHOLE

NOT TO SCALE



TYPICAL UNDERDRAIN TRENCH SECTION

NOT TO SCALE



CABLES TO BE ENCASED IN SCHEDULE 40 PVC CONDUIT WHEN RUN BENEATH PAVED AREAS.

TYPICAL UNDERGROUND CABLE INSTALLATION

NOT TO SCALE

STATE OF MAINE
JEFFREY D. MILLS
No. 11617
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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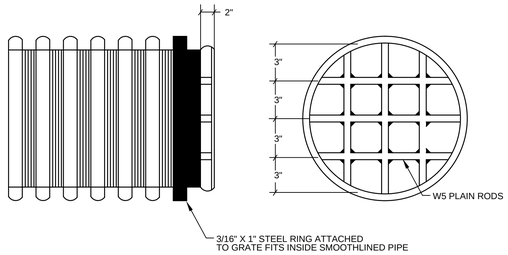
DETAILS

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

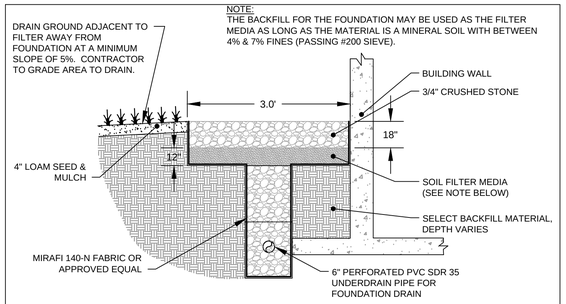
DATE:	1/19/2018
SCALE:	AS SHOWN
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 D.DWG	
SHEET	C-6.3



NOTES:
1. RODS CONFORM TO SECTION 709.1
2. GRATE TO HAVE ONE SHOP COAT OF ALUMINUM PAINT.
3. 3/8" GRADE 304 STAINLESS STEEL BOLT AND NUT (4 EA.)

INLET GRATE DETAIL

NOT TO SCALE

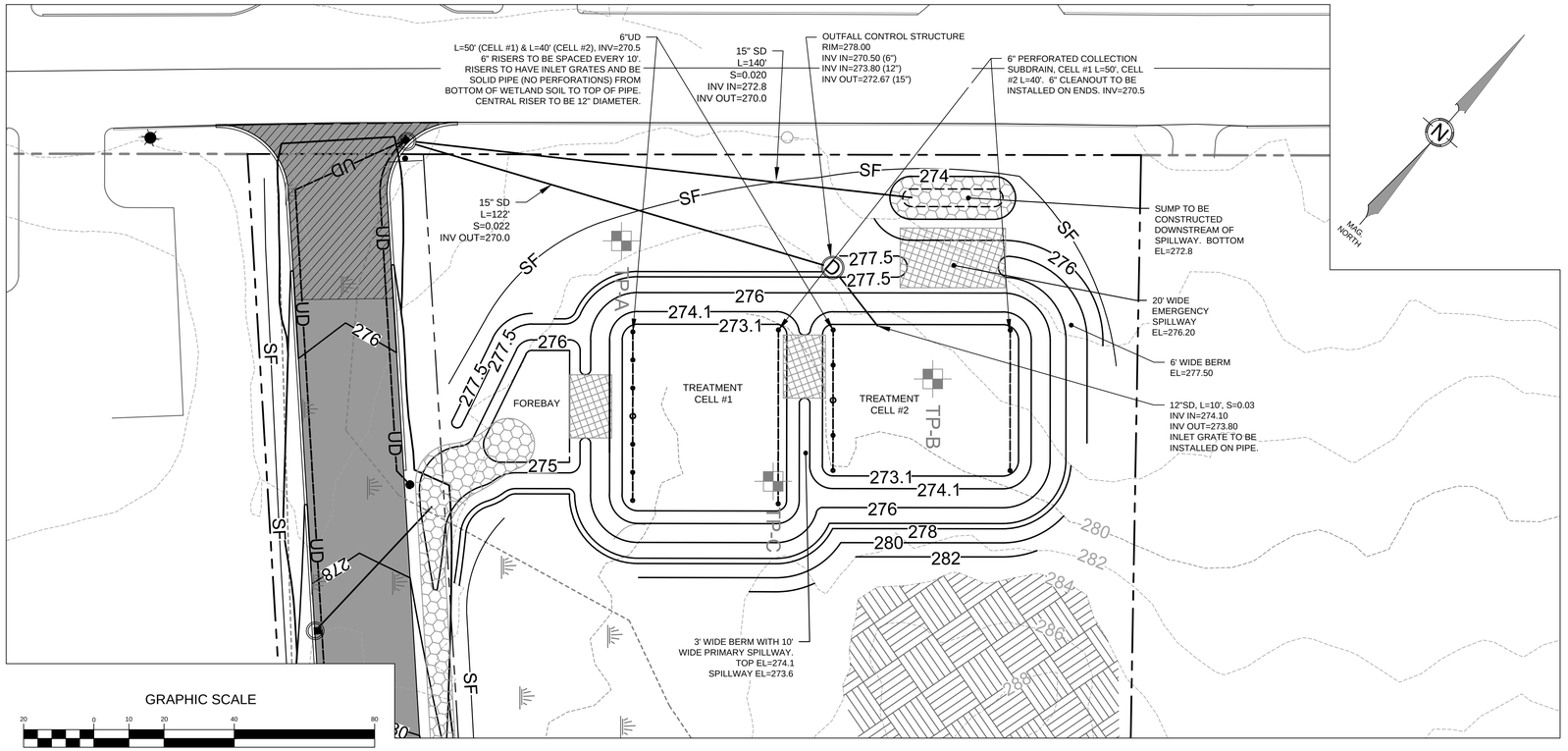


NOTE:
THE BACKFILL FOR THE FOUNDATION MAY BE USED AS THE FILTER MEDIA AS LONG AS THE MATERIAL IS A MINERAL SOIL WITH BETWEEN 4% & 7% FINES (PASSING #200 SIEVE).

CONSTRUCTION INSPECTION NOTES:
Inspections by a professional engineer shall consist of weekly visits to the site to inspect each the roof drip edge filter's underdrain construction, filter material placement, and overflow from initial ground disturbance to final stabilization of the filter.

ROOF DRIPLINE FILTER BED

NOT TO SCALE



GRAVEL WETLAND #1 PLAN VIEW

SCALE: 1"=20'

GRAVEL WETLAND INSTALLATION NOTES:

1. THE MINIMUM SPACING BETWEEN THE SUBSURFACE PERFORATED DISTRIBUTION LINE AND THE SUBSURFACE PERFORATED COLLECTION DRAIN AT EITHER END OF THE GRAVEL IN EACH TREATMENT CELL IS 15 FT.

2. THERE SHOULD BE A MINIMUM HORIZONTAL TRAVEL DISTANCE OF 15 FT WITHIN THE GRAVEL LAYER IN EACH CELL.

3. VERTICAL PERFORATED OR SLOTTED RISER PIPES DELIVER WATER FROM THE SURFACE DOWN TO THE SUBSURFACE, PERFORATED OR SLOTTED DISTRIBUTION LINES. THESE RISERS SHALL HAVE A MAXIMUM SPACING OF 10 FEET.

4. SLOTTED VERTICAL RISERS SHALL HAVE A MINIMUM DIAMETER OF 12" FOR THE CENTRAL RISER AND 6" FOR END RISERS. THE VERTICAL RISERS SHALL NOT BE CAPPED, BUT RATHER COVERED WITH AN INLET GRATE.

5. VERTICAL CLEANOUTS CONNECTED TO THE DISTRIBUTION AND COLLECTION SUBDRAINS, AT EACH END, SHALL BE PERFORATED OR SLOTTED ONLY WITHIN THE GRAVEL LAYER, AND SOLID WITHIN THE WETLAND SOIL AND STORAGE AREA ABOVE.

6. TREATMENT CELL FLOOR TO BE GRADED FLAT.

7. BERMS AND WEIRS SEPARATING THE FOREBAY AND TREATMENT CELLS SHOULD BE CONSTRUCTED WITH CLAY, OR NON-CONDUCTIVE SOILS, AND/OR A FINE GEOTEXTILE, OR SOME COMBINATION THEREOF, TO AVOID WATER SEEPAGE AND SOIL PIPING THROUGH THESE EARTHEN DIVIDERS.

8. THE SYSTEM SHOULD BE PLANTED TO ACHIEVE A RIGOROUS ROOT MAT WITH GRASSES, FORBS, AND SHRUBS WITH OBLIGATE AND FACULTATIVE WETLAND SPECIES.

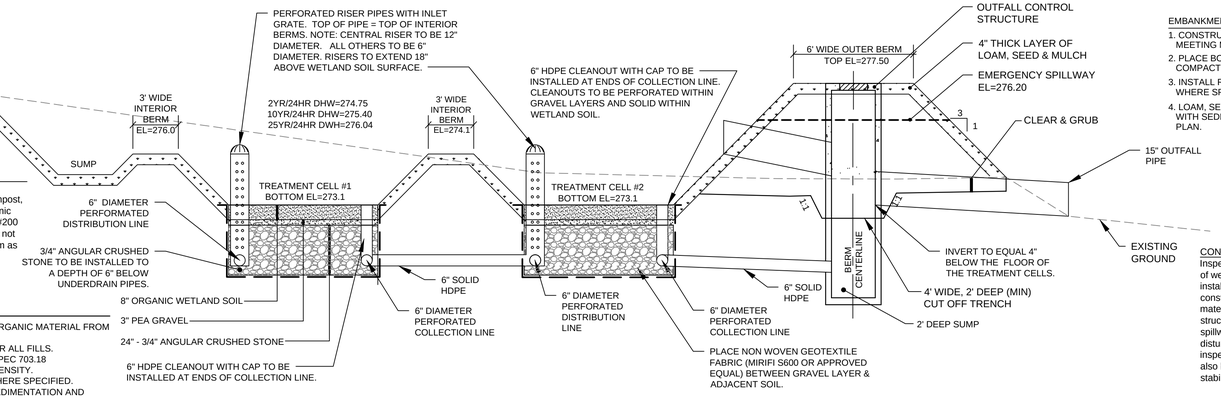
9. THE SUBAREA DRAINING TO A CREATED WETLAND MUST BE COMPLETELY STABLE BEFORE RUNOFF IS DIRECTED TO THE BASIN TO PREVENT SEDIMENTATION OF THE DRAINAGE LAYER; OR ALL RUNOFF SHOULD BE RE-DIRECTED UNTIL CONSTRUCTION IS FINALIZED. THE VEGETATION WITHIN THE STRUCTURE IS EQUALLY IMPORTANT AND MUST BE WELL ESTABLISHED BEFORE IT CAN ACCEPT ANY RUNOFF.

10. GRAVEL WETLAND STORMWATER AREA TO BE SEEDED WITH "NEW ENGLAND WETMIX" AS DISTRIBUTED BY NEW ENGLAND WETLAND PLANTS, INC., 820 WEST STREET, AMHERST, MA 01002, PHONE 413-548-8000, EMAIL INFO@NEWP.COM, OR APPROVED EQUIVALENT. APPLY AT A RATE OF 1 LB/2,500 SF.

11. THE SEEDS WILL NOT GERMINATE UNDER INUNDATED CONDITIONS. IF PLANTED DURING THE FALL MONTHS THE SEED MIX WILL GERMINATE THE FOLLOWING SPRING. DURING THE FIRST SEASON OF GROWTH SEVERAL SPECIES WILL PRODUCE SEEDS WHILE OTHER SPECIES WILL PRODUCE SEEDS AFTER THE SECOND GROWING SEASON. NOT ALL SPECIES WILL GROW IN ALL WETLAND SITUATIONS. THIS MIX IS COMPRISED OF THE WETLAND SPECIES MOST LIKELY TO GROW IN CREATED/RESTORED WETLANDS AND SHOULD PRODUCE MORE THAN 75% GROUND COVER IN TWO FULL GROWING SEASONS.

12. THE WETLAND SEEDS IN THIS MIX CAN BE SOWN BY HAND, WITH A HAND-HELD SPREADER, OR HYDRO-SEEDED ON LARGE OR HARD TO REACH SITES. LIGHTLY RAKE TO ENSURE GOOD SEED-TO-SOIL CONTACT. SEEDING CAN TAKE PLACE ON FROZEN SOIL AS THE FREEZING AND THAWING WEATHER OF LATE FALL AND LATE WINTER WILL WORK THE SEED INTO THE SOIL. IF SPRING CONDITIONS ARE DRIER THAN USUAL, WATERING MAY BE REQUIRED. IF SOWING DURING THE SUMMER MONTHS, SUPPLEMENTAL WATERING WILL LIKELY BE REQUIRED UNTIL GERMINATION. A LIGHT MULCH OF CLEAN, WEED FREE STRAW IS RECOMMENDED.

13. THE POND CONSTRUCTION SHOULD BE ONLY CONSTRUCTED UNDER THE SUPERVISION OF THE DESIGN ENGINEER.



ORGANIC WETLAND SOIL MIXTURE:
The wetland soil should have a low hydraulic conductivity (0.1-0.01 ft/day). This soil can be manufactured using compost, sand and find soils, into a blend with more thatn 15% organic matter. It should contain more than 15% silt (passing the #200 sieve); but with a clay size portion that is less than 2%. Do not use geotextiles between the horizontal layers of this system as they will clog due to fines and may restrict root growth.

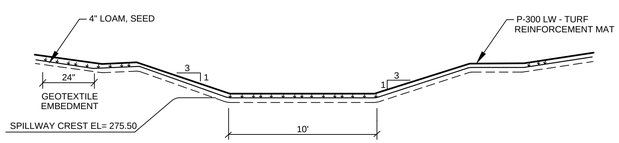
POND CONSTRUCTION NOTES:
1. CONTRACTOR SHALL REMOVE ALL TOPSOIL AND ORGANIC MATERIAL FROM EMBANKMENT AND POND CONSTRUCTION AREA.
2. SCARIFY SUBGRADE TO ESTABLISH INTERFACE FOR ALL FILLS.
3. CONSTRUCTION MATERIAL SHALL MEET M.D.O.T. SPEC 703.18
4. COMPACT IN 12" LIFTS TO 92% OF MAXIMUM DRY DENSITY.
5. INSTALL RIPRAP AND EROSION CONTROL MESH WHERE SPECIFIED.
6. LOAM, SEED & STABILIZE IN ACCORDANCE WITH SEDIMENTATION AND EROSION CONTROL PLAN & NOTES.

CROSS SECTION VIEW - GRAVEL WETLAND

NOT TO SCALE

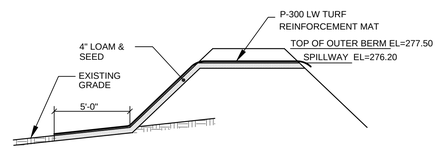
EMBANKMENT CONSTRUCTION
1. CONSTRUCTION OF COMMON BORROW MATERIAL MEETING M.D.O.T. SPECIFICATION 703.
2. PLACE BORROW MATERIAL IN 12" LIFTS COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
3. INSTALL RIPRAP AND EROSION CONTROL MESH WHERE SPECIFIED ON PLANS
4. LOAM, SEED, AND STABILIZE IN ACCORDANCE WITH SEDIMENTATION AND EROSION CONTROL PLAN.

CONSTRUCTION INSPECTION NOTES:
Inspection by a professional engineer will consist of weekly visits to the site to inspect the installation of each pond's embankment construction, stormwater inlet, underdrains, filter material makeup and placement, outlet control structure, clay liner (if applicable), and emergency spillway construction from initial ground disturbance to final stabilization of the pond. An inspection of the underdrained gravel outlet shall also be performed one year after the final stabilization of the pond.



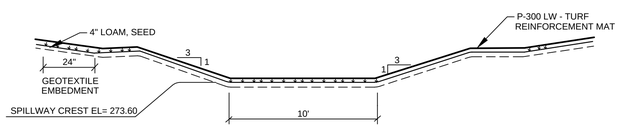
INTERNAL BERM SPILLWAY CROSS-SECTION (FROM FOREBAY TO CELL #1)

NOT TO SCALE



SPILLWAY EMBANKMENT SECTION

NOT TO SCALE

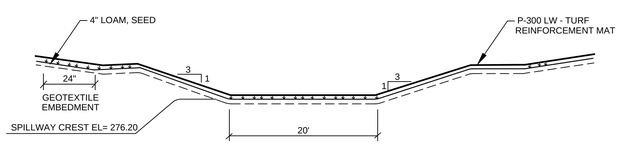


INTERNAL BERM SPILLWAY CROSS-SECTION (FROM CELL #1 TO CELL #2)

NOT TO SCALE

GRAVEL WETLAND DETAILS

NOT TO SCALE



EMERGENCY SPILLWAY CROSS-SECTION

NOT TO SCALE

STATE OF MAINE
JEFFREY D. JAMES
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

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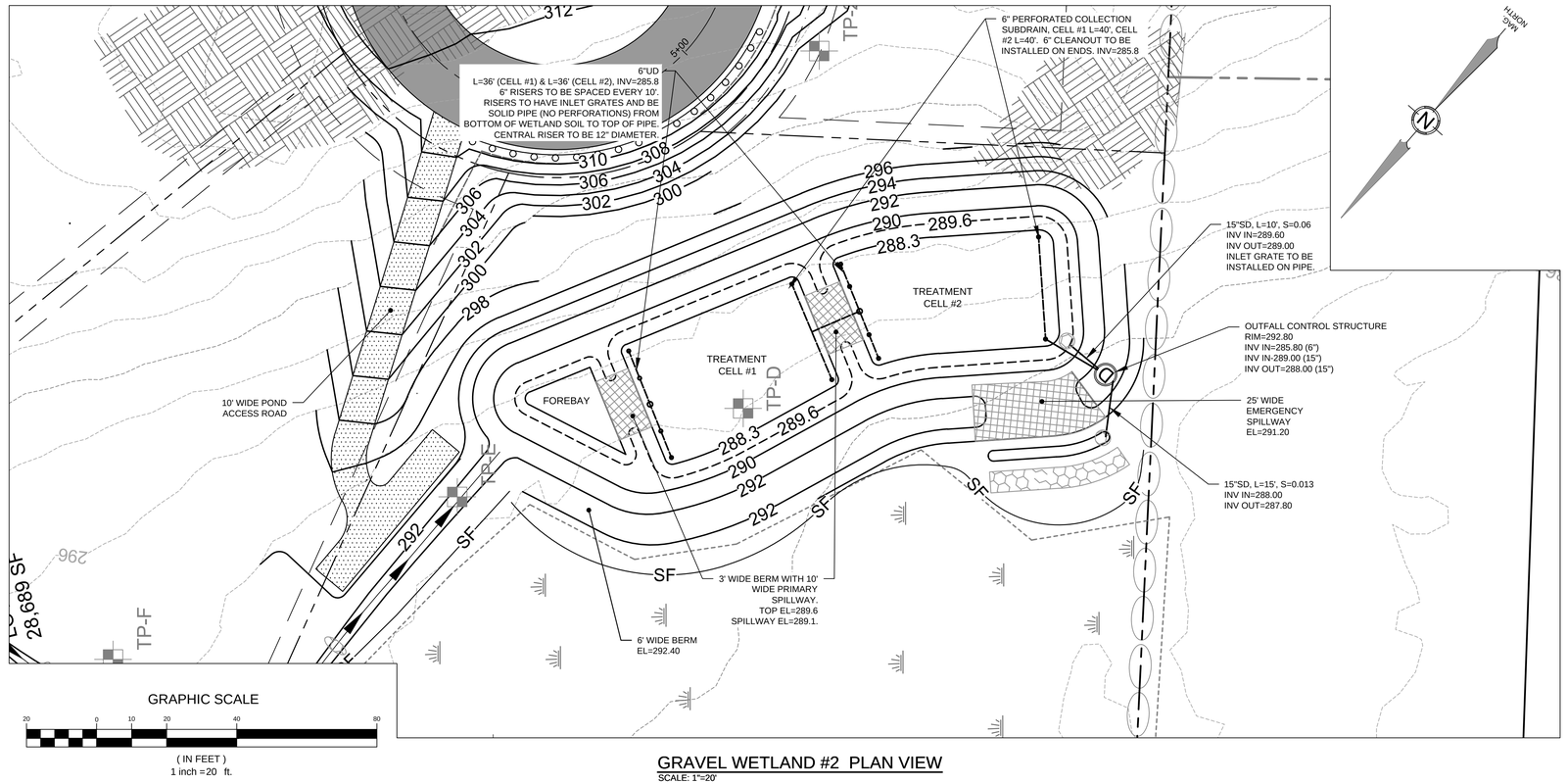
290 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 D.DWG	

SHEET C-6.4



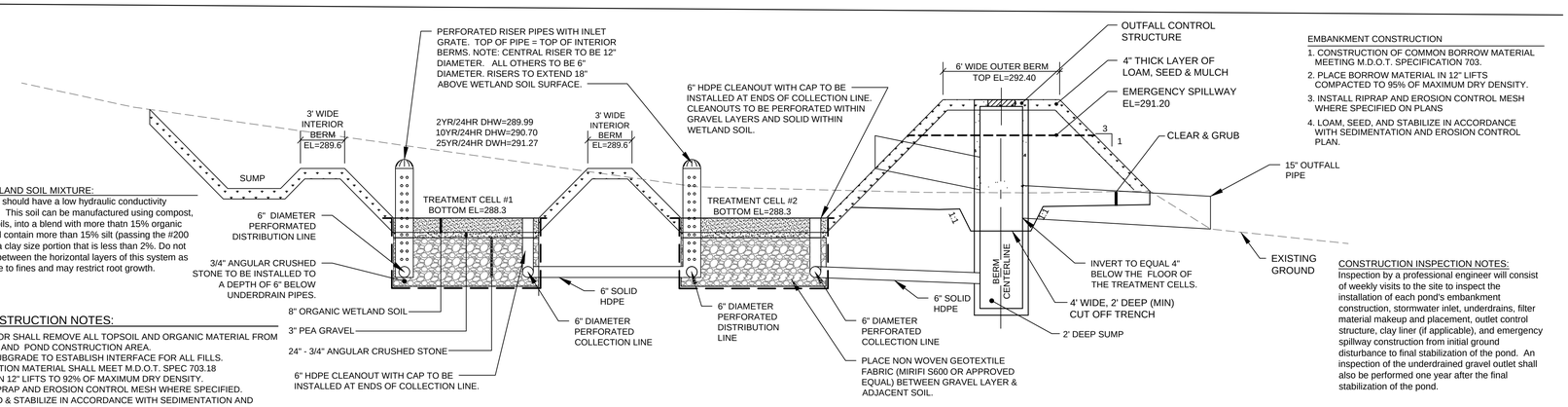
GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

GRAVEL WETLAND #2 PLAN VIEW

SCALE: 1"=20'



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CROSS SECTION VIEW - GRAVEL WETLAND

NOT TO SCALE

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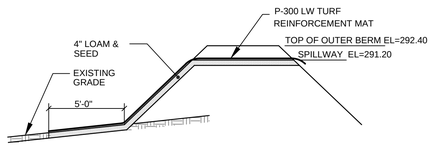
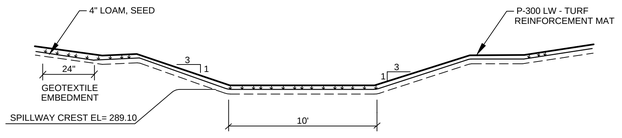


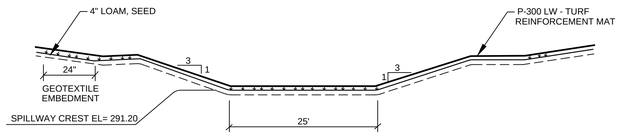
SPILLWAY EMBANKMENT SECTION

NOT TO SCALE



INTERNAL BERM SPILLWAY CROSS-SECTIONS

NOT TO SCALE



GRAVEL WETLAND #2 DETAILS

NOT TO SCALE

EMERGENCY SPILLWAY CROSS-SECTION

NOT TO SCALE

STATE OF MAINE
JEFFREY D. JAMES
No. 10167
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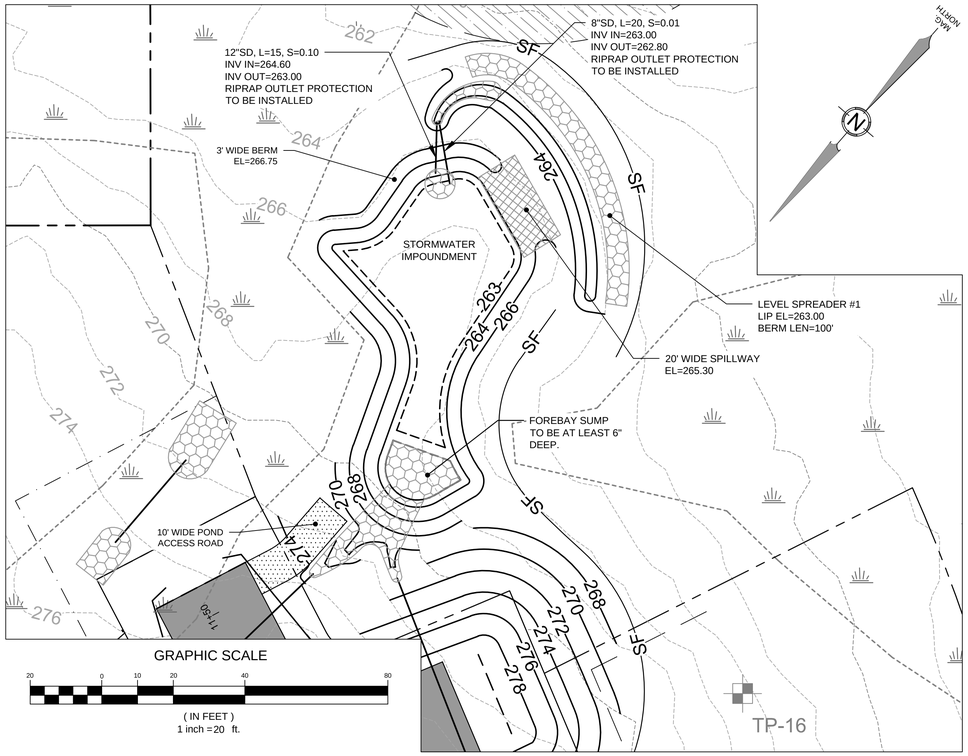
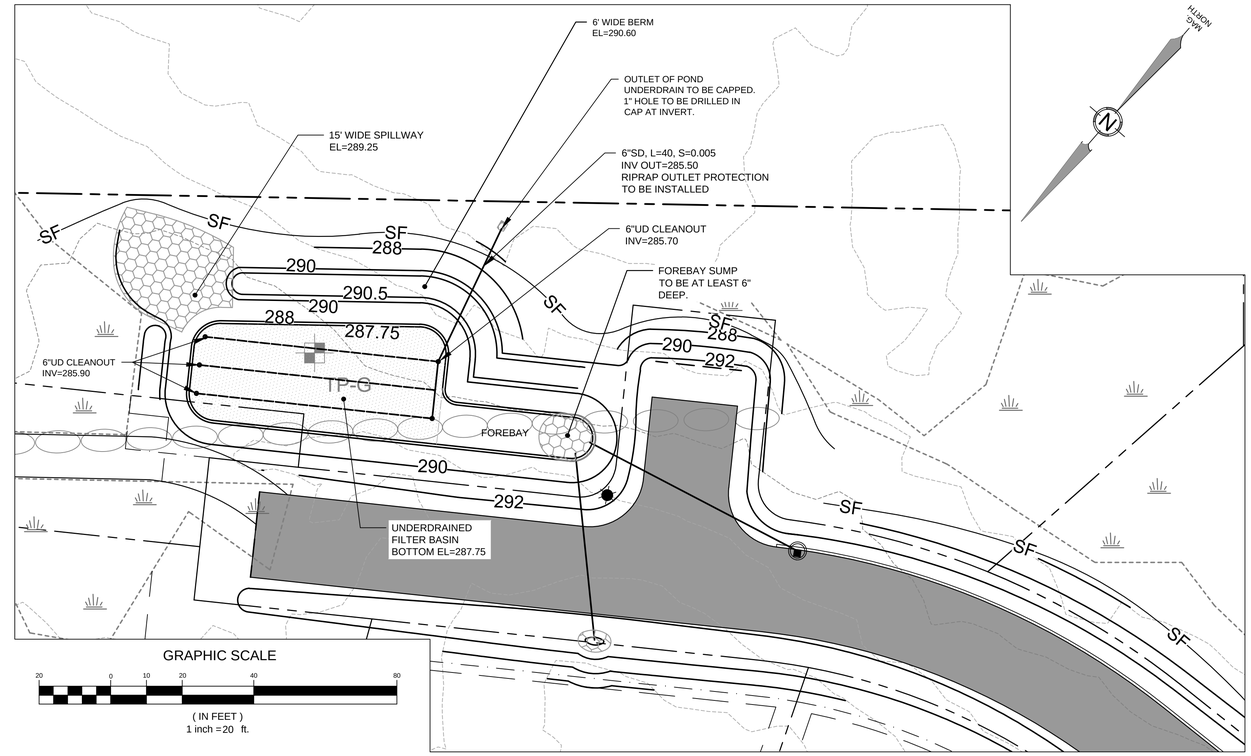
CHASE CUSTOM HOMES & FINANCE
230 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 D.DWG	
SHEET	C-6.5



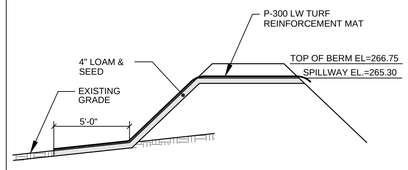
STORMWATER IMPOUNDMENT - PLAN VIEW

SCALE: 1"=20'



FILTER BASIN #1 - PLAN VIEW

SCALE: 1"=20'

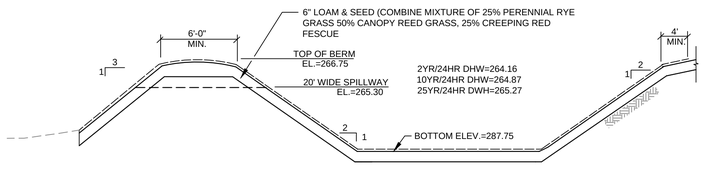


EMBANKMENT CONSTRUCTION

1. CONSTRUCTION OF COMMON BORROW MATERIAL MEETING M.D.O.T. SPECIFICATION 703.
2. PLACE BORROW MATERIAL IN 12" LIFTS COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
3. INSTALL RIPRAP AND EROSION CONTROL MESH WHERE SPECIFIED ON PLANS
4. LOAM, SEED, AND STABILIZE IN ACCORDANCE WITH SEDIMENTATION AND EROSION CONTROL PLAN.

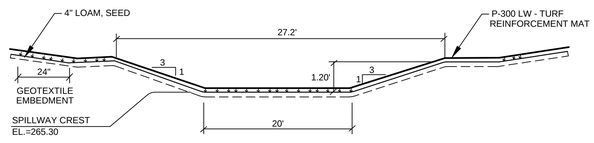
SPILLWAY SECTION

NOT TO SCALE



CROSS SECTION

NOT TO SCALE

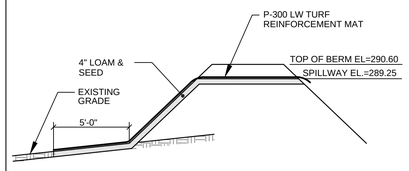


SPILLWAY CROSS-SECTION

NOT TO SCALE

STORMWATER IMPOUNDMENT DETAILS

NOT TO SCALE



EMBANKMENT CONSTRUCTION

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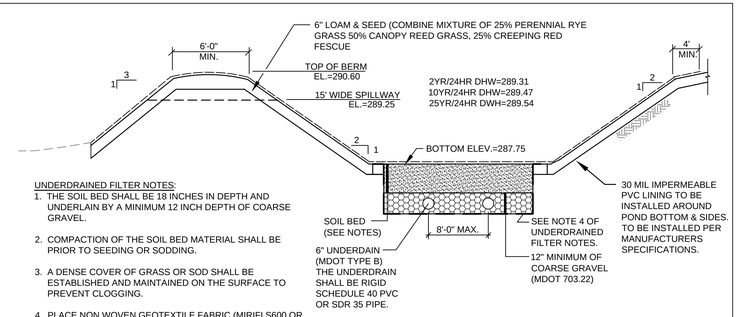
2. PLACE BORROW MATERIAL IN 12" LIFTS COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
3. INSTALL RIPRAP AND EROSION CONTROL MESH WHERE SPECIFIED ON PLANS
4. LOAM, SEED, AND STABILIZE IN ACCORDANCE WITH SEDIMENTATION AND EROSION CONTROL PLAN.

SPILLWAY SECTION - FILTER BASIN

NOT TO SCALE



UNDERDRAINED FILTER NOTES:

1. THE SOIL BED SHALL BE 18 INCHES IN DEPTH AND UNDERLAIN BY A MINIMUM 12 INCH DEPTH OF COARSE GRAVEL.
2. COMPACTION OF THE SOIL BED MATERIAL SHALL BE PRIOR TO SEEDING OR SODDING.
3. A DENSE COVER OF GRASS OR SOD SHALL BE ESTABLISHED AND MAINTAINED ON THE SURFACE TO PREVENT CLOGGING.
4. PLACE NON WOVEN GEOTEXTILE FABRIC (MIRIFI S600 OR APPROVED EQUAL) ON ALL SIDES AND BOTTOM OF SOIL & GRAVEL FILTER AREA.
5. SOIL FILTER BED SHALL MEET THE SPECIFICATIONS SHOWN IN SOIL FILTER MEDIA TABLE.

FILTER BASIN

NOT TO SCALE

CONSTRUCTION PHASE NOTES:

Construction Sequence: The soil filter media and vegetation must not be installed until the area that drains to the filter has been permanently stabilized with pavement or other structure, 90% vegetation cover, or other permanent stabilization unless the runoff from the contributing drainage area is diverted around the filter until stabilization is completed.

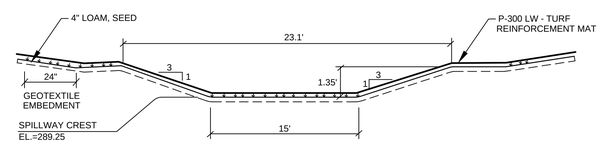
Compaction of Soil Filter: Filter soil media and underdrain bedding material must be compacted to between 90% and 92% standard proctor. The bed should be installed in at least 2 lifts of 9 inches to prevent pockets of loose media.

Construction Oversight: Inspection by a professional engineer will occur at a minimum:

- After the preliminary construction of the filter grades and once the underdrain pipes are installed but not backfilled,
- After the drainage layer is constructed and prior to the installation of the filter media,
- After the filter media has been installed and seeded. Bio-retention cells must be stabilized per the provided planting scheme and density for the canopy coverage of 30 and 50%.
- After one year to inspect health of the vegetation and make corrections, and
- All the material used for the construction of the filter basin must be confirmed as suitable by the design engineer. Testing must be done by a certified laboratory to show that they are passing DEP specifications.

Testing and Submittals: The contractor shall identify the location of the source of each component of the filter media. All results of field and laboratory testing shall be submitted to the project engineer for confirmation. The contractor shall:

- Select samples for sampling of each type of material to be blended for the mixed filter media and samples of the underdrain bedding material. Samples must be a composite of three different locations (grabs) from the stockpile or pit face. Sample size required will be determined by the testing laboratory.
- Perform a sieve analysis conforming to STM C136 (Standard Test Method for Sieve Analysis of fine and Course Aggregates 1996A) on each type of the sample material. The resulting soil filter media mixture must have 8% to 12% by weight passing the #200 sieve, a clay content of less than 2% (determined hydrometer grain size analysis) and have 10% dry weight of organic matter.
- Perform a permeability test on the soil filter media mixture conforming to ASTM D2434 with the mixture compacted to 90-92% of maximum dry density based on ASTM D698.



SPILLWAY CROSS-SECTION - FILTER BASIN

NOT TO SCALE

SOIL FILTER MEDIA TABLE

FILTER MEDIA	MIXTURE BY VOLUME	SPECIFICATION
SAND	50%-55%	MEDOT SPEC. 703.01 FINE AGGREGATE FOR CONCRETE
TOPSOIL	20%-30%	LOAMY SAND TOPSOIL WITH MINIMAL CLAY CONTENT AND BETWEEN 15-25% FINES PASSING THE #200 SIEVE.
MULCH	20%-30%	MODERATELY FINE, SHREDDED BARK OR WOOD FIBER MULCH WITH LESS THAN 5% PASSING THE #200 SIEVE

FILTER BASIN DETAILS

NOT TO SCALE

STATE OF MAINE
JEFFREY D. JAMES
No. 10167
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE DATE: 3/27/2018

NO.	DATE	REVISIONS	APP'D BY
1	3/27/2018	REVISED PER CITY REVIEW	

TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
SANCTUARY ESTATES
HOGAN ROAD, LEWISTON, ME
DETAILS & NOTES

PREPARED FOR
CHASE CUSTOM HOMES & FINANCE
230 BRIDGTON ROAD
WESTBROOK, MAINE 04092

DATE:	1/19/2018
SCALE:	1" = 40'
DESIGNED:	JDA
JOB NO:	1660
FILE: 1660 D.DWG	

SHEET C-6.6

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

March 30, 2018

David Hediger
27 Pine St
Lewiston ME, 04240

RE: Chase Custom Homes & Finance | Sanctuary Estates | Lewiston, ME | DEP #L-27849-L3-B-D

Dear Mr. Hediger:

This letter is to inform you that the Department of Environmental Protection has received the Notification of Application Acceptance concerning the application of Chase Custom Homes & Finance, regarding the construction of a subdivision at 131 Hogan Road in Lewiston. The Department is satisfied that the notice provisions of 38 M.R.S. Section 489-A Subsection 8 for Municipal Review of Development have been satisfied by the City of Lewiston and the applicant. Based upon its review of the notice and application, the Department will not be exercising jurisdiction over this application pursuant to 38 M.R.S. Section 489-A Subsection 9. However, this determination of non-jurisdiction does not apply to any Natural Resources Protection Act (NRPA) issues that may relate to the proposed project

If the application is amended prior to the municipality taking final action, another Notification of Application Acceptance may be required. Please contact me should this occur. The municipality is also required to submit one copy of the record of review and basis of decision within 40 working days of the final action by the reviewing authority.

If you have any questions concerning this, please call me at 207-215-4525 or contact me by email at dustin.dorr@maine.gov.

Sincerely,

Dustin Dorr
Bureau of Land Resources

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

CITY OF LEWISTON

Department of Planning & Code Enforcement

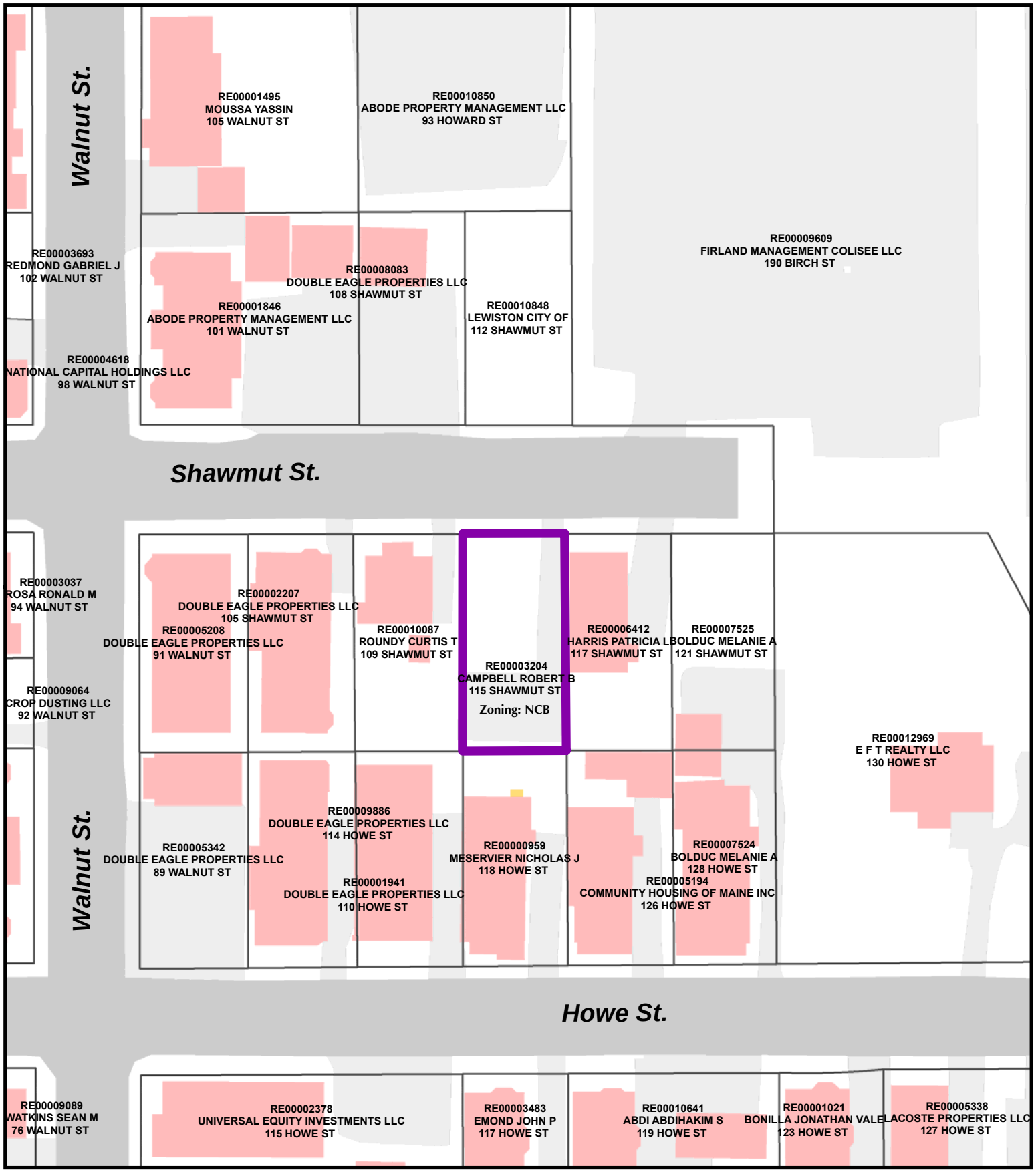
TO: **Planning Board**
FROM: **David Hediger, City Planner**
DATE: **April 62018**
RE: **Recommendation regarding the disposition of 115 Shawmut Street.**

The disposition of this property was continued by the Planning Board at their March 26, 2018 meeting. At that time, the Board inquired whether the city owned property at 112 Shawmut Street should be sold and if so, should it be sold together with 115 Shawmut. Upon discussing the matter with staff and administration, it has been determined 115 Shawmut will not be offered for sale at this time.

As the Board may be aware, the city was just awarded a $1.3 million planning and action grant to develop a transformation plan for the tree street neighborhood that will address the goal areas of housing, people, and neighborhood. Both Shawmut Street properties fall within this area. City Economic Development Specialist Misty Parker has explained that the HUD Choice Neighborhood Planning Grant involves a planning process that will include detailed assessments of the neighborhood this summer to aid the development of strategies to transform the neighborhood. Until those strategies can be determined it is uncertain the role vacant parcels may play in the transformation of the neighborhood. Each lot the city acquires may aid in a strategy for developing new housing, parks or other important features in the area. To lose control of these properties at such an early stage may be to lose the opportunity for implementation and neighborhood transformation.

Therefore, neither 115 nor 112 Shawmut are being considered for disposition at this time.

NO ACTION NECESSARY



Tax-Aquired Acquisition

115 Shawmut Street

February 2018

Tree Street Neighborhood

HUD Choice Neighborhood Grant

August 2017

CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: **Planning Board**
FROM: **David Hediger, City Planner**
DATE: **May 18, 2017**
RE: **May 22, 2017 Planning Board Agenda Item V(b)**

De minimis change amendment: Leblanc Subdivision, 610 Webster Street

Davis Land Surveying, LLC has submitted an amendment to the Leblanc Subdivision, Revision II. On November 9, 2015 the Planning Board approved this three lot subdivision. Lot 1 gains access and frontage from Webster Street. Lots 2 and 3 gain access and frontage utilizing the frontage right-of-way (ROW) provisions of Article XII, Section 10 off Pagoma Lane. Revision I was approved by the Board on May 22, 2017 to shift properties lines.

Revision II is being submitted to revise lot lines between lots 2 and 3, update survey bearing requirements, add a small triangular parcel of land to an abutter, and add a note referencing NFPA requirements for a sprinkler system for development of lot 3 if deemed necessary. Reference should be made plan notes 21, 23, and 26.

Staff has no concerns with the proposed amendment, views the change as being de minimis pursuant to Article XIII, Section 3(k) of the Zoning and Land Use Code, and recommends approval.

ACTIONS NECESSARY:

Make a motion pursuant to Article XIII, Section 3(k), Section 4, and Section 5 of the Zoning and Land Use Code to approve a request by Davis Land Surveying, LLC for an amendment to the Leblanc Subdivision –Revision II.

Davis Land Surveying, LLC
64 Old County Road
Oxford, Maine 04270

(207)345-9991 office
(207) 345-9996 fax
(207) 240-9949 cell
Email: davissurveying@yahoo.com
www.davislandsurveying.net

April 4, 2017

City of Lewiston
Planning Board
27 Pine Street
Lewiston, Maine 04240

RE: "Revision II" Leblanc Subdivision – 3 Lots

Dear Planning Board Members,

Enclosed please find a 11" X 17" Plan of "Revision II" Leblanc Subdivision on behalf of Jesse & Jamie Leblanc who still reside at 279 Webster Street in Lewiston, Maine. The Leblanc's currently own Lot 2(86) as shown on a previously recorded Subdivision Plans as recorded in the Androscoggin County Registry of Deeds in Plan Book 51, Page 64 and Plan Book 51, Page 200. Lots 1(88) & 3(87) have been conveyed and recording information for said Lots was updated to this Revised Plan. Said properties being the same as being shown on City of Lewiston Tax Map 122 and being Lost 86,87 & 88. The property lies in the *Suburban Residential Zone per the City of Lewiston Land Use Code.*

The purpose of this Revised Plan is to show revisions made to the above previously referenced recorded Subdivision Plans. Revisions as shown on this Revised Plan:

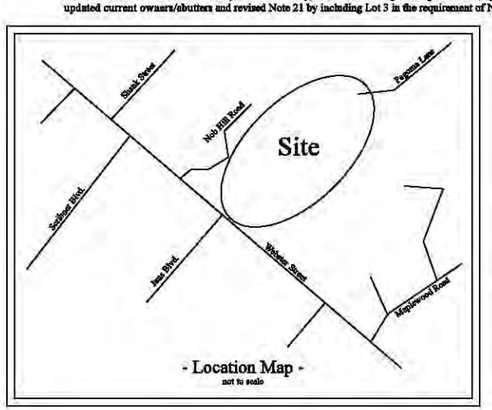
1) Added Note 26 – as outlined below.
2) Revised Note 21 by including Lot 3 in the requirement of NFPA 1, Uniform Fire Code, 2006.
3) Updated Abutters/Current Owners, Plan References e. & f.
4) Revised lines A & B as shown along the westerly sideline of Lots 2 & 3.
5) Rotated Plan Bearings to Grid North MSPC NAD83.
6) Added tri-angular parcel of land to be conveyed to Lucus J. & Marybeth Mawhinney from Giles N. Leblanc per Note 23.

Respectfully Submitted,

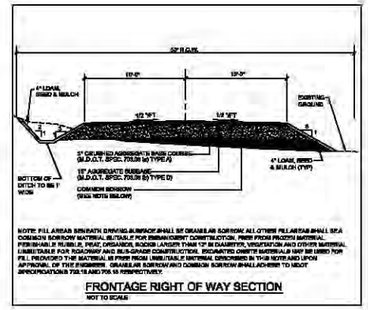
Stuart Davis PLS

General Notes :

1. All Book and Page references as shown hereon are from the Androscoggin County Registry of Deeds.
2. Lines shown and not labeled (bearing & distance) are illustrative only, they are based on tax maps and are not verified by this surveyor.
3. Source deed -
   Giles N. Leblanc personal representative of the Estate of Jeannine R. LeBlanc, a/k/a Janine M. LeBlanc to Jesse N. LeBlanc and Jaime L. LeBlanc by deed dated December 30, 2014, and recorded in said Registry in Book 9069, Page 38.
4. Property as shown on the City of Lewiston Tax Maps, on map 122, lot 86.
5. Property lies within the Suburban Residential Zone (SR).
   Space and Bulk requirements :
   Front setback = 25', Front yard = 25'
   Side & Rear setback = 15' Side & Rear yard = 15'
   Min. frontage = 125' Min. lot size without public sewer = 40,000 square feet
6. Reference plans -
   a. State of Maine Department of Transportation Right of Way Map dated September 1995, sheet 17 of 18, D.O.T. File No. 1-115.
   b. Subdivision Plan of Blue Heron Subdivision, dated June 23, 2006, and recorded in said Registry in Book of Plans, in Book 45, Page 145.
   c. Proposed Pagoma Lane Extension and Standard Boundary Survey for Normand LeBlanc Property, dated June 1985, recorded in said Registry in Book of Plans, in Book 31, Page 119.
   d. Pagoma Heights prepared for Maurice Goulet dated September 1986, recorded in said Registry in Book of Plans, Book 32, Page 75.
   e. Leblanc Subdivision dated September 17 2015, recorded in said Registry of Deeds in Plan Book 51, Page 64.
   f. Leblanc Subdivision "Revision 1" dated May 16 2017, recorded in said Registry of Deeds in Plan Book 51, Page 200.
7. Wetlands as shown on this plan were located by Mark Censi of Geologic Inc.
8. Property does not lie within the 100 year flood hazard zone, per the Flood Insurance Rate Maps, Androscoggin County (Lewiston), Map Number 23001C0333E, effective date of July 8, 2013.
9. Silt fencing will be installed and maintained prior to any construction and being consistent with the Maine Erosion and Sedimentation Control BMPs, Pub. No. DEPLW0588.
10. Building activity on lots 1,2 and 3, limited to building envelope as shown hereon.
11. Pagoma Lane and Pagoma Lane Extension as recorded in the City of Lewiston Street Records in Volume 3, Page 58, and Volume 4, Page 28.
12. Prior to any certificates of occupancy issued for any construction, the frontage ROW must be completed in accordance with the approved plan. The applicant shall be responsible to provide written statement from a licensed surveyor or engineer that it has been completed accordingly.
13. The applicant will be responsible for the City's cost to install a street sign at the end of Pagoma Lane.
14. If development has not occurred as defined within the scope of the Zoning and Land Use Code within two years, development review approval shall expire, pursuant to Article XIII, Section 11.
15. Lots 2 & 3 to be wholly responsible for all maintenance of Fawkes Drive as outlined in "Road Maintenance Agreement" and made subject thereto and recorded in the Androscoggin County Registry of Deeds - Book 9437, Page 127. The City of Lewiston shall be held harmless and at no time will be responsible for the maintenance of said Fawkes Drive.
16. Leblanc Subdivision has been designed and to be developed based on Article XIII Sections 4 & 5, Article XII Section 10. and made subject thereto and to be recorded in the Androscoggin County Registry of Deeds.
17. Lot 1 to apply for Permit By Rule for a reduction of the setback of 75' to 25' within a wetland of special significance for the upgrade of an existing woods road to a ±12 wide gravel drive for access to Lot 1 from Webster Street.
18. The existing turnaround located at the end of Pagoma Lane shall be maintained at its current location.
19. The construction, maintenance, and repair of Fawkes Drive shall be the sole responsibility of those listed in Road Maintenance Agreement.
20. Drainage easements for level lip spreaders as shown on Storm water Plans and located on private property, to be established and included in the Road Maintenance Agreement and will be maintained by those parties included in said agreement.
21. The driveway accessing Lots 1 & 3 must be 20' wide and meet requirements of NFPA 1, Uniform Fire Code, 2006 Edition - Sections: 18.2.3.2.2.1, 18.2.3.4.1.1, 18.2.3.4.1.2,18.2.3.2.2, unless the property is sprinkled with a 13R System (Residential Property) sprinkler system to the satisfaction of the Lewiston Fire Prevention.
22. The driveway must meet the side yard requirements of the Suburban Residential District, unless modifications are granted by the appropriate reviewing authority.
23. The purpose of the plan "Leblanc Subdivision - Revision 1" is to show the relocation of the southwest corner of land of Giles N. Leblanc. 5/8" rebar replaced in stone wall vs. location as described in a deed dated June 3, 2015 and recorded in Deed Book 9155, Page 176. A new deed will be prepared describing the new southwest corner of said Leblanc. The hatched area as shown and being 0.08 acres to be conveyed to Lucus J. & Marybeth Mawhinney.
24. Additional revisions made, updated owners of Lot 1 and Lot 3, revised note 15 by adding Book & Page of Road Maintenance Agreement and added Plan Reference 6e.
25. Additional updated research includes Release of Right of Way as dated 8-24-2016 in Deed Book 9437, Page 122 and also Easement Deeds as dated 8-24-2016 in Deed Book 9837, Page 115.
26. The purpose of this plan of "Revision II" Leblanc Subdivision is to show the relocation of lines A and B on Lots 2 & 3, to rotate bearings to Grid North - Maine State Plane West Zone - NAD 83, show tri-angular parcel to be conveyed from Giles N. Leblanc to Lucus J. & Marybeth Mawhinney, increased building envelope on Lot 3, updated Plan References, updated current owners/abutters and revised Note 21 by including Lot 3 in the requirement of NFPA 1, Uniform Fire Code, 2006.



- Location Map -
not to scale



FRONTAGE RIGHT OF WAY SECTION
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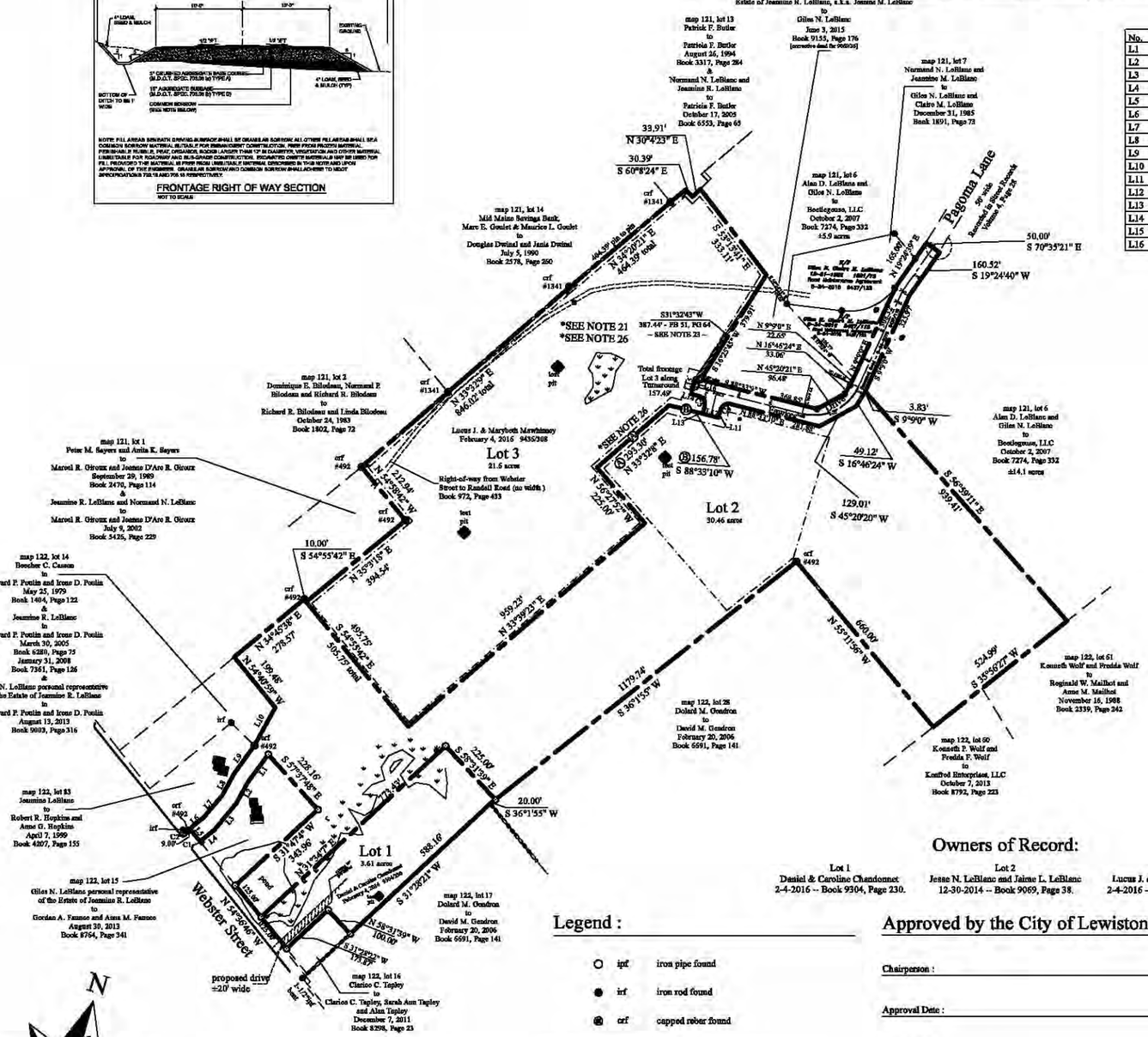
map 121, lot 13
Patrick F. Butler
to
Patricia F. Butler
August 26, 1994
Book 3317, Page 284
&
Normand N. LeBlanc and Jeannine R. LeBlanc
to
Patricia F. Butler
October 17, 2005
Book 6553, Page 65
Giles LeBlanc personal representative of the Estate of Jeannine R. LeBlanc, a.k.a. Janine M. LeBlanc
to
Giles N. LeBlanc
June 3, 2015
Book 9155, Page 176
map 121, lot 7
Normand N. LeBlanc and Jeannine M. LeBlanc
to
Giles N. LeBlanc and Claire M. LeBlanc
December 31, 1985
Bank 1891, Page 73
map 121, lot 14
Mid Maine Savings Bank
Marc E. Goulet & Maurice L. Goulet
to
Douglas Dwinal and Janis Dwinal
July 5, 1990
Book 2578, Page 250
map 121, lot 6
Alan D. LeBlanc and Giles N. LeBlanc
to
Beetlegouse, LLC
October 2, 2007
Book 7274, Page 332
±5.9 acres
Pagoma Lane
50' wide
Recorded in Street Records Volume 4, Page 28
map 121, lot 2
Dominique E. Bilodeau, Normand P. Bilodeau and Richard R. Bilodeau
to
Richard R. Bilodeau and Linda Bilodeau
October 24, 1983
Book 1802, Page 72
map 121, lot 1
Peter M. Sayers and Anita K. Sayers
to
Marcel R. Giroux and Joanne D'Arc R. Giroux
September 29, 1989
Book 2470, Page 114
&
Jeannine R. LeBlanc and Normand N. LeBlanc
to
Marcel R. Giroux and Joanne D'Arc R. Giroux
July 9, 2002
Book 5425, Page 229
Lucus J. & Marybeth Mawhinney
February 4, 2016 9436/308
Lot 3
21.5 acres
Right-of-way from Webster Street to Randall Road (no width)
Book 972, Page 433
Lot 2
30.46 acres
Lot 1
3.61 acres
*SEE NOTE 21
*SEE NOTE 26
Total frontage Lot 3 along Turnaround 157.49'
map 122, lot 14
Beucher C. Cassan
in
Edward P. Poulin and Irene D. Poulin
May 25, 1979
Book 1404, Page 122
&
Jeannine R. LeBlanc
to
Edward P. Poulin and Irene D. Poulin
March 30, 2005
Book 6280, Page 75
January 31, 2008
Book 7361, Page 126
&
Giles N. LeBlanc personal representative of the Estate of Jeannine R. LeBlanc
in
Edward P. Poulin and Irene D. Poulin
August 13, 2013
Book 9003, Page 316
map 122, lot 83
Jeannine LeBlanc
to
Robert R. Hopkins and Anne G. Hopkins
April 7, 1999
Book 4207, Page 155
map 122, lot 15
Giles N. LeBlanc personal representative of the Estate of Jeannine R. LeBlanc
to
Gordan A. Fannoe and Anna M. Fannoe
August 30, 2013
Book 8764, Page 341
Webster Street
proposed drive ±20' wide
map 122, lot 16
Clarice C. Tapley
to
Clarice C. Tapley, Sarah Ann Tapley and Alan Tapley
December 7, 2011
Book 8298, Page 23
map 122, lot 17
Doland M. Gendron
to
David M. Gendron
February 20, 2006
Book 6591, Page 141
map 122, lot 28
Doland M. Gendron
to
David M. Gendron
February 20, 2006
Book 6591, Page 141
map 122, lot 51
Kenneth Wolf and Freida Wolf
to
Reginald W. Maillhot and Anne M. Maillhot
November 16, 1988
Book 2339, Page 242
map 122, lot 60
Kenneth P. Wolf and Freida F. Wolf
to
Kentfred Enterprises, LLC
October 7, 2013
Book 8792, Page 223
N 30°4'23" E
S 60°8'24" E
S 19°24'40" W
S 70°35'21" E
S 9°9'0" W
S 16°46'24" W
S 45°20'20" W
S 88°33'10" W
N 45°20'21" E
N 16°46'24" E
N 9°9'0" E
S 31°32'43" W
387.44' - PB 51, PG 64 -- SEE NOTE 21 --
N 35°39'29" E
N 54°55'42" E
S 54°55'42" E
N 35°39'16" E
N 34°45'58" E
N 54°46'59" W
S 57°37'48" E
S 31°47'4" W
N 58°31'39" W
S 31°29'21" W
S 36°1'55" W
N 55°11'55" W
S 55°56'27" W
S 66°59'11" E
S 53°31'39" E
S 31°29'21" W
S 31°29'52" W
N 54°36'46" W
N 53°39'23" E
S 53°39'23" E
N 53°39'16" E
N 54°45'58" E
S 54°55'42" E
N 35°39'16" E
N 54°46'59" W
S 57°37'48" E
S 31°47'4" W
N 58°31'39" W

CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: **Planning Board**
FROM: **David Hediger, City Planner**
DATE: **April 6, 2018**
RE: **Shoreland Zoning**

The city has been advised that our shoreland zoning provisions with respect to timber harvesting are out of date and in need of being amended. In 2012 the Maine Legislature enacted L.D. 1739, An Act to Change Regulation of Forestry Activities. It contains a provision that allowed Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas to take effect in municipalities that have either repealed timber harvesting standards in their shoreland zoning ordinance (Option 1) or adopted timber harvesting standards in their ordinance that are identical to the statewide standards (Option 2). Municipalities also had the option of retaining their old ordinance (Option 3).

Staff recommends that the Maine Forest Service assume administration and enforcement responsibilities of statewide standards for timber harvesting for the city of Lewiston (option 1). The Forest Service has the expertise needed to take accurate measurements of tree removal, tree height, etc. While not a common occurrence in Lewiston, staff has taken the lead on these enforcement actions, sometimes requesting the assistance of the Forest Service. Their administration of timber harvesting provisions within the shoreland zone will benefit both staff and property owners in ensure a more accurate and fair interpretation of the provisions.

Therefore, staff recommends the Planning Board initiate an amendment to Article XII, Section 2, Shoreland Area Standards to update the timber harvesting provisions.

ACTION NECESSARY
Make a motion pursuant to Article XVII, Section 5 of the Zoning and Land Use Code to prepare an amendment to Article XII, Section 2, Shoreland Area Standards to update the timber harvesting provisions within the shoreland zone.

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
BUREAU OF FORESTRY
22 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

April 2, 2018

City of Lewiston, Planning Board Chair
27 Pine St.
Lewiston, ME 04240

Dear City of Lewiston Planning Board Chair:

We're writing to encourage your town to update the timber harvesting provisions of its municipal shoreland zoning ordinance.

In 2012 the Maine Legislature enacted L.D. 1739, An Act to Change Regulation of Forestry Activities. It contains a provision that allowed Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas to take effect in municipalities that have either repealed timber harvesting standards in their shoreland zoning ordinance (Option 1) or adopted timber harvesting standards in their ordinance that are identical to the statewide standards (Option 2). Municipalities also had the option of retaining their old ordinance (Option 3).

As of the date of this letter, the Maine Forest Service has assumed administration and enforcement responsibilities of statewide standards for timber harvesting in 160 municipalities under Option 1. An additional 55 municipalities have entered into a joint enforcement agreement with the Forest Service under Option 2. Depending on the option chosen, municipalities are relieved of some or all of the burden of administering and enforcing timber harvesting ordinances in shoreland areas. Municipalities that choose Option 3 will continue to administer and enforce their ordinances without the assistance of the Maine Forest Service.

According to our records the City of Lewiston has not yet updated its shoreland zoning ordinance to include an option under statewide standards for timber harvesting. We strongly encourage your municipality to complete these tasks, which would be part of the amendments required by the Mandatory Shoreland Zoning Act, administered by the Department of Environmental Protection (DEP).

DOUG DENICO, BUREAU DIRECTOR
FORESTRY
18 ELKINS LANE, HARLOW BUILDING

DEPARTMENT OF
maine Agriculture Conservation & Forestry

PHONE: (207) 287-2791
FAX: (207) 287-8422
WWW.MAINE.GOV/DACF

The Maine Department of Environmental Protection shoreland zoning unit staff are available to assist towns with updating their shoreland ordinances:

Central Maine, Colin Clark, 207-441-7419, colin.a.clark@maine.gov

Eastern and Northern Maine, Dawn Abbott, 207-356-8318, dawn.abbott@maine.gov

Southern Maine, Mike Morse, 207-822-6328, michael.j.morse@maine.gov

Guidance for updating the timber harvesting portion of your shoreland zoning ordinance is enclosed. Please review the document titled "Adopting Statewide Timber Harvesting Standards for Your Shoreland Zoning Ordinance" for details. Also enclosed is a fact sheet with a summary of the standards. You may also view the standards in their entirety in the Water Resources section of our website: www.maineforestservice.gov.

If you have any questions about the process of adopting statewide standards for timber harvesting in shoreland areas, please contact Tom Gilbert at 207-287-1073 or at thomas.gilbert@maine.gov. Thank you for your attention to this matter.

Sincerely,

Doug Denico

Doug Denico
Director, Maine Forest Service

Cc: Don Mansius, Maine Forest Service
Colin Clark, Maine DEP
Dawn Abbott, Maine DEP
Michael Morse, Maine DEP

ADOPTING STATEWIDE TIMBER HARVESTING STANDARDS FOR YOUR SHORELAND ZONING ORDINANCE:

Title 38 M.R.S.A. section 438-B establishes three options from which each municipality may choose as the State implements a set of statewide timber harvesting standards in shoreland areas:

Option 1: The first option available to a municipality is the complete repeal of timber harvesting provisions from the shoreland zoning ordinance. Under this option the Bureau of Forestry will administer the regulation of all forestry activities within the municipality. Section 438-B(2) states:
A municipality may choose to have the statewide standards apply to timber harvesting and timber harvesting activities in that municipality by authorizing the repeal of all provisions within the municipal shoreland zoning ordinance that regulate timber harvesting and timber harvesting activities in shoreland areas and notifying the (Director of the Bureau of Forestry within the Department of Agriculture, Conservation and Forestry) of the repeal. The authorization must specify a repeal date. When a municipality accepts the statewide standards in accordance with this subsection, the (Director of the Bureau of Forestry) shall administer and enforce the statewide standards within that municipality beginning on (January 1, 2013) or the municipal repeal date specified in the notification received under this subsection.

Section 438-B(6) provides that, notwithstanding any provision in a local ordinance to the contrary, beginning January 1, 2013 rules adopted by the Bureau of Forestry under Title 12, section 8867-B will apply in all municipalities that have accepted the statewide standards in accordance with Option 1.

If a municipality chooses option 1, completely repealing the municipal regulation of timber harvesting activities in the shoreland zone and deferring the regulation of timber harvesting activities to the Bureau of Forestry, the repeal should include all references to timber harvesting regulations, including:

1. Section 14, Table 1, *Land Uses in the Shoreland Zone,* Item 3 (forest management activities except for timber harvesting & land management roads), Item 4 (timber harvesting), and Item 27 (land management roads) of the Table;

2. Section 15(O) in its entirety (Section 15(O-1) would not have been adopted by those municipalities that had elected to retain section 15(O), so there would be no need to repeal section 15(O-1)); and

3. All definitions in Section 17 pertaining to timber harvesting and forest management activities, including the terms: Cross-sectional area, DBH, Disruption of shoreline integrity, Forest management activities, Forest stand, Harvest area, Land management road, Licensed forester, Residual basal area, Residual stand, Skid road or skid trail, Slash, Timber harvesting and related activities, and Wind firm.

Option 2: The second option available to the municipality is the adoption of timber harvesting standards that are identical to the statewide standards. This option allows the municipality to retain some local control over the administration and enforcement of timber harvesting in the shoreland zone, while receiving assistance and expertise from staff of the Bureau of Forestry. Section 438-B(3) states:

A municipality may adopt an ordinance to regulate timber harvesting and timber harvesting activities that is identical to the statewide standards. A municipality that adopts an ordinance under this subsection may request the director (of the Bureau of Forestry) to administer and enforce the ordinance or to participate in joint administration and enforcement of the ordinance with the municipality beginning on the effective date

of the statewide standards (January 1, 2013) or within 60 days of the director's receiving a request. When a municipality requests joint responsibilities, the director and the municipality shall enter into an agreement that delineates the administrative and enforcement duties of each. To continue to receive administrative and enforcement assistance from the (Bureau of Forestry) under this subsection, a municipality must amend its ordinance as necessary to maintain identical provisions with the statewide standards.

Section 438-B(6) provides that, notwithstanding any provision in a local ordinance to the contrary, beginning January 1, 2013 rules adopted by the Bureau of Forestry under Title 12, section 8867-B will apply in all municipalities that have adopted an ordinance identical to the statewide standards in accordance with Option 2.

For those municipalities that choose option 2, these Guidelines contain timber harvesting standards that are based on the June 15, 2005 Bureau of Forestry Chapter 21 statewide standards (Section 15.O-1). Provisions for culvert sizing in this section 15.O-1 have been updated to comply with current NRPA standards, and a reference to Bureau of Forestry definitions for terms used in this section has been added. However, before a municipality adopts or amends this section they should consult with the Bureau of Forestry to get the latest version of Chapter 21. A municipality amending their own forestry standards, whether under Option 2 or Option 3, is required to coordinate with the Bureau of Forestry through the Title 12, section 8869, subsection 8 process to ensure that any local amendments are consistent with the statewide standards in effect at the time of the local ordinance amendments.

Option 3: The third option available to the municipality is to retain its current timber harvesting standards. Section 438-B(4) states:

A municipal ordinance regulating timber harvesting and timber harvesting activities that is in effect and consistent with state laws and rules in effect on December 31, 2005 continues in effect unless action is taken in accordance with (Option 1 or Option 2 above). A municipality that retains an ordinance with provisions that differ from the statewide standards shall administer and enforce that ordinance unless the municipality requests that the director (of the Bureau of Forestry) administer and enforce the ordinance and the director agrees with the request after reviewing the ordinance. The director may not administer or enforce any ordinance that is more stringent than or significantly different from the requirements of section 438-B(3). A municipality may not amend a municipal ordinance regulating timber harvesting and timber harvesting activities unless the process established in Title 12, section 8869, subsection 8 is followed. Beginning on (January 1, 2013), a municipality may not amend an ordinance regulating timber harvesting and timber harvesting activities in a manner that results in standards that are less stringent than or otherwise conflict with the statewide standards (Section 438-B(4)).

Option 3 municipalities may also amend their timber harvesting ordinances in accordance with section 15.O-1, but before a municipality amends their ordinance they should consult with the Bureau of Forestry to get the latest version of Chapter 21. A municipality amending their forestry standards, whether under Option 2 or Option 3, is required to coordinate with the Bureau of Forestry through the Title 12, section 8869, subsection 8 process to ensure that any local amendments are consistent with the statewide standards in effect at the time of the local ordinance amendments.

Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas (DEP Towns)

Maine Forest Service, DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
22 State House Station, Augusta, ME 04333

This information sheet is an overview of Statewide Standards. For specific details consult the actual rules.
http://www.maine.gov/dacf/mfs/policy_management/water_resources/sws/sws.html

What are statewide standards?

Statewide standards for timber harvesting in shoreland areas is a law that applies to water bodies and wetlands in certain organized towns. Statewide Standards apply in only those towns that have chosen to replace their own ordinance for timber harvesting in the shoreland zone town with statewide standards. For information on town ordinances see information sheet #5. For an up to date list of towns where statewide standards apply see: http://www.maine.gov/dacf/mfs/policy_management/water_resources/sws/sws.html.

Where does it apply?

Statewide standards for timber harvesting apply to the following areas:

- within 250 feet of
  - Great Ponds (waterbodies larger than 10 acres)
  - Rivers (downstream of the point where the watershed drains 25 square miles)
  - Tidal waters and coastal wetlands
  - Non-forested freshwater wetlands larger than 10 acres
  - Any size pond or freshwater wetland identified by the Department of Inland Fisheries and Wildlife as essential wildlife habitat
- within 75 feet of
  - Streams, downstream of the point where the watershed drains 300 acres
- adjacent to
  - Streams above the 300 acre drainage point; and, ponds or freshwater wetlands larger than 4,300 square feet but less than 10 acres that are not identified by the Department of Inland Fisheries and Wildlife as essential wildlife habitat.

What are the restrictions on timber harvesting and related activities?

Timber harvesting is allowed in shoreland areas covered by statewide standards, though there are restrictions on timber harvest levels, cleared openings, stream crossings, road construction and exposure of mineral soil.

1. In areas with 250' zones
   a. Harvesting of no more than 40 percent of the total volume of trees 4.5 inches DBH or greater in any 10 year period is permitted OR
   b. The residual stand must contain an average basal area of at least 60 square feet per acre of woody vegetation greater than or equal to 1.0 inch DBH, of which 40 square feet per acre must be greater than or equal to 4.5 inches DBH
   c. A well-distributed stand of trees which is windfirm, and other vegetation including existing ground cover, must be maintained;
   d. Within 75 feet, horizontal distance of the normal high water mark there must be no cleared openings. At distances greater than 75 feet, timber harvesting must not create single cleared openings greater than 14,000 square feet. Where openings exceed 10,000 square feet, they must be at least 100 feet apart.
2. In areas with 75' zones
   a. Harvesting of no more than 40 percent of the total volume of trees 4.5 inches DBH or greater in any 10 year period is permitted OR

b. The residual stand must contain an average basal area of at least 60 square feet per acre of woody vegetation greater than or equal to 1.0 inch DBH, of which 40 square feet per acre must be greater than or equal to 4.5 inches DBH

c. A well-distributed stand of trees which is windfirm, and other vegetation including existing ground cover, must be maintained;

d. There must be no cleared openings.

3. Adjacent to streams with watersheds draining less than 300 acres and ponds and non-forested wetlands >4300ft^2 but < 10 acres that are not significant wildlife habitat or essential wildlife habitat.
   a. Shoreline integrity must be protected.

Note: In all zones an alternative method, signed by a licensed forester or certified wildlife biologist may be proposed in an application to the Maine Forest Service (See Option 3 outcome based in MFS Chapter 21 rule.)

4. Slash must not be left within 50' of the normal high water line of Great Ponds, rivers, non-forested wetlands larger than 10 acres, and tidal waters, except slash actively used to protect soil from disturbance by equipment or to stabilize exposed soil. From 50 to 250 feet slash greater than 3" in diameter must be kept below 4' above the ground.
5. Streams may not be used as travel routes (unless frozen and undisturbed).
6. During harvesting shoreline integrity must be protected on all streams and wetlands greater than 4300ft^2.
7. Temporary crossing structures must be removed when the harvest is complete (or a soon a possible after snowmelt) and exposed soil must be stabilized.

Can roads be built in Shoreland Areas?

Roads can be built in shoreland areas but require minimum setbacks. These minimum setbacks increase with slope.

1. 100 feet from the normal high-water line of a Great Pond or a river that flows to a Great Pond, rivers draining more than 25 square miles, nonforested freshwater wetlands 10 acres or larger, any coastal wetland or tidal water, and any pond or freshwater wetland identified by the Department of Inland Fisheries and Wildlife as significant wildlife habitat or essential wildlife habitat.

2. 50 feet from the normal high water line of streams draining more than 300 acres but above the 25 square mile drainage point.

3. 25 feet from the normal high water line of streams draining less than 300 acres and ponds or freshwater wetlands larger than 4,300 square feet but less than 10 acres not identified by the Department of Inland Fisheries and Wildlife as significant wildlife habitat or essential wildlife habitat.

Roads and crossings must also:

1. Use a bridge or culvert below the 25mi^2 drainage point, temporary structure are permitted above the 25mi^2 drainage point.
2. Maintain natural stream flow, not block fish passage and not impound water.
3. Stream crossings approaches must divert runoff into vegetated filter strips, not directly into the waterbody.
4. Permanent crossings must be sized to have a capacity of 3X the cross-sectional area of the stream.

What about other land uses?

Timber harvesting does not include clearing land for development. These activities fall under a separate set of rules.

Where can I get more information or assistance with statewide standards?

Information, including maps of where statewide standards apply and a copy of the actual rule can be found on the Maine Forest Service website: http://www.maine.gov/dacf/mfs/policy_management/water_resources/sws/sws.html.
You can also contact the Maine Forest Service directly with questions.

For more information, please contact:
Maine Forest Service
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
22 State House Station
Augusta, ME 04333-0022
(207) 287-2791 or
1-800-367-0223
forestinfo@maine.gov

Be Woods Wise!
Practical advice for your land and trees from the Maine Forest Service

www.maineforestservice.gov