MEMORANDUM

PLANNING DEPARTMENT
TOWN OF CUMBERLAND, MAINE

Date: August 15, 2018

To: Cumberland Planning Board

From: Carla Nixon, Town Planner

Subject: OceanView at Cumberland Major Subdivision Final Review

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The applicants were hopeful that the MDEP permits would be issued by the meeting date, however that is not looking likely. There are still some outstanding engineering issues that need to be addressed so it will be likely that following the presentation and public hearing, the Board will need to table this until the September 18th meeting.

Date	August 15, 2018
To	Town of Cumberland Planning Board
From	Carla Nixon, Town Planner
Subject	**Major 52 Unit Major Subdivision, Final Review: OceanView at Cumberland – 277 Tuttle Road**

I. REQUEST/OVERVIEW:

The applicant is Oceanview at Cumberland, LLC. The applicant is requesting Final Subdivision Review of a proposed major subdivision; there will be 52 single family "cottage" homes and 1 community center. The project access point will be at 277 Tuttle Road, approximately 250' south of Town Hall. The project will be served by public water and sewer and natural gas. The parcels are shown on Tax Assessor Map R 04, lots 4E, 4B, 4D & 5 in the Rural Residential 1 (RR 1) zoning district. Frederic Licht, P.E. of Licht Environmental Design, LLC is the Applicant's representative. Jeffrey Read, P.E. of Sevee and Maher Engineers reviewed the plans for the Town of Cumberland.

II. PROJECT HISTORY:

Sketch Plan Review: 10/17/17

Site Walk: 11/3/17 (did not include the Allen property)

February 20, 2018: Preliminary Subdivision Review. Tabled by Board.

March 20, 2018: Preliminary Subdivision Review approved by Planning Board.

III. DESCRIPTION:

Parcel size: 36.56 acres

Net Residential Density: Not required for developments in the SHC Overlay district.

Proposed # of units: 52, plus a community center.

Zoning: Rural Residential 1 with a Senior Housing Community Overlay

Development Type: Clustered Subdivision Design

Right, Title or Interest: Applicant has closed on the 3 subject parcels and deeds have been submitted.

Min. Lot Size: RR 1 requires a 4 acre minimum lot size; the SHC Overlay requires a 5 acres minimum total parcel lot size. The proposed project site is 36.83 acres.

Setbacks: 20' between structures; 25' from edge of roads;

Parking: 2 spaces per unit required;

Buffering: 50' undisturbed buffer along entire perimeter of site.

Water & Sewer: Portland Water District

Electricity: Central Maine Power

Natural Gas: Summit Gas

Open Space: 20% required, 78% provided.

Wetlands: 12,700' of wetland fill (including stream crossings)

Trails: Shown on plans and reviewed by Lands & Cons. Comm.

Utilities: Underground electric, telephone, cable, gas, water and sewer from Tuttle Road.

Street Lighting: For street intersections and along roadways at "key locations".

Road: 22' wide paved main road (Little Acres Drive) will extend approximately 1500' from Tuttle Rd; with a 5'esplanade and 5'sidewalk on right side.
Road will be constructed to municipal standards for a Residential Sub-collector Road.
25 mph speed limit posted.

Homeowners Association: Draft homeowners' documents are required for final submission.

Floodplain Map Classification: Zone C – area of minimal flooding; Map # 230005C0536F

Fire Protection: Public water. 4 hydrant locations. Units to have sprinklers

Waiver Granted (2/21/18): To show trees over 10" in diameter.

Outside Agency Approvals Required:

Agency	Type of Permit	Status
MDEP	Site Location of Dev. Permit (SLODA)	
MDEP	NRPA Tier 1 permit	
US Army Corp of Engineers	(wetlands) permit	
MDOT	Traffic Movement Permit	
MDOT	Entrance Permit	On file, dated 3/16/18
Maine Natural Areas Program	Rare Botanical Data	Letter dated 5/25/17
Maine Historic Preservation Commission	Historic Properties	Letter dated 6/27/17
Maine Dept. Inland Fisheries & Wildlife	Habitat Data	Letter dated 6/14/17

IV. REVIEW COMMENTS:

DEPARTMENT HEAD REVIEWS:

William Longley, CEO: No comments

Police Chief Charles Rumsey: No comments

Fire Chief Small: The proposed automatic fire protection sprinkler systems must conform to the code requirements of the State of Maine Fire Marshal's Office. It is recommended, ***but not required***, to have monitored fire alarm systems in each residence. It is recommended, ***but not required***, to have fire department approved key boxes on each residence.

CUMBERLAND LANDS & CONSERVATION COMMITTEE: ***All comments have been addressed.***

TOWN PLANNER COMMENTS DATED AUGUST 13, 2018

Carla:
See responses below in blue. Please let us know if you have any additional comments.
Best
Rick

From: Carla Nixon [mailto:cnixon@cumberlandmaine.com]
Sent: Monday, August 13, 2018 2:24 PM
To: rick licht
Cc: Jeffrey Read
Subject: Planner's Comments for Ocean View

Hi Rick,
A few items to respond to please.
Thanks.
Carla

TOWN PLANNER'S REVIEW: 8-13-18:

1. Photometric plan missing. Light fixture locations are shown on plans and appear to be excessive with overhead street lights, front lawn pole lights and wall mounted lights at each unit door entrance. Night Sky concerns? Carla: We omitted Plan ES-1 Photometric Plan as an oversight. It was included in the Prelim Plan Set. See copy attached. The focus is indeed on Dark Sky ideals. The Beacon Full-Cut off Street Fixtures with LED lights meet the IDA cut off standards. The Individual driveway lights while not cut off are low wattage and provide ambient night lighting without creating a large "glare". The residents of OceanVIew Falmouth have found these to be pleasing. The wall mounts at the front entry are typical for any home and are recessed into the ceiling so there is no spillover and the other light fixture matching the post light is mounted at the garage. Again very subtle. The unit lights do not create spillover beyond the unit itself.
   We will add the Photometric Plan Es-1 to the Town Link for the Final Plan Submission.
2. Typos noticed in the following locations: Note 16 on S-4 ("does includes"); Sheets C33 and 34 (Portland Water District"). We will fix typos for the final Mylar. Thanks for picking up.
3. DOT Entrance Permit and Traffic Movement Permit: Status? Required? Attached. Submitted on March 16th. Copy Attached for ease of accessing.
4. On Sheet C1 there are small green circles shown with no legend reference. Meaning? These are simply surveyed pine trees (Along Tuttle Road and the beginning of Little Acres Drive) as a file layer. Not important to the Phasing plan.
5. On Sheet C 2, what do orange dashes depict? The orange dashes are the 6-8 foot Trail Type C shown on the Trail and Walk Masterplan C-12. Also the Green Dash refers graphically to the Snowmobile/multi use trail type F on the Trails plan C-12.
6. Note 11 on S-4 does not include all the roads in the subdivision as requiring access and utility easements. Why? The note references the streets which have utility easements for the various utility companies (Summit NG, CMP, TWCTV, Fairpoint and PWD) Each street is noted with the width of the easement and noted that PWD does NOT require easements on Ivy, Azalea, Honeysuckle and Lilac). **Perhaps we should remove the word "Access" and just leave as "Utility" easements and reference the access easement over the 490 ft +/- of the Allen Front lot separately as there are no real access easements over the roads as the internal roads and drives are private and under the ownership of OV at Cumberland LLC and residents have full use of all of the underlying land.

TOWN ENGINEER'S REVIEW: Jeffrey Read, P.E., Sevee & Maher Engineers. 8-15-18:

As requested, Sevee & Maher Engineers, Inc. (SME) has completed a review of the comment responses submitted for the final application for a Major Subdivision and Site Plan for the proposed OceanView at Cumberland senior living community located off Tuttle Road. This submission is identified by the applicant as Revised Final Subdivision Plan Submittal. The application materials received by SME were prepared by LICHT Environmental Design, LLC (LICHT), and consist of the following:

- Cover letter report by Frederic Licht, P.E., L.S.E, dated July 31, 2018;
- Major Subdivision Final Plan Review Checklist;
- MEDEP and US ACOE emails;
- Exhibits 1 through 8 prepared by LICHT outlining the Tax Map Locus; Conveyance Plan; Right, Title & Interest; Snowmobile Trail License Draft; Utility Letters; Stormwater Maintenance Agreement; lighting cut sheets; and response to SME comments from March 12, 2018;
- Final Subdivision Plans, Revision 6, dated July 31st, 2018;
- Stormwater Management Report dated March 1, 2018;
- Pre-Development Drainage Plan dated May 4, 2018; and
- Post-Development Drainage Plan dated June 15, 2018.

PROJECT DESCRIPTION

The Applicant received Preliminary Major Subdivision approval on March 20, 2018 for a 52-unit senior living facility on a combined 36.83-acre parcel currently owned by Richard Doane and Laurence Allen. The parcel is located off Tuttle Road in Cumberland, across the street from the Town of Cumberland (Town) Municipal Office. The development will be accessed by a proposed private roadway constructed in accordance with Town residential sub-collector roadway standards as outlined in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code. The subdivision will be served with public utilities, including water, sewer, natural gas, electric, telephone, and cable.

PEER REVIEW COMMENTS DATED MARCH 12, 2018

The project was reviewed as a Major Subdivision as outlined in Chapter 250 - Subdivision of Land of the Town of Cumberland Ordinances, most recently amended and adopted on January 12, 2011, and Chapter 229 - Site Plan Review, most recently amended and adopted on March 26, 2012. The comments and responses below relate to the appropriate Ordinance Sections.

Chapter 250: Subdivision of Land

SME has reviewed comment responses provided by the Applicant and applicable sections of Chapter 250 and has provided comments for those sections not found to be addressed by the Application. The remaining sections have been reviewed and found to comply with Chapter 250 requirements.

Section 250-1(P) – River, stream or brook

1. There are two stream crossings associated with the proposed development. Please submit additional detail regarding the proposed construction, including any State or Federal Permit approvals, for review prior to final approval.

   The Applicant intends to provide vendor supplied design details for wall construction prior to installation. Permit applications are currently under review by MEDEP. The USACOE permit was received on August 14, 2018.

Section 250-19 – Review and approval by other agencies

2. SME understands the following permit applications are underway for the project and applications will be filed with appropriate agencies following submittal of the preliminary subdivision and site plan application:

   - Maine Department of Environmental Protection (MEDEP) Site Location of Development Act (SLODA) permit,
   - MEDEP Natural Resources Protection Act (NRPA) Tier 1 permit for proposed wetland impacts,
   - Cumberland County Soil and Water Conservation District (CCS&WCD) stormwater and erosion control review, and

   Where review and approval of any subdivision or site plan by any other governmental agency is required, approvals shall be submitted to the Planning Board in writing prior to the submission of the final plan.

   MEDEP SLODA and MEDEP NRPA permit applications are currently under review by MEDEP.

Section 250-27 – Utilities

3. Design details for utility pipes and conduits are not included in the project plan set. SME recommends sizes of all utilities pipes and additional design information be provided with the final plan application.

   There are some overlapping tables on sheet C-13A. Please verify the Pipe Table is complete and not missing any information.

<u>Chapter 229: Site Plan Review</u>

SME has reviewed the application for conformance with the applicable sections of Chapter 229 and has no further comment.

<u>General Comments</u>

4. Erosion Control Notes C16 – SME recommends the applicant update the Construction Plan Notes to reflect the current project.

5. *SME recommends the applicant update the Construction Plan Notes to reflect the current project schedule.*
6. Misc. Details C19 – SME recommends the applicant update the Trench Repair Detail to reflect current Town pavement sections.

7. *SME recommends the trench repair and pavement butt joint details be adjusted to reflect Town standards.*

8. Stormwater Management Report, Page 4, Focal Point Proprietary System – This section references 500 feet of gutter line flow. Section 250-40, B(4) outlines 300 feet as the maximum length for stormwater in a street gutter prior to intake at a catch basin. SME recommends the Applicant adjust the length of flow or request a waiver prior to final approval.

9. *Gutter line between CB-2A and CB-3 exceeds 300 feet. SME Recommends the Applicant address this item prior to final approval.*

10. Stormwater Management Report, Page 4, Forested Buffer – Please verify that wetland buffers outlined on the plan qualify as stormwater treatment based on length, grade and soil type. If approved for treatment by MEDEP, SME recommends adding required sign details and boundary information to the plan set.

11. *It is not clear if the DEP Forested Buffers outlined on the Subdivision Plat qualify as stormwater treatment based on length, grade and soil type. We anticipate MEDEP will require this prior to issuance of the SLODA permit.*

12. Stormwater Management Report, Page 5, Arctic Fox Wet Pond Design Criteria – Please verify above pool and below pool treatment volume calculations.

13. *SME Recommends the Applicant address this item prior to final approval.*

14. Stormwater Management Report, Page 6, Mallard Way Wet Pond Design Criteria – Please verify above pool and below pool treatment volume and provided storage calculations.

15. *SME Recommends the Applicant address this item prior to final approval.*

16. Stormwater Management Report, Page 7, Post Area Summary and General Standard Calculation – Please verify total area calculations. The sum of component areas does not appear to match the total area.

17. *SME Recommends the Applicant address this item prior to final approval.*

18. Exhibit 3 – Please update site footprint to reflect inclusion of the Allen Property.

19. *SME recommends the Applicant address this item prior to final approval.*

20. Pre-Development Drainage Plan – SME recommends the plan be updated to include the full drainage area and subcatchment boundaries, soil boundaries, and topography outside the project area. Labels for 18R and 55R are missing from the plan sheet.

21. *SME Recommends the Applicant address this item prior to final approval.*

22. Post Development Drainage Plan – SME recommends the plan be updated to include the full drainage area and subcatchment boundaries, soil boundaries, and topography outside the project area. Labels for 15S, 51S, and 51P are missing from the plan sheet.

23. *SME recommends the Applicant address this item prior to final approval.*

24. The gravel trench outlets for Mallard Way and Arctic Fox Drive wet ponds are not modeled. SME will complete a more thorough review with the final plan submission.

25. *SME Recommends the Applicant address this item prior to final approval.*

26. The elevations for the Cultec separator row are not consistent with the stormwater model. SME will complete a more thorough review with the final plan submission.

27. *SME Recommends the Applicant address this item prior to final approval.*

New Comments

28. On sheet S-1 and throughout the plan set, the proposed multi use trail is shown passing through the DEP Meadow buffer for stormwater treatment. According to MEDEP standards, 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.

29. On sheet C-8, Little Acres Drive profile section at STA 38+75 appears to have some information overlaid onto the profile section that makes that portion of the plan difficult to interpret. Please clarify.

30. On sheet C-9, Low Station and Low Elevation information are missing at STA 51+84.47 and STA 58+09.32.

31. On sheet C-10, Low Station and Low Elevation information are missing at STA 43+45.6.

32. Sheet C-9 does not include a plan view for Azalea Lane.

33. Sheet C-13, Road Construction Note 4, SME recommends the Applicant provide additional information for fabric under road base when clay is encountered.

34. Sheet C-13, Verizon Notes should be coordinated with utility providers outlined on Sheet C-0.

35. Sheet C-13, the bituminous concrete walk detail does not conform to Town performance standards outlined in Section 250, Attachment 2, Table 3. Please update the pavement materials and thicknesses to reflect current Town standards.

36. Sheet C-13A, the bottom of the Pipe Table appears to be cut off. Please verify there is no information missing.

37. Sheet C-14, SME recommends the Typical Stormwater Buffer Sign identify the area as a stormwater buffer and include a note to outline size and spacing requirements per MEDEP standards.

38. Erosion Control Notes C16 – SME recommends the applicant update the Construction Plan Notes to reflect the current project schedule.

39. Sheet C-28, R-Tank dimensional data for FP-2 is incomplete.

40. The plan set submitted to the Town should be updated to include copies of plan sheets C-28, C-29, and C-30 signed and sealed by a registered professional engineer.

41. Throughout the plan set, a significant amount of information is overlaid on top of other information, making it difficult to interpret stationing, utility information, site layout, etc. SME recommends revising the plans to provide clear, consistent information.

Please call me with any questions, or if you would like, I could meet with you to discuss our comments.

Sincerely,
SEVEE & MAHER ENGINEERS, INC.

Jeffrey T. Read, P.E.
Civil Engineer/Project Manager

V. SUBDIVISION REVIEW:
PROPOSED FINDINGS OF FACT - Chapter 250 - Subdivision of Land

The purpose of these standards shall be to assure the comfort, convenience, safety, health and welfare of the people, to protect the environment and to promote the development of an economically sound and stable community. To this end, in approving subdivisions within the Town of Cumberland, Maine, the Board shall consider the following criteria and before granting approval shall determine that the proposed subdivision:

1. Pollution. The proposed subdivision will not result in undue water or air pollution. In making this determination, it shall at least consider:
   A. The elevation of the land above sea level and its relation to the flood plains;
   B. The nature of soils and subsoil and their ability to adequately support waste disposal;
   C. The slope of the land and its effect on effluents;
   D. The availability of streams for disposal of effluents; and
   E. The applicable state and local health and water resource rules and regulations;

The parcel is above sea level and not within a floodplain. The project will use public water and sewer. A groundwater impact assessment was provided by the applicant and reviewed and approved by the Town Engineer.

Based on the information provided, the standards of this section have been met.

2. Sufficient Water. The proposed subdivision has sufficient water available for the reasonable foreseeable needs of the subdivision;

The subdivision will be served by public water. There is a letter on file, dated July 31, 2018, from the Portland Water District stating the District's ability to serve the proposed project.

Based on the information provided, the standards of this section have been met.

3. Municipal Water Supply. The proposed subdivision will not cause an unreasonable burden on an existing water supply, if one is to be used;

The subdivision will utilize a municipal water source. There is a letter on file, dated July 31, 2018, from the Portland Water District stating the District's ability to serve the proposed project.

Based on the information provided, the standards of this section have been met for preliminary plan approval.

4. Erosion. The proposed subdivision will not cause unreasonable soil erosion or a reduction in the land's capacity to hold water so that a dangerous or unhealthy condition results;

The applicant has submitted an erosion and sedimentation control plan that is consistent with the current Maine Erosion and Sediment Control Best Management Practices. This plan has been reviewed and approved by the Town Engineer.

Based on the information provided, the standards of this section have been met.

5. Traffic. The proposed subdivision will not cause unreasonable highway or public road congestion or unsafe conditions with respect to the use of the highways or public roads existing or proposed;

A traffic study was performed by Maine Traffic Resources and reviewed and approved by the Town Engineer. An MDOT Entrance permit is required for final plan submission.

Based on the information provided, the standards of this section have been met for preliminary plan approval.

6. Sewage disposal. The proposed subdivision will provide for adequate sewage waste disposal and will not cause an unreasonable burden on municipal services, if they are utilized;

The project will utilize public sewer. A letter indicating there is sufficient capacity is on file from both the Portland Water District and the Town of Falmouth. There is a letter dated 5/22/18 from Town Manager Bill Shane stating that the Town agrees to accept the sewer design flow from the project. A charge of $500 for each of the units will be charged to the applicant.

Based on the information provided, the standards of this section have been met for preliminary plan approval.

7. Municipal solid waste disposal. The proposed subdivision will not cause an unreasonable burden on the municipality's ability to dispose of solid waste, if municipal services are to be utilized;

Cumberland provides curbside trash collection and recycling through a contracted waste hauler. Based on a conversation with the Director of Public Services, the addition of 52 new homes will not cause a burden on the municipality's ability to dispose of solid waste.

Based on the information provided, the standards of this section have been met.

8. Aesthetic, cultural and natural values. The proposed subdivision will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites, significant wildlife habitat identified by the Department of inland Fisheries and Wildlife or the municipality, or rare and irreplaceable natural areas or any public rights for physical or visual access to the shoreline;

Letters are on file from the relevant state agencies stating that the subdivision will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites, significant wildlife habitat or rare and irreplaceable natural areas.

Based on the information provided, the standards of this section have been met.

9. Conformity with local ordinances and plans. The proposed subdivision conforms to a duly adopted subdivision regulation or ordinance, comprehensive plan, development plan or land use plan, if any. In making this determination, the municipal reviewing authority may interpret these ordinances and plans;

   The plans have been reviewed by the town planner, the town engineer and town department heads. There are outstanding issues that have been raises by the Town Planner and Town Engineer.

   Based on the information provided, the standards of this section have not yet been met.

10. Financial and technical capacity. The subdivider has adequate financial and technical capacity to meet the standards of this section;

    Technical capacity is evidenced by the use of the following experts: a professional engineer, a licensed land surveyor, a traffic engineer and a licensed soils scientist.

    Evidence of financial capacity is evidenced by a letter dated 12/20/17 from SIS Bank stating that developer has solid financial capacity and that the bank has approved financing for the acquisition, infrastructure development, and home construction for the project.

    Based on the information provided, the standards of this section have been met for preliminary plan approval.

11. Surface waters; outstanding river segments. Whenever situated entirely or partially within the watershed of any pond or lake or within 250 feet of any wetland, great pond or river as defined in Title 38 chapter 3, subchapter I, article 2-B, the proposed subdivision will not adversely affect the quality of that body of water or unreasonably affect the shoreline of the body of water;

    The proposed subdivision will not adversely affect the quality of the mapped wetlands or unreasonably affect the shoreline of the stream on the parcel. Plans include a MEDEP 75' stream setback to protect the resource.

    Based on the information provided, the standards of this section have been met.

12. Ground water. The proposed subdivision will not alone, or in conjunction with, existing activities, adversely affect the quality or quantity of ground water;

    The project will not utilize any groundwater from wells. Infiltration of stormwater is limited to the installation of BMP's along the access road which meet all DEP standards for treatment of stormwater prior to discharge of groundwater.

    Based on the information provided, the standards of this section have been met.

13. Flood areas. Based on the Federal Emergency Management Agency's Flood Boundary and Floodway Maps and Flood Insurance Rate Maps, and information presented by the applicant whether the subdivision is in a flood-prone area. If the subdivision, or any part of it, is in such an area, the subdivider shall determine the 100-year flood elevation and flood hazard boundaries within the subdivision. The proposed subdivision plan must include a condition of plan approval requiring that principal structures in the subdivision will be constructed with their lowest floor, including the basement, at least one foot above the 100-year flood elevation;

    The parcel is shown on FEMA floodplain maps as being in Zone C (area of minimal flooding).

    Based on the information provided, the standards of this section have been met.

14. Storm water. The proposed subdivision will provide for adequate storm water management;

A stormwater management plan was submitted as part of the application packet and has been reviewed and approved by the Town Engineer for conformance with Chapter 250-38 of the Cumberland Subdivision Ordinance. The stormwater plan is being reviewed by the MDEP.

Based on the information provided, the standards of this section have not yet been met.

15. Freshwater wetlands. All potential freshwater wetlands, as defined in 30-A M.R.S.A. §4401 (2-A), within the proposed subdivision have been identified on any maps submitted as part of the application, regardless of the size of these wetlands. Any mapping of freshwater wetlands may be done with the help of the local soil and water conservation district.

    All wetlands within the proposed subdivision have been delineated and mapped by Mark Hampton Associate, Inc. and shown on the project plans. A DEP Tier 1 permit has been requested for the disturbance to the wetlands.
    Based on the information provided, the standards of this section have not yet been met.

16. River, stream or brook... Any river, stream, or brook within or abutting the proposed subdivision has been identified on any map submitted as a part of the application. For purposes of this section, "river, stream or brook" has the same meaning as in Title 38, Section 480-B, Subsection 9. [Amended; Effective. 11/27/89]

    There is a stream on the property which is depicted on the plans.
    Based on the information provided, the standards of this section have been met.

X. STANDARD CONDITIONS OF APPROVAl:

This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted by the applicant. Any variation from the plans, proposals and supporting documents, except deminimus changes as so determined by the Town Planner which do not affect approval standards, is subject to review and approval of the Planning Board prior to implementation.

XI. LIMITATION OF APPROVAL:

Construction of the improvements covered by any site plan approval must be substantially commenced within twelve (12) months of the date upon which the approval was granted. If construction has not been substantially commenced and substantially completed within the specified period, the approval shall be null and void. The applicant may request an extension of the approval deadline prior to expiration of the period. Such request must be in writing and must be made to the Planning Board. The Planning Board may grant up to two (2) 1 year extensions to the periods if the approved plan conforms to the ordinances in effect at the time the extension is granted and any and all federal and state approvals and permits are current.

LICHT
ENVIRONMENTAL DESIGN, LLC

July 31, 2018 (Via Delivery & Email) J16.084

Carla Nixon, Town Planner
Town of Cumberland
290 Tuttle Road
Cumberland, Maine 04021

OceanView at Cumberland, Tuttle Road, Cumberland
FINAL SUBDIVISION PLAN SUBMISSION
(Map R04 Parcels 4B, 4E and 5)

Dear Carla:

On behalf of OceanView at Cumberland LLC, we are pleased to present for staff and Planning Board review, a ***Final Subdivision Application and Plans dated July 31st, 2018*** for the development of the "*OceanView at Cumberland*" active senior community located at 277 Tuttle Road across from the Town Hall and Town Forest property.

This submission includes the following materials; (3 hard copies and PDF Copies)

- Cover Letter Report
- Major Subdivision -Final Plan Review Checklist Appendix I
- DEP and Corps of Engineers Emails re: Permitting
- Exhibit-1 Tax Map Locus-Project Parcels
- Exhibit -2 Conveyance Plan (Reduced Copy)
- Exhibit -3 Right, Title & Interest - Deeds
- Exhibit -4 Snowmobile Trail License Draft
- Exhibit -5 Utility Serviceability Letters
- Exhibit -6 Stormwater Maintenance Agreement
- Exhibit -7 Lighting Cuts
- Exhibit -8 Responses to Sevee and Maher Comments
- Final Subdivision Plans, OceanView at Cumberland, Tuttle Road, Cumberland, Maine prepared by Belanger Engineering and Licht Environmental Design, LLC Revised 07-31-18.

1. BACKGROUND:

The project received Preliminary Major Subdivision approval on March 20, 2018 for a 52-unit senior community with a community center. No waivers were requested nor granted for Preliminary Approval. In the interim months since Preliminary Approval the project has undergone a number of refinements to satisfy Final Major Subdivision submission. Each of the project updates are described below and in the accompanying Exhibits, however a general summary of updates are as follows:
(Note- within this document use of the terms "OceanView at Cumberland, LLC " and "OceanView" shall have the same meaning as OceanView at Cumberland, LLC.)

1. *Right, title and Interest* – OceanView at Cumberland, LLC has executed the prior Purchase and Sale Options and closed on the three subject parcels or portions of parcels and properties included within the project scope. The overall project acreage and areas are described in detail below to update the Planning Board. Refer to *Exhibit 3* for deeds.

2. *Plan Design Changes* – The design team has spent the interim period following Preliminary Approval working closely with the DEP and Corps of Engineers through their respective permitting processes. The accompanying plans provide several key project detailed refinements as described below. However the overall plan design and program has not changed. (Refer to items 7 and 9 below for further information.)

3. *DEP and U.S. Army Corps of Engineers (Corps) Permitting* – The DEP and Corps of Engineers are completing permit reviews and all comments to date have been addressed by the applicant's team. We have submitted, attached to this cover letter, copies of emails from both agencies indicating that the applications are under review however final drafting of permits has not yet been completed. We understand that the Town of Cumberland will not provide final plan approval without receipt of final agency permits. To that end we are working closely with the agencies to have permits issued as soon as possible so that final plan approval can be granted.

   The project will be subject to the MDIF&W and Corps "window" for stream culvert installation – requiring installation of culvert #1 on Little Acres Drive to be installed by October 1st. The applicant's team is working closely with the DEP and the site contractor to plan for a potentially tight window of time to install the culvert once final permits are issued to provide access to Phase 1 of the project for the 2018-19 construction season.

4. *Utility Extensions and Serviceability*- The project team has been working closely with the various utility companies to complete final utility designs and secure letters of serviceability. Final utility information is included herein.

2. RIGHT TITLE & INTEREST – AMENDMENTS TO ORIGINAL APPLICATION:

The applicants have worked closely with Richard Doane (Map R04 Portions of Parcels 4B 4D and 4E) and Laurence and Beverly Allen (Map R04 Parcel 5) to satisfy conditions of the purchase and sales agreements provided to the Town with the Preliminary Submission. The final plans and *Exhibit 1 Tax Map Locus* and *Exhibit 2 –Conveyance Plan* reflects the following minor adjustments to the project area. *Exhibit 3* contains copies of the executed property deeds. Refer also to the Subdivision Plats Sheets S1-S4 for detailed information.

a. The main development parcel (portion of Map R04 Parcel 4E) has been acquired from Richard W. Doane and recorded in the CCRD Book 24876 Page 194 in June, 2018. The acreage of this parcel is 30.99 acres.

b. Negotiations with Richard Doane resulted in the slight re-alignment of the Little Acres Drive such that the prior full length 50-foot access and utility easement over the former Maine Central Railroad bed has been reduced to require only the conveyance of a small (0.22 acre) portion of said railroad ROW to OceanView at Cumberland. That conveyance was recorded

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in a deed from Richard and Hillary Doane to OceanView at Cumberland, LLC and recorded in the CCRD Book 34876 Page 192.

c. The division of the Allen Lot (Map R04-05) has been executed and the deed from Laurence Allen to OceanView at Cumberland, LLC recorded in Book 34876 page 184. The Allen's conveyed 5.35 acres in the rear of their 8.64 acre lot to OceanView and retained a 3.29 acre lot fronting on Tuttle Road and Little Acres Drive. The plan to provide a 50-foot by 450 foot right of way from Tuttle Road as a part of the OceanView property has been revised to a 50 foot access and utility *easement* over the new front Allen Lot. Review with the Codes Enforcement Officer determined that a right of way would have created a corner lot for the Allen lot and there would be less than the required 200 feet of frontage on Tuttle Road with the dedication of a 50 foot right of way to OceanView. The final plans, deed and *Exhibit 2* provide an easement granted from Allen to Oceanview over the 3.29 acre front Allen lot.

d. The applicant has reserved within the 50 foot access and utility easement the rights for Richard Doane to access the adjacent lot R04-4D with a single driveway for future potential single family residences on lots 4D and/or 4B. (Refer to Subdivision Plat Sheet S1).

e. The plans have removed reference to any formal landscaping buffers on the Doane properties (Map R04 Parcels 4B and 4D). Instead, the applicants and Richard Doane have provided separate agreements to provide infill landscaping and buffering to be field located during construction. (These areas on the west side of Little Acres Drive are already wooded – the additional plantings have been negotiated as additional buffering.)

f. The project no longer includes any portion of Map R04 Parcel 4D (Richard W. Doane)

The revised project acreage is as follows:

• Doane rear parcel 04E	30.99 acres
• Right of Way Doane parcel 04B to OceanView	0.22 acres
• Allen lot parcel 5 to OceanView	5.35 acres
Total acreage (fee)	36.56 acres
• 50 foot access and utility easement over Allen	0.53 acres
Total Project Area (fee and easement)	**37.09 acres**

3. SNOWMOBILE TRAIL LICENSE:

The applicants have worked closely with the Town Manager, Lands and Recreation Committee and Snow Skimmers Snowmobile Club to provide a snowmobile/multi-use path connection along the southeastern property line. A license agreement (*Exhibit 4*) has been drafted and reviewed with the Town Manager and will be executed following project approvals.

The license provides for reasonable use of this section of trail by the public and for provisions to resolve conflicts or uses resulting in adverse impacts to OceanView residents. OceanView has agreed to fund the construction of this section of trail for up to $10,000 and work with the Town on construction and maintenance. The project will also provide additional buffer planting along sections of this trail to provide additional privacy to the adjacent cottages as shown on Plan C12 – Landscaping Plan.

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Refer also to the Trail and Walkway Masterplan, plan sheet C12 and the Landscaping Plan, sheet C11A for the trail location and proposed buffer plantings along the trail.

4. PROJECT PHASING:

The project phasing plan, Sheet C1 provides a six (6) phased project for purposes of marketing of units. However, the infrastructure is expected to be installed over a three (3) year period in either two (2) or three (3) phases commencing in the fall of 2018, following permit approvals. The general infrastructure phasing is planned as follows:

Phase 1A – Install water main tap Tuttle Road and Little Acres Drive (Completed June 2018)

Phase 1 –Little Acres Drive (Station 10+00 to 28+50, Periwinkle Drive Ivy Lane and Honeysuckle Way, Wet Pond 1, Stream Crossing 1 and associated infrastructure. Units 1-20. Phase 1 will utilize the existing Allen residence and provide temporary power as Little Acres Drive is constructed and the Allen's complete construction of their new home on the front Allen 3.29 acre lot over the summer and late fall of 2018. The existing Allen residence may be used as a temporary sales and construction office or removed as the project progresses to provide for Units 50-52 construction. (2018-2019.)

Phase 2 – Little Acres Drive Station 28+50 to 29+43, Mallard Way and Lilac Way, Wet Pond 2 and associated infrastructure. Units 21-35. (2019-2020.)

Phase 3 – Mallard Way and Azalea Lane and associated infrastructure. Units 36-49 and 50-52. (2020-2021.)

Trail construction phasing will be coordinated based on project infrastructure phasing and occupation of units and completion of the various neighborhoods.

5. UTILTY SERVICEABILITY:

Final letters of serviceability from the Portland Water District (PWD), Central Maine Power Company (CMP), Summit Natural Gas and the Town of Cumberland are included in *Exhibit 5*.

Easements have been shown on the Subdivision Plat and engineering plans over the private roadways for the respective utilities. The water distribution system will be constructed in phases conveyed to PWD as a public utility through a Portland Water District Main Extension Agreement and Easement.

The CMP design plan for the project has been included at the end of the plan set and final transformer locations shown on plan sheets C3-C10.

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6. **STORMWATER AGREEMENT MS-4:**

A draft copy of the Town Stormwater Agreement is attached in *Exhibit 6*. The applicant intends to contract with a third party, Ross Cudlitz, PE for annual inspections and reporting. The stormwater system including two wet ponds will be private and maintained by OceanView at Cumberland, LLC.

7. **UNIT DRIVEWAY POST –LIGHITNG CUTS:**

Site lighting has been shown on the previous Photometric Plan ES-1. The standard cut-off-LED Beacon® site fixtures provided in the Preliminary Submission are attached for convenience in *Exhibit 7 –Lighting Cuts.* Additionally each unit will have a decorative driveway light similar to the Falmouth project mounted on a granite or similar post and also building mounted on the front of each unit. The lighting cuts for these fixtures have been added in *Exhibit 7* as well. These are small decorative lights and while not formally cut-off style, are low wattage and very attractive. The residents of OceanVIew Falmouth have found these to fit well within their neighborhoods.

8. **SEVEE & MAHER FEBRUARY 12, 2018 PEER REVIEW COMMENTS:**

The majority of the Sevee and Maher comments were addressed at the Preliminary Plan approval submission. Outstanding items for Final Plan review are addressed in *Exhibit 8*.

9. **PLAN REVISIONS:**

The Final Subdivision plans dated July 31, 2018 include an additional level of detail commensurate with final plan submission to comply with the Town of Cumberland Appendix I Final Plan Checklist and Chapter 250-7.D Final Plan and Article IV Design Improvement requirements. A summary of overall plan changes including responses to agency review comments follows:

a. Little Acres Road Alignment (Stations 15+00 to 28+00) – the road was shifted 5-10 feet to the east at the Culvert #1 crossing and approach stations to save specific trees requested by Richard Doane resulting also in a reconfiguration of the curve and alignment from Station 22+00 to 28+00. In response to DEP Comments the road “sag” at culvert 1 was also revised to shift the location of the Focal Point stormwater treatment systems to be further away from the stream. The system was reconfigured and located on the right side of the road only. Refer to plan sheets C6, C7 and C27.
b. Culvert Designs- After evaluation of constructability with the site contractor the two stream crossing culverts (#1 and #2) were changed from open pipe arches to pre-cast box culverts buried with 2 feet of substrate in the bottom in accordance with Corps of Engineers requirements. Refer to plan sheets C20 and C21.
c. Utility Designs – The plans have undergone final utility design with the respective utility companies. The water main on Little Acres Drive has been increased from an 8 to a 12 inch main and the main on Mallard Way reduced to a 4 inch main per PWD recommendations. Additional valving and details have been added to the plans together with CMP transformer and pull box locations.
d. Stormwater Management– The plans reflect minor modifications to the two wet ponds in response to DEP comments. A level spreader and DEP meadow buffer have been added

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behind Unit 52 to treat stormwater from a portion of Little Acres Drive and Units 50-52. The Focal Point treatment system was revised as noted above and a culvert added at the project entrance.

e. Buffers – the plans have been updated to clearly label several key buffers–the 100 foot MDIFW stream Buffer, the DEP Forested Stormwater Buffer Areas and a DEP Meadow Buffer located with a level lip spreader behind Unit 52. Additionally tree lines and limits of cutting have been further refined.
f. Trails – Plan C12 –Trail and Walkway Masterplan, has been updated to reflect the location of the snowmobile trail and adjustments to several hiking trails near wetlands.
g. Crosswalk at Tuttle Road – Plan C3 indicates a crosswalk and ADA ramps on either side of Tuttle Road at the project entrance. The Town sidewalk project has incorporated the ADA ramp on the south side of Tuttle Road this summer. The project will complete the crosswalk and signage during Phase 1 or 2 of the project. We understand through communication with the MDOT that this crosswalk can be approved by the Town of Cumberland.
h. Road Names – Road names have been approved and added to the plans.

10. SUMMARY:

We believe that the submitted materials address the Town of Cumberland requirements for final plan review and approval. Should you have any further comments please do not hesitate to contact me. On behalf of our entire project team we look forward to meeting with the Planning Board at the August 21st meeting to present the project in further detail.

Sincerely,

Frederic (Rick) Licht, PE, LSE
Principal

Encl: As Noted

Cc: Matt Teare; OceanView at Cumberland LLC
Chris Wasileski: OceanView at Cumberland LLC
Christian Haynes; OceanView at Cumberland LLC
David Haynes; SeaCoast Management Company
Chris Belanger; Belanger Engineering
Rex Croteau; Titcomb Associates
Scott Anderson; Verrill-Dana

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SUBDIVISION OF LAND

Appendix I
Application Checklist
Major Subdivision – Final Plan Review

Proposed subdivision name OCEANVIEW AT CUMBERLAND

Applicant name OCEANVIEW AT CUMBERLAND, LLC

Owner name OCEANVIEW AT CUMBERLAND, LLC

	Check When Satisfactory		Indicate Date When Satisfactory
	Applicant	**CEO**	**Planning Bd.**
1. 1~~0~~ 3 copies of final plan and accompanying materials & PDF FILE	✓		
2. Title	✓		
3. Scale	✓		
4. North arrow	✓		
5. Date of plan	✓		
6. Name, address and signature of owner	✓		
7. Name, address and signature of subdivider	✓		
8. Name, address and signature of licensed engineer, land surveyor, architect or planner	✓		
9. Names of adjoining property owners or subdivisions	✓		
10. Check for conformity with preliminary plan	✓		
11. Dimensions and bearings of property being subdivided	✓		
12. Location, names and widths of existing and proposed streets	✓		
13. Location and names of existing and proposed parks, playgrounds and other public areas	✓		

14. Lot lines and accurate dimensions and bearings or angles	✓		
15. Lot areas	✓		
16. Building setback lines	✓		
17. Curve data	✓		
18. Location, description and size of all monuments	✓		
19. Certification by agencies as required	PENDING (See DEP/CORPS emails)		
20. Restrictive covenants	✓ DEP COVENANTS		
21. Street plans and profiles	✓		
22. Typical cross sections of street pavements, including curbs and gutters, sidewalks, manholes and catch basins	✓		
23. Landscaping	✓		
24. Plan and profiles showing location, size and invert elevations of existing and proposed sanitary sewers and storm sewers	✓		
25. Plan and profiles showing location and size of all waterlines, gas lines, and other underground utilities and structures	✓		

To the Applicant:

If you are requesting a waiver from a particular requirement or you do not feel that the requirement is applicable to your proposed project, please place an asterisk (*) in the space and explain your reasons in the space below or on attached sheets.

From: Bergeron, Mark
To: Carla Nixon
Cc: rlicht@securespeed.net; Stebbins, Mark N; Sirois, Alison; Woodruff, Christine
Subject: OceanView project
Date: Tuesday, July 31, 2018 12:01:12 PM

Hi Carla-

It's nice to see a familiar name again. I hope all is well with you.

The applicant has requested that we provide an update of where DEP's review stands for the application review of the OceanView project. The Department received a Site Location of Development application and a Natural Resources Protection Act application on February 18, 2018 for the OceanView project in Cumberland. The Department accepted these applications as complete for processing on March 3, 2018, making the statutory deadline September 10, 2018 as to when the Department needs to make a decision. This email confirms that the Department is diligently reviewing these applications, but due to our very heavy workloads, we are not able to issue a decision before our statutory deadline of September 10.

Please contact me if you have any questions.

Thank you.
Mark Bergeron, P.E.
Director, Bureau of Land Resources
Maine Department of Environmental Protection
(207) 215-4397
www.maine.gov/dep

From: Clement, Jay L CIV USARMY CENAE (US)
To: rick licht
Subject: RE: [Non-DoD Source] OceanView at Cumberland DEP and Corps Permits
Date: Wednesday, July 25, 2018 4:17:44 AM

Not this week Rick, too many in front of it and too much field time this week. Perhaps next week.

Jay

-----Original Message-----
From: rick licht [mailto:rlicht@securespeed.net]
Sent: Monday, July 23, 2018 12:03 PM
To: Clement, Jay L CIV USARMY CENAE (US) <Jay.L.Clement@usace.army.mil>
Subject: FW: [Non-DoD Source] OceanView at Cumberland DEP and Corps Permits

Hi Jay:

Was out last week and just checking in to see if permit may be issued this week? Thanks for any updates you can provide.

Best

Rick Licht

Frederic (Rick) Licht, PE, LSE
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039
(v) 207.749.4924
lichtenvironmentaldesign.com

-----Original Message-----
From: rick licht [mailto:rlicht@securespeed.net]
Sent: Friday, July 13, 2018 7:52 AM
To: 'Clement, Jay L CIV USARMY CENAE (US)'
Subject: RE: [Non-DoD Source] OceanView at Cumberland DEP and Corps Permits

Great thanks Jay

Rick

Frederic (Rick) Licht, PE, LSE
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039
(v) 207.749.4924
lichtenvironmentaldesign.com

-----Original Message-----
From: Clement, Jay L CIV USARMY CENAE (US)
[mailto:Jay.L.Clement@usace.army.mil]
Sent: Friday, July 13, 2018 7:37 AM
To: rick licht; 'Woodruff, Christine'
Subject: RE: [Non-DoD Source] OceanView at Cumberland DEP and Corps Permits

Think I have what I need for now Rick.

Jay

-----Original Message-----
From: rick licht [mailto:rlicht@securespeed.net]
Sent: Wednesday, July 11, 2018 7:37 AM
To: 'Woodruff, Christine' <Christine.Woodruff@maine.gov>; Clement, Jay L CIV
USARMY CENAE (US) <Jay.L.Clement@usace.army.mil>
Subject: [Non-DoD Source] OceanView at Cumberland DEP and Corps Permits

Good Morning Christine & Jay:

I just wanted to reach out to see if there were any lingering comments which need addressing in the final processing of the SLODA/NRPA and Corps permits for the Cumberland Project. We are expecting to submit final plans to the Town of Cumberland on or about July 30th so that we can get a late August approval and follow up with Performance Guarantees, etc. and start construction towards Culvert 1 in Early September if all goes well.

Again per email of July 10th we are withdrawing request for an extension of the July - Oct 1 Culvert installation window.

Please advise if you see any issues with final permits by the end of July as they are required for Final Plan submittal to the Town.

Best

Rick Licht

Frederic (Rick) Licht, PE, LSE

Licht Environmental Design, LLC

35 Fran Circle

Gray, Maine 04039

(v) 207.749.4924

lichtenvironmentaldesign.com

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO ATTENTION OF

MAINE GENERAL PERMIT (GP)
AUTHORIZATION LETTER AND SCREENING SUMMARY

OCEANVIEW AT CUMBERLAND, LLC
20 BLUEBERRY LANE
FALMOUTH, MAINE 04105

CORPS PERMIT # NAE-2018-00545
CORPS GP ID# 18-155
STATE ID# NRPA

DESCRIPTION OF WORK:

Place temporary and permanent fill below the ordinary high water line of unnamed streams and in adjacent freshwater wetlands at Cumberland, Maine in order to develop a 52 unit senior community. The development will result in approximately 70 s.f. of temporary and 1,386 s.f. of permanent stream bed impact, and 12,449 s.f. of permanent wetland fill. An additional 784 s.f. of wetland will be spanned by elevated timber boardwalk. This work is shown on the attached plans entitled "Oceanview @ Cumberland, Senior Community, Tuttle Road, Cumberland, Maine" in 17 sheets with multiple dates.

LAT/LONG COORDINATES : 43.792043° N -70.242084° W USGS QUAD: CUMBERLAND CTR, ME

I. CORPS DETERMINATION:

Based on our review of the information you provided, we have determined that your project will have only minimal individual and cumulative impacts on waters and wetlands of the United States. Your work is therefore authorized by the U.S. Army Corps of Engineers under the enclosed Federal Permit, the Maine General Permit (GP). Accordingly, we do not plan to take any further action on this project.

You must perform the activity authorized herein in compliance with all the terms and conditions of the GP [including any attached Additional Conditions and any conditions placed on the State 401 Water Quality Certification including any required mitigation]. Please review the enclosed GP carefully, including the GP conditions beginning on page 5, to familiarize yourself with its contents. You are responsible for complying with all of the GP requirements; therefore you should be certain that whoever does the work fully understands all of the conditions. You may wish to discuss the conditions of this authorization with your contractor to ensure the contractor can accomplish the work in a manner that conforms to all requirements.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

Condition 38 of the GP (page 16) provides one year for completion of work that has commenced or is under contract to commence prior to the expiration of the GP on October 13, 2020. You will need to apply for reauthorization for any work within Corps jurisdiction that is not completed by October 13, 2021.

This authorization presumes the work shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to the undersigned.

No work may be started unless and until all other required local, State and Federal licenses and permits have been obtained. **This includes but is not limited to a Flood Hazard Development Permit issued by the town if necessary.**

II. STATE ACTIONS: PENDING [ ], ISSUED [X], DENIED [ ] DATE____

APPLICATION TYPE: PBR:___, TIER 1:___, TIER 2 : X___, TIER 3:___, LURC:___ DMR LEASE:___ NA:___

III. FEDERAL ACTIONS:

JOINT PROCESSING MEETING: 3/15/18 LEVEL OF REVIEW: CATEGORY 1:___ CATEGORY 2: X

AUTHORITY (Based on a review of plans and/or State/Federal applications): SEC 10___, 404 X 10/404___, 103___

EXCLUSIONS: The exclusionary criteria identified in the general permit do not apply to this project.

FEDERAL RESOURCE AGENCY OBJECTIONS: EPA NO, USF&WS NO, NMFS NO

If you have any questions on this matter, please contact my staff at 207-623-8367 at our Augusta, Maine Project Office. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

Jay L. Clement

JAY L. CLEMENT
SENIOR PROJECT MANAGER
MAINE PROJECT OFFICE

For Jay L. Clement 8/14/18

FRANK J. DEL GIUDICE DATE
CHIEF, PERMITS & ENFORCEMENT BRANCH
REGULATORY DIVISION

PLEASE NOTE THE FOLLOWING CONDITIONS FOR DEPARTMENT OF THE ARMY GENERAL PERMIT NO. NAE-2018-01631

1. This authorization requires you to 1) notify us before beginning work so we may inspect the project, and 2) submit a Compliance Certification Form. You must complete and return the enclosed Work Start Notification Form(s) to this office at least two weeks before the anticipated starting date. You must complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work and any required mitigation (but not mitigation monitoring, which requires separate submittals).

2. The permittee shall assure that a copy of this permit is at the work site whenever work is being performed and that all personnel performing work at the site of the work authorized by this permit are fully aware of the terms and conditions of the permit. This permit, including its drawings and any appendices and other attachments, shall be made a part of any and all contracts and sub-contracts for work which affects areas of Corps of Engineers' jurisdiction at the site of the work authorized by this permit. This shall be done by including the entire permit in the specifications for the work. If the permit is issued after construction specifications but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. The term "entire permit" includes permit amendments. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions of the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps of Engineers jurisdiction.

3. Adequate sedimentation and erosion control devices, such as geotextile silt fences or other devices capable of filtering the fines involved, shall be installed and properly maintained to minimize impacts during construction. These devices must be removed upon completion of work and stabilization of disturbed areas. The sediment collected by these devices must also be removed and placed upland, in a manner that will prevent its later erosion and transport to a waterway or wetland.

4. All exposed soils resulting from the construction will be promptly seeded and mulched in order to achieve vegetative stabilization.

5. All areas of temporary fill shall be removed and the areas restored to original contours and character upon completion of the construction.

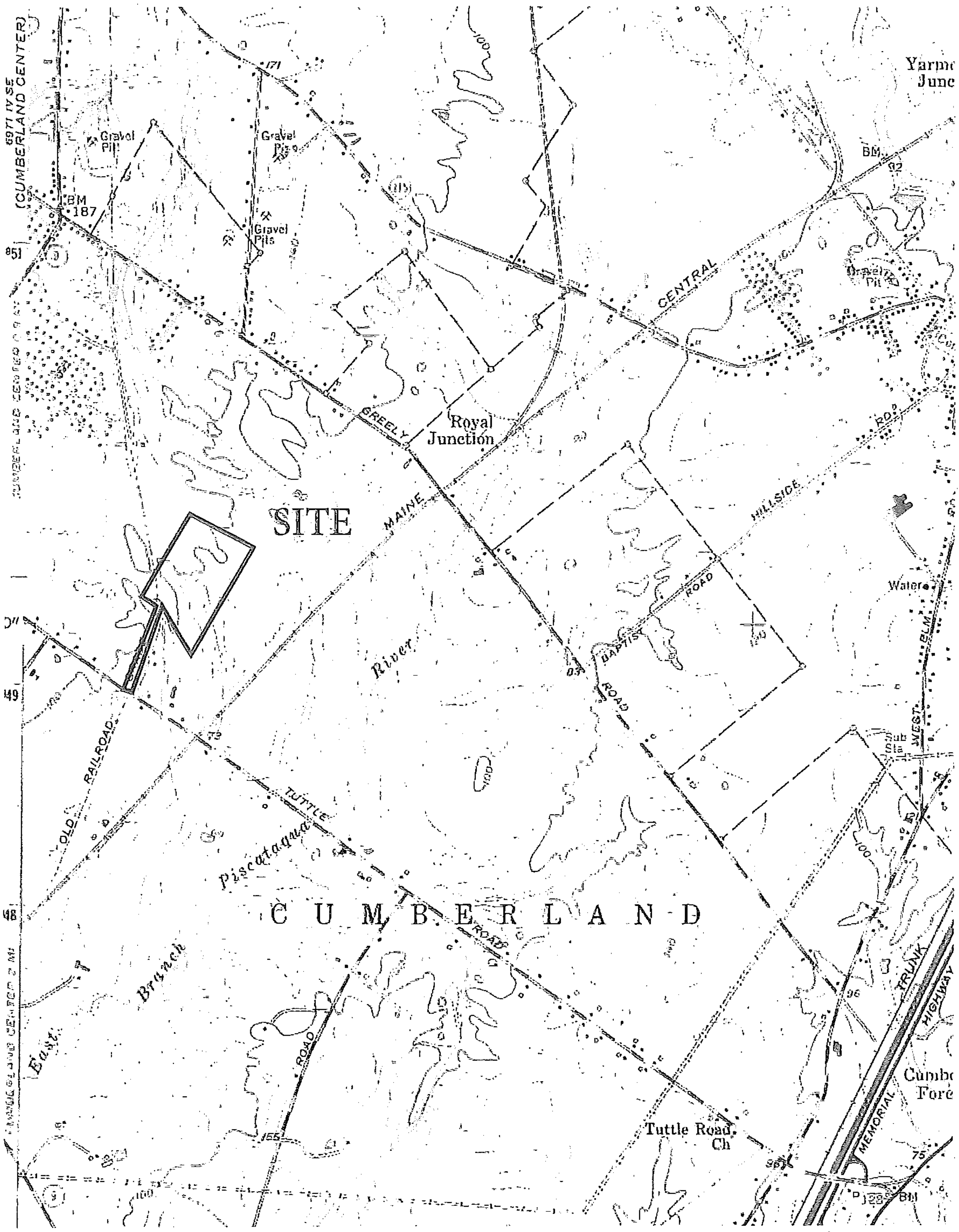
6. The permittee must still obtain any other Federal, State, or local permits as required by law before beginning work. This includes but is not limited to a Flood Hazard Development Permit issued by the town if necessary.

7. No additional filling of waters of the United States (wetlands or waterways) for additional lot development is authorized without written approval from the Corps.

8. In water work shall be conducted between July 15 and September 30 in order to minimize potential impact to aquatic organisms and local water quality.

9. All tree cutting shall occur between October 16 and April 19 of any year to the maximum extent practicable and no tree cutting shall occur between June 1 and July 31 of any year in order to minimize potential impacts to federally listed northern long-eared bats.

REFERENCE: USGS, Yarmouth, 7.5 Minute Series, 1957, 1977 Rev



PREPARED FOR:

Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

TITLE:

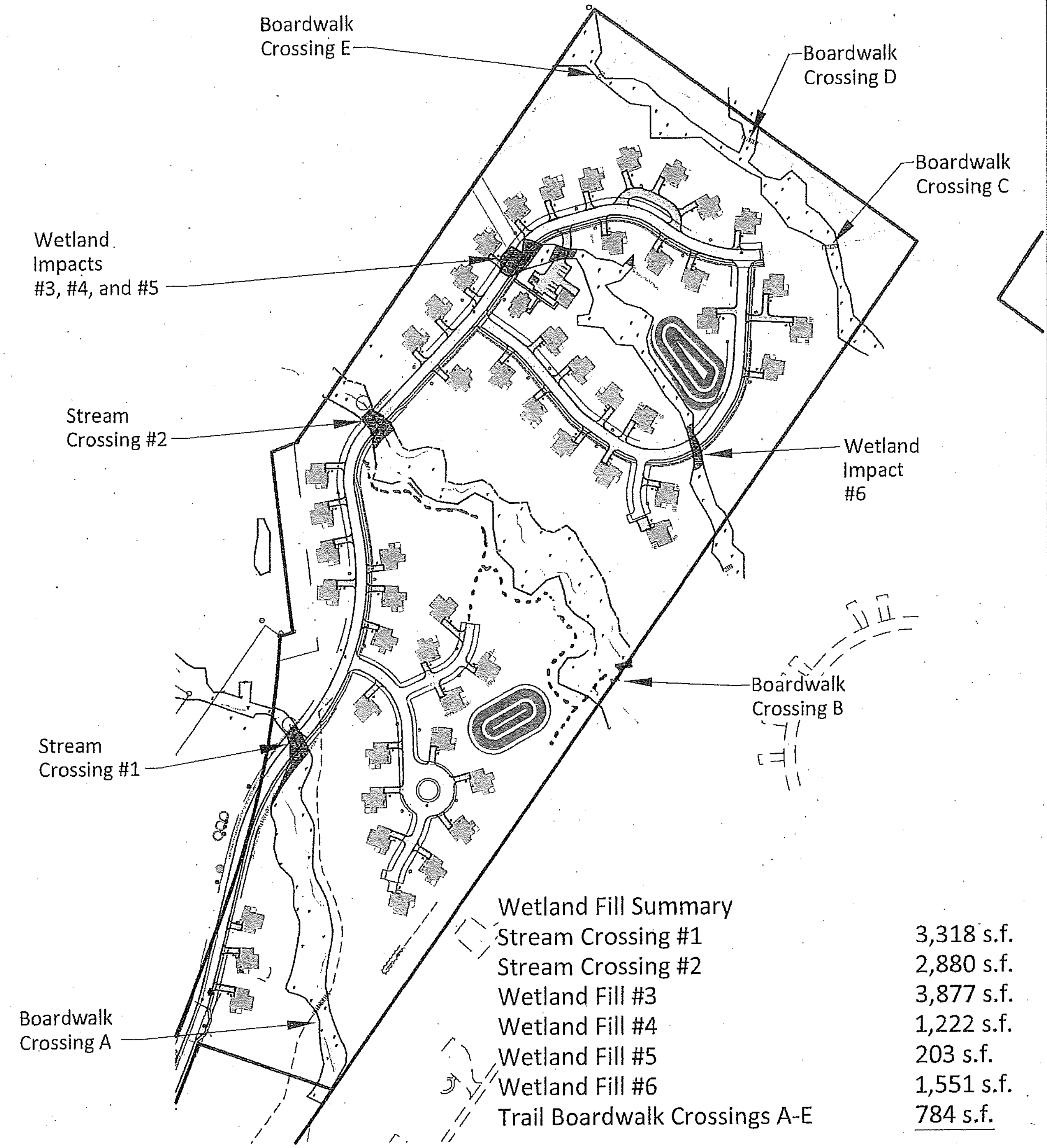
USGS Locus Map

LICHT
ENVIRONMENTAL DESIGN, LLC

DATE: 12.2017 SCALE: 1"=1000' JOB NO: 16.084

Exhibit 3

43.792043
-70.242084



Wetland Fill Summary	
Stream Crossing #1	3,318 s.f.
Stream Crossing #2	2,880 s.f.
Wetland Fill #3	3,877 s.f.
Wetland Fill #4	1,222 s.f.
Wetland Fill #5	203 s.f.
Wetland Fill #6	1,551 s.f.
Trail Boardwalk Crossings A-E	784 s.f.
Total:	13,835 s.f.

BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

Title:
Overall Plan
Wetland Impacts

Scale: 1"=300'

Date: May 4, 2018

Project #: 109

Sheet #:
Figure
0

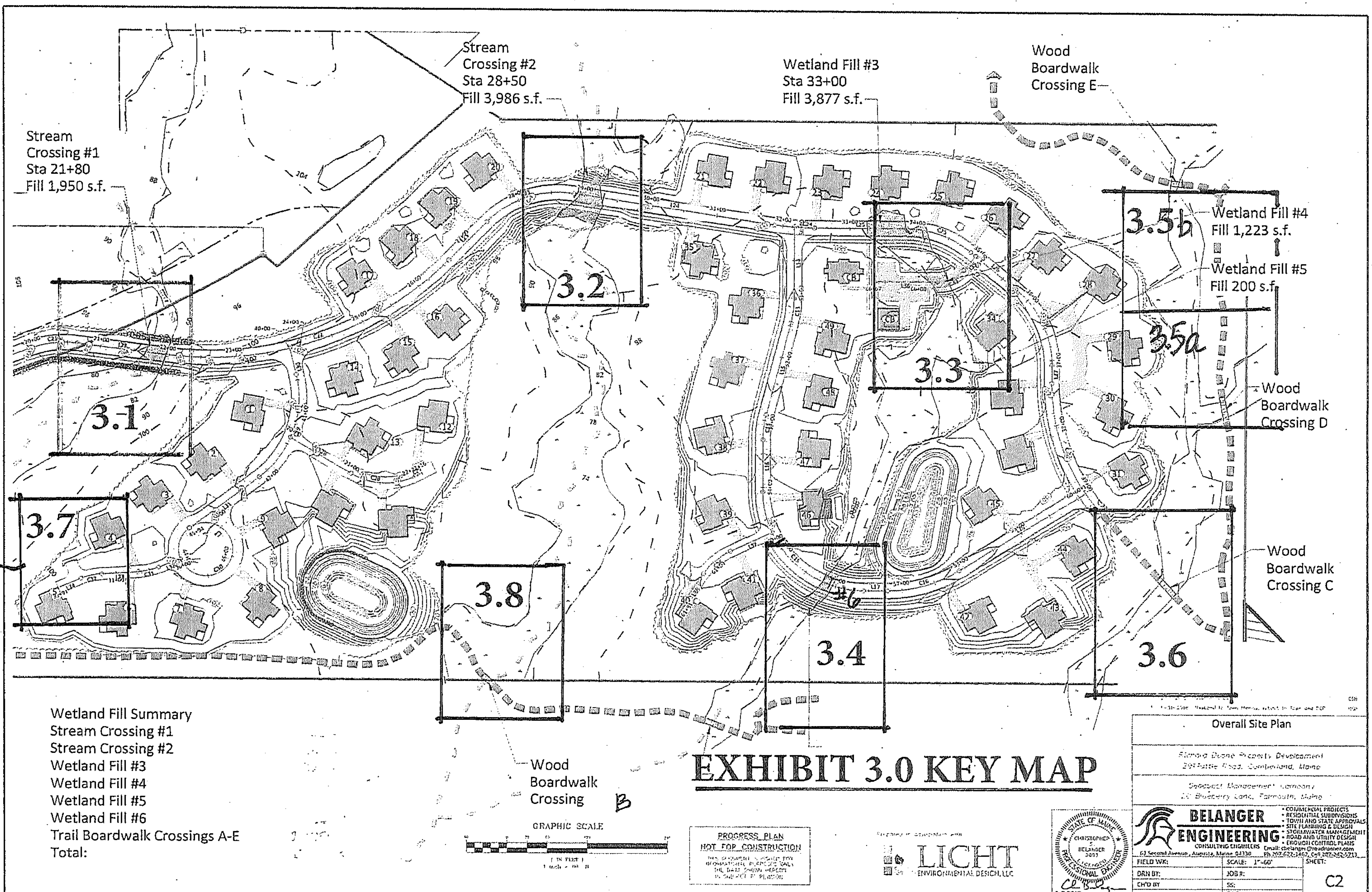
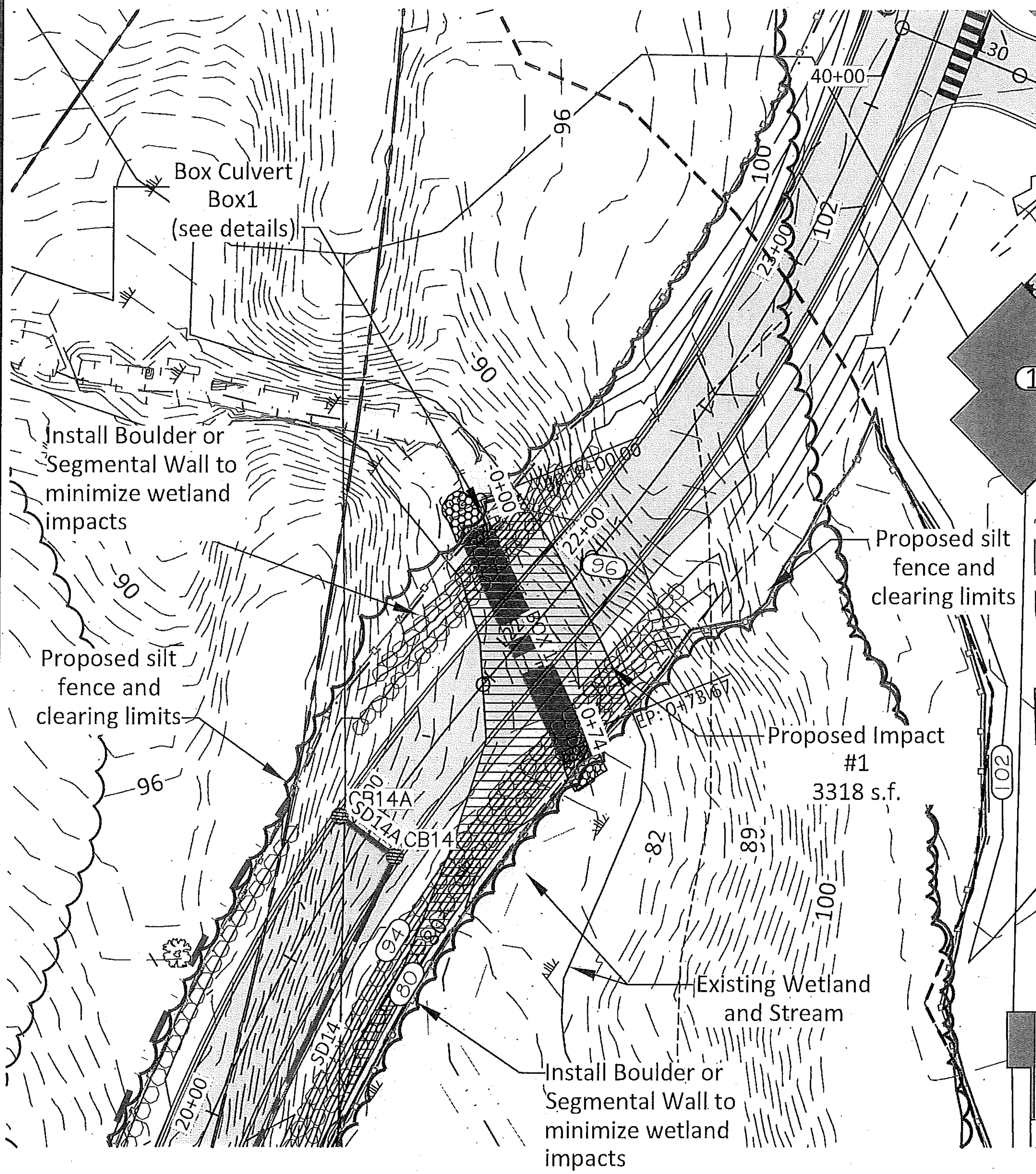


EXHIBIT 3.0 KEY MAP

Wetland Fill Summary
Stream Crossing #1
Stream Crossing #2
Wetland Fill #3
Wetland Fill #4
Wetland Fill #5
Wetland Fill #6
Trail Boardwalk Crossings A-E
Total:



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

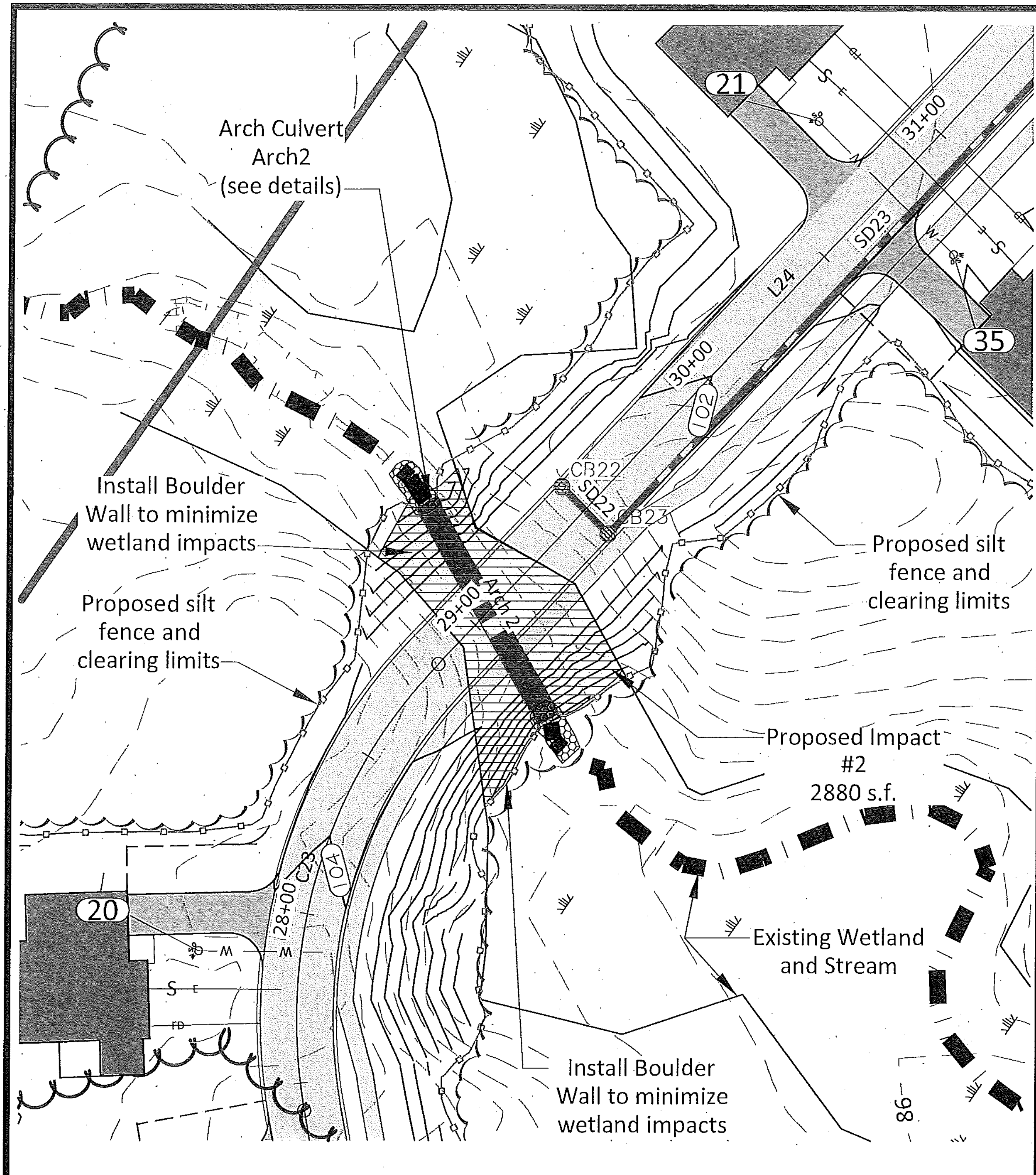
Title:
Wetland Impact #1

Scale: 1"=40'

Date: June 15, 2018

Project #: 109

Sheet #:
Exhibit
3.1



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CONSULTING ENGINEERS

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ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

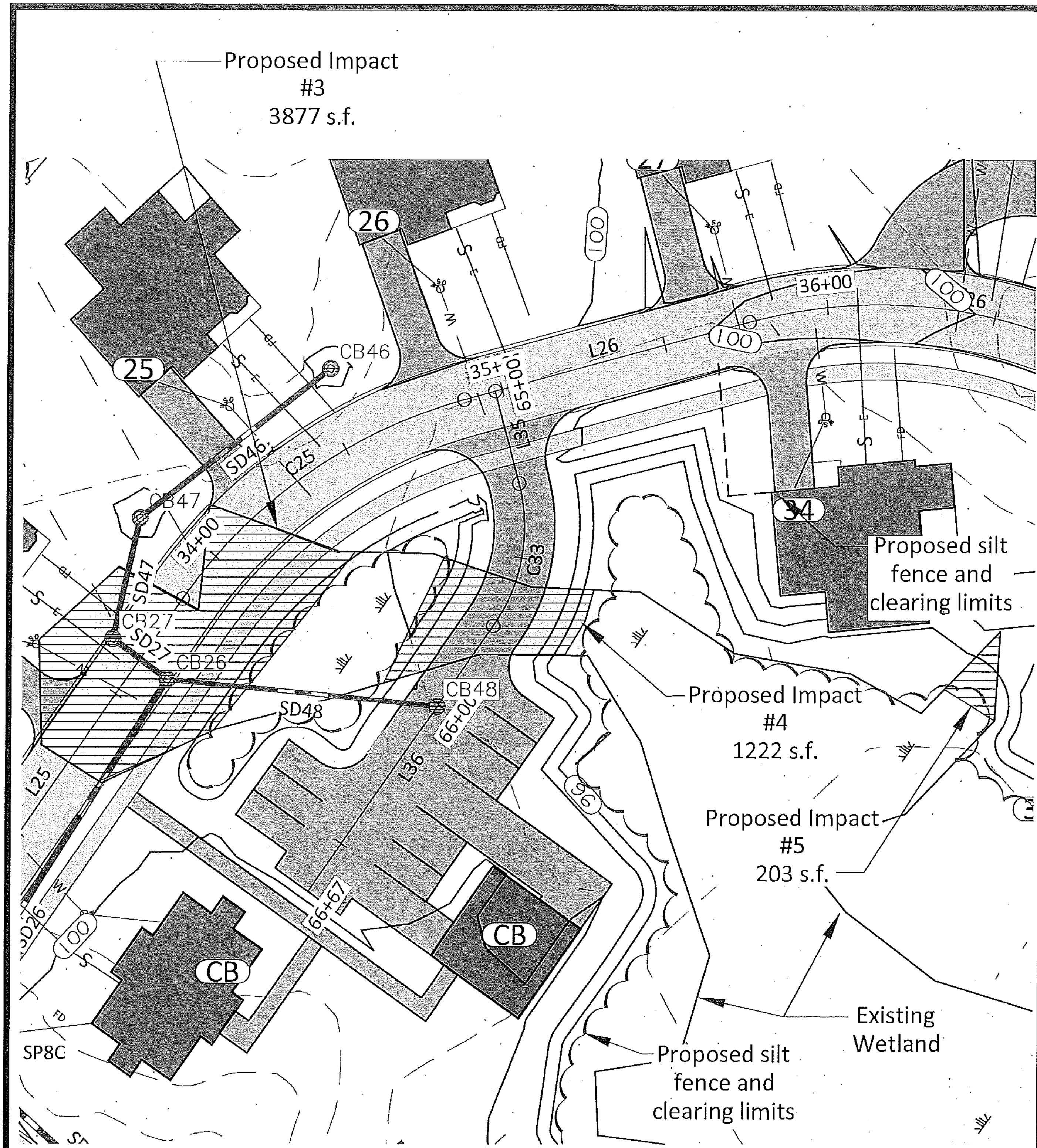
Title:
Wetland Impact #2

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.2



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CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

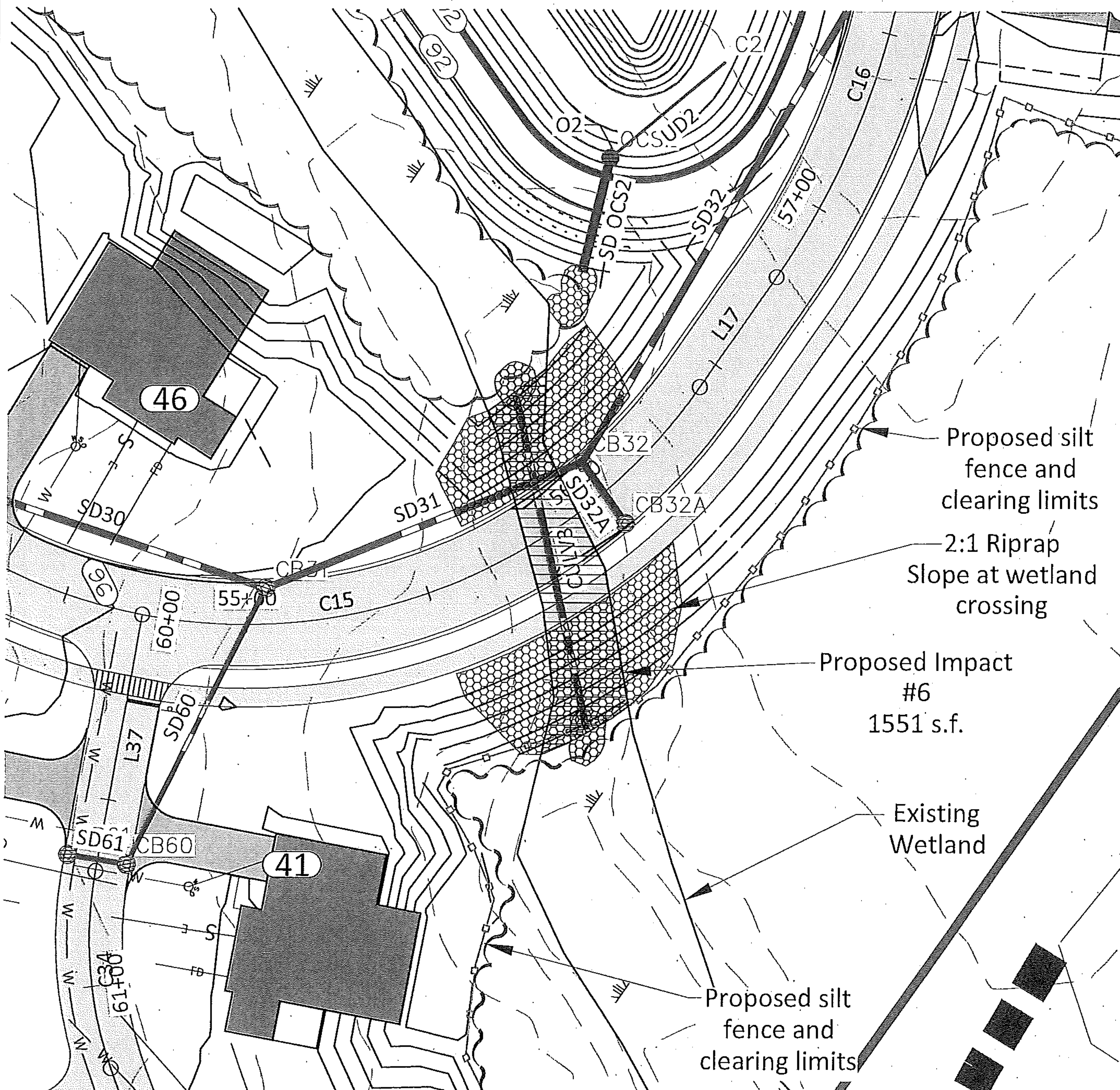
Title:
Wetland Impact #3, 4 & 5

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.3



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CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

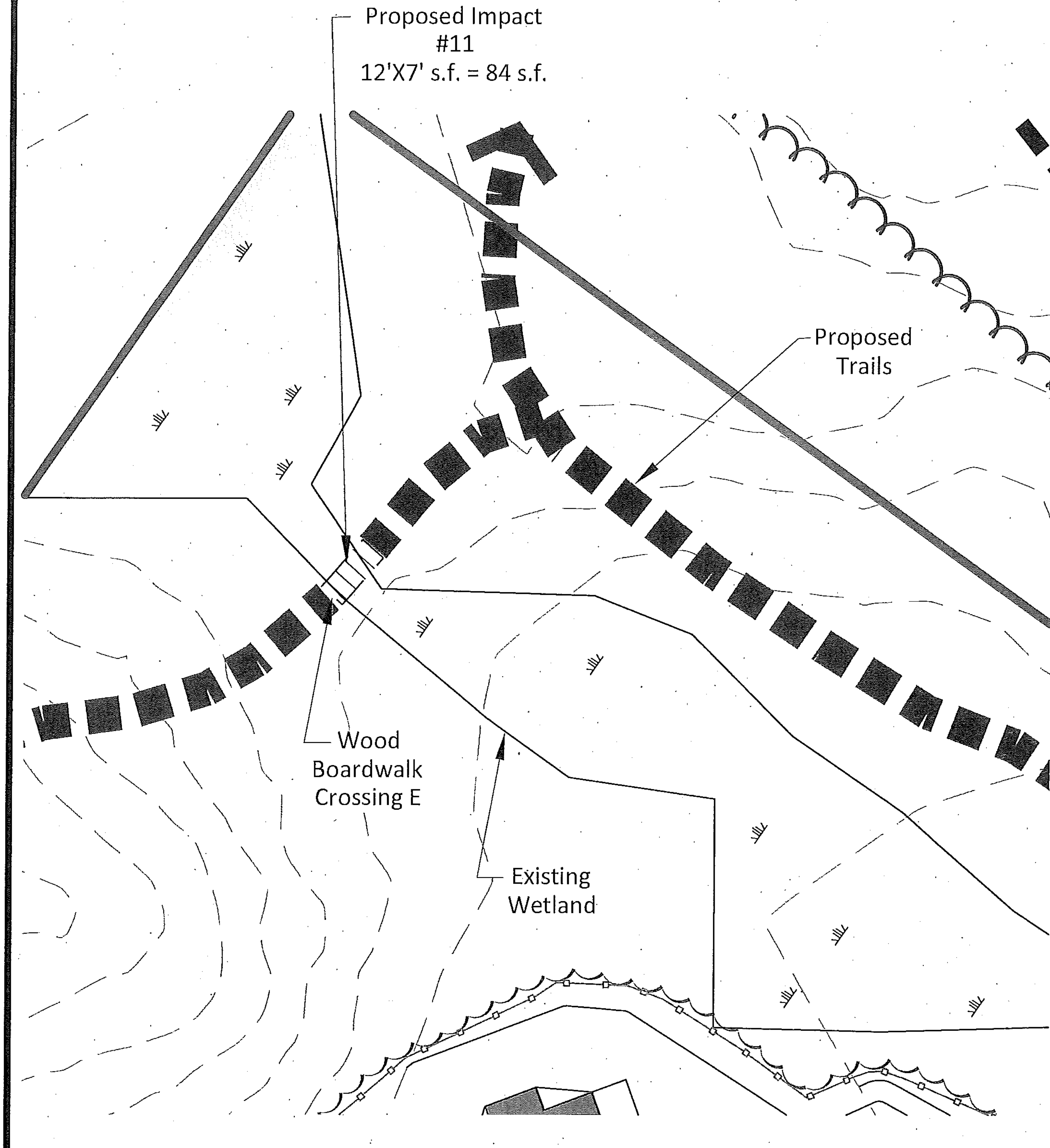
Title:
Wetland Impact #6

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.4



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

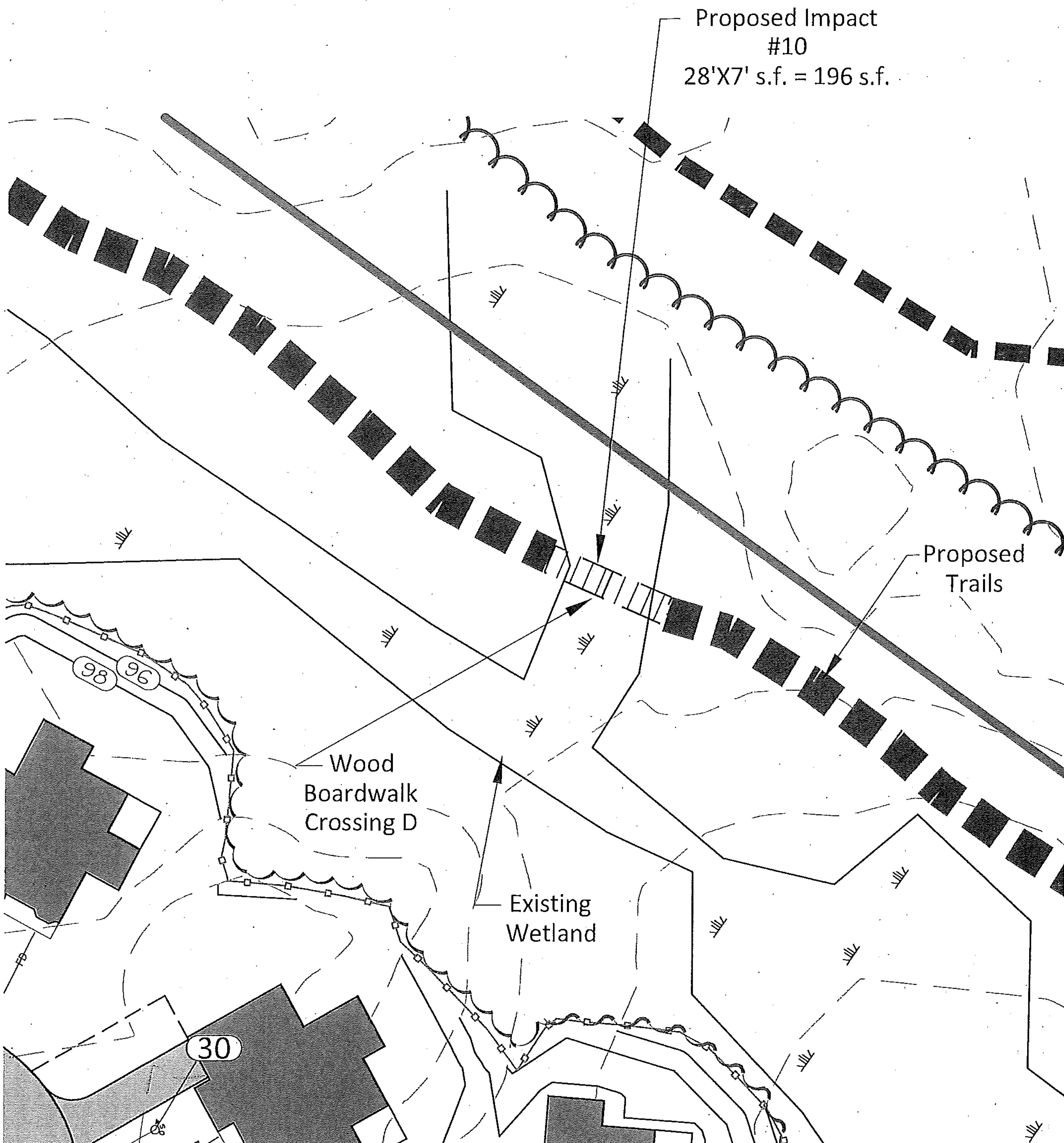
Title:
Boardwalk Crossing E
Wetland Impact #11

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.5a



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

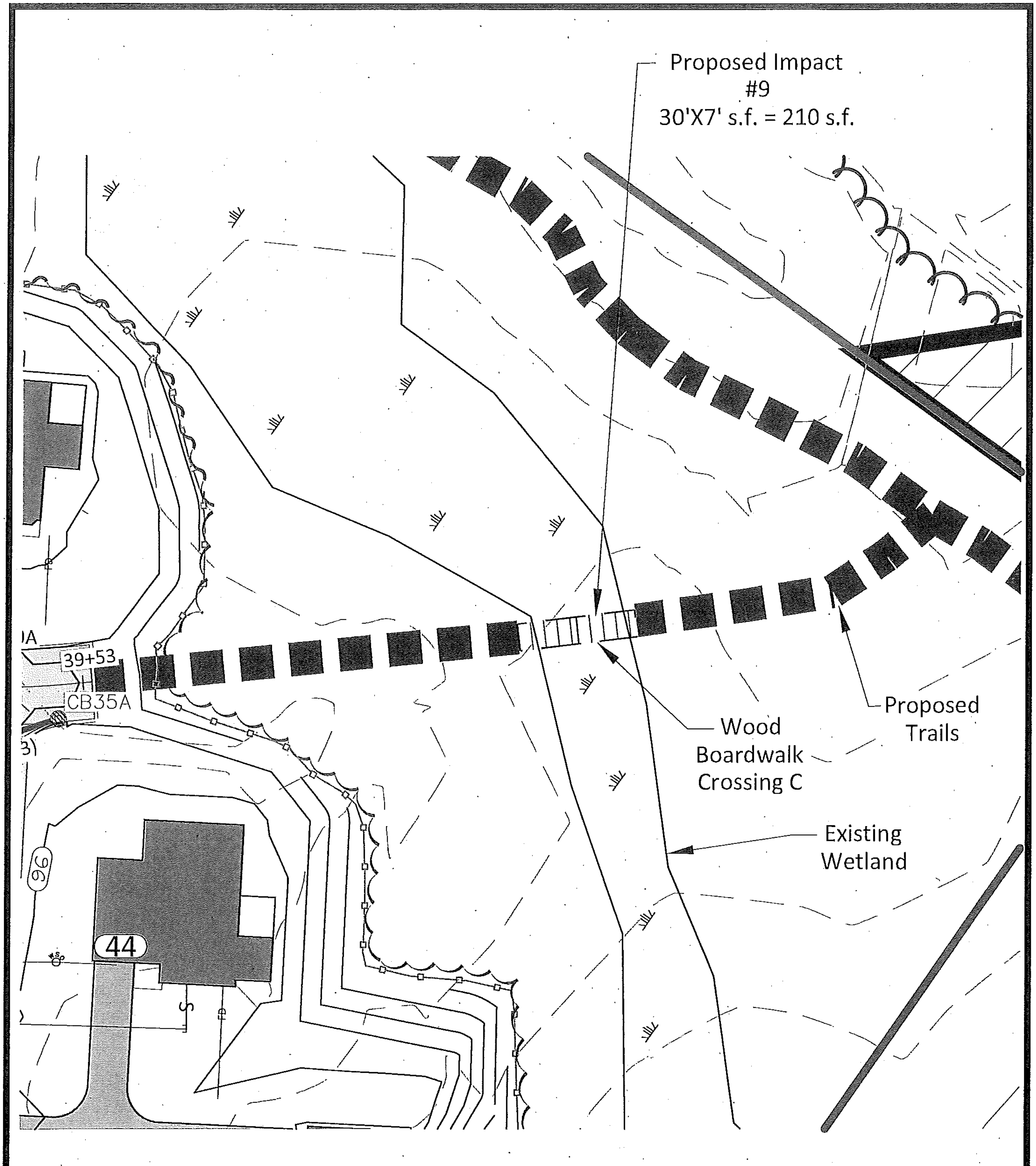
Title:
Boardwalk Crossing D
Wetland Impact #10

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.5b



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

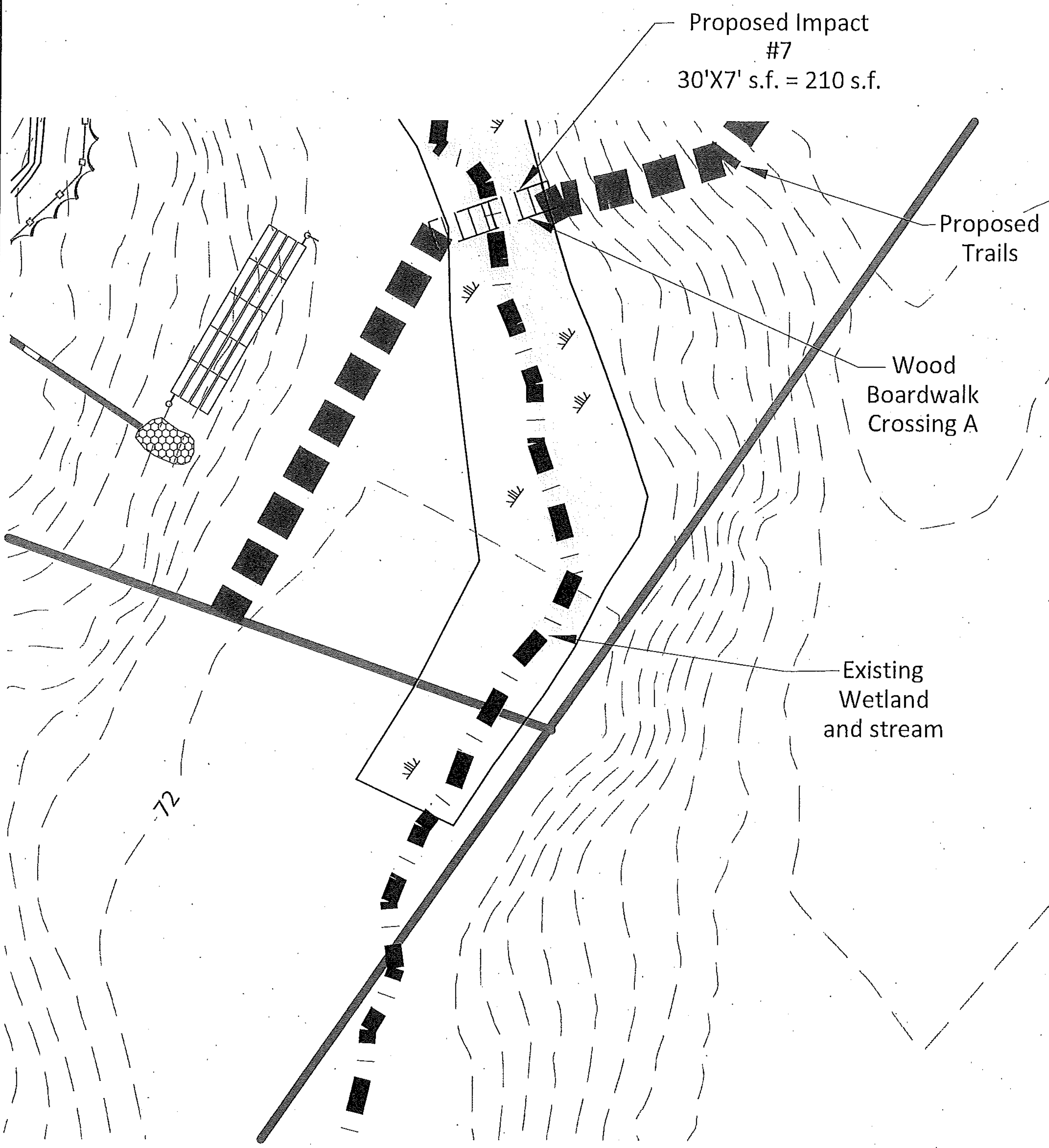
Title:
Boardwalk Crossing C
Wetland Impact #9

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.6



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

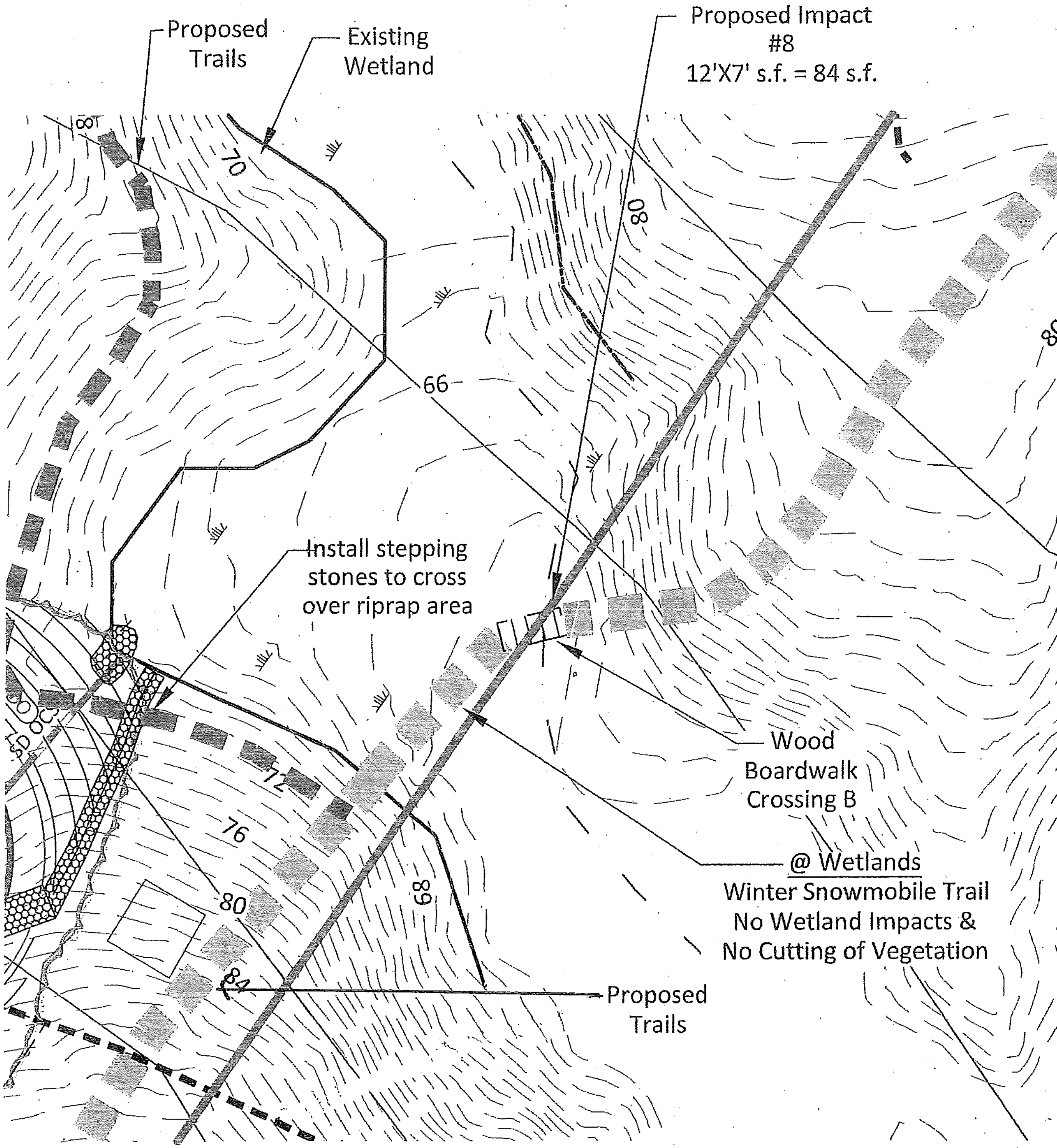
Title:
Boardwalk Crossing A
Wetland Impact #7

Scale: 1"=40'

Date: February 7, 2018

Project #: 109

Sheet #:
Figure
3.7



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

Title:
Boardwalk Crossing B
Wetland Impact #8

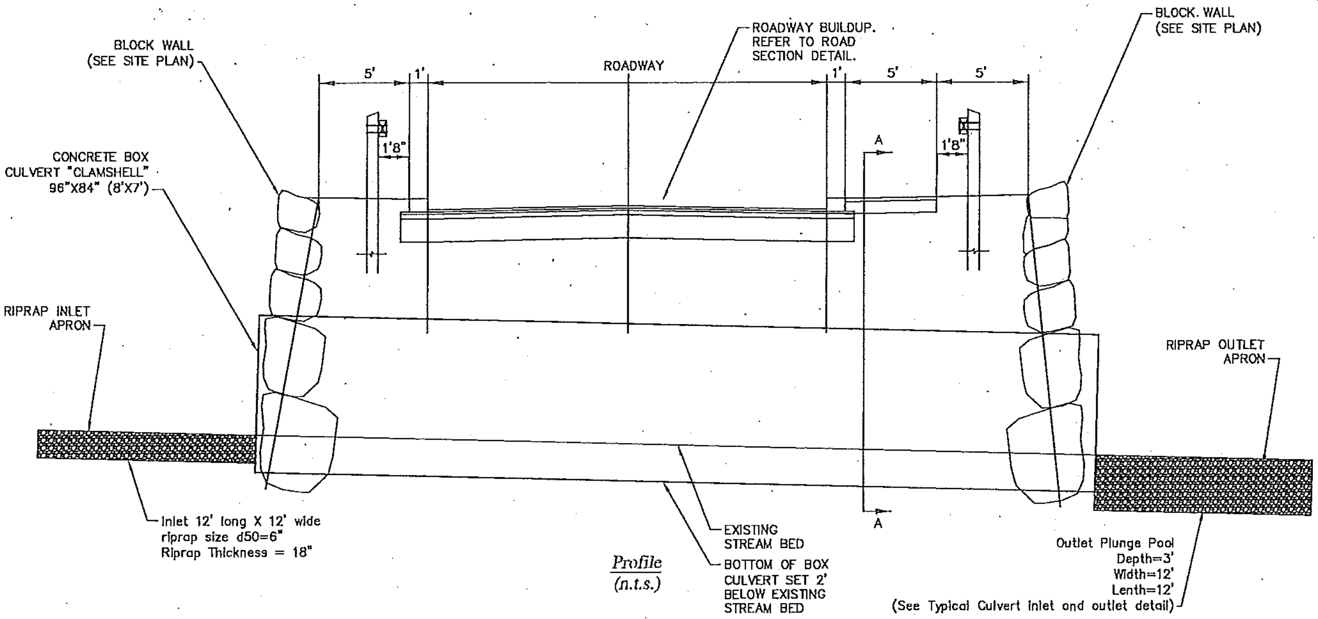
Scale: 1"=40'

Date: July 23, 2018

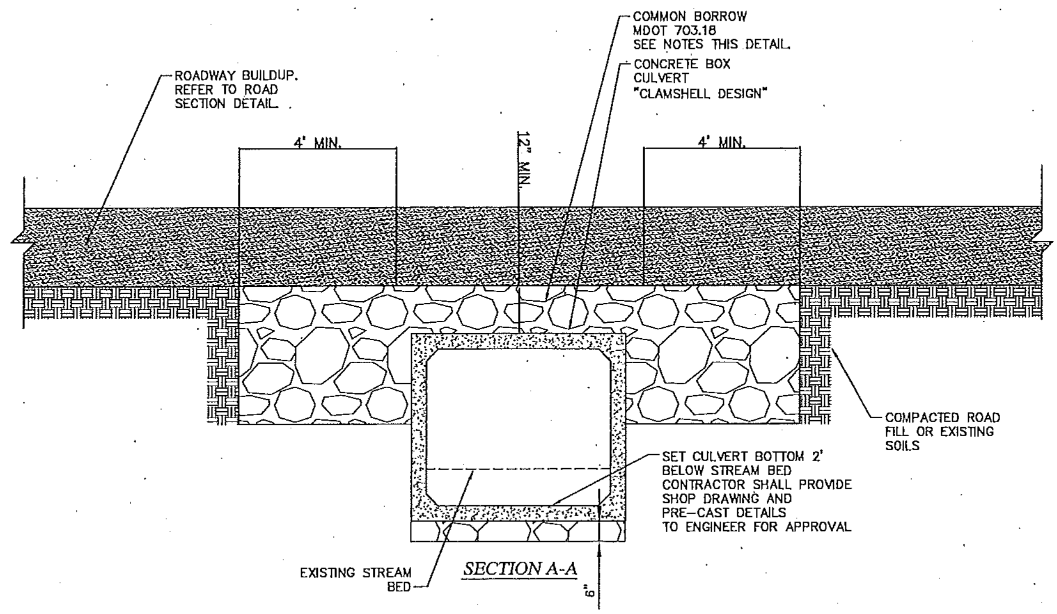
Project #: 109

Sheet #:
Figure
3.8

NOTES:
1. COMMON BORROW USED FOR BACKFILL SHALL CONSIST OF EARTH, SUITABLE FOR EMBANKMENT CONSTRUCTION. IT SHALL BE FREE FROM FROZEN MATERIAL, PERISHABLE RUBISSH, PEAT, AND OTHER UNSUITABLE MATERIALS INCLUDING MATERIAL CURRENTLY OR PREVIOUSLY CONTAMINATED BY CHEMICAL, RADIOLOGICAL, OR BIOLOGIAL AGENTS. ALL MATERIAL SHALL HAVE NO ROCKS WITH A MAXIMUM DIMENSION OVER 6 INCHES. ON-SITE MATERIAL MAY BE USED IF IT MEETS THE ABOVE SPECIFIED REQUIREMENTS.



Profile
(n.t.s.)



SECTION A-A

BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

Title:
Box Culvert #1
Section

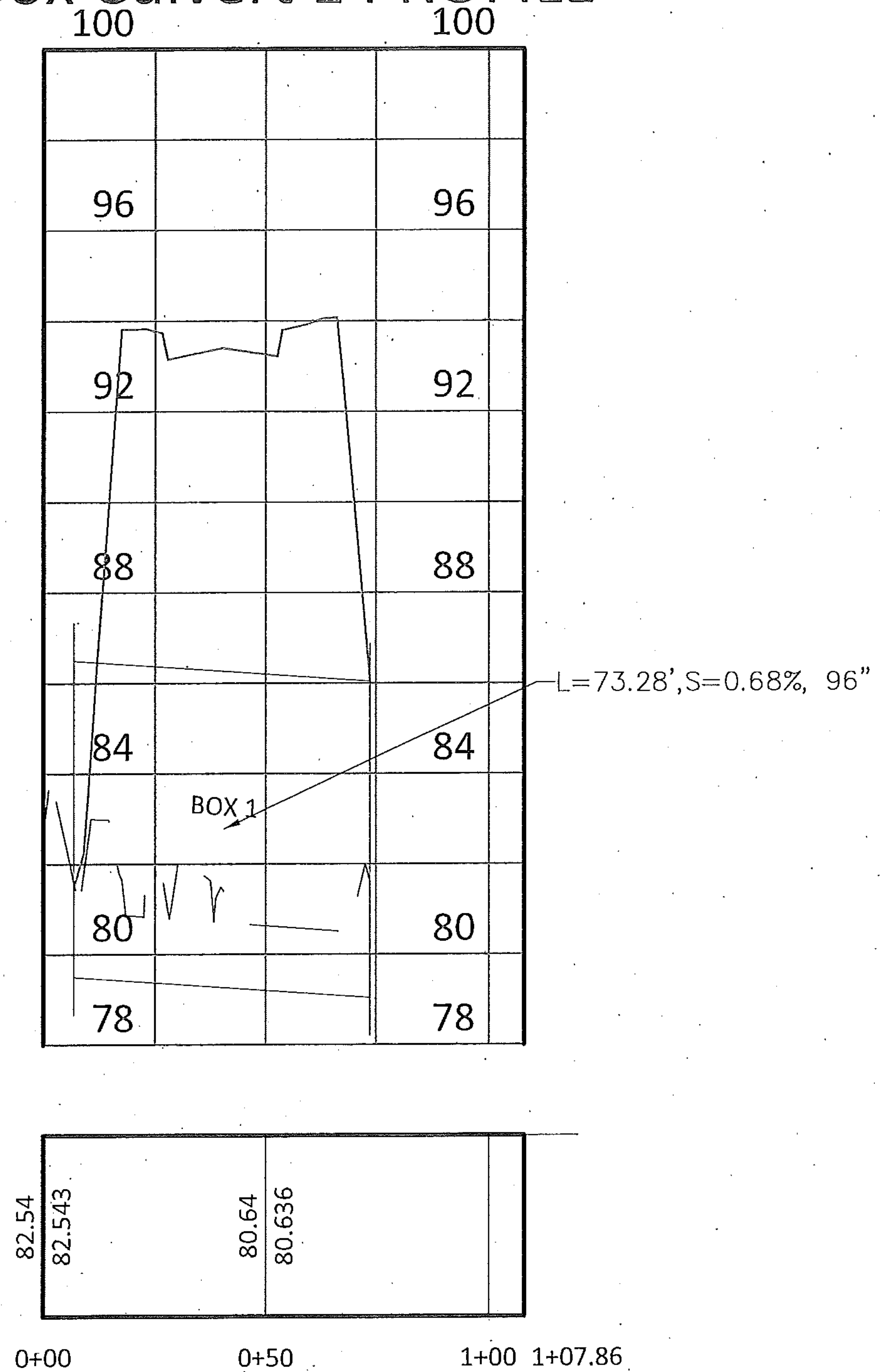
Scale: N.T.S.

Date: May 4, 2018

Project #: 109

Sheet #:
Figure
3.9

Box Culvert 1 PROFILE



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

Title:
Box Culvert 1
Section

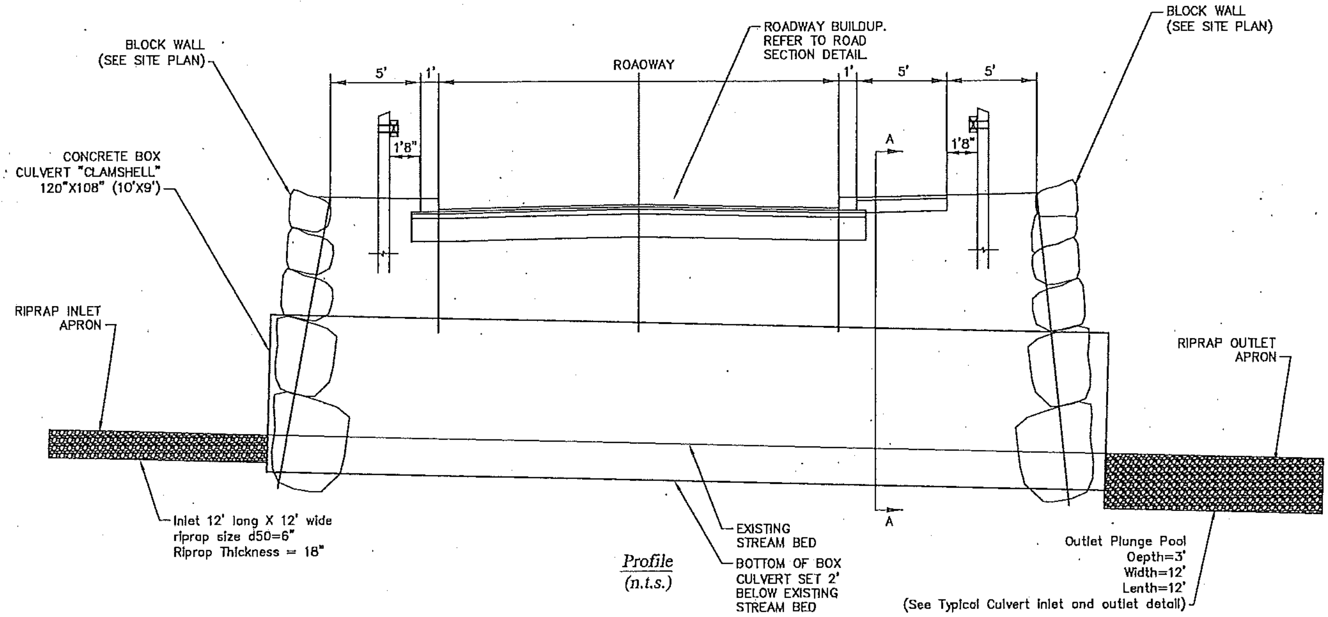
Scale: 1"=40'H-4'V

Date: May 4, 2018

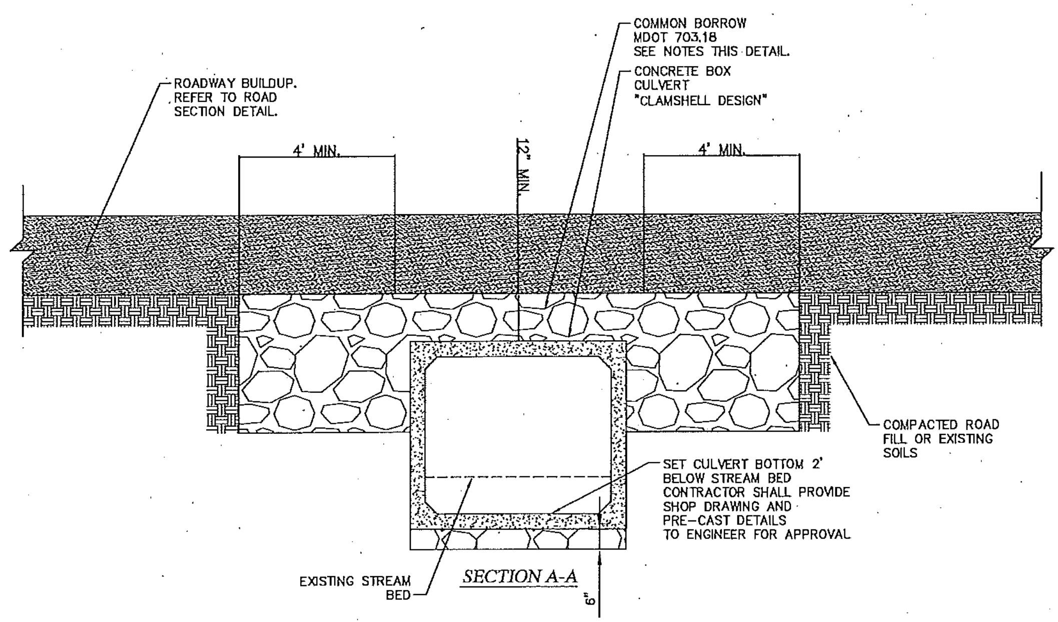
Project #: 109

Sheet #:
Figure
3.9A

NOTES:
1. COMMON BORROW USED FOR BACKFILL SHALL CONSIST OF EARTH, SUITABLE FOR EMBANKMENT CONSTRUCTION. IT SHALL BE FREE FROM FROZEN MATERIAL, PERISHABLE RUBISSH, PEAT, AND OTHER UNSUITABLE MATERIALS INCLUDING MATERIAL CURRENTLY OR PREVIOUSLY CONTAMINATED BY CHEMICAL, RADIOLOGICAL, OR BIOLOGIAL AGENTS. ALL MATERIAL SHALL HAVE NO ROCKS WITH A MAXIMUM DIMENSION OVER 6 INCHES. ON-SITE MATERIAL MAY BE USED IF IT MEETS THE ABOVE SPECIFIED REQUIREMENTS.



Profile
(n.t.s.)



SECTION A-A

BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

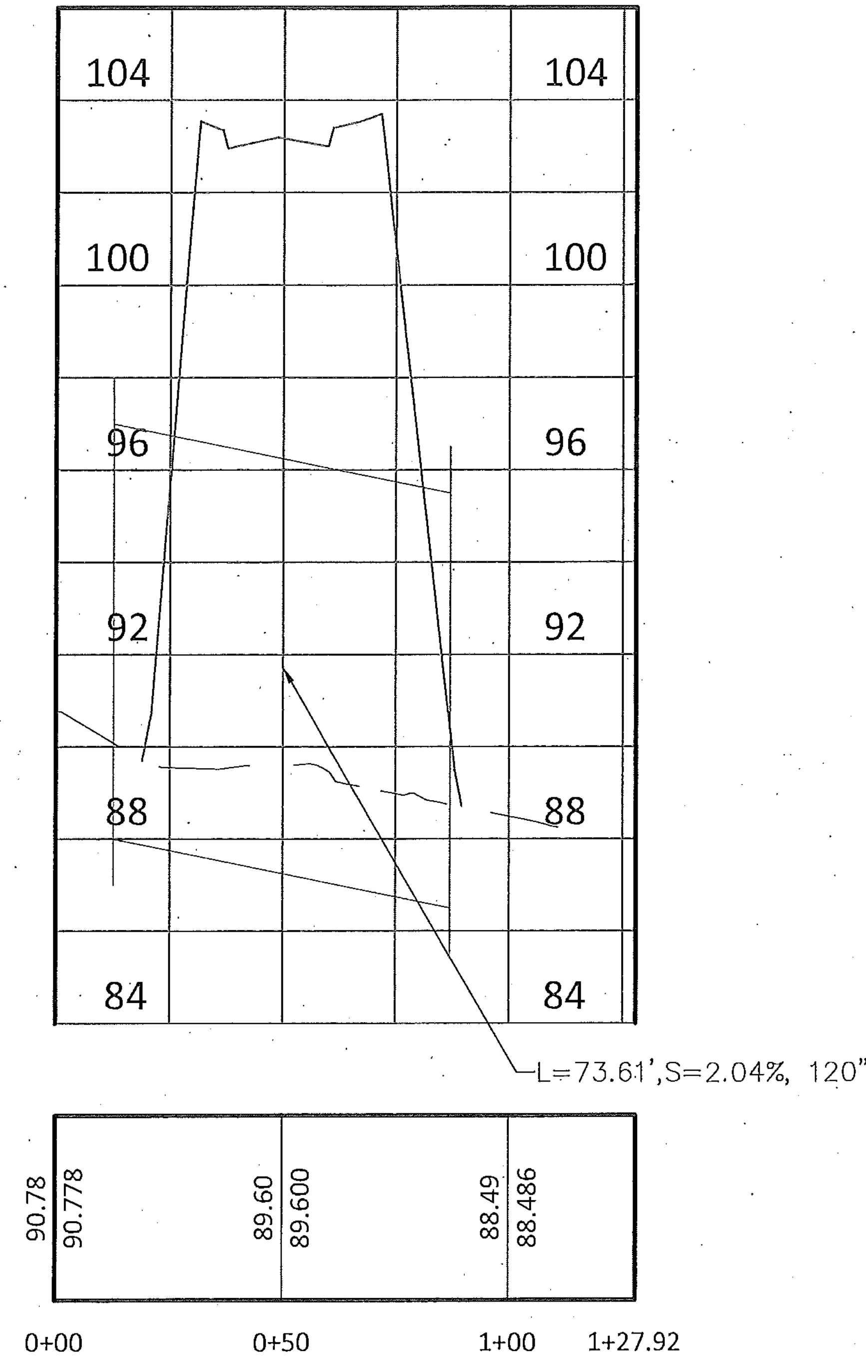
Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

Title:
Box Culvert #2
Section

Scale: N.T.S.
Date: May 4, 2018
Project #: 109

Sheet #:
Figure
3.10

Box Culvert 2 PROFILE



BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

Prepared For:
Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

Title:
Box Culvert #2
Section

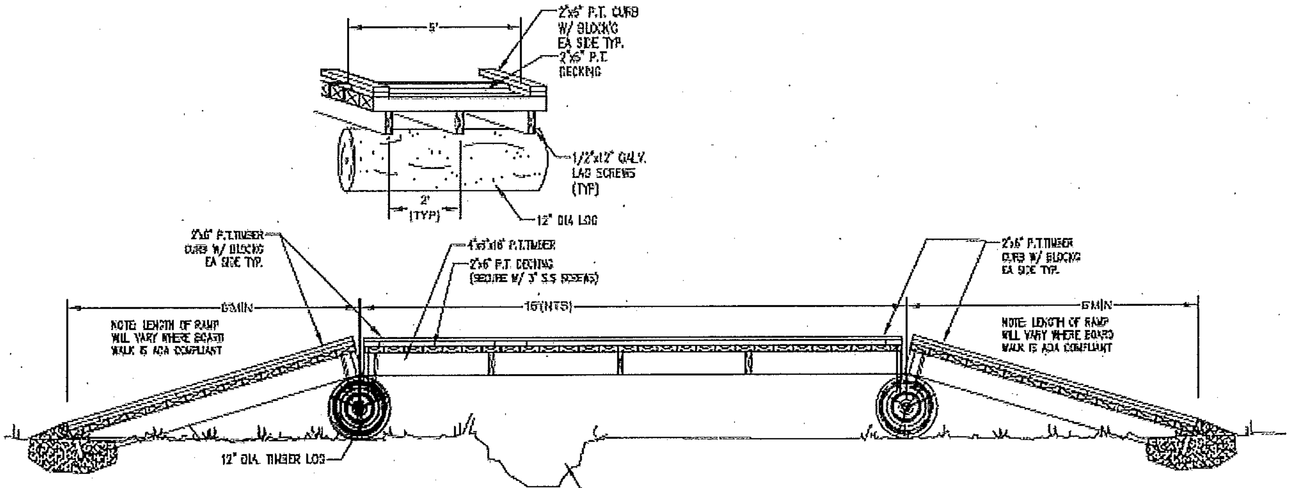
Scale: 1"=40'H-4'V

Date: May 4, 2018

Project #: 109

Sheet #:
Figure
3.10A

• REFERENCE :



13 **WOODEN BOARDWALK FOOTPATH**
NOT TO SCALE

EXHIBIT 3.11

BELANGER ENGINEERING
CONSULTING ENGINEERS

LICHT
ENVIRONMENTAL DESIGN, LLC

• PREPARED FOR:

Oceanview @ Cumberland
Senior Community
Tuttle Road, Cumberland, Maine

• TITLE:
TRAIL BOARDWALK CROSSING

• SCALE: FILL IN
• DATE: 01-30-18

• JOB NO:
16.084

US Army Corps
of Engineers ®
New England District

(Minimum Notice: Permittee must sign and return notification within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2018-00545

Project Manager Clement

Name of Permittee: Oceanview at Cumberland, LLC

Permit Issuance Date: ____________________

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch C *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

____________________	____________________
Signature of Permittee	Date
____________________	____________________
Printed Name	Date of Work Completion
( ) ____________________	( ) ____________________
Telephone Number	Telephone Number

US Army Corps of Engineers ®
New England District

GENERAL PERMIT
WORK-START NOTIFICATION FORM
(Minimum Notice: Two weeks before work begins)

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Corps of Engineers Permit No. NAE-2018-00545 was issued to Oceanview at Cumberland, LLC on ____________. This work is located in unnamed streams and in adjacent wetlands at Cumberland, Maine. The permit authorized the permittee to place temporary and permanent fill in order to develop a 52 unit senior community. The development will result in approximately 70 s.f. of temporary and 1,386 s.f. of permanent stream bed impact, and 12,449 s.f. of permanent wetland fill. An additional 784 s.f. of wetland will be spanned by elevated timber boardwalk.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

PLEASE PRINT OR TYPE

Name of Person/Firm: ____________________

Business Address: ____________________

Telephone Numbers: ( ) ________ ( ) ________

Proposed Work Dates: **Start:** ________ **Finish:** ________

Permittee/Agent Signature: ________ **Date:** ________

Printed Name: ________ **Title:** ________

Date Permit Issued: ________ **Date Permit Expires:** ________

****

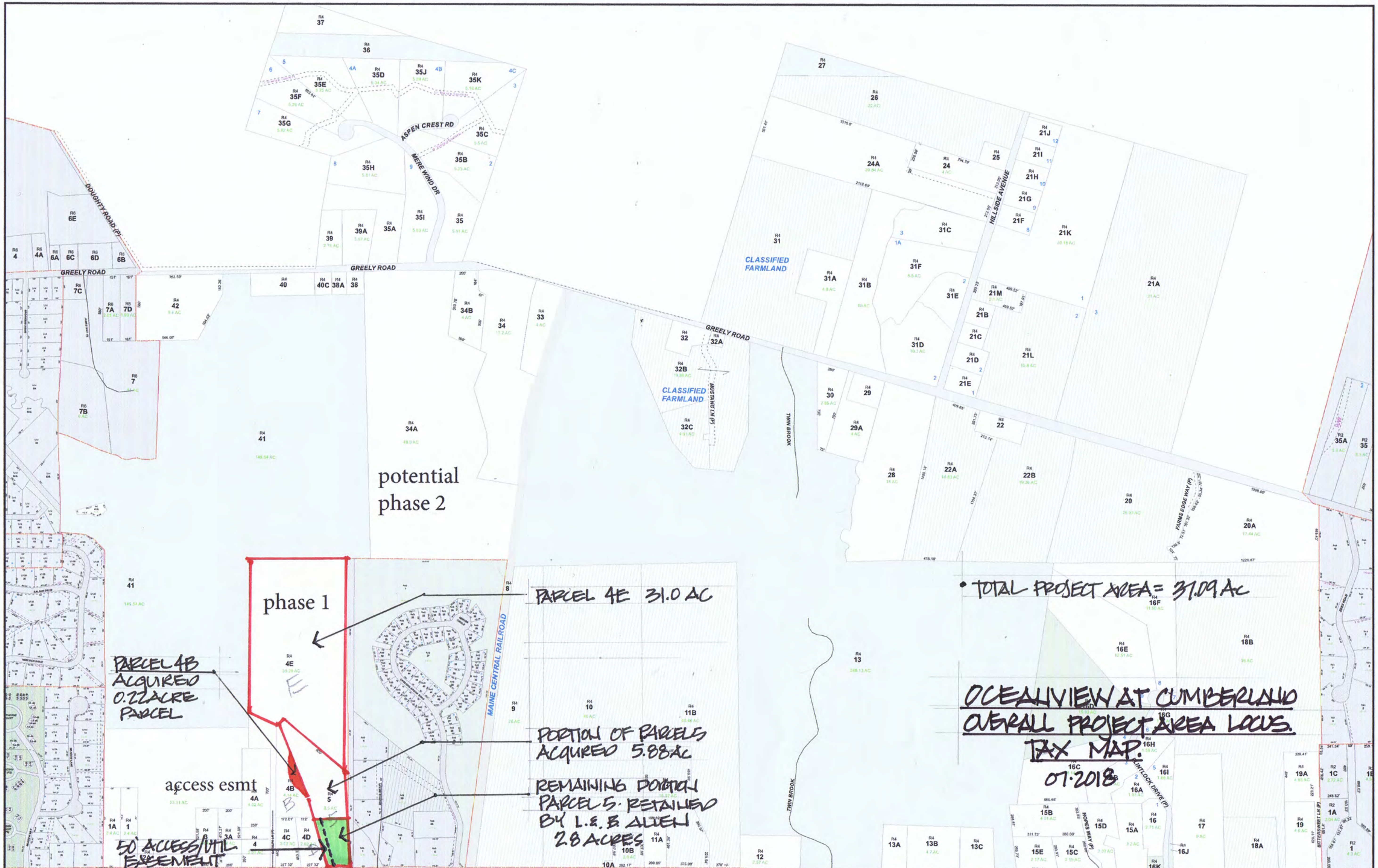
FOR USE BY THE CORPS OF ENGINEERS

PM: Clement **Submittals Required:** No

Inspection Recommendation: Inspect as convenient

Exhibit 1

Tax Map Parcels Locus



Maps Prepared by: Spatial Alternatives 207.846.2355 www.spatialalternatives.com

Tax Sheets are intended for assessing purposes only. Boundary locations are approximate and should not be used for conveyance of property.

Legend

— ROW/Easements
Tax Parcels
Parcels
Farmland and Tree Growth
Town Owned or Cemetery
Open Space
ROW
Utility
Railroad
Roads
Water

Town of Cumberland, Maine

800 Feet

Index Map

U14 R04 R02 R03 R01

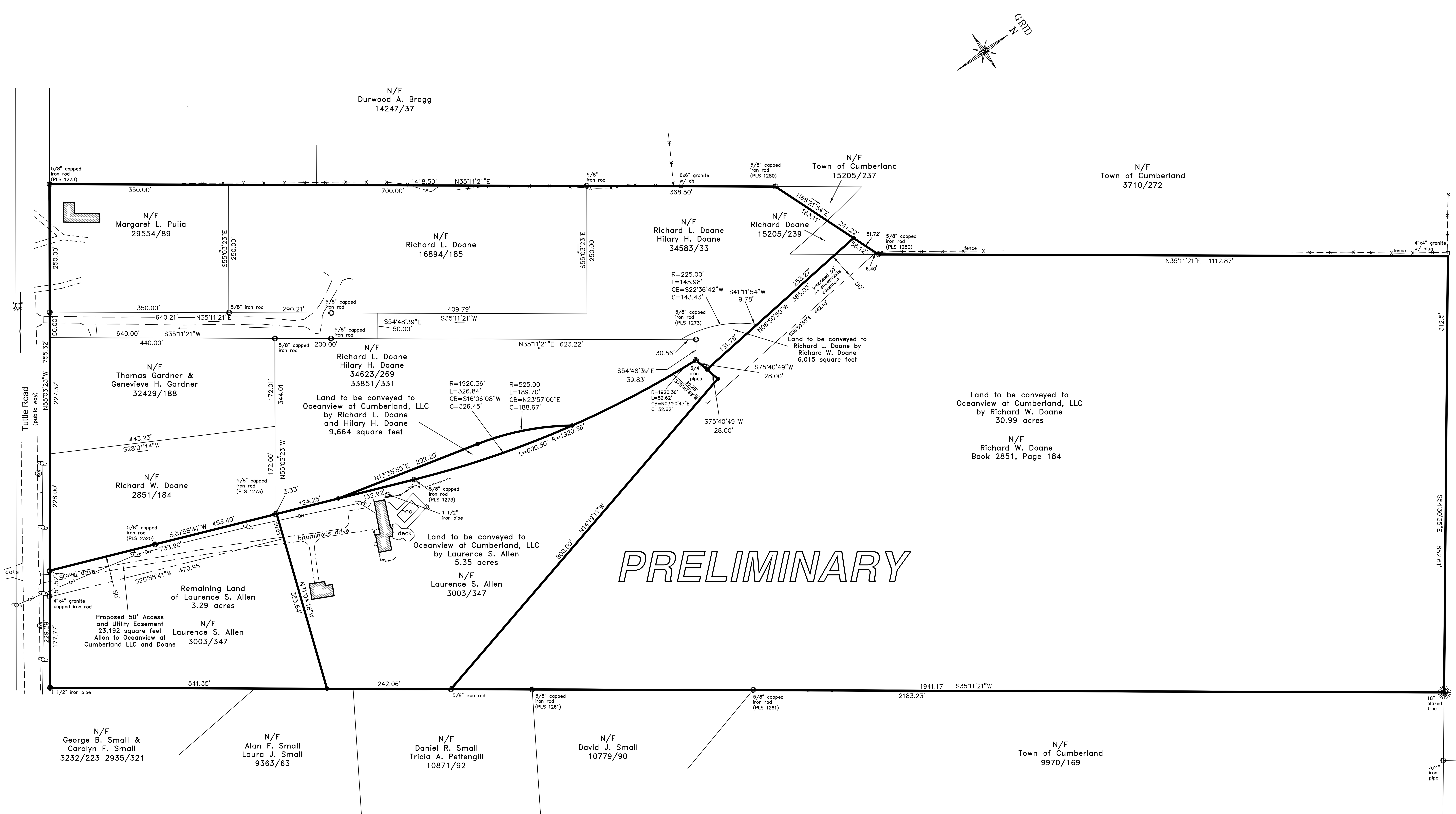
N

Cumberland Tax Map R04

Map updated to: April 1, 2017

Exhibit 2

Property Conveyance Plan (Reduced Copy)



LEGEND

•	Iron marker to be set
▫	Monument – found
o	Iron marker – found
	Property line (locus)
	Property line (abutter)
	Fence
	Edge of pavement
	Edge of gravel
	Curb
	Sign
	Utility pole
	Guy wire
	Lamp or light pole
	Fire hydrant
	Sewer manhole
N/F	Now or formerly of
1234/567	Deed reference (Book/Page)
	Coniferous tree
	Existing building

SCALE IN FEET

100 0 100 200

1" = 100'

NOTES

1) Book and Page references are to the Cumberland County Registry of Deeds.

2) Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.

3) Utility information on this plan is approximate, based on location of visible features. DigSafe and/or the appropriate utilities should be contacted prior to any construction.

4) Property lies within Zone C based on FIRM Community #230162 Panel #0015 B, dated May 19, 1981. It does not lie within a special flood hazard area.

5) OceanView at Cumberland, LLC to provide single curb cut for access to the Doane property for up to two (2) dwelling units within 50 foot Access and Utility Easement. Final location to be field determined.

PLAN REFERENCES

1) Right-of-way and Track Map, Maine Central R.R., station 307+80 to station 360+60, June 30, 1916. MCRR file no. V2/S1 and V2/S2.

2) Standard Boundary Survey prepared for Marion B. Small by Gary E. Johnson, RLS. 1261, Dated Aug. 1987. unrecorded.

3) Plan of Wyman Farm, Cumberland Center, Maine, by Earl Rand, dated May 2, 1931. unrecorded.

4) Plan of Tuttle Road in Cumberland from Cumberland Center to Federal Road, surveyed Oct. 11, 1926 by WM. E. Winslow. recorded in the Cumberland County commissioners Plan Book 5, Page 2.

5) Original Lotting Plan of North Yarmouth, recorded in the Cumberland County Registry of Deeds, Plan Book 24, Page 14. Cumberland County Registry of Deeds in Plan Book 203, Page 82.

6) Amended Plan of Private Way made for Richard Doane by Titcomb Associates dated May 7, 1990 and revised through Nov. 11. 2009 and recorded in Plan Book 204, Page 895

7) Recording Plat of Small's Brook Crossing Subdivision made by Land Use Consultants, dated October 14, 1991 and revised through October 7, 1992 and recorded in Plan Book 192, Page 312–314.

OWNERS OF RECORD

As noted on each parcel.

CERTIFICATION

This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Rex J. Croteau, P.L.S. #2273

Rev. 3	05/30/18	revised Allen lot division	RJC
Rev. 2	04/18/18	metes an bounds for snowmobile easement	RJC
Rev. 1	04/13/18	reconfigure Doane conveyance to Oceanview	RJC

PLAN OF

Proposed Conveyances

Tuttle Road — Cumberland, Maine

MADE FOR

Oceanview at Cumberland, LLC

Tuttle Road — Cumberland, Maine

JOB #89076	DATE: April 6, 2018	SCALE: 1" = 100'
BOOK #898		
89076_2016.dwg		

Titcomb Associates
133 Gray Road, Falmouth, Maine 04105
(207)797-9199 www.titcombsurvey.com

Exhibit 3

Right, Title & Interest - Deeds

DLN: 1001840027971

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that Laurence S. Allen, Jr., in consideration of One Dollar and other valuable considerations paid by Ocean View at Cumberland, LLC, a Maine limited liability company, whose mailing address is 20 Blueberry Lane, Falmouth, Maine, the receipt whereof is hereby acknowledged, do hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY unto the said Ocean View at Cumberland, LLC, its successors and assigns forever, the following described real estate:

Property Conveyed by Grantor to Grantee: A certain lot or parcel of land located on the northeasterly side of Tuttle Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows: Beginning at a point on the northeasterly side of Tuttle Road at the southerly corner of land now or formerly of Richard W. Doane as described in a deed recorded in the Cumberland County Registry of Deeds in Book 2851, Page 184; thence N 20°58'41" E by said land of Doane and land now or formerly of Richard L. Doane and Hilary H. Doane as described in deeds recorded in said Registry in Book 34623, Page 269 and Book 33851, Page 331 a distance of Seven Hundred Thirty-Three and 90/100 (733.90) feet to a point of curvature; thence Northerly by said land of Richard L. Doane and Hilary H. Doane, following a curve to the left having a radius of One Thousand Nine Hundred Twenty and 36/100 (1920.36) feet, an arc distance of Six Hundred and 50/100 (600.50) feet to a ¾" iron pipe at a separate portion of the land now or formerly of Richard W. Doane as described in a deed recorded in said Registry in Book 2851, Page 184; thence N 75°40'49" E by said land of Richard W. Doane a distance of Fifty-Six and 00/100 (56.00) feet to a point; thence S 14°19'11" E by said land of Richard W. Doane a distance of Eight Hundred and 00/100 (800.00) feet to a point on the northwesterly line of land now or formerly of Daniel R. Small and Tricia A. Pettengill as described in a deed recorded in said Registry in Book 10871, Page 92; thence S 35°11'21" W by said land of Small and Pettegill and land now or formerly of Alan F. Small and Laura J. Small as described in a deed recorded in said Registry in Book 9363, Page 63 a distance of Two Hundred Forty-Two and 06/100 (242.06) feet to a point; thence N 71°04'18" W through the "Retained Allen Land" of the Grantor described below a distance of Three Hundred Five and 61/100 (305.61) feet to a point; thence S20°58'41" W through said land of the Grantor a distance of Four Hundred Seventy and 95/100 (470.95) feet to a point on the northwesterly side of said Tuttle Road; thence N 55°03'23" W by said Tuttle Road a distance of Fifty-One and 52/100 (51.52) feet to the point of beginning.

Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.

The above described parcel contains 5.9 acres, more or less, and being a portion of land now or formerly of Grantor, Laurence S. Allen, Jr. as described in the deed from Leroy W. Beal and Lois E. Beal, dated July 14, 1967 and recorded in the Cumberland County Registry of Deeds in Book 3003, Page 347.

Road Access Area Excepting and reserving to Grantor, his heirs and assigns and not hereby conveying the following described portion of the above described parcel: Beginning at a point on the northeasterly side of Tuttle Road at the southerly corner of Richard W. Doane as described in a deed recorded in the Cumberland County Registry of Deeds in Book 2851, Page 184; thence N 20°58'41" E by said land of Doane and land now or formerly of Richard L. Doane and Hilary H. Doane as described in deeds recorded in said Registry in Book 34623, Page 269 and Book 33851, Page 331 a distance of Four Hundred Fifty-Six and 73/100 (456.73) feet to a point; thence S 71°04'18" E a distance of Fifty and 03/100 (50.03) feet to a point at the northwesterly corner of said remaining land of Laurence S. Allen, Jr.; thence S20°58'41" W by said remaining land of Laurence S. Allen, Jr. a distance of Four Hundred Seventy and 95/100 (470.95) feet to a point on the northwesterly side of said Tuttle Road; thence N 55°03'23" W by said Tuttle Road a distance of Fifty-One and 52/100 (51.52) feet to the point of beginning. The Road Access Area described in this paragraph contains 23,192 square feet, more or less. Grantor grants to Grantee, its successors and assigns, for the benefit of the property conveyed to Grantee by this deed and for the benefit of any other property hereafter acquired by Grantee, its successors and assigns, perpetual easements for access and utilities, including the right and obligation to construct, use and maintain the road access and utilities in the area described in this paragraph to provide access and utilities to and from Tuttle Road in common with Grantor and Grantee and their respective heirs, successors and assigns and others. Grantee, its successors and assigns agree to be solely responsible for construction and maintenance of the road to be constructed in said 23,192 square foot area and agree to indemnify, defend and hold Grantor, his heirs and assigns from any liability arising in connection with such area and shall name Grantor, his heirs and assigns as additional insureds on all applicable property liability policies. The parties agree that the Road Access Area described in this paragraph shall be conveyed to Grantee upon the substantial completion of the road area abutting the Retained Allen Land described below and upon the Town of Cumberland's approval of the conveyance as in compliance with any applicable zoning requirements. Grantee shall be responsible for all costs and fees associated with obtaining zoning approval.

The remaining land of Grantor Laurence S. Allen, Jr. not conveyed to Grantee in this deed (hereinafter called the "Retained Allen Land") consists of the parcel described in the prior paragraph hereof and the following parcel that is bounded and described as follows: A certain lot or parcel of land located on the northeasterly side of Tuttle Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows: Beginning at a 1-1/2" iron pipe at the westerly corner of land now or formerly of George B. Small and Carolyn F. Small as described in deeds recorded in the Cumberland County Registry of Deeds in Book 3232, Page 223 and Book 2935, Page 321 and the northwesterly side of Tuttle Road; thence N 55°03'23" W by Tuttle Road a distance of One Hundred Seventy-Seven and 77/100 (177.77) feet to a point; thence N 20°58'41" E a distance of Four Hundred Seventy and 95/100 (470.95) feet to a point; thence S 71°04'18" E a distance of Three Hundred Five and 61/100 (305.61) feet to a point on the northwesterly line of land now or formerly of Alan F. Small and Laura J. Small as described in a deed recorded in said Registry in Book 9363, Page 63; thence S 35°11'21" W by said land of Alan F. Small and Laura J. Small, and said land of George B. Small and Carolyn F. Small a distance of Five Hundred Forty-One and 35/100 (541.35) feet to the point of beginning. Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone. The above described Retained Allen Land parcel contains the 2.8 acres, more or less, described in this paragraph and the 23,192 square foot parcel described in the prior paragraph and being a portion of land of Grantor Laurence S. Allen Jr. as described in a deed recorded in the Cumberland County Registry of Deeds in Book 3003, Page 347.

Covenants of Grantor and Grantee Affecting Retained Allen Land: Grantor, his heirs and assigns, shall not sell or convey or lease the Retained Allen Land or any interest in the Retained Allen Land to any person or entity, except that notwithstanding the foregoing, Grantor, his heirs or assigns may convey the Retained Allen Land, subject to the covenants set forth herein, to his wife, Beverly J. Allen, or any of their children, who may live on the Retained Allen Land subject to the foregoing restrictions, provided, however at such time as either of the Grantor or Beverly J. Allen or any of their children no longer live on the Retained Allen Land, the Retained Allen Land shall be sold to Grantee, its successors and assigns, in accordance with the terms hereof. Grantor or Beverly J. Allen, or their child or children as applicable shall notify Grantee when the applicable person(s) no longer reside on the Retained Allen Land.

References to Grantor below shall mean Grantor, his heirs and assigns, and the references to Grantee below, shall mean Grantee, its successors and assigns:

(i) Appraisal and Price: As soon as reasonably feasible after Grantor or his spouse or children move out of the Retained Allen Land, the Retained Allen Land shall be appraised as described herein. The total Purchase Price payable by Grantee to Grantor for the Retained Allen Land shall be the "Appraised Value", as hereafter defined, adjusted as provided herein (the "Purchase Price"), with payment to be made by wire transfer, or by bank, law firm or title company check, or by certified check. Retained Allen Land taxes shall be prorated at Closing. Appraised Value of shall mean the Fair Market Value of the Retained Allen Land herein conveyed together with all buildings and improvements located thereon at the time of Closing, determined as provided herein. The parties shall instruct a licensed appraiser (the "Appraiser") to determine the fair market value of the Retained Allen Land and the improvements then located thereon, taking into consideration such factors as ordinarily considered by the Appraiser in determining the fair market value of property. The Appraiser shall provide Grantee and Grantor a written appraisal as soon as reasonably possible, setting forth its determination of the Fair Market Value of the Retained Allen Land. The cost of the appraisal shall be split equally by Grantee and Grantor. If either Grantee or Grantor are dissatisfied with the fair market value of the Retained Allen Land, as determined by the Appraiser, such party may commission a second appraisal (the "Second Appraisal) to be performed by a "Qualified Appraiser", provided that notice is given by the requesting party to the other party within ten (10) days after receipt of the First Appraisal. The second appraiser shall be instructed to complete the Second Appraisal within forty-five (45) days. If the Second Appraisal is within five percent (5%) of the value as determined by the first Appraisal, the value determined by the first Appraisal shall be deemed to be the Fair Market Value and the party requesting the Second Appraisal shall be solely responsible for the cost thereof. If the Second Appraisal varies by more than 5% from the value as determined by the first Appraisal, the parties shall designate a third Qualified Appraiser who shall be instructed to select either the First Appraisal or the Second Appraisal as the one he/she believes most accurately represents the fair market value of the Retained Allen Land. If the third appraiser selects the First Appraisal, the party requesting the Second Appraisal shall be solely responsible for the cost of the second and third appraisal. If the third appraiser selects the Second Appraisal, the parties shall split the cost of all three appraisers. A "Qualified Appraiser" is a Maine licensed appraiser with at least five (5) years of experience appraising residential properties.

(ii) Closing: The Closing shall occur on the date that is 45 days after completion of such appraisal process. Grantor shall deliver to Grantee at Closing: (i) a Real Estate Transfer Tax Declaration of Value and any other documents as are reasonably necessary to convey the Retained Allen Land; (ii) an owners/seller's affidavit for the title insurance company issuing the title insurance policy to Grantee to allow the title company to omit from such policy all exceptions for unfiled mechanic's, materialmen's or similar liens arising from any action of Grantor and for parties in possession; (iii) a written notice, in form and substance reasonably satisfactory to Grantee, which written notice shall certify either: (A) that to the best of the Grantor's knowledge, there is no underground oil storage facilities located on the Retained Allen Land, or (B) pursuant to 38 M.R.S.A. § 563(6), if there are any such facilities on the Retained Allen Land, that the facilities exist and shall disclose its registration number or numbers, the exact location of the facilities, whether or not it has been abandoned in place, and that the facilities are subject to regulation by the Maine Board of Environmental Protection.

(iii) Title and Deed. At the Closing, Grantor shall execute and deliver to Grantee or its nominee a good and sufficient Warranty Deed, conveying the Retained Allen Land. It is condition to Grantee's obligations hereunder that Grantor convey the Retained Allen Land in fee simple, with good and marketable title thereto, free and clear of all liens and encumbrances, except for the following ("Permitted Exceptions"): (i) real estate taxes which are not yet due or payable; (ii) any encumbrances existing as of the date hereof, or that may be created or consented to by Grantee hereafter; (iii) zoning and land use regulations; and (iii) customary public utility easements serving the Retained Allen Land.

(iv) Possession; Condition of Retained Allen Land; Casualty Loss. Full possession of the Retained Allen Land will be transferred to Grantee at the Closing in substantially the same condition as the Retained Allen Land is in as of the date of the completion of construction of improvements on the Retained Allen Land, except for: 1) reasonable wear and tear; 2) any non-structural, cosmetic improvements or alterations that do not significantly impact the general character or quality of the Retained Allen Land or significantly diminish the Retained Allen Land exterior's conformity with the general character of Grantee's property in the Town of Cumberland; and 3) any other material improvements or alterations made to the Retained Allen Land by Grantor, its successors or assigns, after notice to Grantee with no objection made by Grantee within 30 days of receipt of such notice, to which Grantee shall make no unreasonable objection. Prior to Closing, the Grantor shall remove all of its personal property, waste and debris from the Retained Allen Land, and shall leave the Retained Allen Land in a clean and orderly condition.

Grantor shall bear the risk of loss to the Retained Allen Land, excepting the Road Access Area described above, prior to the Closing. Grantor agrees to maintain fire and casualty insurance on the Retained Allen Land for the full replacement cost thereof, and to provide evidence of such coverage upon request by Grantee from time to time Notwithstanding anything to the contrary set forth in this Agreement, if, prior to Closing, Two Hundred Thousand Dollars ($200,000.00) or more of damage, as determined by Grantor's insurance company, is caused to the Retained

Allen Land by fire, casualty or otherwise, and such damage is not repaired and restored by Grantor within 180 days after the date of such fire or casualty and in any event prior to Closing, then Grantee may elect to terminate this Agreement by giving written notice to Grantor of its election to terminate this Agreement on or before the date that is ten (10) days after (i) the end of such 180-day period or (ii) the date that Grantor gives notice that it does not intend to repair, as applicable, to terminate this Agreement. If Grantor elects to repair any such damage or destruction, the Closing shall be extended, if necessary, to the date that is fifteen (15) business days after the expiration of such 180 day period; provided, however, that if such destruction or damage is repaired before the end of such 180 day period, Grantor shall have the right to close earlier by giving Grantee written notice setting a Closing Date for the Closing not sooner than twenty one (21) days after such notice, but in any event not sooner than the Closing Date specified above.

If Grantee does not give (or has no right to give) notice of termination within such period specified above: (i) this transaction shall close at Closing, (ii) Grantee shall pay the full applicable Purchase Price (subject to clause (iv) below), (iii) Grantor shall assign to Grantee the proceeds of any insurance policies payable to Grantor (or shall assign the right or claim to receive such proceeds after such Closing), and (iv) the amount of any deductible or self-insured or uninsured amount shall be a credit against the applicable Purchase Price. If Grantee timely delivers a notice of termination pursuant to this section, such that this Agreement is terminated prior to the Closing, the Grantor and Grantee shall have no further obligations or liabilities hereunder.

<u>(v) Default</u>. In the event Grantor or Grantee fails to perform any of its obligations as described herein and such default continues for a period of 15 days after written notice of default, the non-defaulting party may elect either: (a) to waive the default and continue the purchase and sale as if there had been no default; or (b) to terminate this Agreement; or (c) to employ all legal and equitable remedies, including, without limitation, the right of specific performance.

<u>(vi) Benefits</u>. Grantee covenants and agrees that Grantor, his wife and children shall have the right to use, without charge for as long as Grantor, his wife or children reside on the Retained Allen Land, all common facilities and amenities such as walking trails and wellness, educational and entertainment programs (but any meals and/or use of its assisted living and memory care programs and facilities shall be at the cost of Grantor at the ordinary charges therefor by Grantee) and events provided by Grantee to residents of its facilities in Falmouth, Maine and its facilities to be constructed in Cumberland, Maine. The provisions of this paragraph shall benefit Grantor and his family but not any unrelated future buyer of the Retained Allen Land. Grantee covenants and agrees that any restrictions, restrictive covenants or restrictions on use of Grantee's adjoining and nearby property shall not apply to the Retained Allen Land or the residence on the Retained Allen Land.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said Ocean View at Cumberland, LLC, its successors and assigns and to them and their use and behoof forever.

AND the undersigned do COVENANT with the said Grantee, its successors and assigns forever, that the undersigned are lawfully seized in fee of the premises; that they are free of all encumbrances; that the undersigned have good right to sell and convey the same to the said Grantees to hold as aforesaid; and that the undersigned and our heirs and assigns shall and will WARRANT and DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, the said Laurence S. Allen, Jr. has hereunto set his hand and seal, this 31st day of May, 2018.

WITNESS:

Ryan C. Almy

Laurence S. Allen, Jr.

The undersigned Ocean View at Cumberland, LLC, a Maine limited liability company, and Ocean View Retirement Community Limited Partnership for themselves and their successors and assigns hereby agree to the covenants and restrictions set forth in the foregoing deed.

Witness:

Ocean View at Cumberland, LLC

By: ____________________

John B. Wasileski, Its Manager

Ocean View Retirement Community Limited Partnership
By: Ocean View Management Company, its General Partner
(as Guarantor)

By: ____________________

John B. Wasileski, Its President

STATE OF MAINE
COUNTY OF CUMBERLAND, ss. 5/31, 2018

Then personally appeared the above-named Laurence S. Allen, Jr., and acknowledged the foregoing instrument to be his free act and deed, before me,

Attorney at Law/~~Notary Public~~
Bruce McGlauflin

{P0113223.1}

DLN: 1001840027975

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that Richard L. Doane and Hilary H. Doane, in consideration of One Dollar and other valuable considerations paid by Ocean View at Cumberland, LLC, a Maine limited liability company, whose mailing address is 20 Blueberry Lane, Falmouth, Maine, the receipt whereof is hereby acknowledged, do hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY unto the said Ocean View at Cumberland, LLC, its successors and assigns forever, the following described real estate:

A certain lot or parcel of land located northeasterly of, but not adjacent to, Tuttle Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows:

Beginning at a 5/8" capped iron rod ("PLS 1273") on the northwesterly line of land now or formerly of Laurence S. Allen as described in a deed recorded in the Cumberland County Registry of Deeds in Book 3003, Page 347, said point of beginning being located N 20°58'41" E by said land of Allen a distance of Seven Hundred Thirty-Three and 90/100 (733.90) feet from the northeasterly sideline of Tuttle Road. Thence:

1. S 20°58'41" W by said land of Allen a distance of One Hundred Fifty-Two and 92/100 (152.92) feet to a point;

2. N 13°35'55" E through land of the Grantor a distance of Two Hundred Ninety-Two and 20/100 (292.20) feet to a point of curvature;

3. Northerly through said land of the Grantor, following a curve to the right having a radius of Five Hundred Twenty-Five and 00/100 (525.00) feet, an arc distance of One Hundred Eighty-Nine and 70/100 (189.70) feet to a point at said land of Allen, said point being located N 23°57'00" E a distance of One Hundred Eighty-Eight and 67/100 (188.67) feet from the last described point of curvature;

4. Southerly by said land of Allen, following a non-tangent curve to the right having a radius of One Thousand Nine Hundred Twenty and 36/100 (1920.36) feet, an arc distance of Three Hundred Twenty-Six and 84/100 (326.84) feet to the point of beginning, said point of beginning being located S 16°06'08" W a distance of Three Hundred Twenty-Six and 45/100 (326.45) feet from the last described point.

Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.

The above described parcel contains 9,664 square feet, more or less, being a portion of land now or formerly of Richard L. Doane and Hilary H. Doane as described in a deeds recorded in the Cumberland County Registry of Deeds in Book 34623, Page 269 and Book 33851, Page 331, Page 184.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said Ocean View at Cumberland, LLC, its successors and assigns and to them and their use and behoof forever.

AND the undersigned do COVENANT with the said Grantee, its successors and assigns forever, that the undersigned are lawfully seized in fee of the premises; that they are free of all encumbrances; that the undersigned have good right to sell and convey the same to the said Grantees to hold as aforesaid; and that the undersigned and our heirs and assigns shall and will WARRANT and DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, the said Richard L. Doane and Hilary H. Doane have hereunto set their hands and seals, this 31st day of Aug. 2018.

WITNESS:

______________________ ______________________
Richard L. Doane

______________________ Hilary H. Doane
Hilary H. Doane

STATE OF MAINE
COUNTY OF CUMBERLAND, ss. Aug 31, 2018

Then personally appeared the above-named Richard L. Doane, and acknowledged the foregoing instrument to be his free act and deed, before me,

____
Attorney at Law/~~Notary Public~~

DLN: 1001840027973

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that Richard W. Doane, in consideration of One Dollar and other valuable considerations paid by Ocean View at Cumberland, LLC, a Maine limited liability company, whose mailing address is 20 Blueberry Lane, Falmouth, Maine, the receipt whereof is hereby acknowledged, do hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY unto the said Ocean View at Cumberland, LLC, its successors and assigns forever, the following described real estate:

A certain lot or parcel of land located northeasterly of, but not adjacent to, Tuttle Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows:

Beginning at a point on at the southeasterly line of land now or formerly of the Town of Cumberland as described in a deed recorded in the Cumberland County Registry of Deeds in Book 3710, Page 272, and the northwesterly corner of other land of the Town of Cumberland as described in a deed recorded in said Registry in Book 9970, Page 169; thence:

1. S 35°11'21" W by said other land of the Town of Cumberland, land now or formerly of David J. Small as described in a deed recorded in said Registry in Book 10779, Page 90, and land now or formerly of Daniel R. Small and Tricia A. Pettengill as described in a deed recorded in said Registry in Book 10871, Page 92 a distance of One Thousand Nine Hundred Forty-One and 17/100 (1941.17) feet to a 5/8" iron rod at land now or formerly of Laurence S. Allen, Jr. as described in a deed recorded in said Registry in Book 3003, Page 347;

2. N 14°19'11" W by said land of Allen a distance of Eight Hundred and 00/100 (800.00) feet to a point:

3. S 75°40'49" W by said land of Allen a distance of Twenty Eight and 00/100 (28.00) feet to a point;

4. N 06°50'50" W along land now or formerly of Richard L. Doane et al. a distance of Three Hundred Eighty-Five and 03/100 (385.03) feet to a point at land now or formerly of the Town of Cumberland as described in a deed recorded in said Registry in Book 15205, Page 237;

5. N 68°21'54" E by said land of the Town of Cumberland a distance of Fifty-Eight and 12/100 (58.12) feet to a 5/8" capped iron rod ("PLS 1280");

6. N 35°11'21" E by said land of the Town of Cumberland a distance of One Thousand One Hundred Twelve and 87/100 (1112.87) feet to a point:

7. S 54°30'35" E by said land of the Town of Cumberland a distance of Eight Hundred Fifty-Two and 61/100 (852.61) feet to the point of beginning.

Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.

The above described parcel contains 31.0 acres, more or less, being a portion of land now or formerly of Richard W. Doane as described in a deed recorded in the Cumberland County registry of Deeds in Book 2851, Page 184 and a portion of land now or formerly of land of Richard Doane as described in a deed recorded in said Registry in Book 15205, Page 239.

Grantee, its successors and assigns covenant and agree that no more than 50 single family residential dwelling units (and related amenities and common facilities, including a common community or activity building, and also including parking, utilities, drainage, detention and other site improvements) will be constructed on the above described property (this restriction shall not apply to any dwelling units or other improvements to be constructed by Grantee, its successors and assigns on any other adjoining property that Grantee, its successors and assigns may elect to acquire). The restrictions set forth in this paragraph shall be in effect for only as long as Richard L. Doane or Hilary H. Doane or any of their children or any of their grandchildren own the property described in the deed recorded in said Registry, Book 16894, Page 185 or the property described in the deed recorded in said Registry, Book 22850, Page 251.

Grantee, its successors and assigns further covenant and agree that they shall not grant any easements or create any trails of any kind including for snowmobiles, ATVs, bikes or pedestrians in the following described area: Beginning at a point on a line of land now or formerly of the Town of Cumberland as described in a deed recorded in the Cumberland County Registry of Deeds in Book 3710, Page 272, said point of beginning being located S 68°21'54" W a distance of Six and 40/100 (6.40) feet from a capped 5/8" iron rod "PLS 1280" at the easterly corner of land now or formerly of Richard Doane as described in a deed recorded in said Registry in Book 15205, Page 239; thence S 06°50'50" E a distance of Four Hundred Forty-Two and 10/100 (442.10) feet to a point; thence S 75°40'49" W a distance of Eighty-Eight and 28/100 (88.28) feet to a point and land now or formerly of Richard L. Doane and Hilary H. Doane as described in deeds recorded in said Registry in Book 34623, Page 269 and Book 33851, Page 331; thence Northerly by said land of Richard L. Doane and Hilary H. Doane, following a non-tangent curve to the left having a radius of One Thousand Nine Hundred Twenty and 36/100 (1920.36) feet, an arc distance of Fifty-Two and 62/100 (52.62) feet to a ¾" iron pipe and said land of Richard Doane, said iron pipe being located N 03°50'47" E a distance of Fifty-Two and 62/100 (52.62) feet from the last described point; thence N 75°40'49" E a distance of Twenty-Eight and 00/100 (28.00) feet to a point; thence N 06°50'50" W by said land of Richard W. Doane, by land of Richard L. Doane and Hilary H. Doane as described in a deed recorded in said Registry in Book 34583, Page 33, a distance of Three Hundred Eighty-Five and 03/100 (385.03) feet to a point and said land of the Town of Cumberland; thence N 68°21'54" E by said land of the Town of Cumberland a distance of Fifty-One and 72/100 (51.72) feet to the point of beginning. Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone. The above described no snowmobile or trail area contains 23,579 square feet, more or less, lying over a portion of land now or formerly of Richard Doane as described in a deed recorded in the Cumberland County Registry of Deeds in Book 15205, Page 239, a portion of land now or formerly of Richard W. Doane as described in a deed recorded in said Registry in Book 2851, Page 184, and a portion of land now or formerly of Laurence S. Allen as described in a deed recorded in said Registry in Book 3003, Page 347.

Grantee, its successors and assigns agree to develop the sidewalk of Little Acres Drive substantially as shown on the preliminary subdivision plan submitted to the Town of Cumberland Planning Board.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said Ocean View at Cumberland, LLC, its successors and assigns and to them and their use and behoof forever.

AND the undersigned do COVENANT with the said Grantee, its successors and assigns forever, that the undersigned are lawfully seized in fee of the premises; that they are free of all encumbrances; that the undersigned have good right to sell and convey the same to the said Grantees to hold as aforesaid; and that the undersigned and our heirs and assigns shall and will WARRANT and DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, the said Richard W. Doane, by Jeffrey W. Doane, attorney in fact under a Power of Attorney dated September 9, 2011 and recorded in the Cumberland County Registry of Deeds, Book 31294, Page 185, has hereunto set his hand and seal, this 25 day of May, 2018.

WITNESS:

Richard W. Doane by Jeffrey W. Doane, attorney in fact under a Power of Attorney dated September 9, 2011

STATE OF MAINE
COUNTY OF CUMBERLAND, ss. May 25th, 2018

Then personally appeared the above-named Jeffrey W. Doane, attorney in fact for Richard W. Doane, and acknowledged the foregoing instrument to be his free act and deed in said capacity, before me,

Sheila Nodine
Notary Public
Sheila Nodine

MY COMMISSION EXPIRES
JUNE 5, 2025

Exhibit 4

Snowmobile/Multi-Use Trail License

License Agreement

This license agreement ("Agreement") is effective as of ___, 2018, between OceanView at Cumberland, LLC ("OceanView") and the Town of Cumberland (the "Town") to permit the use of a portion of property owned by OceanView in Cumberland, Maine, (the "Property") for recreational use by the residents of Cumberland and surrounding towns.

WHEREAS, OceanView proposes to develop a portion of the Property for residential development; and

WHEREAS, OceanView wishes to make a portion of the Property available to the Town for recreational use compatible with OceanView's proposed development and believes that such use may occur in a manner that is compatible with the proposed development; and

WHEREAS, the Town wishes to use a portion of the Property for recreational use.

NOW THEREFORE, OceanView and the Town (the "Parties") agree as follows:

1. OceanView shall make available a multi-use trail across the Property, located as shown generally on the attached Exhibit "A" (the "Multi-Use Trail"), for recreational use for residents of Cumberland and surrounding towns during all seasons.

2. The Multi-Use Trail may be used by snowmobiles, as well as for pedestrian, bicycle, cross country skiing and other similar non-motorized recreational uses. The Multi-Use Trail may also be used by dogs, when leashed and accompanied by their owners.

3. OceanView shall contribute all funds necessary to construct and improve the Multi-Use Trail and shall also contribute all funds necessary to improve any portion of the connector trail shown on the attached Exhibit "A" on property owned by the Town (the "Town Trail"), in an amount not to exceed $10,000.

4. The Town agrees to use reasonable efforts to maintain the Multi-Use Trail free of debris and trash, and to maintain the Multi-Use Trail such that it can be safely used for the permitted uses as note herein. OceanView shall be responsible for all repairs necessary for the continued use of the Multi-Use Trail and the Town shall maintain the Town Trail.

5. OceanView shall be responsible for obtaining any permits required from any local, state, or federal board, commission, or agency, necessary for the construction and operation of the Multi-Use Trail and the Town shall be responsible for obtaining any permits required for any required improvements to the Town Trail.

6. Use of the Multi-Use Trail shall be subject to reasonable rules set by OceanView, which may be revised or amended from time to time. The Multi-Use Trail may be used during daylight hours between 7 am and 7 pm daily, and snowmobiles shall not exceed a posted limit of 10 miles per hour. The Multi-Use Trail is a connector trail, and no user shall stop for any significant period for picnicking or other similar activities.

7. In the event OceanView determines that the continued use of the Multi-Use Trail for any particular form of recreation is resulting in unreasonable adverse impacts to the adjacent residential uses, OceanView shall contact the Town to discuss its concerns. The Parties shall work in good faith to address any such concerns, including identifying any modifications to the terms and conditions of the use of the Multi-Use Trail deemed necessary by the Parties. OceanView commits to using best efforts working with the Town to ensure the continued use of the Multi-Use Trail for all recreational uses cited herein.

8. If, notwithstanding the efforts of the Parties, concerns about the compatibility of the use of the Multi-Use Trail with adjacent residential uses cannot be resolved, OceanView retains the right, in the exercise of its sole discretion, to terminate this Agreement and discontinue the use of the Multi-Use Trail for any use(s).

9. The rights granted herein are contingent on OceanView obtaining all local, state, and federal permits and approvals necessary to acquire and develop the Property as planned, and to construct and improve the Multi-Use Trail.

10. Subject to the provisions in Section 7, the Town agrees that the rights granted herein are revocable by OceanView, and no rights granted herein are deemed to provide the Town with any permanent right to use or occupy any portion of the Property, including the Multi-Use Trail.

SEEN AND AGREED TO:

_______, 2018

______________________________	______________________________
OceanView at Cumberland, LLC	Town of Cumberland
By: ______________________	By: ______________________
Its: ______________________	Its: ______________________

Exhibit 5

Utility Serviceability Letters

Portland Water District
FROM SEBAGO LAKE TO CASCO BAY

July 31, 2018

Frederic (Rick) Licht, PE, LSE
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039

Re: Oceanview at Cumberland, CU
Ability to Serve with PWD Water

Dear Mr. Licht:

The Portland Water District has received your request for an Ability to Serve Determination for the noted site submitted on June 7, 2017. Based on the information provided per plans dated July 31, 2018, we can confirm that the District will be able to serve the proposed project as further described in this letter. **Please note that this letter constitutes approval of the water system as currently designed. Any changes affecting the approved water system will require further review and approval by PWD.**

Conditions of Service

The following conditions of service apply:

- The District can confirm that the existing water and sewer systems in Tuttle Road have the capacity to serve the additional single family house lots within the Oceanview at Cumberland Subdivision in Cumberland. A 12-inch ductile iron water main extension will be required from the end of the Phase 1 water main extension to at least the center of the last lot to be served within the subdivision.
- New 1.5-inch domestic water services may be installed from the 12-inch water main extension within the subdivision.
- It is the District's understanding that all single family homes within the subdivision will require an NFPA 13D life safety sprinkler system. A single service line may be used to serve both domestic and fire protection needs. The split for the sprinkler service must be located after the water meter and must include a non-testable backflow prevention device.
- Our records show that the site is currently served with a 12-inch ductile iron water main installed during Phase 1 in 2018.

Prior to construction, the owner or contractor will need to complete the Main Extension Initiation form and pay all necessary fees. PWD will guide the applicant through the new development process.

Existing Site Service

According to District records, the project site does currently have existing water service. A 12-inch diameter ductile iron water main installed in Phase 1 provides water service to the site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of this service.

225 DOUGLASS STREET P.O. BOX 3553 PORTLAND, MAINE 04104-3553
PHONE: 207.774.5961 FAX: 207.761.8307 WEB: WWW.PWD.ORG

Water System Characteristics

According to District records, there is an 12-inch diameter cast iron water main in Tuttle Road and a public fire hydrant located approximately 500 feet from the site. Recent flow data is not available in this area. The most recent static pressure reading was 101 psi.

Public Fire Protection

The installation of new public hydrants to be accepted into the District water system will most likely be required. It is your responsibility to contact the Town of Cumberland Fire Department to ensure that this project is adequately served by existing and/or proposed hydrants.

Domestic Water Needs

The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of your proposed project. Based on the high water pressure in this area, we recommend that you consider the installation of pressure reducing devices that comply with state plumbing codes.

Private Fire Protection Water Needs

You have indicated that this project will require water service to provide private fire protection to the site. Please note that the District does not guarantee any quantity of water or pressure through a fire protection service. Please share these results with your sprinkler system designer so that they can design the fire protection system to best fit the noted conditions. If the data is out of date or insufficient for their needs, please contact MEANS to request a hydrant flow test and we will work with you to get more complete data.

Should you disagree with this determination, you may request a review by the District's Internal Review Team. Your request for review must be in writing and state the reason for your disagreement with the determination. The request must be sent to MEANS@PWD.org or mailed to 225 Douglass Street, Portland Maine, 04104 c/o MEANS. The Internal Review Team will undertake review as requested within 2 weeks of receipt of a request for review.

If the District can be of further assistance in this matter, please let us know.

Sincerely,
Portland Water District

Robert A. Bartels, P.E.
Senior Project Engineer

TOWN OF CUMBERLAND, MAINE
290 TUTTLE ROAD
CUMBERLAND, MAINE 04021
TEL: 207-829-2205 FAX: 829-2224

May 22, 2018

Rick Licht, PE, LSE
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039

Re: OceanView at Cumberland
Cumberland, Maine

Dear Rick:

The Town of Cumberland agrees to accept the sewer design flow from your project on Tuttle Road. The Town has the capacity to handle the requested flow amounts. Each unit will be required to have its own account and each permit will be $500. Monthly bills will be assessed upon occupancy through the Portland Water District.

Cumberland is a relatively new sewer system (less than 30 years in age) and we have been fortunate to have limited inflow and infiltration in our system. We presently own 30% of the Falmouth Treatment Plant. This new flow would be pumped via our Route One distribution system.

Please let me know if you have any additional questions regarding this request.

Sincerely,

William R. Shane, P.E.
Town Manager

cc: Carla Nixon, Director of Planning
Bill Longley, Code Enforcement Officer

Town of Falmouth

Wastewater Treatment Facilities ~ 271 Falmouth Road ~ Falmouth, Maine 04105
(207) 781-4462 ~ (Fax 781-2052)

December 19,2017

Mr. Rick Licht, PE
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039

Regarding: Oceanview satellite community, Cumberland – Capacity to Serve

Dear Mr. Licht;

In response to your inquiry related to the planned 50 to 100 housing unit development proposed in Cumberland, the Town of Cumberland current utilizes approximately one-half of their daily capacity allotment of 468,000 gallons per day. Sewage collection and treatment facilities that are in Falmouth and are shared with Cumberland through the Town's contractual agreements with the Portland Water District, have adequate capacity to accommodate the 9000 to 18,500 gallons per day of sewage flow the development is projected to contribute.

If you require additional information or I can be of any other assistance, please feel free to contact me.

Sincerely:

Robert Clark
Superintendent

cc: Chris Wasileski.
Matt Teare

Summit Natural Gas
2 DeLorme Drive ▪ Yarmouth, ME 04096 ▪ Phone: (207) 621-8000 ▪ www.SummitNaturalGasMaine.com

May 4, 2018

Via Hand Delivery

OceanView Retirement Community, LP
Tuttle Rd
Cumberland, ME

Re: Natural Gas Service

Dear Rick,

Thank you for your interest in receiving natural gas service from Summit Natural Gas of Maine, Inc. We are excited that you are considering developing a senior living community on Tuttle Road, Cumberland, Maine, that will be capable of using natural gas as an energy source. We understand that the Phase 1 development plan includes construction of 52 residential cottages, and that an additional 50 cottages may be constructed as part of the Phase 2 development plan.

If the community is engineered and constructed to receive natural gas service, we anticipate being able to provide natural gas service to the community by installing approximately 5100 linear feet of natural gas main line. After further discussion, we should be able to provide you a projected timeframe for completing installation and commencing service.

Any natural gas service will be provided in accordance with our Terms and Conditions of Service currently on file with Maine Public Utilities Commission. For a copy of the Terms and Conditions of Service, please visit http://summitnaturalgasmaine.com/rates-tariff.

Thank you for your interest in Summit as your natural gas provider. We look forward to speaking with you soon.

Sincerely

Arthur R Woolverton

Arthur Woolverton
Director of Sales and Marketing

CENTRAL MAINE POWER

7/30/2018

Frederic Licth
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039

Sent via email

RE: Ability to Serve Letter for Oceanview at Cumberland in Cumberland, ME

Dear Mr. Licth:

CMP has the ability to serve your proposed project located on Tuttle Road in Cumberland, Maine, in accordance with our CMP Handbook (web link below). We can provide you the desired pole or pad mounted transformers per your request and city approval, in accordance with our CMP Standards Handbook. If you have any questions on the process, or need help in completion of the documents, please feel free to contact me. Should this project be single phase with all self-contained metering, then you will be dealing directly with the Portland Service Center. If you require a polyphase service a line extension would have to be completed.

New Service Milestones

- Call 1-800-565-3181 to establish a new account and an SAP work order. Please provide both of these to me.
- Submit Load information. Please complete this CMP spreadsheet using load information
- Submit the easement information worksheet. Please complete this CMP form and either email or fax back to us.
- Submit any electronic drawings (PDF (preferred) or DWG files) of the site layout and proposed electrical connections if you have them.
- Preliminary meetings with CMP Advisor and Engineer to determine details of job (I will need to schedule with your electrician/contractor-please let me know who this is)
- Field planner design appointment to cost out job and develop CMP Invoice.
- Submit invoice for payment.
- Easements signed and payment received.
- Job scheduled for completion after the electrical inspection has been received.

This process can take several months, depending upon several factors including transformer delivery, potential substation upgrades, return of completed paperwork, and other jobs in the system that may be ahead of yours. In addition, contact with the other utilities, including telephone and cable, should be commenced as soon as practical. They may have additional work or charges in addition to the CMP work required to bring your project on line.

Please complete the attached forms (specific instructions are on each form) and email them back to me at your earliest convenience.

For your convenience, here is a link to the CMP Website which contains our Handbook with details on most service requirements:

CMP Handbook of Standard Requirements
(http://www.cmpco.com/MediaLibrary/3/6/Content%20Management/YourAccount/PDFs%20and%20Docs/handbook.pdf)

If you have any questions, please contact me.

Regards,

Jeffrey Lagueux
Supervisor-Energy Services
Central Maine Power Company

Exhibit 7

Lighting Cuts

SPECIFICATIONS

Intended Use:
The Beacon Urban luminaire is available with a choice of different LED wattage configurations, shapes, sizes and optical distributions designed to replace HID lighting up to 400W MH or HPS.

Construction:
- The drivers shall be located in the top cast housing and shall be accessible without tools by hinging the lower shade assembly. The driver and all electrical components shall be on a tray.
- The lower shade shall be made from a one-piece aluminum spinning.
- The housing is designed for LED thermal management without the use of metallic screens, cages, or fans. The top casting shall be able to be pendent mounted in place with a stainless steel safety pin and then permanently held in place with four stainless steel bolts.

Electrical:
- 100V through 277V, 50 Hz to 60 Hz (UNV), or 347V or 480V input.
- Power factor is ≥0.90 at full load.
- Dimming drivers are standard with connections for external dimming equipment available upon request.
- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is listed by UL for use at 600VAC at 50°C or higher.
- Plug disconnects are listed by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only.
- Fixture electrical compartment shall contain all LED driver components.
- Button photocell available.
- Ambient operating temperature -40°C to 40°C
- Surge protection - 20KA.
- Lifeshield™ Circuit - protects luminaire from excessive temperature. The device shall activate at a specific, factory-preset temperature, and progressively reduce power over a finite temperature range. A luminaire equipped with the device may be reliably operated in any ambient temperature up to 55ºC (131ºF). Operation shall be smooth and undetectable to the eye. Thermal circuit is designed to "fail on", allowing the luminaire to revert to full power in the event of an interruption of its power supply, or faulty wiring connection to the drivers. The device shall be able to co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.).

Controls/Options:
- Available with Energeni for optional set dimming, timed dimming with simple delay, or timed dimming based on time of night visit:
  www.beaconproducts.com/products/energeni
- Urban can be specified with **SiteSync™** wireless control system for reduction in energy and maintenance cost while optimizing light quality 24/7. See ordering information or visit:
  www.hubbelllighting.com/products/sitesync/
  for more details

Finish:
- IFS polyester powder-coat electrostatically applied and thermocured.
- IFS finish consists of a five stage pretreatment regimen with a polymer primer sealer and top coated with a thermoset super TGIC polyester powder coat finish.
- The finish meets the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists surface impacts of up to 160 inch-pounds.

Certifications:
- DesignLights Consortium (DLC) qualified, consult DLC website for more details: http://www.designlights.org/QPL
- NRTL Certified, UL8750, UL 1598 and CSA22.2#250. 13-14 for wet locations
- IDA approved
- This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at
  http://www.beaconproducts.com/products/urban

Warranty:
Five year limited warranty for more information visit:
www.hubbelllighting.com/resources/warranty

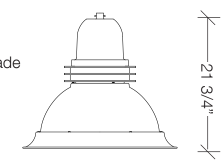
PRODUCT IMAGE(S)

Shown with arm

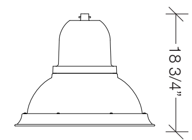
Shown with SiteSync™

STYLES

CAP - Round Shade

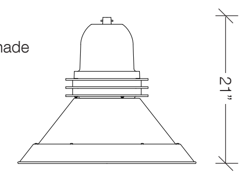


26" - CAP
Shown with optional 3RNW rings
EPA: 1.39 ft²
40 lbs

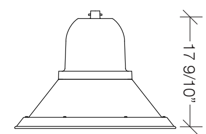


21" - CAP
EPA: 1.04 ft²
35 lbs

MRDS - Deep Shade

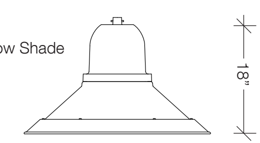


26" - MRDS
Shown with optional 3RNW rings
EPA: 1.25 ft²
40 lbs



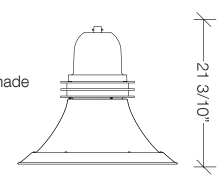
21" - MRDS
EPA: 1.00 ft²
35 lbs

MRSS - Shallow Shade

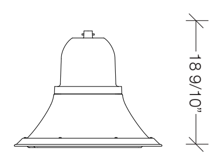


26" - MRSS
EPA: 1.17 ft²
40 lbs

MAR - Curved Shade



26" - MAR
Shown with optional 3RNW rings
EPA: 1.25 ft²
40 lbs



21" - MAR
EPA: 1.00 ft²
35 lbs

CERTIFICATIONS/LISTINGS

C US

*3000K and warmer CCTs only

ORDERING INFORMATION

ORDERING EXAMPLE: URBCAP21/36NB-80/5K/UNV/T4/SWP/NRNW/BBT

URB

MODEL
- **URB** Urban

SERIES
- **CAP-21** 21" Capitol
- **MRDS-21** 21" Miramar deep shade
- **MAR-21** 21" Maritas
- **CAP-26** 26" Capitol
- **MRSS-26** 26" Miramar shallow shade
- **MRDS-26** 26" Miramar deep shade
- **MAR-26** 26" Maritas

ENGINE-WATTS
- **24NB-27** 27W, LED array
- **24NB-55** 55W, LED array
- **36NB-80** 80W, LED array
- **48NB-110**[1] 110W, LED array
- **60NB-136**[1] 136W, LED array

LED COLOR[7]
- **3K** 3000K
- **4K** 4000K
- **5K** 5000K

VOLTAGE
- **UNV** 120-277V
- **347V** 347V
- **480V** 480V

ELECTRICAL OPTIONS
- **PEC-120** button, 120V
- **PEC-208** button, 208V
- **PEC-240** button, 240V
- **PEC-277** button, 277V

OPTICS[2]
- **T1** type I
- **T2** type II
- **T3** type III
- **T4** type IV
- **T4BLC** type IV, backlight control
- **T5R** type V, rectangular
- **T5QM** type V, square medium
- **T5W** type V, round wide

STYLE
- **NRNW** No rings
- **3RNW** Three rings

SENSOR OPTION
- **MOB**[4,6,8] Motion sensor 33% or 50% dimming

CONTROL OPTIONS
- **GENI-XX**[5] energeni
- **SWP**[3,4] SiteSync Wireless Pre-Commission

FINISH
- **BBT** basic black textured
- **BMT** black matte textured
- **WHT** white textured
- **MBT** metallic bronze textured
- **BZT** bronze textured
- **DBT** dark bronze textured
- **GYS** gray smooth
- **DPS** dark platinum smooth
- **GNT** green textured
- **MST** metallic silver textured
- **MTT** metallic titanium textured
- **OWI** old world iron
- **RAL** ______________

1 26" only
2 To rotate optics Left or Right 90 degrees, specify L or R after the optical distribution example:T4L
3 Must specify group and zone information at time of order. See www.hubbelllighting.com/controls/sitesync for further details.
4 Not available with other control or sensor options.
5 When ordering Energeni, specify the routine setting code (Example GENI-04). See Energeni brochure and instructions for setting table and options. Not available with sensor options.
6 Specify time delay; dimming level and mounting height.
7 This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at
8 Only available on 24NB and 36NB configurations
http://cdn.beaconproducts.com/content/products/specs/specs_files/Urban_LED_spec_sheet_turtle.pdf

PRECOMMISSIONED SITESYNC ORDERING INFORMATION: When ordering a fixture with the SiteSync lighting control option, additional information will be required to complete the order. The SiteSync Commissioning Form or alternate schedule information must be completed. This form includes Project location, Group information, and Operating schedules. For more detailed information please visit www.hubbelllighting.com/products/sitesync/ or contact Hubbell Lighting tech support at (800) 345-4928.

SiteSync fixtures with Motion control (SWPM) require the mounting height of the fixture for selection of the lens.

Examples: URB/CAP-26/60NB-136/3K/UNV/T5QM/SWP/NRNW/BBT — SiteSync only
URB/CAP-26/60NB-136/3K/UNV/T5QM/SWPM-20F/NRNW/BBT — SiteSync with Motion Control

SiteSync

SiteSync Lighting Control is available from our most popular brands in a broad range of award-winning product families.

Accessories and Services (Ordered Separately)

Catalog Number	Description
SWUSB*^	SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node.
SWTAB*^	Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node.
SWBRG+	SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested.

*When ordering SiteSync at least one of these two interface options must be ordered per project.
+If needed, an additional Bridge Node can be ordered.

ELECTRICAL DATA

# OF LEDS	NUMBER OF DRIVERS	DRIVE CURRENT (mA)	INPUT VOLTAGE (V)	SYSTEM POWER (w)	CURRENT (Amps)
24	1	350mA	120	27	0.2
			277		0.1
			347		0.1
			480		0.1
24	2	700 mA	120	55	0.5
			277		0.2
			347		0.2
			480		0.1
36	1	700 mA	120	80	0.7
			277		0.3
			347		0.2
			480		0.2
48	1	700 mA	120	110	0.9
			277		0.4
			347		0.3
			480		0.2
60	1	700 mA	120	136	1.1
			277		0.5
			347		0.4
			480		0.3

PROJECTED LUMEN MAINTENANCE

AMBIENT TEMP.	0	25,000	50,000	[1]TM-21-11 60,000	100,000	Calculated L70 (HOURS)
25°C / 77°C	1.00	0.97	0.95	0.95	0.92	>470,000

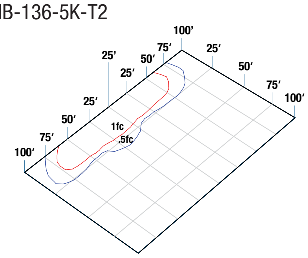
1 Projected per IESNA TM-21-11
Data references the extrapolated performance projections for the base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

AMBIENT TEMPERATURE		LUMEN MULTIPLIER
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	77°F	1.00
30°C	86°F	0.98
40°C	104°F	0.98

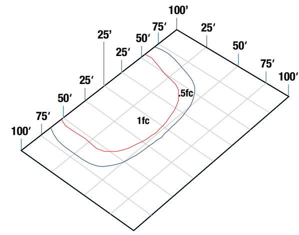
Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

PHOTOMETRICS

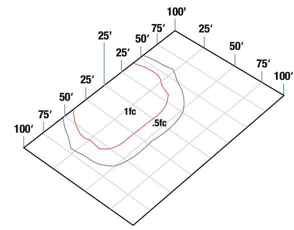
Type II
URB-60NB-136-5K-T2



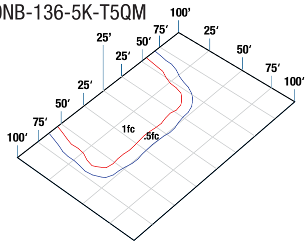
Type III
URB-60NB-136-5K-T3



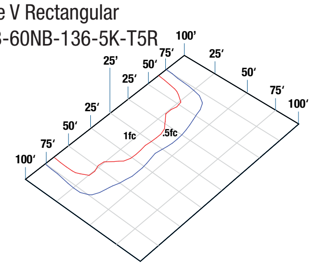
Type IV
URB-60NB-136-5K-T4



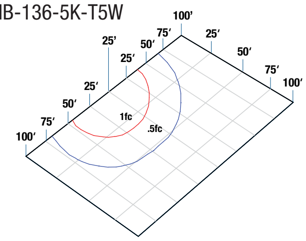
Type V Square Medium
URB-60NB-136-5K-T5QM



Type V Rectangular
URB-60NB-136-5K-T5R



Type V Round Wide
URB-60NB-136-5K-T5W



PERFORMANCE DATA

				5K (5000K nominal, 70 CRI)					4K (4000K nominal, 70 CRI)					3K (3000K nominal, 70 CRI)				
# LED'S	DRIVE CURRENT (MILLIAMPS)	SYSTEM WATTS (120-277V)	DISTRIBUTION TYPE	LUMENS	LPW[1]	B	U	G	LUMENS	LPW[1]	B	U	G	LUMENS	LPW[1]	B	U	G
24	350 mA	27 W	T2	2833	105	1	0	1	2805	104	1	0	1	2408	89	1	0	1
			T3	2805	104	1	0	1	2777	103	1	0	1	2392	89	1	0	1
			T4	3086	114	1	0	1	3055	113	1	0	1	2623	97	1	0	1
			T5QM	3085	114	2	0	0	3055	113	2	0	0	2623	97	1	0	0
			T5R	3142	115	2	0	2	3111	115	2	0	2	2670	99	2	0	2
			T5W	3044	113	2	0	1	3014	112	2	0	1	2600	96	2	0	1
24	700 mA	55 W	T2	5666	102	2	0	2	5610	101	2	0	2	4816	86	1	0	2
			T3	5610	101	1	0	2	5554	100	1	0	2	4784	86	1	0	2
			T4	6171	111	1	0	2	6110	109	1	0	2	5245	94	1	0	2
			T5QM	6171	111	3	0	1	6110	109	3	0	1	5245	94	2	0	1
			T5R	6283	113	3	0	3	6221	111	3	0	3	5341	96	3	0	3
			T5W	6087	109	3	0	1	6027	108	3	0	1	5201	93	3	0	1
36	700 mA	80 W	T2	8505	101	2	0	3	8415	100	2	0	3	7224	87	2	0	2
			T3	8415	100	2	0	2	8331	99	2	0	2	7175	86	2	0	2
			T4	9256	110	1	0	3	9164	109	1	0	3	7868	94	1	0	3
			T5QM	9257	110	3	0	1	9164	109	3	0	1	7868	94	3	0	1
			T5R	9425	112	3	0	3	9331	111	3	0	3	8011	96	3	0	3
			T5W	9131	109	3	0	2	9040	108	3	0	2	7801	93	3	0	2
48*	700 mA	110 W	T2	11332	102	3	0	3	11220	101	3	0	3	9633	87	2	0	3
			T3	11220	101	2	0	3	11108	100	2	0	3	9567	86	2	0	3
			T4	12342	111	2	0	3	12219	110	2	0	3	10491	95	2	0	3
			T5QM	12342	111	3	0	2	12219	111	3	0	2	10491	95	3	0	2
			T5R	12567	113	4	0	4	12441	112	4	0	4	10682	96	3	0	3
			T5W	12175	110	4	0	2	12053	109	4	0	2	10402	94	4	0	2
60*	700 mA	136 W	T2	14165	103	3	0	3	14025	102	3	0	3	12041	88	3	0	3
			T3	14025	102	3	0	3	13885	101	3	0	3	11959	87	3	0	3
			T4	15427	113	2	0	3	15274	111	2	0	3	13114	96	2	0	3
			T5QM	15427	113	4	0	2	15274	111	4	0	2	13314	96	3	0	2
			T5R	15708	115	4	0	4	15259	111	4	0	4	13352	97	4	0	4
			T5W	15218	111	4	0	2	15551	114	4	0	2	13002	95	4	0	2

[1]Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

*AVAILABLE IN THE 26" URBAN ONLY

ELECTRICAL DATA

# OF LEDS	NUMBER OF DRIVERS	DRIVE CURRENT (mA)	INPUT VOLTAGE (V)	SYSTEM POWER (w)	CURRENT (Amps)
24	1	350mA	120	27	0.2
			277		0.1
			347		0.1
			480		0.1
24	2	700 mA	120	55	0.5
			277		0.2
			347		0.2
			480		0.1
36	1	700 mA	120	80	0.7
			277		0.3
			347		0.2
			480		0.2
48	1	700 mA	120	110	0.9
			277		0.4
			347		0.3
			480		0.2
60	1	700 mA	120	136	1.1
			277		0.5
			347		0.4
			480		0.3

PROJECTED LUMEN MAINTENANCE

AMBIENT TEMP.	0	25,000	50,000	[1]TM-21-11 60,000	100,000	Calculated L70 (HOURS)
25°C / 77°C	1.00	0.97	0.95	0.95	0.92	>470,000

[1] Projected per IESNA TM-21-11
Data references the extrapolated performance projections for the base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

AMBIENT TEMPERATURE		LUMEN MULTIPLIER
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	77°F	1.00
30°C	86°F	0.98
40°C	104°F	0.98

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

URBAN SERIES

URBAN LUMINAIRE

Cat.#URBCAP-26/36NB-80/4K/UNV/T5W/PEC-208/GENI-XX/NRNW/BBT

Job	Type	Approvals
OceanView at Cumberland	SB	

SPECIFICATIONS

Intended Use:

The Beacon Urban luminaire is available with a choice of different LED wattage configurations, shapes, sizes and optical distributions designed to replace HID lighting up to 400W MH or HPS.

Construction:

- The drivers shall be located in the top cast housing and shall be accessible without tools by hinging the lower shade assembly. The driver and all electrical components shall be on a tray.
- The lower shade shall be made from a one-piece aluminum spinning.
- The housing is designed for LED thermal management without the use of metallic screens, cages, or fans. The top casting shall be able to be pendent mounted in place with a stainless steel safety pin and then permanently held in place with four stainless steel bolts.

Electrical:

- 100V through 277V, 50 Hz to 60 Hz (UNV), or 347V or 480V input.
- Power factor is ≥0.90 at full load.
- Dimming drivers are standard with connections for external dimming equipment available upon request.
- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is listed by UL for use at 600VAC at 50°C or higher.
- Plug disconnects are listed by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only.
- Fixture electrical compartment shall contain all LED driver components.
- Button photocell available.
- Ambient operating temperature -40°C to 40°C
- Surge protection - 20KA.
- Lifeshield™ Circuit - protects luminaire from excessive temperature. The device shall activate at a specific, factory-preset temperature, and progressively reduce power over a finite temperature range. A luminaire equipped with the device may be reliably operated in any ambient temperature up to 55ºC (131ºF). Operation shall be smooth and undetectable to the eye. Thermal circuit is designed to "fail on", allowing the luminaire to revert to full power in the event of an interruption of its power supply, or faulty wiring connection to the drivers. The device shall be able to co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.).

Controls/Options:

- Available with Energeni for optional set dimming, timed dimming with simple delay, or timed dimming based on time of night visit: www.beaconproducts.com/products/energeni
- Urban can be specified with **SiteSync™** wireless control system for reduction in energy and maintenance cost while optimizing light quality 24/7. See ordering information or visit: www.hubbelllighting.com/products/sitesync/ for more details

Finish:

- IFS polyester powder-coat electrostatically applied and thermocured.
- IFS finish consists of a five stage pretreatment regimen with a polymer primer sealer and top coated with a thermoset super TGIC polyester powder coat finish.
- The finish meets the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists surface impacts of up to 160 inch-pounds.

Certifications:

- DesignLights Consortium (DLC) qualified, consult DLC website for more details: http://www.designlights.org/QPL
- NRTL Certified, UL8750, UL 1598 and CSA22.2#250. 13-14 for wet locations
- IDA approved
- This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at http://www.beaconproducts.com/products/urban

Warranty:

Five year limited warranty for more information visit:
www.hubbelllighting.com/resources/warranty

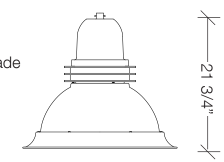
PRODUCT IMAGE(S)

Shown with arm

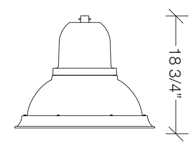
Shown with SiteSync™

STYLES

CAP - Round Shade

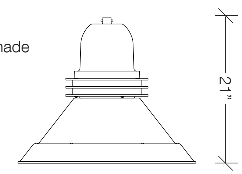


26" - CAP
Shown with optional 3RNW rings
EPA: 1.39 ft²
40 lbs

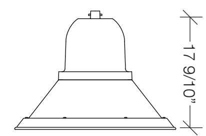


21" - CAP
EPA: 1.04 ft²
35 lbs

MRDS - Deep Shade

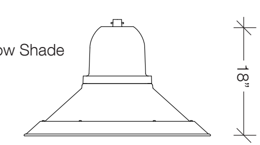


26" - MRDS
Shown with optional 3RNW rings
EPA: 1.25 ft²
40 lbs



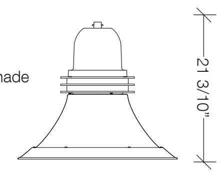
21" - MRDS
EPA: 1.00 ft²
35 lbs

MRSS - Shallow Shade

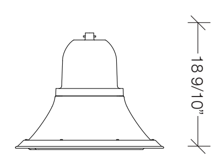


26" - MRSS
EPA: 1.17 ft²
40 lbs

MAR - Curved Shade



26" - MAR
Shown with optional 3RNW rings
EPA: 1.25 ft²
40 lbs



21" - MAR
EPA: 1.00 ft²
35 lbs

CERTIFICATIONS/LISTINGS

C US

*3000K and warmer CCTs only

ORDERING INFORMATION

ORDERING EXAMPLE: URBCAP21/36NB-80/5K/UNV/T4/SWP/NRNW/BBT

URB

MODEL

- **URB** Urban

SERIES

- **CAP-21** 21" Capitol
- **MRDS-21** 21" Miramar deep shade
- **MAR-21** 21" Maritas
- **CAP-26** 26" Capitol
- **MRSS-26** 26" Miramar shallow shade
- **MRDS-26** 26" Miramar deep shade
- **MAR-26** 26" Maritas

ENGINE-WATTS

- **24NB-27** 27W, LED array
- **24NB-55** 55W, LED array
- **36NB-80** 80W, LED array
- **48NB-110**[1] 110W, LED array
- **60NB-136**[1] 136W, LED array

LED COLOR[7]

- **3K** 3000K
- **4K** 4000K
- **5K** 5000K

VOLTAGE

- **UNV** 120-277V
- **347V** 347V
- **480V** 480V

OPTICS[2]

- **T1** type I
- **T2** type II
- **T3** type III
- **T4** type IV
- **T4BLC** type IV, backlight control
- **T5R** type V, rectangular
- **T5QM** type V, square medium
- **T5W** type V, round wide

ELECTRICAL OPTIONS

- **PEC-120** button, 120V
- **PEC-208** button, 208V
- **PEC-240** button, 240V
- **PEC-277** button, 277V

CONTROL OPTIONS

- **GENI-XX**[5] energeni
- **SWP**[3,4] SiteSync Wireless Pre-Commission

STYLE

- **NRNW** No rings
- **3RNW** Three rings

SENSOR OPTION

- **MOB**[4,6,8] Motion sensor 33% or 50% dimming

FINISH

- **BBT** basic black textured
- **BMT** black matte textured
- **WHT** white textured
- **MBT** metallic bronze textured
- **BZT** bronze textured
- **DBT** dark bronze textured
- **GYS** gray smooth
- **DPS** dark platinum smooth
- **GNT** green textured
- **MST** metallic silver textured
- **MTT** metallic titanium textured
- **OWI** old world iron
- **RAL** _____________

1 26" only
2 To rotate optics Left or Right 90 degrees, specify L or R after the optical distribution example:T4L
3 Must specify group and zone information at time of order. See www.hubbelllighting.com/controls/sitesync for further details.
4 Not available with other control or sensor options.
5 When ordering Energeni, specify the routine setting code (Example GENI-04). See Energeni brochure and instructions for setting table and options. Not available with sensor options.
6 Specify time delay; dimming level and mounting height.
7 This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at
8 Only available on 24NB and 36NB configurations
http://cdn.beaconproducts.com/content/products/specs/specs_files/Urban_LED_spec_sheet_turtle.pdf

PRECOMMISSIONED SITESYNC ORDERING INFORMATION: When ordering a fixture with the SiteSync lighting control option, additional information will be required to complete the order. The SiteSync Commissioning Form or alternate schedule information must be completed. This form includes Project location, Group information, and Operating schedules. For more detailed information please visit www.hubbelllighting.com/products/sitesync/ or contact Hubbell Lighting tech support at (800) 345-4928.

SiteSync fixtures with Motion control (SWPM) require the mounting height of the fixture for selection of the lens.

Examples: URB/CAP-26/60NB-136/3K/UNV/T5QM/SWP/NRNW/BBT — SiteSync only
URB/CAP-26/60NB-136/3K/UNV/T5QM/SWPM-20F/NRNW/BBT — SiteSync with Motion Control

Accessories and Services (Ordered Separately)

Catalog Number	Description
SWUSB*^	SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node.
SWTAB*^	Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node.
SWBRG+	SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested.

*When ordering SiteSync at least one of these two interface options must be ordered per project.
+ If needed, an additional Bridge Node can be ordered.

SiteSync Lighting Control is available from our most popular brands in a broad range of award-winning product families.

ELECTRICAL DATA

# OF LEDS	NUMBER OF DRIVERS	DRIVE CURRENT (mA)	INPUT VOLTAGE (V)	SYSTEM POWER (w)	CURRENT (Amps)
24	1	350mA	120	27	0.2
			277		0.1
			347		0.1
			480		0.1
24	2	700 mA	120	55	0.5
			277		0.2
			347		0.2
			480		0.1
36	1	700 mA	120	80	0.7
			277		0.3
			347		0.2
			480		0.2
48	1	700 mA	120	110	0.9
			277		0.4
			347		0.3
			480		0.2
60	1	700 mA	120	136	1.1
			277		0.5
			347		0.4
			480		0.3

PROJECTED LUMEN MAINTENANCE

AMBIENT TEMP.	0	25,000	50,000	[1]TM-21-11 60,000	100,000	Calculated L70 (HOURS)
25°C / 77°C	1.00	0.97	0.95	0.95	0.92	>470,000

1 Projected per IESNA TM-21-11
Data references the extrapolated performance projections for the base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

AMBIENT TEMPERATURE		LUMEN MULTIPLIER
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	77°F	1.00
30°C	86°F	0.98
40°C	104°F	0.98

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

energeni

a compact control device that gives lighting owners a simple way to save on energy costs...

BEACON
design . performance . technology

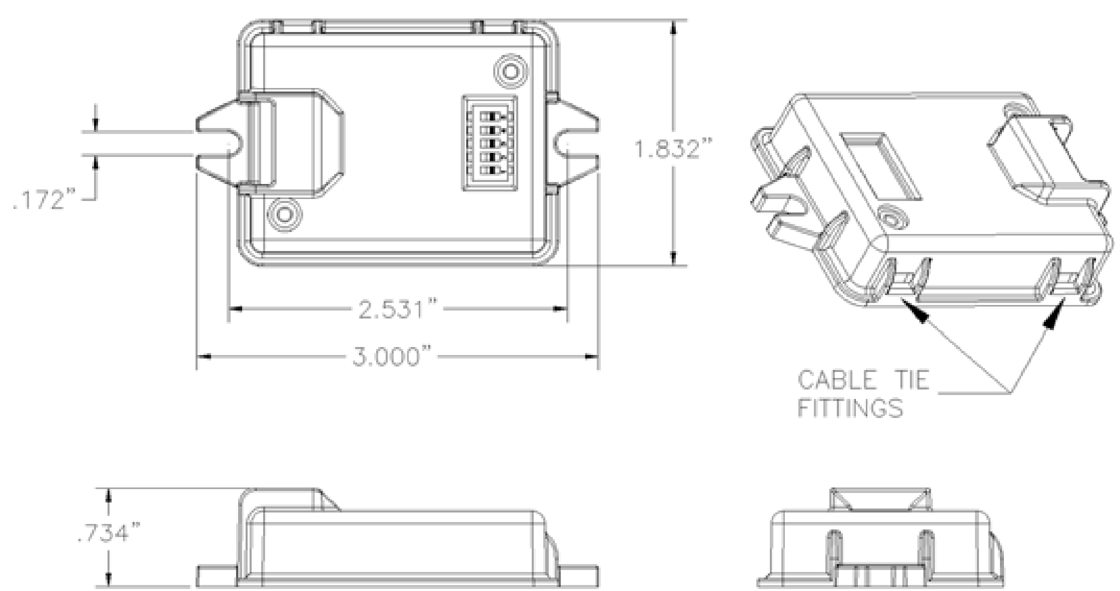
HUBBELL Lighting

energeni

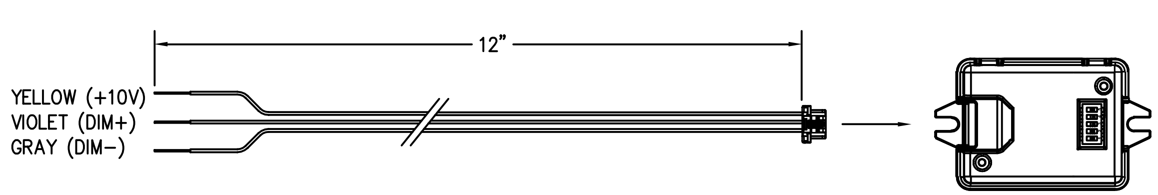
The **ENERGENI** lighting control system is a simple way for owners to save money by dimming the fixtures during unoccupied hours.

The **ENERGENI** has flexible setting options to work with fixtures activated by photocontrols or time clocks. The delay and dimming level options can be configured at the factory or re-configured at will in the field without the need for special cables or computers.

ENERGENI PRODUCT DIMENSIONS



WIRING HARNESS DIMENSIONS



Routine Setting Chart

32 Pre-programmed functional settings

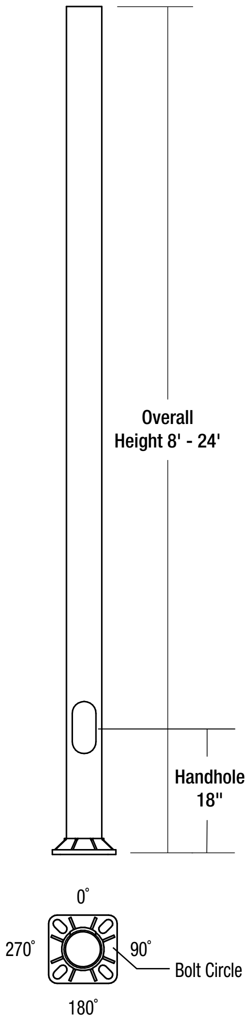
SETTING OPTIONS

The ENERGENI has 32 pre-programmed functional settings that can be selected with its five DIP switches. The combination of switch settings allows for options of set dimming, timed diming with a simple delay or timed diming based on hours of operation or time at night.

	Switch Settings (0 = Down, 1 = Up)								
Routine Number	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Brightness %	Energy Savings %	Simple Delay (Hrs.)	Variable Delay Estimated Time
01	0	0	0	0	0	100	0	0	
02	1	0	0	0	0	20	80	0	
03	0	1	0	0	0	20	80	3	
04	1	1	0	0	0	20	80	5	
05	0	0	1	0	0	20	80	7	
06	1	0	1	0	0	20	80	9	
07	0	1	1	0	0	40	60	0	
08	1	1	1	0	0	40	60	3	
09	0	0	0	1	0	40	60	5	
10	1	0	0	1	0	40	60	7	
11	0	1	0	1	0	40	60	9	
12	1	1	0	1	0	60	40	0	
13	0	0	1	1	0	60	40	3	
14	1	0	1	1	0	60	40	5	
15	0	1	1	1	0	60	40	7	
16	1	1	1	1	0	60	40	9	
17	0	0	0	0	1	20	80		6:00 pm
18	1	0	0	0	1	20	80		8:00 pm
19	0	1	0	0	1	20	80		10:00 pm
20	1	1	0	0	1	20	80		12:00 am
21	0	0	1	0	1	20	80		2:00 am
22	1	0	1	0	1	40	60		6:00 pm
23	0	1	1	0	1	40	60		8:00 pm
24	1	1	1	0	1	40	60		10:00 pm
25	0	0	0	1	1	40	60		12:00 am
26	1	0	0	1	1	40	60		2:00 am
27	0	1	0	1	1	40	60		4:00 am
28	1	1	0	1	1	60	40		6:00 pm
29	0	0	1	1	1	60	40		8:00 pm
30	1	0	1	1	1	60	40		10:00 pm
31	0	1	1	1	1	60	40		12:00 am
32	1	1	1	1	1	60	40		2:00 am

RSA-B-SHO-S SERIES POLES
ROUND STRAIGHT ALUMINUM

Cat.# RSA-B-SHO-S-14-40-OT-BBT		BEACON design . performance . technology
Job: OceanView at Cumberland	Type	Approvals

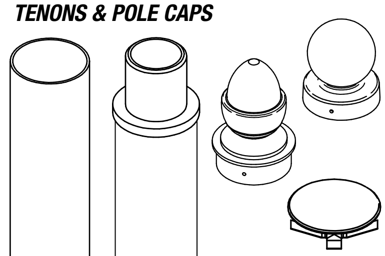


APPLICATIONS
- Lighting installations for side and top mounting of luminaires with effective projected area (EPA) not exceeding maximum allowable loading of the specified pole in its installed geographic location

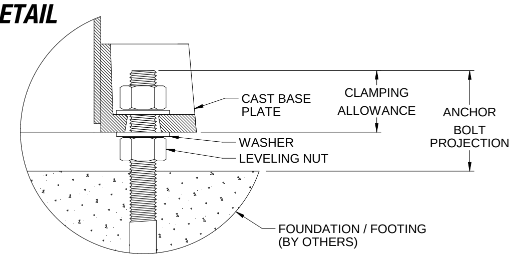
CONSTRUCTION
- SHAFT: One-piece straight aluminum with round cross section; Extruded shafts of 6061-T6 aluminum in 1/8”, 3/16”, or 1/4” thickness. Base plate of 356 cast aluminum.
- POLE CAP OR FINALS: Cap or decorative finials available for side mounted luminaires. Open top or tenons provided for post top mounted luminaires.
- HAND HOLE: Aluminum hand hole frame; Mounting provisions for grounding lug located behind cover
- ANCHOR BOLTS: Four galvanized anchor bolts provided per pole with minimum yield of 55,000 psi (ASTM F1554). Galvanized hardware with two washers and two nuts per bolt for leveling

FINISH
- Durable thermoset polyester powder coat paint finish with nominal 3.0 mil thickness
- Powder paint finish coat available in twelve standard colors; Custom colors available; RAL number preferable.

TENONS & POLE CAPS



BASE DETAIL



ORDERING EXAMPLE:

RSA-B-SHO-S - 16 - 40 - A/B/C - CAP - 2L - B3 - DBT - VM2

SERIES

RSA-B-SHO-S	Round Straight Aluminum Pole Beacon Smooth

HEIGHT

Reference page 2 Ordering matrix

SHAFT

Reference page 2 Ordering matrix

THICKNESS

Reference page 2 Ordering matrix

MOUNTING

1	Single arm mount
2	Two fixtures at 180˚
2L	Two fixtures at 90˚
3T	Three fixtures at 90˚
3Y	Three at 120˚
4	Four fixtures at 90˚
OT[4]	Open top (includes pole cap)
TN3[4]	Tenon 3 x 3[2]
TN4[4]	Tenon 3 x 4[2]
TN5[4]	Tenon 4 x 5[3]
TN8[4]	Tenon 4 x 8[3]
ARC[4]	Acorn Finial
BAL[4]	Ball Finial
CAP[4]	Flat Cap

DRILL PATTERN

B1	Cruzer
B3	VP-L
B4	VP-S

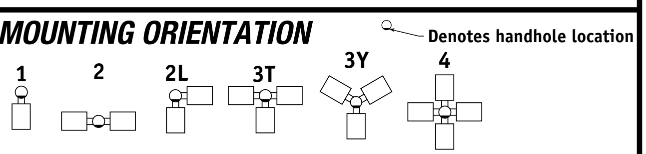
FINISH

DB	Dark Bronze Textured
BL	Black Textured
WH	White Textured
PS	Platinum Silver
GYS	Light Gray Smooth
BZT	Bronze Textured
BBT	Basic Black Textured
CC	Custom Color

OPTIONS

GFI[1]	20 Amp GFCI Receptacle and Cover
EHH[1]	Extra Handhole
C05[1]	.5” Coupling
C07[1]	.75” Coupling
C20[1]	2” Coupling
VM2	2nd mode vibration damper
LAB	Less Anchor Bolts

MOUNTING ORIENTATION



ACCESSORIES **- Order Separately**

Catalog Number	Description
VM2SXX	2nd mode vibration damper

1 Specify option location using logic found on page 2 **(Option Orientation)**
2 TN3 and TN4 not available on 3” diameter poles
3 TN5 and TN8 not available on 4” diameter poles
4 Specify pole top

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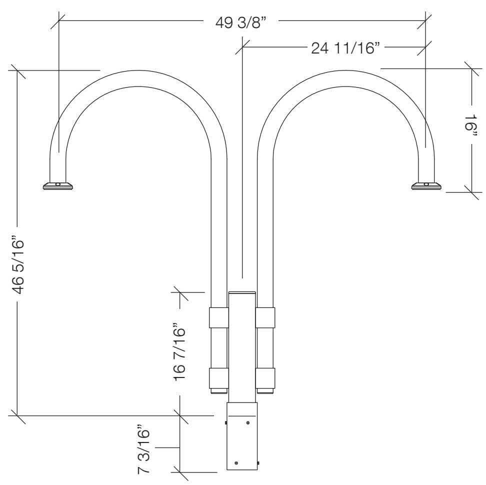
Type:	SA
Project Name:	OceanView at Cumberland
Notes:	AA-41/S/4/B/P/BBT

rev. 01.14.2014

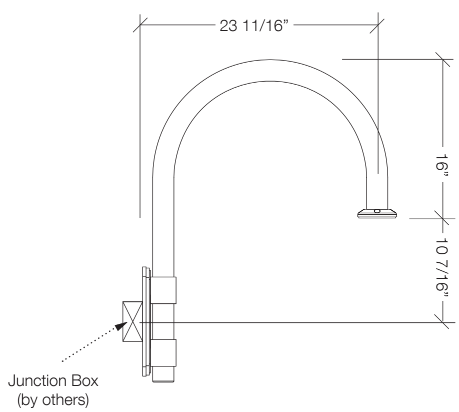
AA-41 RAILROAD STRAP
Arms

	A		B		C		D		E		F
Sample	AA-40		S		4		B		P		BBT
Ordering		/		/		/		/		/	

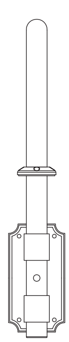
DETAILS



WALL BRACKET DETAILS



WALL PLATE DETAILS



Due to our continued efforts to improve our products, product specifications are subject to change without notice.

A. MODEL
AA-41 Railroad Strap

B. POST SHAFT PROFILE
W wall mount
S smooth
F fluted

C. POST SHAFT DIAMETER
4 4”
5 5”
6 6”
OTHER ____________

D. ARRANGEMENT
____ *see arrangement table below*

E. LUMINAIRE MOUNTING
P pendant

F. COLOR
BBT basic black textured
BMT black matte textured
WHT white textured
MBT metallic bronze textured
BZT bronze textured
GYS gray smooth
DPS dark platinum smooth
GNT green textured
MST metallic silver textured
MTT metallic titanium textured
OWI old world iron
RAL ____________

Construction: All cast aluminum parts shall be low copper alloy A356. All extruded aluminum parts shall be alloy 6061-T6, 6063-T5 or equal.

EPA (effective projected area): EPA is de¬fined as (projected surface area X drag factor) and measured in ft2. Allowable post, luminaire arm, luminaire and accessory EPAs are derived from the most current published AASHTO (American Association of State Highway and Transportation Officials) standard, currently AASHTO 2001 (50yr design life). Customer assumes all responsibility for selecting the ap¬propri-ate post for installation (consult factory for assistance). Luminaire arm, luminaire and accessory EPA must be equal to or less than allowable EPA of post. Consult a professional engineer for compliance with local codes and standards.

Fasteners: All fasteners shall be Corrosion Resistant. When tamper resistant fasteners are required, spanner HD (snake eye) style shall be provided (special tool required, available at additional cost).

Finish: Finish shall be a Beacote V polyester pow-der-coat electro-statically applied and thermocured. Beacote V finish shall consist of a five stage iron phosphate chemical pretreatment regimen with a poly-mer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester pow¬der coat finish. The finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists sur-face impacts of up to 160 inch-pound.

Limited Warranty: Beacon Products warrants its products, to the original purchaser, against defects in materials and workmanship for proper usage for a pe-riod of 5 years after date of production, when properly installed, maintained and appropriately specified. See Warranty Information on www.beaconproducts.com for complete details and exclusions.

		arrangement (EPA index ft^2 / weight (lbs))									
shaft Ø		A	B	C	D	E	F	G	H	I	J
wall	weight	12	-	-	-	-	-	-	-	-	-
Ø4"	EPA	-	1.50	2.41	-	1.93	2.17	-	2.41	2.41	-
	weight	-	15	23	-	23	32	-	32	41	-
Ø5"	EPA	-	1.52	2.49	-	2.00	2.24	-	2.49	2.49	-
	weight	-	16	25	-	25	34	-	34	43	-
Ø6"	EPA	-	1.71	2.62	-	2.10	2.36	-	2.62	2.62	-
	weight	-	19	27	-	27	36	-	36	45	-

2041 58th Avenue Circle East Bradenton, fl 34203 Phone: (800) 345-4928 Fax: (941) 751-5535

www.beaconproducts.com

Type:	SA
Project Name:	OceanView at Cumberland
Notes:	DOMU/4/BBT

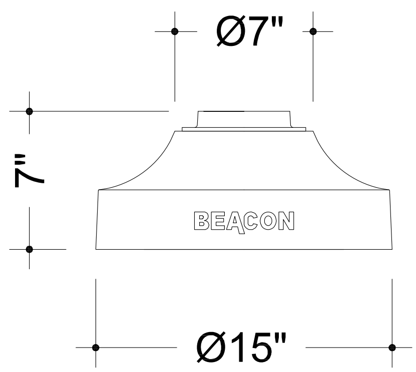
rev. 02.20.2014

DOMUS

Poles & Bases

	A		B		C
Sample	DOMU		5		BBT
Ordering		/		/	

DETAILS



A. MODEL

DOMU	Domus

B. POST SHAFT DIAMETER

3	3”
4	4”
5	5”
6	6”

C. COLOR

BBT	basic black textured
BMT	black matte textured
WHT	white textured
MBT	metallic bronze textured
BZT	bronze textured
DBT	dark bronze textured
GYS	gray smooth
DPS	dark platinum smooth
GNT	green textured
MST	metallic silver textured
MTT	metallic titanium textured
OWI	old world iron
RAL	______________

Construction: All cast aluminum parts shall be low copper alloy A356. All extruded aluminum parts shall be alloy 6061-T6, 6063-T5 or equal. Standard fluted shaft profile shall be 16-flat flutes for 3”OD and 12-flat flutes for 4”, 5”, & 6”OD.

Base Covers: require specification of smooth or fluted shafts of the size required to meet wind load requirements

Vibration Dampeners: Vibration dampener pads shall be provided when required by customer or deemed necessary by Beacon Products. Please consult factory for bridge mounted applications.

EPA (effective projected area): EPA is defined as (projected surface area X drag factor) and measured in ft2. Allowable post, luminaire arm, luminaire and accessory EPAs are derived from the most current published AASHTO (American Association of State Highway and Transportation Officials) standard, currently AASHTO 2001 (50yr design life). Customer assumes all responsibility for selecting the appropriate post for installation (consult factory for assistance). Luminaire arm, luminaire and accessory EPA must be equal to or less than allowable EPA of post. Consult a professional engineer for compliance with local codes and standards.

Anchor Bolt: Anchor bolts, sized as required, double hex nuts and flat washers shall be hot dipped galvanized steel. A bolt circle template shall be provided for installation.

Fasteners: All fasteners shall be Corrosion Resistant. When tamper resistant fasteners are required, spanner HD (snake eye) style shall be provided (special tool required, available at additional cost).

Finish: Finish shall be a Beacote V polyester powdercoat electrostatically applied and thermocured. Beacote V finish shall consist of a five stage iron phosphate chemical pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish. The finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists surface impacts of up to 160 inch-pound.

Limited Warranty: Beacon Products warrants its products, to the original purchaser, against defects in materials and workmanship for proper usage for a period of 5 years after date of production, when properly installed, maintained and appropriately specified. See Warranty Information on www.beaconproducts.com for complete details and exclusions.

Due to our continued efforts to improve our products, product specifications are subject to change without notice.

Cottage Building & Post lights

Norwell Lighting

Product Name	Cottage Onion
Model Number	1323 1324 1321
Project Name	OceanView at Cumberland
Fixture Type	Quantity

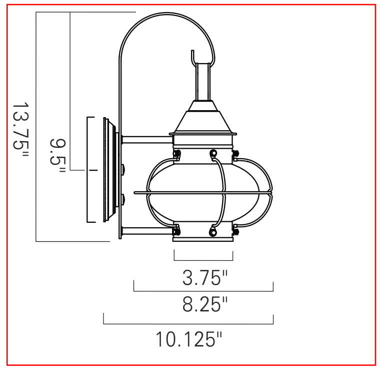
Cottage Onion Small - 1323
Bronze (BR) Seedy Glass (SE)

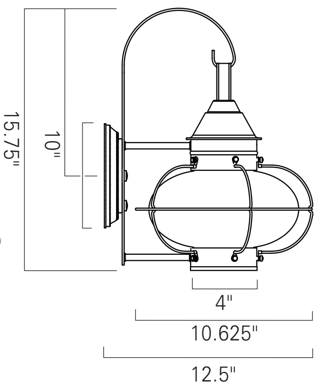
Cottage Onion Small - 1323
Bronze (BR) Clear Glass (CL)

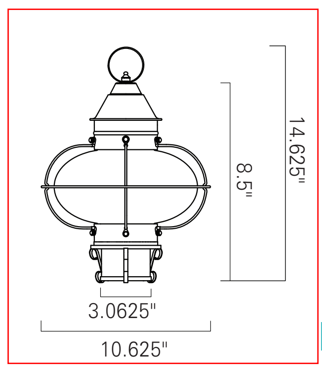
Cottage Onion Medium - 1324
Black (BL) Clear Glass (CL)

Cottage Post - 1321
Black (BL) Seedy Glass (SE)

Cottage Post - 1321
Black (BL) Clear Glass (CL)







INC

Product Name / Model / Dimensions	Finish Options	Glass	Lamping Options
Cottage Onion Small - 1323 Cottage Onion Medium - 1324 Cottage Onion Post - 1321	**Standard** Black (BL) Bronze (BR)	**Standard** Clear (CL) Seedy (SE)	**Standard** Incandescent (1) 100 Watt Edison

	Height	Width	Projection	TTO
1323	13.75"	8.25"	10.125"	9.5"
1324	15.75"	10.625"	12.5"	10"
1321	14.625"	10.625"		

Backplate Sconce 6.25" Diameter

Exhibit 8

Responses to 03-12-18 Peer Review Memo

COPY OF LETTER UPDATED WITH OCEANVIEW AT CUMBERLAND TEAM RESPONSES IN RED
07-31-18.

EXHIBIT 8 OF FINAL PLAN APPLICATION

March 12, 2018

Ms. Carla Nixon, Town Planner
Town of Cumberland
290 Tuttle Road
Cumberland, Maine 04021

Subject: Peer Review of OceanView At Cumberland
Major Subdivision and Site Plan Application – Addenda 1A
Preliminary Review Comment Responses
Tuttle Road, Cumberland, Maine

Dear Ms. Nixon:

As requested, Sevee & Maher Engineers, Inc. (SME) has completed a review of the comment responses submitted for the preliminary application for a Major Subdivision and Site Plan for the proposed OceanView at Cumberland senior living community located off Tuttle Road. This submission is identified by the applicant as Revised Preliminary Subdivision Plan Submittal – Addenda-1A. The application materials received by SME were prepared by LICHT Environmental Design, LLC (LICHT), and consist of the following:

- Cover letter by Frederic Licht, P.E., L.S.E, outlining responses to Planning Board, staff and peer review comments, dated March 2, 2018;
- Exhibits 1 through 4 prepared by LICHT outlining signage, lighting cut sheets, traffic updates, and cottage elevations, dated March 2, 2018;
- Project plan set, Revision 3, dated March 1, 2018;
- An updated stormwater management report prepared by Belanger Engineering, dated March 1, 2018; and
- Updated Pre- and Post-Development Stormwater Management Plans, dated March 1, 2018.

PROJECT DESCRIPTION

The Applicant proposes to develop a 52-unit senior living facility on a combined 36.83-acre parcel currently owned by Richard Doane and Laurence Allen. The parcel is located off Tuttle

Road in Cumberland, across the street from the Town of Cumberland (Town) Municipal Office. The development will be accessed by a proposed private roadway constructed in accordance with Town residential sub-collector roadway standards as outlined in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code. The subdivision will be served with public utilities, including water, sewer, natural gas, electric, telephone, and cable.

TOWN PLANNER COMMENTS DATED FEBRUARY 8, 2018

The applicant provided additional clarification to their previous response to comments on February 14, 2018. We anticipate the 26 comments listed have been reviewed with Carla Nixon, the Town Planner, and addressed to her satisfaction.

PEER REVIEW COMMENTS DATED FEBRUARY 12, 2018

The following comments were issued in our peer review letter for the Preliminary Major Subdivision and Site Plan Application, dated February 12, 2018. The project was reviewed as a Major Subdivision as outlined in Chapter 250 - Subdivision of Land of the Town of Cumberland Ordinances, most recently amended and adopted on January 12, 2011, and Chapter 229 - Site Plan Review, most recently amended and adopted on March 26, 2012. The comments and responses below relate to the appropriate Ordinance Sections.

Chapter 250: Subdivision of Land

SME has reviewed the applicable sections of Chapter 250 and has provided comments for those sections not found to be addressed by the Application. The remaining sections have been reviewed and found to comply with Chapter 250 requirements.

Section 250-1(C) – Municipal water supply

1. SME understands that the applicant has contacted the Portland Water District regarding their capacity to serve the project. Please provide a verification letter from the District prior to final approval.

The Applicant intends to address this item in the final plan application.
PWD letter attached Exhibit 5.

Section 250-1(E) – Traffic

2. The Updated Traffic Impact Study included with this application prepared by Maine Traffic Resources and dated December 11, 2017 is based on a maximum of 50 residential units. SME recommends the study be updated to reflect the current planned development of 52 residential units.

This item has been addressed.

Section 250-1(N) – Stormwater

3. The application SME reviewed did not include a Stormwater Management Exhibit. Please provide a stormwater report and stormwater management plan prior to preliminary approval.

   This item has been addressed. Comment responses to our letter dated February 20, 2018 are included in the following section.

Section 250-1(O) – Freshwater Wetlands

4. The cover letter outlines 11,200 sf +/- of proposed wetland impacts. Plan sheet C2 outlined 12,700 sf of proposed wetland impacts. Please clarify.

   This item has been addressed.

Section 250-1(P) – River, stream or brook

5. There are two stream crossings associated with the proposed development. Please submit additional detail regarding the proposed construction, including any State or Federal Permit approvals, for review prior to final approval.

   The Applicant intends to address this item in the final plan application. Final concrete box culvert designs have been included with the final plans. Refer to Plan sheets C20-C21 and Plan and Profile Sheets. Final Wall shop submittals to be provided by wall vendor prior to construction under contract to the Site Contractor.

Section 250-19 – Review and approval by other agencies

6. SME understands the following permit applications are underway for the project and applications will be filed with appropriate agencies following submittal of the preliminary subdivision and site plan application:

   - Maine Department of Environmental Protection (MEDEP) Site Location of Development Act (SLODA) permit,
   - MEDEP Natural Resources Protection Act (NRPA) Tier 1 permit for proposed wetland impacts,
   - United States Army Corps of Engineers (USACOE) permit for proposed stream crossings and culvert replacements,
   - Cumberland County Soil and Water Conservation District (CCS&WCD) stormwater and erosion control review, and
   - Maine Department of Transportation (ME DOT) Driveway/Entrance Permit.

Where review and approval of any subdivision or site plan by any other governmental agency is required, approvals shall be submitted to the Planning Board in writing prior to the submission of the final plan.

The Applicant intends to address this item in the final plan application.
See cover letter for agency emails re final permits in progress.

Section 250-22 – Retention of proposed public sites and open spaces

7. The application package outlines portions of the development, including pedestrian trails and walkways, will be available for public use. SME recommends that areas designated for recreation and/or reserved as public open space be outlined in the project plan set.

   This item has been addressed.

Section 250-27 – Utilities

8. Design details for utility pipes and conduits are not included in the project plan set. SME recommends sizes of all utilities pipes and additional design information be provided with the final plan application.

   This item has been addressed.

9. SME recommends Water Detail sheets be signed and stamped by a registered Professional Engineer prior to final approval.

   This item has been addressed.

10. SME understands Summit Natural Gas has been contacted to provide natural gas for the development. SME recommends a capacity to serve letter be provided with the final plan application.

    The Applicant intends to address this item in the final plan application.
    See Exhibit 5 for Summit NG Serviceability Letter.

11. SME understands Central Maine Power (CMP) has been contacted to provide electricity for the development. SME recommends the location of underground electric lines, transformers, and electrical easements be added to the plan. Please provide a capacity to serve letter with the final plan application.

    The plans have been updated. The Applicant intends to submit a capacity to serve letter with the final plan application.
    See Exhibit 5 for CMP Sereviceability Letter

Section 250-28 – Water Supply

12. SME understands that the applicant has contacted the Portland Water District regarding their capacity to serve the project. Please provide a verification letter from the District prior to final approval.

The Applicant intends to address this item in the final plan application.
See Exhibit 5 for PWD Serviceability Letter.

Section 250-29 – Sewage disposal

13. The application includes a capacity to serve letter from the Town of Falmouth regarding their ability to accommodate the anticipated sewage flow from the development. In addition, SME recommends the applicant provide a letter from the Town of Cumberland and the Portland Water District to ensure capacity of the local system to accommodate additional loading.

The Applicant intends to address this item in the final plan application.
See Exhibit 5 for a letter from Bill Shane indicating available capacity. An additional letter from the Falmouth Wastewater Facility is also included.

Section 250-32 – Design and construction standards

14. SME understands proposed streets will be constructed in accordance with Town residential sub-collector roadway standards as outlined in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code. Plans for Arctic Fox Drive do not include a sidewalk, which is listed in the Ordinance as a required improvement unless waived by the Board. SME recommends the applicant add a sidewalk to the final plans or request a waiver to address this item.

This item has been addressed.

Section 250-36 through 250-43 – Storm Drainage Design and Construction Standards

15. SME has not received an updated Stormwater Management Report for the revised plan set. As outlined previously in Comment 3, a stormwater report and stormwater management plan for the proposed development should be provided prior to preliminary approval.

This item has been addressed. Comment responses to our letter dated February 20, 2018 are included in the following section.

Section 250-44 – Fire Protection

16. SME understands the public water service will be used to sprinkle individual units in the proposed development. SME recommends the applicant provide

documentation to support the Water District's capacity to meet the fire protection needs of the development prior to final approval.

The Applicant intends to address this item in the final plan application.
All units will be sprinklered under a NFPA 13D system. We have reviewed the project with PWD and 1.5 inch services and I inch meter shall be provided to each unit for domestic and fire sprinkler system designs as approved by PWD. A note has been added to the plans (PWD Service Connection Detail indicating services to be 1.5 inch .)

Section 250-49 – Waivers and modifications

17. The applicant has requested a waiver from the requirement to show street signs for preliminary approval only. SME recommends approval of the requested waiver and that signs be included on the final plan application.

    This item has been addressed.

18. The applicant has requested a waiver from the requirement to provide capacity to serve letters from selected utility providers for preliminary approval only. SME recommends approval of the requested waiver and that capacity to serve letters be provided with the final plan application.

    This item has been addressed.

19. The applicant has requested a waiver from the requirement to locate 10-inch diameter or more trees on the property. SME recommends approval of this waiver.

    This item has been addressed.

<u>Chapter 229: Site Plan Review</u>

SME has reviewed the applicable sections of Chapter 229 and has provided comments for those sections not found to be addressed by the Application. The remaining sections have been reviewed and found to comply with Chapter 229 requirements.

Section 229-10(H) – Exterior lighting

20. SME understands the Applicant is evaluating site lighting options for the project. SME recommends that a final lighting layout and photometrics plan be provided with the final plan application.

    This item has been addressed.

General Comments

21. Site Plan Application – Please update the project description to reflect the correct number of units in the proposed development.

    This item has been addressed.

22. Application Exhibit 6 – Soils. The Soil Narrative Reports included in the exhibit should be signed and dated by Mark Hampton prior to final approval.

    This item has been addressed.

23. Application Exhibit 10 – Traffic Impact Assessment. As previously outlined in Comment 2, SME recommends the Traffic Impact Study be updated to reflect the current planned development of 52 residential units.

    This item has been addressed.

24. Plan Sheet C0 – Approvals Required Note 2 references a MEDEP SLODA permit *amendment*. Please update the plan to clarify the current project permitting status.

    This item has been addressed.

25. Subdivision Plat S1 – The plan outlines overhead electric service from Tuttle Road to Units 51, 52 and 53. The application outlines underground utilities. Please clarify.

    This item has been addressed.

26. Subdivision Plat S1-3 – Please add supplementary information to the drawings prior to final approval, including sight distances, stream setbacks, stormwater and grading easements, road layout information (alignment and intersection radii), and wetland impact areas, etc.

    This item has been addressed.

27. Topographic Site Plan by Titcomb Associates (Sheet 1 of 1) is not included in the plan set. Please add an existing conditions plan to the drawing set.

    This item has been addressed.

28. Overall Plan Sheet C1 references a 50-foot buffer and golf cart trails not shown on the drawing.

This item has been addressed.

29. Site Development Plan Sheets C3 through C5 – Please include additional labeling and detail for utilities, easements, stormwater management, and natural features such as streams and wetlands. Please update clearing limits should be updated to reflect modifications to stormwater treatment systems. Please add grading easements to reflect work scheduled outside the property boundary and access easement limits. SME recommends this information be added to the plan to verify compliance with applicable Town standards.

This item has been addressed.

30. Plan and Profile Plan Sheets C6 through C10 do not outline utility information for force main, electric or communications wiring. SME recommends this information be added to the plan.

This item has been addressed.

31. Roadway design does not conform to minimum K factors for sag vertical curves at Little Acres Drive STA 21+50; Arctic Fox Drive STA 41+99.64 and STA 44+99.90; and Arctic Fox Spur STA 21+61.63. SME recommends the applicant review these areas and adjust to meet Town construction standards.

This item has been addressed.

32. Improvements were noted at several locations in the no-cut buffer along the property boundaries for site grading. SME recommends the applicant amend the plans to minimize disturbance in the 50 foot no-cut buffer.

This item has been addressed.

33. Roadway Sections and Details Sheet C13 –There are several references to Brunswick, Topsham, and SAD 75 in the notes on this plan sheet. SME recommends the notes be updated to reflect the current project.

This item has been addressed.

34. Civil details C15 – The Town of Cumberland does not usually include ladder rungs in catch basin structures. SME recommends the applicant amend the plans to reflect Town construction standards.

This item has been addressed.

35. Erosion Control Notes C16 – SME Recommends Note 1 be updated to reflect the current Maine Erosion and Sediment Control Best Management Practices edition (October 2016).

This item has been addressed.

36. Erosion Control Notes C16 – SME recommends the applicant update the Construction Plan Notes to reflect the current project.

This item has been addressed.

37. Misc. Details C19 – SME recommends the applicant update the Trench Repair Detail to reflect current Town pavement sections.

SME recommends the base and subbase gravel materials be adjusted to reflect Town standards.
Detail has been updated.

38. Arch 1 Culvert Details – Profile does not include a sidewalk. SME recommends the applicant update the plan to reflect proposed construction.

The Applicant intends to address this item in the final plan application.
The sidewalk has been added to the Culvert section/plan views.

39. Arch 2 Culvert Details C21 - Profile does not include a sidewalk. SME recommends the applicant update the plan to reflect proposed construction.

The Applicant intends to address this item in the final plan application.
The sidewalk has been added to the section/plan views.

PEER REVIEW COMMENTS DATED FEBRUARY 20, 2018

The following comments were issued in our peer review letter for the Preliminary Stormwater Review for Major Subdivision and Site Plan Application, dated February 20, 2018.

Chapter 242: Stormwater Management

SME has reviewed the applicable sections of Chapter 242 and has provided comments for those sections not found to be addressed by the Application. The remaining sections have been reviewed and found to comply with Chapter 242 requirements.

Section 242-24(C)

1. SME understands the applicant intends to retain ownership of the stormwater management facilities shown in its post-construction stormwater management plan. Prior to final approval, SME recommends the applicant submit documentation that the applicant, its successors, heirs and assigns shall have the legal obligation and the resources available to operate, repair, maintain and replace the stormwater management facilities, as well as a maintenance agreement with the Town in conformance with this section of the Ordinance.

   The Applicant intends to address this item in the final plan application.
   A Town of Cumberland Stormwater agreement (Draft) is included in Exhibit 6 to be completed and executed upon approvals. The applicant will maintain all facilities and will contract with Ross Cudlitz, PE to perform annual inspections under the MS-4 Program.

Section 242-1(D)

2. Stormwater management facilities not located in a public right-of-way and not offered to the Town for acceptance as public facilities may require access easements to the Town. SME recommends the Applicant clarify this item with the Town and add required easements, if necessary, prior to final approval.

   The Applicant intends to address this item prior to final approval.
   The Town will be named as a party in the Exhibit 6 Stormwater Agreement allowing access to facilities in the event they are not maintained.

General Comments

3. Stormwater Management Report, Page 1, Surface Water on or Abutting the Site – SME recommends the Applicant coordinate with the Town Engineer regarding runoff from the site and proposed improvements scheduled for Tuttle Road in the Summer of 2018.

   This item has been addressed.

4. Stormwater Management Report, Page 2, Proposed Conditions – SME recommends the section be updated to reflect the 52 residential units.

   This item has been addressed.

5. Stormwater Management Report, Page 3, Impervious Area Summary – The table references road sections not outlined in the plan detail sheets. SME recommends the Applicant update the plan set to include all applicable road section details.

   This item has been addressed.

6. Stormwater Management Report, Page 4, Focal Point Proprietary System – This section references 500 feet of gutter line flow. Section 250-40, B(4) outlines 300 feet as the maximum length for stormwater in a street gutter prior to intake at a catch basin. SME recommends the Applicant adjust the length of flow or request a waiver prior to final approval.

   The Applicant intends to address this item prior to final approval.
   The focal point system has been revised along with the location due to a change in the road profile to move further away from the stream crossing. Refer to the plans.

7. Stormwater Management Report, Page 4, Forested Buffer – Please verify that wetland buffers outlined on the plan qualify as stormwater treatment based on length, grade and soil type. If approved for treatment by MEDEP, SME recommends adding required sign details and boundary information to the plan set.

   The Applicant intends to address this item prior to final approval.
   The Forested Stormwater Buffers and the one Meadow Buffer and level spreader behind unit 52 have been clarified and labeled. Notes on the Subdivision Plat sheet 4 and on the engineering plans indicate the Meadow Buffer to be pinned with buffer caps and 4 by 4 placards and survey pins with

caps to be placed at strategic locations along the residential sides of the Forested Buffers. A detail of the typical type of plackard is included on the plans.

8. Stormwater Management Report, Page 5, Arctic Fox Wet Pond Design Criteria – Please verify above pool and below pool treatment volume calculations.

   SME Recommends the Applicant address this item prior to final approval.
   The Pond has been revised and also reflects final DEP review comments.

9. Stormwater Management Report, Page 5, Groundwater Impacts – Please show boring/test pit locations on the plan set.

   This item has been addressed.

10. Stormwater Management Report, Page 6, Mallard Way Wet Pond Design Criteria – Please verify above pool and below pool treatment volume and provided storage calculations.

    SME Recommends the Applicant address this item prior to final approval.
    The Pond has been revised and also reflects final DEP review comments.

11. Stormwater Management Report, Page 6, Groundwater Impacts – Please show boring/test pit locations on the plan set.

    This item has been addressed.

12. Stormwater Management Report, Page 7, Post Area Summary and General Standard Calculation – Please verify total area calculations. The sum of component areas does not appear to match the total area.

    SME Recommends the Applicant address this item prior to final approval.
    The stormwater table has been updated.

13. Stormwater Management Report, Page 7, Flooding Standard – Please verify the top of the watershed area. A significant contributing drainage area exists above the middle school entrance.

    This item has been addressed.

14. Stormwater Management Report, Page 7, Flooding Standard – SME understands the site access was relocated from the former railroad bed to the Allen property. Please update the site entrance description.

    This item has been addressed.

15. Property Maintenance Part 3, page 17 – Please update references to Loon Lane.

    This item has been addressed.

16. Permitting Authorization Letter – Please update authorizations to include OceanView at Cumberland

    SME Recommends the Applicant address this item prior to final approval. (Applicant to review with SME for clarity on response to item.)

17. Exhibit 3 – Please update site footprint to reflect inclusion of the Allen Property.

    SME Recommends the Applicant address this item prior to final approval. (Exhibit to be updated. The Allen acquisition includes 5.35 acres and the new Allen Lot is not part of the SLODA or stormwater application.

18. Pre-Development Drainage Plan – SME recommends the plan be updated to include the full drainage area and subcatchment boundaries, soil boundaries, and topography outside the project area. Labels for 18R and 55R are missing from the plan sheet.

    SME Recommends the Applicant address this item prior to final approval. We believe the final plans address this comment and total areas.

19. Post Development Drainage Plan – SME recommends the plan be updated to include the full drainage area and subcatchment boundaries, soil boundaries, and topography outside the project area. Labels for 15S, 51S, and 51P are missing from the plan sheet.

    SME Recommends the Applicant address this item prior to final approval. We believe the final plans address this comment and total areas.

New Comments

20. The gravel trench outlets for Mallard Way and Arctic Fox Drive wet ponds are not modeled. SME will complete a more thorough review with the final plan submission. We will await any further comments on the hydrocad model.

21. The elevations for the Cultec separator row are not consistent with the stormwater model. SME will complete a more thorough review with the final plan submission.
The Separator units have been revised in a new configuration and should be acceptable. We will await any further comments.

PLANNING BOARD ADDITIONAL COMMENTS

The applicant provided clarification for Planning Board comments from the Planning Board meeting held on February 20, 2018. We anticipate the comments listed have been addressed to the Board's satisfaction.

Please call me with any questions, or if you would like, I could meet with you to discuss our comments.

Sincerely,

SEVEE & MAHER ENGINEERS, INC.

Jeffrey T. Read, P.E.
Civil Engineer/Project Manager

OCEANVIEW @ CUMBERLAND
Tuttle Road, Cumberland, Maine
July 31, 2018
Town Submission Set

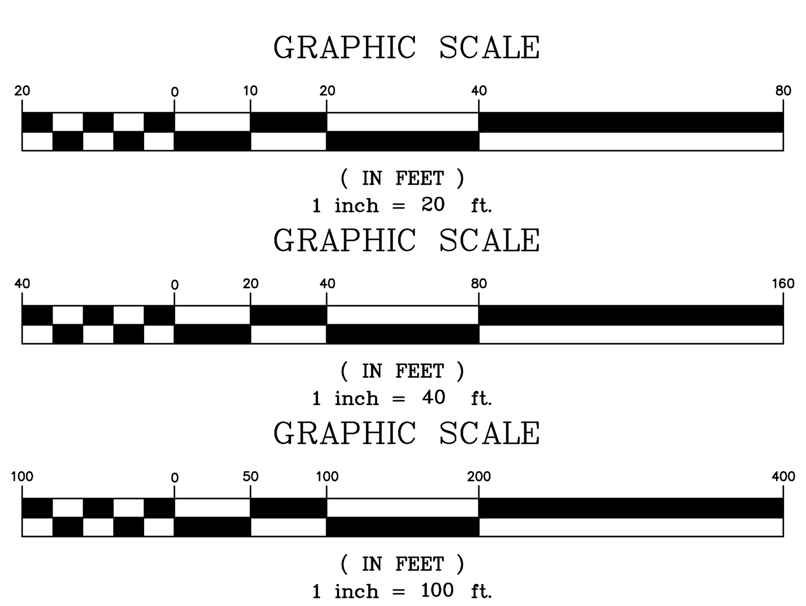
LEGEND:

EXISTING		PROPOSED
OR	IRON PIPE OR MONUMENT	OR
	BENCH MARK (SEE NOTES)	
	TRAVERSE STATION	
TP2	TEST PIT	TP2
	CATCH BASIN	&
	SEWER MANHOLE	
HYD	FIRE HYDRANT	HYD
WV	WATER GATE VALVE	WV
WSO	WATER SHUT-OFF	WSO
	BLOW-OFF/CLEAN-OUT	
	WELL	
	UTILITY POLE	
	POLE W/SINGLE LIGHT	&
	POLE W/DOUBLE LIGHT	
	SPOT LIGHT & WALL LIGHT	
	BOLLARD LIGHT	
	SIGN	
	RESIDENTIAL SEWER PUMP STATION	P
GAS	GAS VALVE	GAS
	HANDICAP SYMBOL	
	PAVEMENT PAINT MARKINGS	
	PARKING SPACE COUNT	15
	PROPERTY LINE	
	EASEMENTS	
	SETBACK/BUFFER	
WmB Au	SOILS BOUNDARY	WmB Au
	WETLAND BOUNDARY	
	STREAM	
	CULVERT	
	CONCRETE SLIPFORM	
	GRANITE CURB	
	VERTICAL CONCRETE CURB	
	EDGE OF PAVEMENT	
	ROAD CENTERLINE	
	BUILDING	
	STORM DRAIN(SEE PLAN FOR SIZE)	12"SD
S	SEWER LINE(SEE PLAN FOR SIZE)	S
FM	SEWER FORCE MAIN(SEE PLAN FOR SIZE)	FM
W	WATER LINE(SEE PLAN FOR SIZE)	W W W
GAS	NATURAL GAS LINE(SEE PLAN FOR SIZE)	GAS
UE	UNDERGROUND POWER,PHONE,CABLE CONDUIT	UE
SE	UNDERGROUND SECONDARY POWER LINES	SE
WC	CHILLER LINES	WC
x (100.00)	SPOT ELEVATION	x 100.00
	SPOT: CURB TOP & BOTTOM	T=106.9 B=106.4
100	CONTOURS	100
	CATCH BASIN HAY BALE BARRIER	
	CLEARING LIMIT	
	TREE LINE	
	SILT FENCE	
x	CHAIN LINK FENCE	x
	WOOD GUARD RAIL	
	RIPRAP	
	CONSTRUCTION ENTRANCE	
	CONCRETE	
	PAVEMENT	
	PAVEMENT OVERLAY	
	BUILDING	
	EXISTING BUILDING	
"NIC"	NOT IN CONTRACT	"NIC"

PROGRESS PLAN
NOT FOR CONSTRUCTION

THIS DOCUMENT IS ISSUED FOR INFORMATIONAL PURPOSES ONLY. THE DATA SHOWN HEREON IS SUBJECT TO REVISION.

PROJECT SCALES



GENERAL NOTES:

1. TOPOGRAPHIC DATA IS BASED ON COMPILATIONS OF INFORMATION INCLUDING AERIAL INFORMATION, ON THE GROUND SURVEY, APPROVED DESIGN PLANS, AND FIELD OBSERVATIONS. ON THE GROUND SURVEYS HAVE BEEN COMPLETED BY TITCOMB ASSOCIATES IN 2017

2. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR THE ELEVATION OF THE EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION HAS NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVES AND IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANY AND DIG SAFE (1-800-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

3. UNIT FOOTPRINTS AS SHOWN ARE FOR PLANNING PURPOSES ONLY. FINAL FOOTPRINTS MAY VARY. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND ALL DETAILS CONTIGUOUS TO THE BUILDING, INCLUDING SIDEWALKS, RAMPS, BUILDING ENTRANCES, STAIRWAYS, UTILITY PENETRATIONS, CONCRETE DOOR PADS, COMPACTOR PAD, LOADING DOCKS, BOLLARDS ETC.

4. LAYOUT DIMENSIONS ARE FROM FACE OF BUILDING, RETAINING WALLS, CURBS OR BERMS.

5. RIM ELEVATIONS OF PROPOSED DRAINAGE AND SANITARY SEWER MANHOLES AND ASSOCIATED STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH AND CONSISTENT WITH THE GRADING PLANS. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, GAS GATES AND OTHER UTILITIES TO FINISH GRADE WITHIN LIMITS OF WORK.

6. THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY THE RESPECTIVE UTILITY COMPANY (GAS, TELEPHONE, ELECTRIC AND FIRE ALARM). FINAL DESIGN LOADS AND LOCATIONS TO BE COORDINATED WITH OWNER AND ARCHITECT.

7. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION, SIZE, INVERTS AND TYPES OF EXISTING PIPES AT ALL PROPOSED POINTS OF CONNECTION PRIOR TO ORDERING MATERIALS. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATIONS, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT.

8. ALL AREAS OUTSIDE THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. ALL AREAS DISTURBED DURING CONSTRUCTION NOT COVERED WITH BUILDINGS, STRUCTURES, OR PAVEMENT SHALL RECEIVE 6 INCHES OF LOAM AND SEED.

9. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS AND SHALL BE RESPONSIBLE FOR PAYING ANY FEES FOR ANY POLE RELOCATION AND FOR THE ALTERATION OR ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, FIRE ALARM AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.

10. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY PERMITS, PAY ALL FEES AND POST ALL BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS.

11. ALL PROPERTY MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE RESET TO THEIR ORIGINAL LOCATION BY A MAINE REGISTERED PROFESSIONAL LAND SURVEYOR (PLS) AT THE CONTRACTOR'S EXPENSE.

12. THE CONTRACTOR SHALL PREPARE/PROVIDE AN AS-BUILT SURVEY SHOWING LOCATIONS OF ALL CONSTRUCTED SURFACE FEATURES AND SUBSURFACE UTILITY SYSTEMS INCLUDING THE GPS POINT LOCATION, TYPE, SIZE AND INVERTS. THE CONTRACTOR SHALL PROVIDE SURVEY POINTS AND DATA TO THE ENGINEER.

13. CONTRACTOR SHALL INSTALL ALL EROSION CONTROL MEASURES PRIOR TO EARTHWORK OPERATION AND MAINTAIN ALL EROSION CONTROL MEASURES AND SEEDED EMBANKMENTS DURING CONSTRUCTION. EROSION CONTROL SHALL BE REMOVED ONLY UPON THE ESTABLISHMENT OF ALL LANDSCAPED AREAS. AL WORK SHALL BE IN COMPLIANCE WITH THE ENVIRONMENTAL QUALITY HANDBOOK FOR EROSION AND SEDIMENT CONTROL, LATEST EDITION, AS ADOPTED BY THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

14. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. ALL CONSTRUCTION ACTIVITY SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.

15. ALL MATERIALS AND CONSTRUCTION METHODS USED WITHIN THE PUBLIC RIGHT-OF-WAY SHALL CONFORM TO ALL LOCAL MUNICIPAL STANDARDS AND MAINE DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.

16. ALL HANDICAP ACCESSIBLE PARKING SPACES, RAMPS AND SIDEWALKS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE AMERICANS WITH DISABILITIES ACT (ADA).

17. ALL SITE SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

LAYOUT NOTES:

1. ALL DIMENSIONING, UNLESS NOTED OTHERWISE, IS TO THE FACE OF CURB OR BUILDING.

2. OFFSETS TO CATCH BASINS AND MANHOLES ARE TO THE CENTER OF THE FRAME.

3. PIPE LENGTH EQUALS THE CENTER TO CENTER DISTANCES BETWEEN CATCH BASINS AND/OR MANHOLES MINUS ONE HALF THE DIAMETER OF EACH CATCH BASIN OR MANHOLE.

4. BOUNDARY INFORMATION ON LAYOUT PLAN IS FOR REFERENCE ONLY, REFER TO SUBDIVISION PLAT AND ACTUAL SURVEY AND BOUNDARY SURVEY REFERENCES BY TITCOMB ASSOCIATES.

GRADING AND DRAINAGE NOTES:

1. UNLESS OTHERWISE NOTED, ALL STORM DRAIN PIPE SHALL BE IN ACCORDANCE WITH MDOT SPECIFICATIONS SECTION 603. PIPE CULVERTS AND STORM DRAINS, LATEST REVISION WITH THE EXCEPTION THAT THE ONLY ACCEPTABLE TYPES OF PIPE ARE AS FOLLOWS:
   REINFORCED CONCRETE PIPE
   POLYVINYL CHLORIDE PIPE (PVC)
   SMOOTH BORE HDPE POLYETHYLENE PIPE

2. TOPSOIL STRIPPED IN AREAS OF CONSTRUCTION THAT IS SUITABLE FOR REUSE AS LOAM SHALL BE STOCKPILED ON SITE AT A LOCATION TO BE DESIGNATED BY OWNER. UNSUITABLE SOIL SHALL BE SEPARATED, REMOVED AND DISPOSED OF AT AN APPROVED DISPOSAL LOCATION OFF SITE.

3. THE CONTRACTOR SHALL ANTICIPATE THAT GROUNDWATER WILL BE ENCOUNTERED DURING CONSTRUCTION AND SHALL INCLUDE SUFFICIENT COSTS WITHIN THEIR BID TO PROVIDE DEWATERING AS NECESSARY. NO SEPARATE PAYMENT SHALL BE MADE TO THE CONTRACTOR FOR DEWATERING.

EROSION CONTROL NOTES:

1. LAND DISTURBING ACTIVITIES SHALL BE ACCOMPLISHED IN A MANNER AND SEQUENCE THAT CAUSES THE LEAST PRACTICAL DISTURBANCE OF THE SITE. SEE EROSION CONTROL PLAN FOR EROSION CONTROL SEQUENCING.

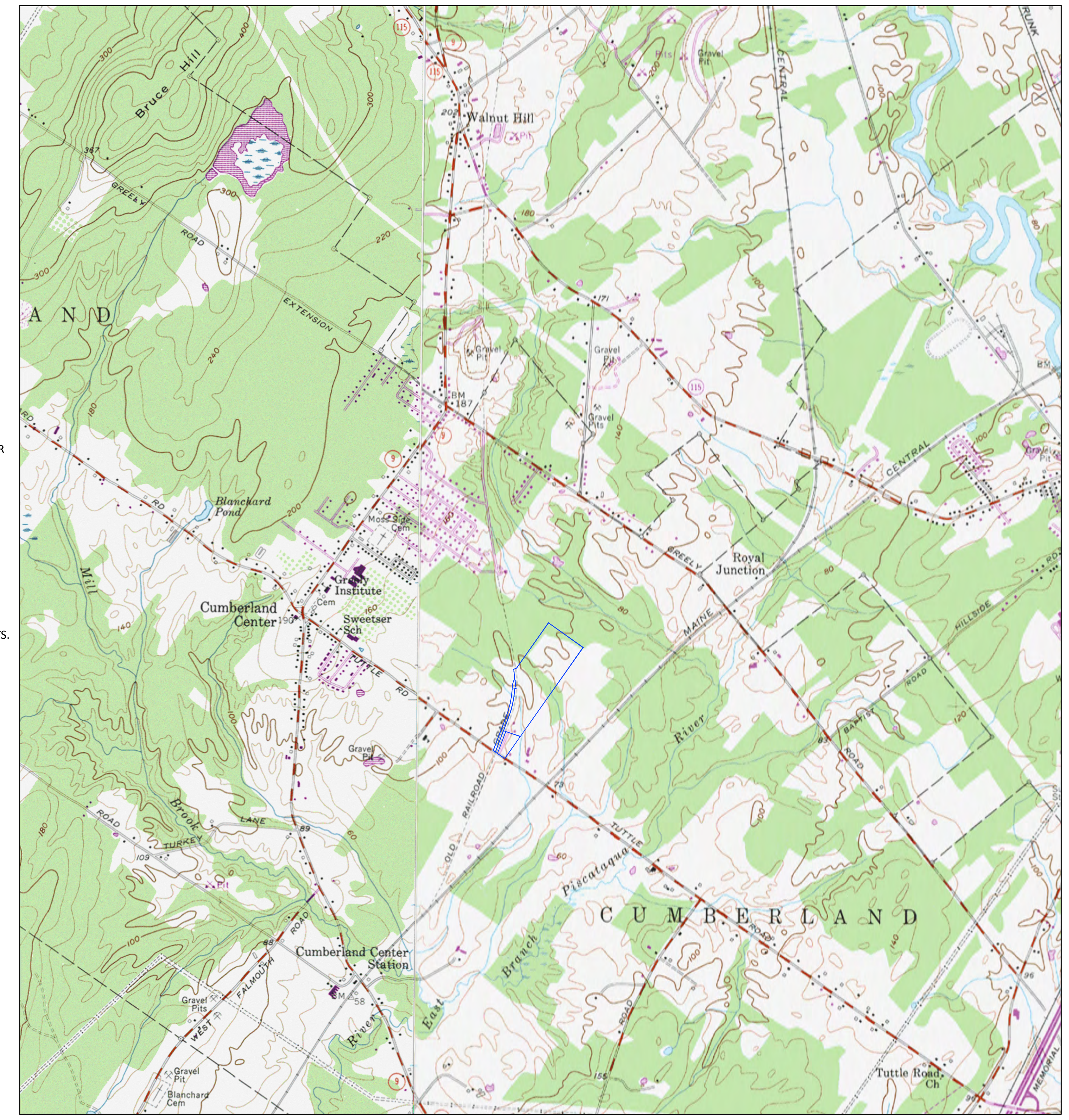
2. ALL EROSION CONTROL METHODS IMPLEMENTED SHALL CONFORM TO THE "MAINE EROSION AND SEDIMENT CONTROL EST MANAGEMENT PRACTICES (BMP's) MANUAL" DATED OCTOBER 2016 BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION. http://www.maine.gov/dep/land/erosion/escbmps/esc_bmp_engineers.pdf

3. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL PLACE THE EROSION CONTROL BMPS INCLUDING SILT FENCE, BERMS, EROSION CONTROL MIX, ETC.. THE CONTRACTOR SHALL INSPECT THE BARRIER AND OTHER PREVENTATIVE MEASURES BI-WEEKLY, BEFORE ANY PREDICTED RAIN EVENT, AND AFTER ANY RAIN EVENT. THE CONTRACTOR SHALL REMOVE ANY ACCUMULATED SILT AND/OR MAKE REPAIRS AS NECESSARY.

4. THE CONTRACTOR IS CAUTIONED THAT FAILURE TO COMPLY WITH THE SEQUENCE OF CONSTRUCTION, EROSION/SEDIMENT CONTROL PLAN, AND OTHER PERMIT REQUIREMENTS MAY RESULT IN MONETARY PENALTIES. THE CONTRACTOR SHALL BE ASSESSED ALL SUCH PENALTIES AT NO COST TO THE OWNER OR PERMITTEE.

APPROVALS REQUIRED:

1. TOWN OF CUMBERLAND PLANNING BOARD.
2. MAINE DEP SITE LOCATION OF DEVELOPMENT PERMIT.
3. MAINE DEP NRPA TIER 1 PERMIT.
4. MAINE DOT ENTRANCE PERMIT.
5. U.S. ARMY CORPS OF ENGINEERS PERMIT.



LOCATION MAP
1"=2000'

SHEET INDEX:

C0	COVER SHEET
4 sheets	SUBDIVISION PLAT BY TITCOMB ASSOCIATES
1 OF 1	TOPOGRAPHIC SITE PLAN BY TITCOMB ASSOCIATES
T1	EXISTING CONDITIONS AND REMOVALS PLAN 1"=100'
C1.	OVERALL PHASING PLAN *1"=100'*
C2.	OVERALL SITE DEVELOPMENT PLAN *SCALE: 1" = 60'*
C3.	OVERALL SITE DEVELOPMENT PLAN *SCALE: 1" = 40'*
C4.	OVERALL SITE DEVELOPMENT PLAN *SCALE: 1" = 40'*
C5	OVERALL SITE DEVELOPMENT PLAN *SCALE: 1" = 40'*
C6-C10.	PLAN & PROFILES *SCALE: 1" = 40'*
C11A-C11B.	LANDSCAPE PLANS 1"=60'
C12.	TRAIL AND WALKWAY MASTER PLAN 1" = 100'
C13.	ROADWAY SECTIONS, EROSION DETAILS, AND GENERAL NOTES
C13A	STRUCTURE NOTES AND TABLES
C14-C15.	SITE DEVELOPMENT DETAILS
C16-C17	EROSION CONTROL NOTES AND DETAILS
C18	LOW PRESSURE SEWER MAIN DETAILS
C19	ROOF DRIPLINE BMP, BOULDER WALL, AND MISC. DETAILS
C20-C21	BOX CULVERT DETAILS
C22-C25	WET POND DETAILS
C26	FORESTED BUFFER BEHIND UNITS 50-52
C27	FOCALPOINT 10 SCALE PLAN VIEW
C28-C30	FOCALPOINT DETAILS
C31A	PRETX CURB INLET DETAIL - STA 21+89.32 RIGHT SIDE
C31B	RAIN GUARDIAN TURRET PRETREATMENT DETAIL - STA 21+89.32 LEFT SIDE
C32	CLASS B HIGH INTENSITY SOIL SURVEY BY MARK HAMPTON
C33	SH 1 PORTLAND WATER DISTRICT STANDARD DETAILS
C34	SH 2 PORTLAND WATER DISTRICT STANDARD DETAILS
ES1	MANCINI ELECTRICAL PHOTOMETRIC PLAN
PRE	PRE DEVELOPMENT DRAINAGE PLAN - SUBMITTED SEPARATELY
POST	POST DEVELOPMENT DRAINAGE PLAN - SUBMITTED SEPARATELY

UTILITY INFO & CONTACTS:

SUMMIT NATURAL GAS: 12 INCH MAIN, W. SIDE TUTTLE RD.
CONTACT: MICHAEL STINCHFIELD, PROJECT MANAGER 207.620.8000

WATER: PORTLAND WATER DISTRICT: 12 C.I.INCH MAIN, E. SIDE TUTTLE RD.
CONTACT: ROBERT BARTELS, MEANS DEPT. 207.774.5961 X3199

SANITARY SEWER: PORTLAND WATER DISTRICT - 8 INCH GRAVITY SS, W. SIDE TUTTLE RD.
CONTACT: ROBERT BARTELS, MEANS DEPT. 207.774.5961 X3199

ELECTRIC CENTRAL MAINE POWER: 3 PHASE OVERHEAD, W. SIDE TUTTLE RD.
CONTACT: HERB STEVENS, 800.750.4000

COMMUNICATIONS/CTV: SPECTRUM COMMUNICATIONS, OVERHEAD, W. SIDE TUTTLE ROAD
CONTACT: PETER DETESO, 207.318.6542

TELE; FAIRPOINT & CONSOLIDATED, OVERHEAD, W. SIDE TUTTLE ROAD
CONTACT MATT FREE (CONSOLIDATED), 207.626.2007

STREET OPENING: TOWN OF CUMBERLAND URBAN COMPACT& (MDOT)
CONTACT: MDOT SCARBOROGH, REGION 1, 207.885.7000
CONTACT: CUMBERLAND DPW: CHRIS BOLDUC, 207.829.2220

DESIGN CONSULTANTS:

BELANGER ENGINEERING
63 SECOND AVENUE
AUGUSTA, ME 04330
(207) 622-0543

ANTHONY MANCINI, INC.
179 SHERIDAN STREET
PORTLAND, MAINE 04101
(207) 774-5829

LICHT ENVIRONMENTAL DESIGN
35 FRAN CIRCLE
GRAY, ME 04330
(207) 749-4924

GAWRON / TURGEON ARCHITECTS
29 BLACK PT. ROAD
SCARBOROUGH, MAINE 04074
207-883-6307

DAVE HAYNES
MAINE REGISTERED
LANDSCAPE ARCHITECT
OCEAN VIEW RETIREMENT
COMMUNITY
207-653-9427

TITCOMB ASSOCIATES
39 COURT STREET
BATH, ME 04530
(207) 443-9199

Prepared in association with:

LICHT
ENVIRONMENTAL DESIGN, LLC

6.	7-31-2018	Town Submission Set	CSB
5.	7-16-2018	Changes per PWD and CMP review	CSB
4.	5-4-2018	Change date, resubmit to DEP and ACOE	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	Submit to Maine DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

Cover Sheet and Notes

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

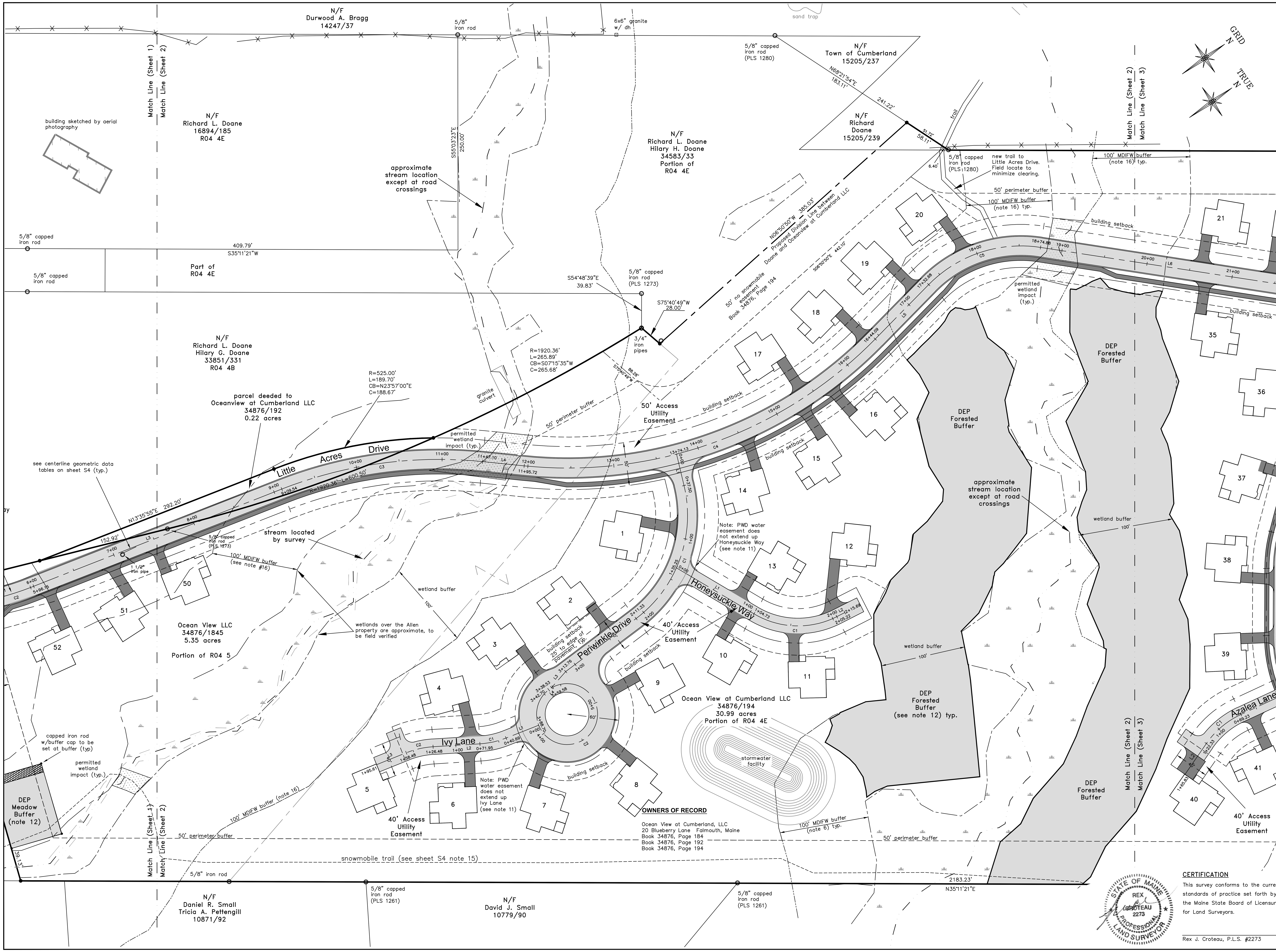
STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C0
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

LEGEND
Monument – found
Iron marker – found
Iron marker – set (#5 rebar)
Monument – set
Property line (locus)
Property line (abutter)
Easement line
Wire fence
Overhead utility line
Edge of pavement
Edge of gravel (existing)
Catch basin
Utility pole
Sewer manhole
Now or formerly of
Deed reference (Book/Page)
Tree line
Wetlands
Sign
Edge of wetland
Coniferous tree
Existing building
Wetland impact area
Tuttle Road (66' wide public way)
N/F Margaret L. Puiia 29554/89
N/F Durwood A. Bragg 14247/37
N/F Richard L. Doane 16894/185 R04 4E
N/F Richard L. Doane Hilary H. Doane 34583/33 Portion of R04 4E
N/F Kimberly T. O'Grady 34781/212
N/F Richard L. Doane Hilary G. Doane 33851/331 R04 4B
N/F Richard W. Doane 2851/184 R04 4D
parcel deeded to Oceanview at Cumberland LLC 34876/192 0.22 acres
Ocean View LLC 34876/1845 5.35 acres Portion of R04 5
Remaining land of Laurence S. Allen 34876/184 3.29 acres Portion of R04 5
50' Access / Utility & Landscaping Easement to benefit Oceanview at Cumberland, LLC
Little Acres Drive
Periwinkle Drive
Ivy Lane
Honeysuckle
22' traveled way 5' sidewalk
DEP Meadow Buffer (note 12)
snowmobile trail (see sheet S4 note 14)
snowmobile trail (see sheet S4 note 15)
Match Line (Sheet 1) Match Line (Sheet 2)
N/F George B. Small, Carolyn F. Small 3232/223 2935/321 7963/79
N/F Alan F. Small Laura J. Small 9363/63
N/F Daniel R. Small Tricia A. Pettengill 10871/92
N/F David J. Small 10779/90
State of Maine, Cumberland ss
Registry of Deeds
Received ____________ 20____
at ___h___m___M and recorded in
Plan Book ________ Page ____
Attest: ______________________
Register
Approved by the Town of Cumberland Planning Board
dated
SCALE IN FEET
1" = 50'
S-1 Sheet 1 of 4
See Sheet 4 for notes, charts and road data
Rev. 6 07/31/18 Final plan submission nse
Rev. 5 07/16/18 Road names update deed references RJC
Rev. 4 05/04/18 Little Acres Drive alignment RJC
Rev. 3 03/02/18 miscellaneous staff comment revisions RJC
Rev. 2 02/21/18 additional feature locations JS
Rev. 1 01/30/18 Allen lot, design revisions RJC
OWNERS OF RECORD
Ocean View at Cumberland, LLC 20 Blueberry Lane Falmouth, Maine
Book 34876, Page 184
Book 34876, Page 192
Book 34876, Page 194
CERTIFICATION
This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.
Rex J. Croteau, P.L.S. #2273
STATE OF MAINE REX J. CROTEAU 2273 PROFESSIONAL LAND SURVEYOR
SUBDIVISION PLAN
Oceanview at Cumberland
Tuttle Road Cumberland, Maine
MADE FOR
Ocean View at Cumberland LLC
20 Blueberry Lane Falmouth, Maine
JOB #89076 DATE: December 26, 2017 SCALE: 1" = 50'
BOOK #898
89076_2016.dwg
Titcomb Associates
133 Gray Road, Falmouth, Maine 04105
(207)797-9199 www.titcombsurvey.com



LEGEND

- Monument – found
- Iron marker – found
- Iron marker – set (#5 rebar)
- Monument – set
- Property line (locus)
- Property line (abutter)
- Easement line
- Wire fence
- Overhead utility line
- Edge of pavement (existing)
- Edge of gravel
- Catch basin
- Utility pole
- Sewer manhole
- N/F Now or formerly of
- 1234/567 Deed reference (Book/Page)
- Tree line
- Wetlands
- Sign
- Edge of wetland
- Coniferous tree
- Existing building
- Wetland impact area

State of Maine, Cumberland ss
Registry of Deeds
Received ____________ 20____
at ___h___m___M and recorded in
Plan Book ________ Page ____
Attest: ____________________
Register

Approved by the Town of
Cumberland Planning Board

dated ____________

SCALE IN FEET

50 0 50 100

1" = 50'

CERTIFICATION

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Rex J. Croteau, P.L.S. #2273

S-2 Sheet 2 of 4

See Sheet 4 for notes, charts, and road data

Rev. 6	07/31/18	Final plan submission	nse
Rev. 5	07/16/18	Road names update deed references	RjC
Rev. 4	05/04/18	Little Acres Drive alignment	RjC
Rev. 3	03/02/18	miscellaneous staff comment revisions	RjC
Rev. 2	02/21/18	additional feature locations	JS
Rev. 1	01/30/18	Allen lot, design revisions	RjC

SUBDIVISION PLAN

Oceanview at Cumberland

Tuttle Road Cumberland, Maine

MADE FOR

Ocean View at Cumberland LLC

20 Blueberry Lane Falmouth, Maine

JOB #89076 | DATE: December 26, 2017 | SCALE: 1" = 50'

BOOK #898

89076_2016.dwg

Titcomb Associates
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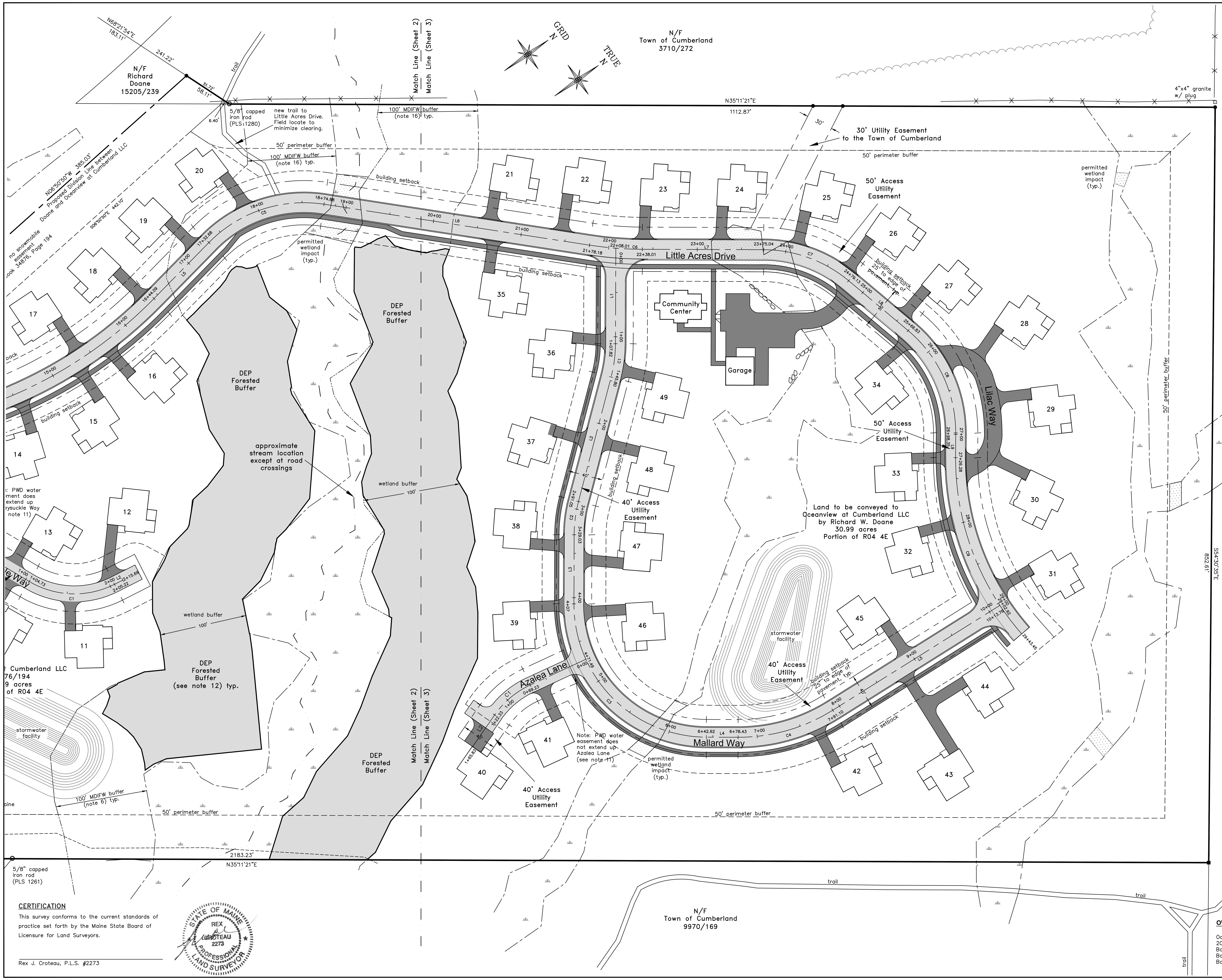

LEGEND

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	Iron marker – found
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	Easement line
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N/F	Now or formerly of
1234/567	Deed reference (Book/Page)
	Tree line
	Wetlands
	Sign
	Edge of wetland
	Coniferous tree
	Existing building
	Wetland impact area

State of Maine, Cumberland ss
Registry of Deeds
Received ________________ 20____
at ___h___m___M and recorded in
Plan Book ________ Page ____
Attest: ____________________
Register

Approved by the Town of Cumberland Planning Board

dated ____________

SCALE IN FEET

50 0 50 100

1" = 50'

S-3 Sheet 3 of 4

See Sheet 4 for notes, charts and road data

Rev. 6	07/31/18	Final plan submission	nse
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SUBDIVISION PLAN

Oceanview at Cumberland

Tuttle Road — Cumberland, Maine

MADE FOR

Ocean View at Cumberland LLC

20 Blueberry Lane — Falmouth, Maine

JOB #89076	DATE: December 26, 2017	SCALE: 1" = 50'
BOOK #898		
89076_2016.dwg		

Titcomb Associates
133 Gray Road, Falmouth, Maine 04105
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OWNERS OF RECORD

Ocean View at Cumberland, LLC
20 Blueberry Lane Falmouth, Maine
Book 34876, Page 184
Book 34876, Page 192
Book 34876, Page 194

CERTIFICATION

This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Rex J. Croteau, P.L.S. #2273

STATE OF MAINE
REX J. CROTEAU
2273
PROFESSIONAL LAND SURVEYOR

LITTLE ACRES DRIVE

LINE	BEARING	DISTANCE
L1	S 35°42'06" W	24.33'
L2	S 20°58'41" W	494.63'
L3	S 13°35'55" W	313.39'
L4	S 40°49'17" W	48.62'
L5	N 10°33'29" W	88.59'
L6	S 43°45'29" W	303.30'
L7	N 35°11'21" E	137.03'
L8	S 74°57'02" W	87.70'
L9	N 54°48'39" W	27.92'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	38.55'	150.00'	N 28°20'23" E	38.44'
C2	38.64'	300.00'	S 17°17'18" W	38.61'
C3	237.56'	500.00'	S 27°12'36" W	235.33'
C4	448.37'	500.00'	S 15°07'54" W	433.50'
C5	142.20'	150.00'	N 16°36'00" E	136.93'
C6	59.82'	400.00'	N 39°28'25" E	59.77'
C7	104.10'	150.00'	S 55°04'11" W	102.02'
C8	131.52'	150.00'	N 79°55'49" W	127.35'
C9	217.18'	300.00'	N 75°32'59" W	212.47'

PERIWINKLE DRIVE

LINE	BEARING	DISTANCE
L1	N 68°23'46" W	37.50'
L2	N 01°59'54" W	102.43'
L3	N 13°38'39" W	24.77'
L4	S 01°59'54" E	4.17

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	173.83'	150.00'	N 35°11'50" W	164.26'
C2	216.89'	35.41'	N 02°31'31" E	5.59'

HONEYSUCKLE WAY

LINE	BEARING	DISTANCE
L1	S 65°42'42" W	104.73'
L2	N 08°08'04" E	10.47'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	100.49'	100.00'	S 36°55'23" W	96.32'

IVY LANE

LINE	BEARING	DISTANCE
L1	N 13°33'32" E	40.69'
L2	N 31°28'07" E	54.53'
L3	N 13°07'56" E	37.13'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	31.26'	100.00'	S 22°30'49" W	31.13'
C2	32.00'	100.00'	N 22°18'01" E	31.87'

MALLARD WAY

LINE	BEARING	DISTANCE
L1	S 54°48'39" E	107.82'
L2	N 40°18'22" W	145.26'
L3	N 54°48'39" W	77.97'
L4	S 35°11'21" W	35.81'
L5	S 02°54'45" W	222.67'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	37.97'	150.00'	N 47°33'30" W	37.87'
C2	37.97'	150.00'	N 47°33'30" W	37.87'
C3	235.62'	150.00'	S 80°11'21" W	212.13'
C4	112.67'	200.00'	S 19°03'03" W	111.18'

AZALEA LANE

LINE	BEARING	DISTANCE
L1	N 10°09'08" E	69.23'
L2	N 20°16'02" W	43.51'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	53.09'	100.00'	N 05°03'27" W	52.47'

OV AT CUMBERLAND SUBDIV PLAN NOTES

1) THIS PROJECT IS BEING PROPOSED AS A SENIOR HOUSING COMMUNITY PERMITTED UNDER THE TOWN OF CUMBERLAND LAND USE ORDINANCE SECTION 315–28.4. THE PROJECT INCLUDES 52 COTTAGE UNITS, A COMMUNITY CENTER AND ASSOCIATED INFRASTRUCTURE.

2) PROJECT LIES WITHIN THE RR1 ZONING DISTRICT AND SENIOR HOUSING COMMUNITY (SHC) OVERLAY DISTRICT

3) WETLANDS MAPPING BY HAMPTON ASSOCIATES, FALL 2016 AND LOCATED BY GPS SURVEY (HAMPTON ASSOC. AND TITCOMB ASSOC, SURVEYORS.)

4) SITE TOPOGRAPHY AND EXISTING CONDITIONS FROM A FIELD SURVEY BY TITCOMB ASSOCIATES, SURVEYORS WITH INFORMATION SUPPLEMENTED FROM THE STATE OF MAINE GIS DIGITAL ORTHO AND LIDAR MAPPING AS NOTED.

5) PROJECT TO BE SERVICED BY PUBLIC WATER, PRIVATE ON–SITE LOW PRESSURE SEWER SYSTEM DISCHARGING TO THE PORTLAND WATER DISTRICT PUBLIC SEWERAGE SYSTEM IN TUTTLE ROAD, NATURAL GAS AND UNDERGROUND CABLE UTILITIES.

6) AZALIA LANE, HONEYSUCKLE WAY, IVY LANE, LILAC WAY, LITTLE ACRES DRIVE, MALLARD WAY, AND PERIWINKLE DRIVE SHALL REMAIN PRIVATE.

7) COTTAGE UNITS AND FOOTPRINT STYLES AND DRIVEWAY LOCATIONS ARE SHOWN IN THE GENERAL LOCATIONS INTENDED TO BE CONSTRUCTED. HOWEVER APPROVAL. FINAL LOCATIONS AND BUILDING TYPES MAY VARY SLIGHTLY TO FIT FIELD CONDITIONS.

8) THERE SHALL BE NO LESS THAN TWO PARKING SPACE PER UNIT PER ORDINANCE SECTION 315–28.4.F. GARAGES AND ONE SPACE IN THE DRIVEWAY MAY BE USED TO MEET THIS REQUIREMENT.

9) REFER TO SITE DATA TABLE FOR SETBACKS AND DIMENSIONAL REQUIREMENTS.

10) THIS PLAT SHALL BE RECORDED WITHIN 90 DAYS OF FINAL SUBDIVISION APPROVAL AND SIGNING OF THE PLAT BY THE TOWN OF CUMBERLAND PLANNING BOARD, SUBJECT TO THE ESTABLISHMENT OF ANY PERFORMANCE GUARANTEE. APPROVAL OF ANY SUBDIVISION PLAN NOT RECORDED WITHIN 90 DAYS AFTER FINAL PLAN APPROVAL SHALL BECOME NULL AND VOID.

11) ACCESS AND UTILITY EASEMENT WIDTHS:
LITTLE ACRE DRIVE: 50 FEET*
AZALEA LANE: 40 FEET
HONEYSUCKLE WAY: 40 FEET
IVY LANE: 40 FEET
LILAC WAY: N/A
MALLARD WAY: 40 FEET*
PERIWINKLE DRIVE: 40 FEET*

*DENOTES UTILITY EASEMENTS TO THE PORTLAND WATER DISTRICT IN ADDITION TO OTHER UTILITIES.

12) DEP MEADOW AND FORESTED BUFFERS AS SHOWN SHALL BE MONUMENTED OR MARKED IN THE FIELD USING IRON RODS AND PLASTIC "BUFFER CAPS"OR SIMILAR MARKINGS. LOCATIONS OF FORESTED BUFFER MONUMENTS SHALL BE FIELD DETERMINED AT REASONABLE LOCATIONS DUE TO THE IRREGULAR AND LARGE SIZE OF THESE BUFFERS.

13) RIGHTS TO BE RESERVED TO RICHARD W.DOANE AND HIS ATTORNEY–IN–FACT RICHARD W. DOANE OVER THE 50–FOOT ACCESS AND UTILITY EASEMENT FOR ACCESS TO LOT R04–4D TO PROVIDE A DRIVEWAY ACCESS AND CURB CUT OFF LITTLE ACRES DRIVE FOR A MAXIMUM OF TWO (2) DWELLING UNITS OR RESIDENCES ON LOTS R04–4D AND R04–4B. LOCATION OF SAID DRIVEWAY SHALL BE FIELD DETERMINED.

14) THE SNOWMOBILE TRAIL SHOWN ON THE 3.29 ALLEN LOT IS SHOWN GENERALLY ONLY FOR ILLUSTRATIVE PURPOSES. OCEANVIEW AT CUMBERLAND MAKES NO WARRANTIES AS TO THE FUTURE EXISTENCE, LICENSE, LOCATION OR WINTER MAINTENANCE OF SAID SECTION OF TRAIL OVER THE ALLEN LOT.

15) OCEANVIEW AT CUMBERLAND, LLC SHALL PROVIDE A REVOCABLE LICENSE TO THE TOWN OF CUMBERLAND FOR USE OF A MULTI–USE/SNOWMOBILE TRAIL LOCATED GENERALLY WITHIN THE 50–FOOT PERIMETER BUFFER AS SHOWN SUBJECT TO CONDITIONS OF DEP OR CORPS OF ENGINEERS WETLAND PERMITS FOR CROSSING OF REGULATED WETLANDS. FINAL LOCATION OF THE TRAIL SHALL BE DETERMINED IN THE FIELD. SAID LICENSE TO BE EXECUTED AND RECORDED IN THE CCRD FOLLOWING PROJECT APPROVALS.

16) 100– FOOT MAINE DEPARTMENT OF INLAND FISHERIES & WILDLIFE (MDIFW) BUFFERS ARE SHOWN ALONG STREAM ASSOCIATED WETLANDS EXCEPTING PERMITTED AREAS OF ENCROACHMENT FOR ROADS AND INFRASTRUCTURE AS SHOWN ON THIS PLAN AND THE ACCOMPANYING ENGINEERING PLANS. THE BUFFER LINE SHOWN IN THE AREAS OF UNITS 50–52 DOES INCLUDES EXISTING DEVELOPED AREAS OF THE ALLEN RESIDENCE AND IS LIMITED ONLY TO NO CUTTING BEYOND THE CURRENT TREELINE EXCEPT FOR CONSTRUCTION OF A PORTION OF LITTLE ACRES DRIVE AS SHOWN WITHIN THE 100–FOOT BUFFER.

SURVEY NOTES

1) BOOK AND PAGE REFERENCES ARE TO THE CUMBERLAND COUNTY REGISTRY OF DEEDS.

2) BEARINGS ARE REFERENCED TO GRID NORTH, MAINE STATE PLANE COORDINATE SYSTEM, NAD83, WEST ZONE.

4) UTILITY INFORMATION ON THIS PLAN IS APPROXIMATE, BASED ON LOCATION OF VISIBLE FEATURES. DIGSAFE AND/OR THE APPROPRIATE UTILITIES SHOULD BE CONTACTED PRIOR TO ANY CONSTRUCTION.

5) PROPERTY LIES WITHIN ZONE C BASED ON FIRM COMMUNITY #230162 PANEL #0015 B, DATED MAY 19, 1981. IT DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA.

OWNERS OF RECORD

Ocean View at Cumberland, LLC
Book 34876, Page 184
Book 34876, Page 192
Book 34876, Page 194

PROJECT AREA

Land conveyed to Oceanview at Cumberland LLC by Richard W. Doane: Book 34876, Page 194	30.99 acres
Land conveyed to Oceanview at Cumberland LLC by Richard L Doane and Hilary G. Doane: Book 34876, Page 192	0.22 acres
Land conveyed to Oceanview LLC by Laurence S. Allen: Book 34876, Page 184	5.35 acres
Total project area in fee	36.56 acres
50' Access Easement over Allen parcel	0.53 acres
Total Project Area	37.09 acres

SITE DATA TABLE

ZONING	RR1 AND SENIOR HOUSING COMMUNITY (SHC) OVERLAY DISTRICT	
STANDARD	REQUIRED SHC	PROVIDED
MIN. LOT AREA (AC)	5 AC	37.09
MIN. FRONTAGE (FT)	0	50
SETBACKS:		
A. EDGE PAVED ROAD	25	25+
B. BETWEEN STRUCTURES	20	20+
C. DEVELOPMENT PROPERTY LINE	30	50+
MAXIMUM DENSITY (LAND AREA/UNIT) (3.)	10,000	31,003
MAX. ALLOWABLE UNITS (2)	161	52
OPEN SPACE	20% (7.4 AC.)	78% (28.7 AC.)
MAX. STRUCTURE HEIGHT (FT.)	40	40 (4.)
PERIMETER BUFFER (FT.)	50	50

NOTES:

1. PROJECT EXCLUDES 2.8 ACRE ALLEN OUT-LOT
2. NOT INCLUDING PROPOSED COMMUNITY CENTER
3. DENSITY BASED ON LOT AREA OF 37.01 ACRES - NO DEDUCTS REQUIRED
4. TYPICAL COTTAGE HEIGHTS ARE 23 FEET+/-. NO BUILDING SHALL EXCEED 40 FT.

PLAN REFERENCES

1) RIGHT–OF–WAY AND TRACK MAP, MAINE CENTRAL R.R., STATION 307+80 TO STATION 360+60, JUNE 30, 1916. MCRR FILE NO. V2/S1 AND V2/S2.

2) STANDARD BOUNDARY SURVEY PREPARED FOR MARION B. SMALL BY GARY E. JOHNSON, RLS. 1261, DATED AUG. 1987. UNRECORDED.

3) PLAN OF WYMAN FARM, CUMBERLAND CENTER, MAINE, BY EARL RAND, DATED MAY 2, 1931. UNRECORDED.

4) PLAN OF TUTTLE ROAD IN CUMBERLAND FROM CUMBERLAND CENTER TO FEDERAL ROAD, SURVEYED OCT. 11, 1926 BY WM. E. WINSLOW. RECORDED IN THE CUMBERLAND COUNTY COMMISSIONERS PLAN BOOK 5, PAGE 2.

5) ORIGINAL LOTTING PLAN OF NORTH YARMOUTH, RECORDED INTHE CUMBERLAND COUNTY REGISTRY OF DEEDS, PLAN BOOK 24,PAGE 14. CUMBERLAND COUNTY REGISTRY OF DEEDS IN PLAN BOOK 203, PAGE 82.

6) AMENDED PLAN OF PRIVATE WAY MADE FOR RICHARD DOANE BY TITCOMB ASSOCIATES DATED MAY 7, 1990 AND REVISED THROUGH NOV. 11. 2009 AND RECORDED IN PLAN BOOK 204, PAGE 895

7) RECORDING PLAT OF SMALL'S BROOK CROSSING SUBDIVISION MADE BY LAND USE CONSULTANTS, DATED OCTOBER 14, 1991 AND REVISED THROUGH OCTOBER 7, 1992 AND RECORDED IN PLAN BOOK 192, PAGE 312–314.

8) PLAN OF PROPOSED CONVEYANCES MADE FOR OCEAN VIEW AT CUMBERLAND LLC BY TITCOMB ASSOCIATES DATED APRIL 6, 2018 AND REVISED THROUGH MAY 30, 2018.

State of Maine, Cumberland ss
Registry of Deeds
Received ______________ 20 ____
at ___h___m___M and recorded in
Plan Book ________ Page ____
Attest: ____________________
Register

Approved by the Town of Cumberland Planning Board
dated ____________

SCALE IN FEET
50 0 50 100
1" = 50'

S-4 Sheet 4 of 4

Rev. 6	07/31/18	Final plan submission	nse
Rev. 5	07/16/18	Road names update deed references	RjC
Rev. 4	05/04/18	Little Acres Drive alignment	RjC
Rev. 3	03/02/18	miscellaneous staff comment revisions	RjC
Rev. 2	02/21/18	additional feature locations	JS
Rev. 1	01/30/18	Allen lot, design revisions	RjC

OWNERS OF RECORD

Ocean View at Cumberland, LLC
20 Blueberry Lane Falmouth, Maine
Book 34876, Page 184
Book 34876, Page 192
Book 34876, Page 194

STATE OF MAINE
REX J. CROTEAU
2273
PROFESSIONAL LAND SURVEYOR

CERTIFICATION

This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Rex J. Croteau, P.L.S. #2273

SUBDIVISION PLAN

Oceanview at Cumberland

Tuttle Road Cumberland, Maine

MADE FOR

Ocean View at Cumberland LLC

20 Blueberry Lane Falmouth, Maine

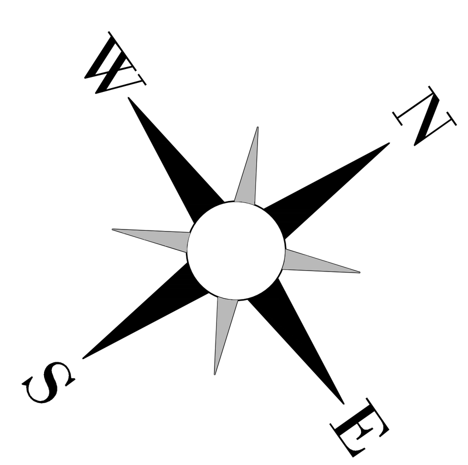
JOB #89076 | DATE: December 26, 2017 | SCALE: 1" = 50'

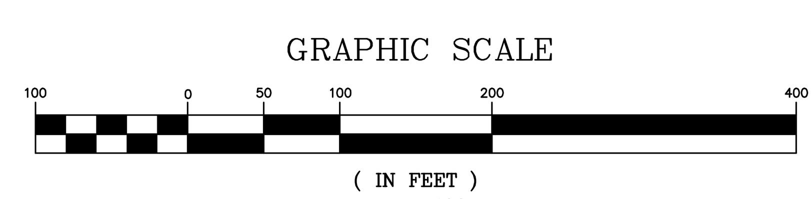
BOOK #898

89076_2016.dwg

Titcomb Associates
133 Gray Road, Falmouth, Maine 04105
(207)797-9199 www.titcombsurvey.com

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Re-submit to Town of Cumberland	CSB
2.	2.7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-submit to Town and DEP	CSB





Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

Existing Conditions and Removals Plan

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE: 1"=100'	SHEET: T1
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

Road Lengths
Little Acres Drive = 3000'±
Periwinkle Drive = 600'± Right
Ivy Lane = 200'± Right
Honeysuckle Way = 225'± Left
Mallard Way = 1000'± Right
Azalea Lane = 150'± Right
Lilac Way = 150'± Left

Note:
Phasing shown is for general marketing purposes only. Refer to Plan sheets C3-C10 for infrastructure phasing.

PROGRESS PLAN
NOT FOR CONSTRUCTION
THIS DOCUMENT IS ISSUED FOR INFORMATIONAL PURPOSES ONLY. THE DATA SHOWN HEREON IS SUBJECT TO REVISION.

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	Update Road Names	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Re-submit to Town of Cumberland	CSB
2.	2.7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-submit to Town and DEP	CSB

Prepared in association with:
LICHT ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER
7-31-2018

Overall Phasing Plan

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
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63 Second Avenue , Augusta, Maine 04330
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FIELD WK:	SCALE: 1"=100'	SHEET: C1
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

Wetland Fill Summary

Stream Crossing #1	3,318 s.f.
Stream Crossing #2	2,880 s.f.
Wetland Fill #3	3,877 s.f.
Wetland Fill #4	1,222 s.f.
Wetland Fill #5	203 s.f.
Wetland Fill #6	1,551 s.f.
Trail Boardwalk Crossings A-E	784 s.f.
Total:	13,835 s.f.

PROGRESS PLAN
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Prepared in association with:
LICHT ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	Update Wetland Impacts at Crossing #1	
3.	3-1-2018	Respond to Peer review comments, re-submit to Town	CSB
2.	2-7-2018	Submit to DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Overall Site Plan

Richard Doane Property Development
291Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
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FIELD WK:	SCALE: 1"=60'	SHEET:
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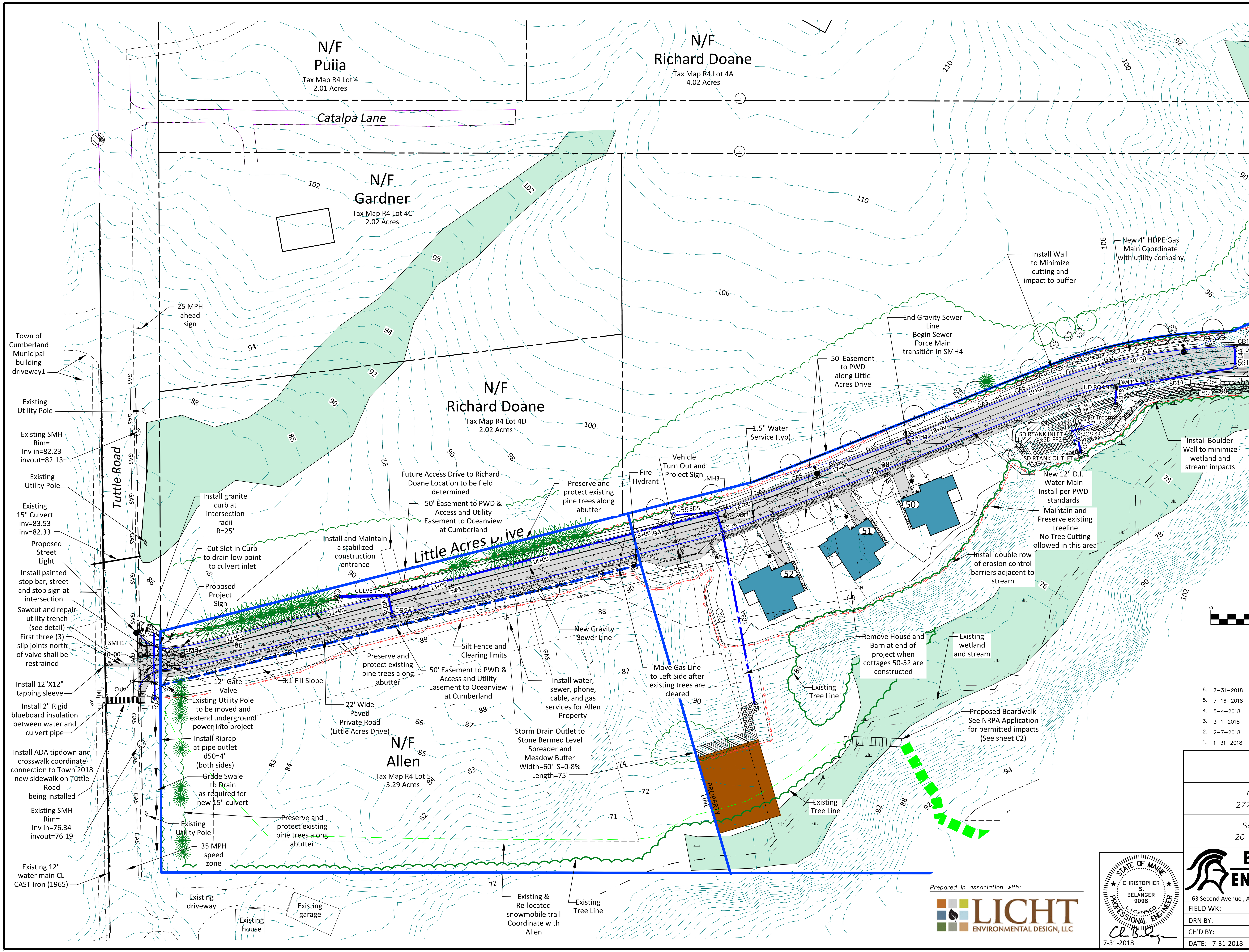
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



PROGRESS PLAN
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GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

6.	7–31–2018	No changes this sheet, re–submit to Town	CSB
5.	7–16–2018	PWD revisions, resubmit to PWD	CSB
4.	5–4–2018	Water Revisions per PWD. Road shift 10'+/–	CSB
3.	3–1–2018	Respond to Town Comments, Re–submit to Town	CSB
2.	2–7–2018.	SUBMIT TO DEP	CSB
1.	1–31–2018	Respond to Town Memos, submit to Town and DEP	CSB

Site Development Plan

Oceanview at Cumberland LLC
277Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

Prepared in association with:
LICHT ENVIRONMENTAL DESIGN, LLC

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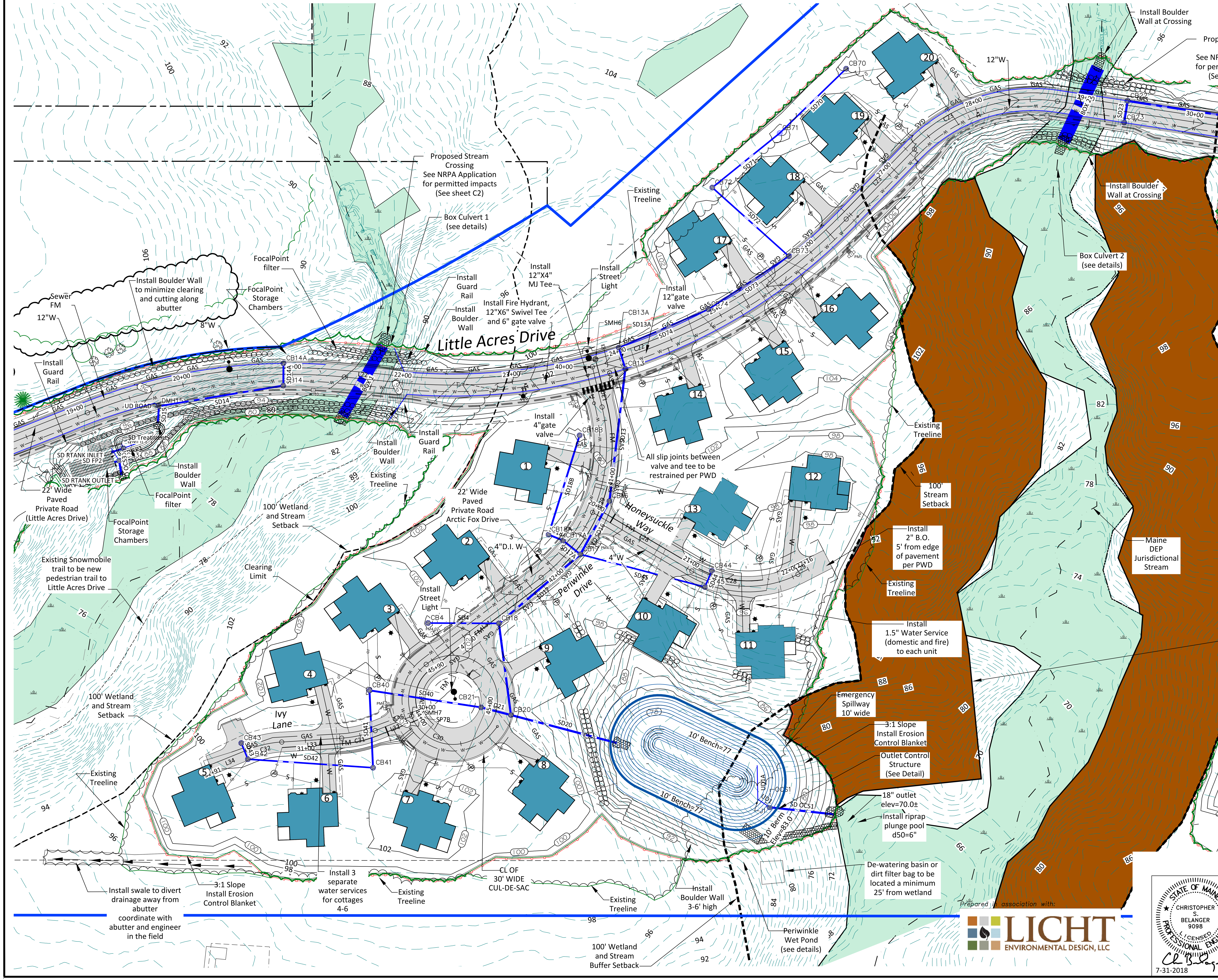
FIELD WK:	SCALE: 1"=40'	SHEET:
DRN BY:	JOB #:	C3
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



Stormwater and Stream Buffer, L=100' "Brown Shade"

PROGRESS PLAN
NOT FOR CONSTRUCTION

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GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	Water revisions per PWD	CSB
4.	5-4-2018	Water revisions per PWD, revised pond grading to 3:1 ratio, re-submit to DEP	CSB
3.	3-1-2018	Respond to Town Comments	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Site Development Plan

Oceanview at Cumberland LLC
277Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
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7-31-2018

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FIELD WK:	SCALE: 1"=40'	SHEET: C4
DRN BY:	JOB #:	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

PROGRESS PLAN
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6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	PWD revisions	CSB
4.	5-4-2018	PWD revisions, respond to DEP comments	CSB
3.	3-1-2018	Respond to Town Comments, re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Site Development Plan

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

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20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
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9098
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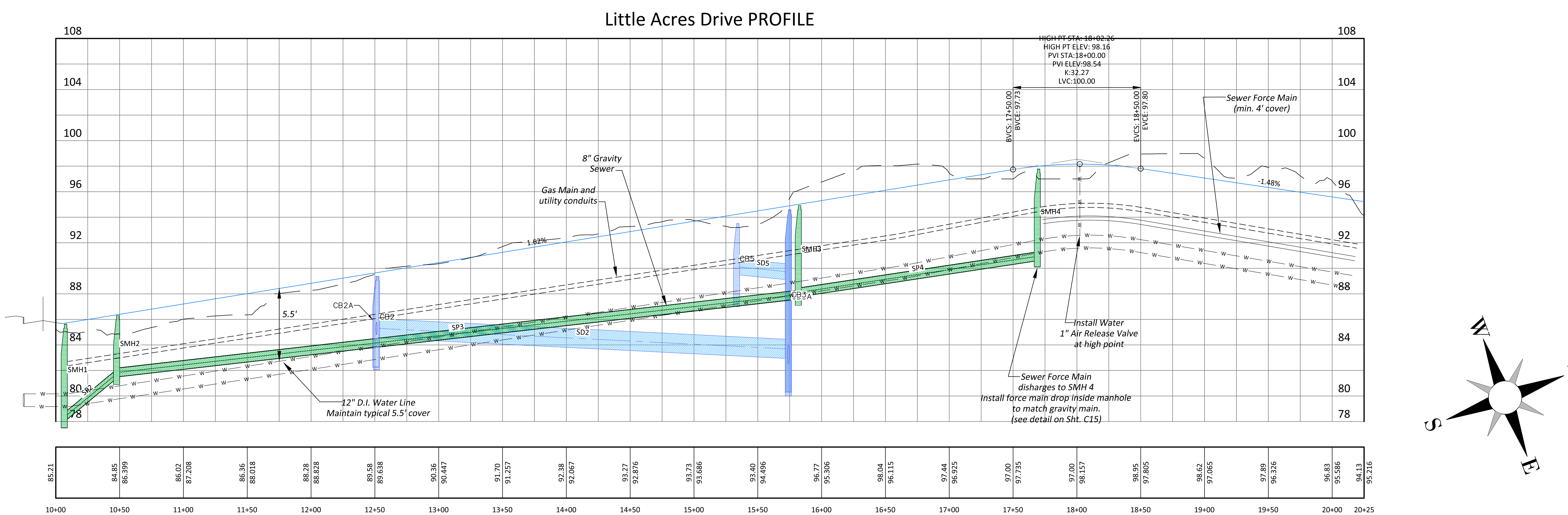
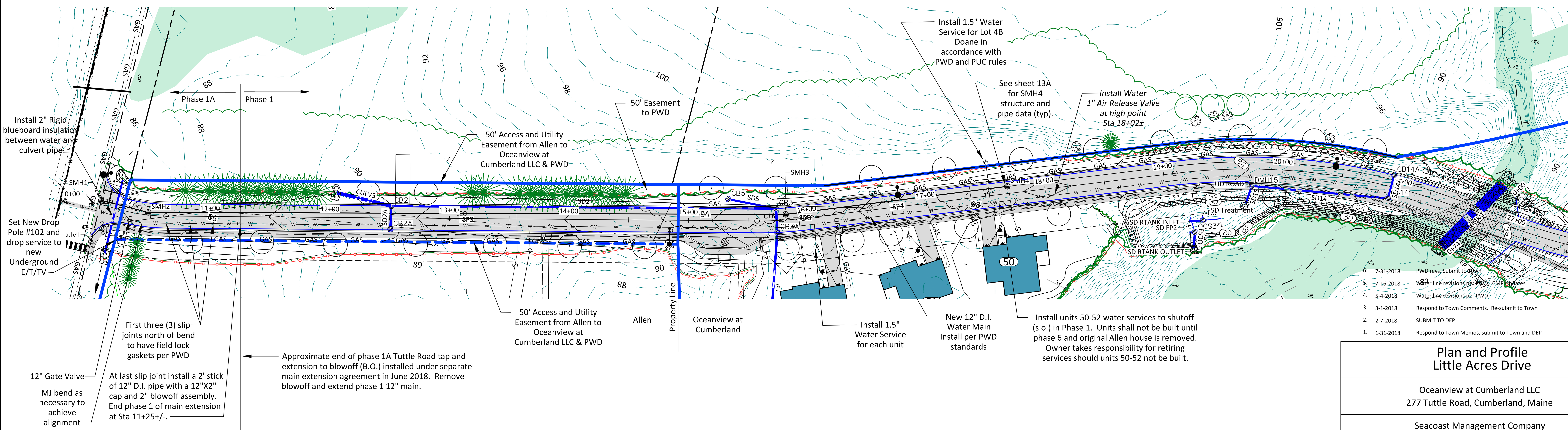
7-31-2018

FIELD WK:	SCALE: 1"=40'	SHEET:
DRN BY:	JOB #:	C5
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	





6.	7-31-2018	PWD revs, Submit to Town	CSB
5.	7-16-2018	Water line revisions per PWD, CMP updates	CSB
4.	5-4-2018	Water line revisions per PWD	CSB
3.	3-1-2018	Respond to Town Comments. Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

PROGRESS PLAN
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GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER

7-31-2018

Plan and Profile
Little Acres Drive

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330 Ph 207-622-1462, Cell 207-242-5713
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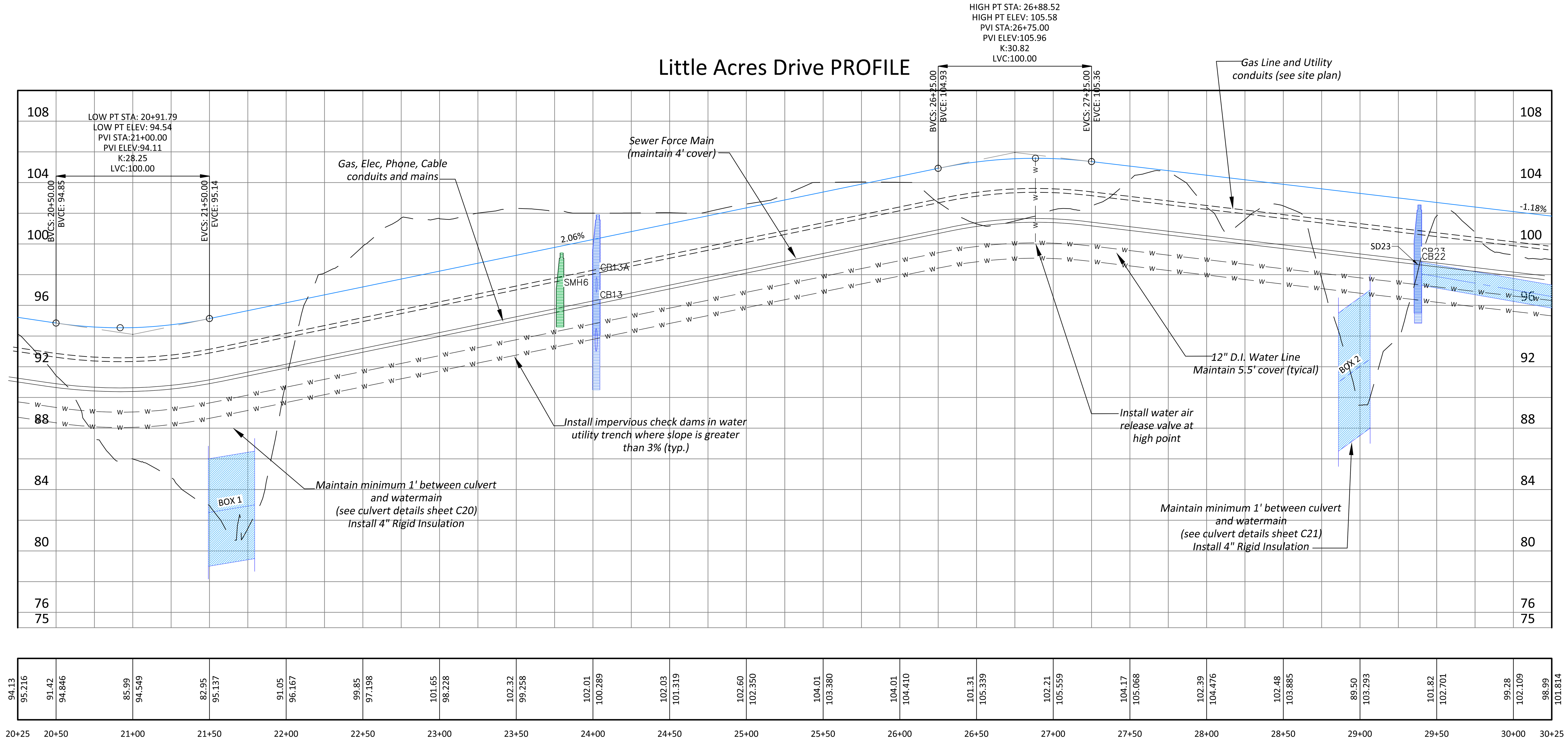
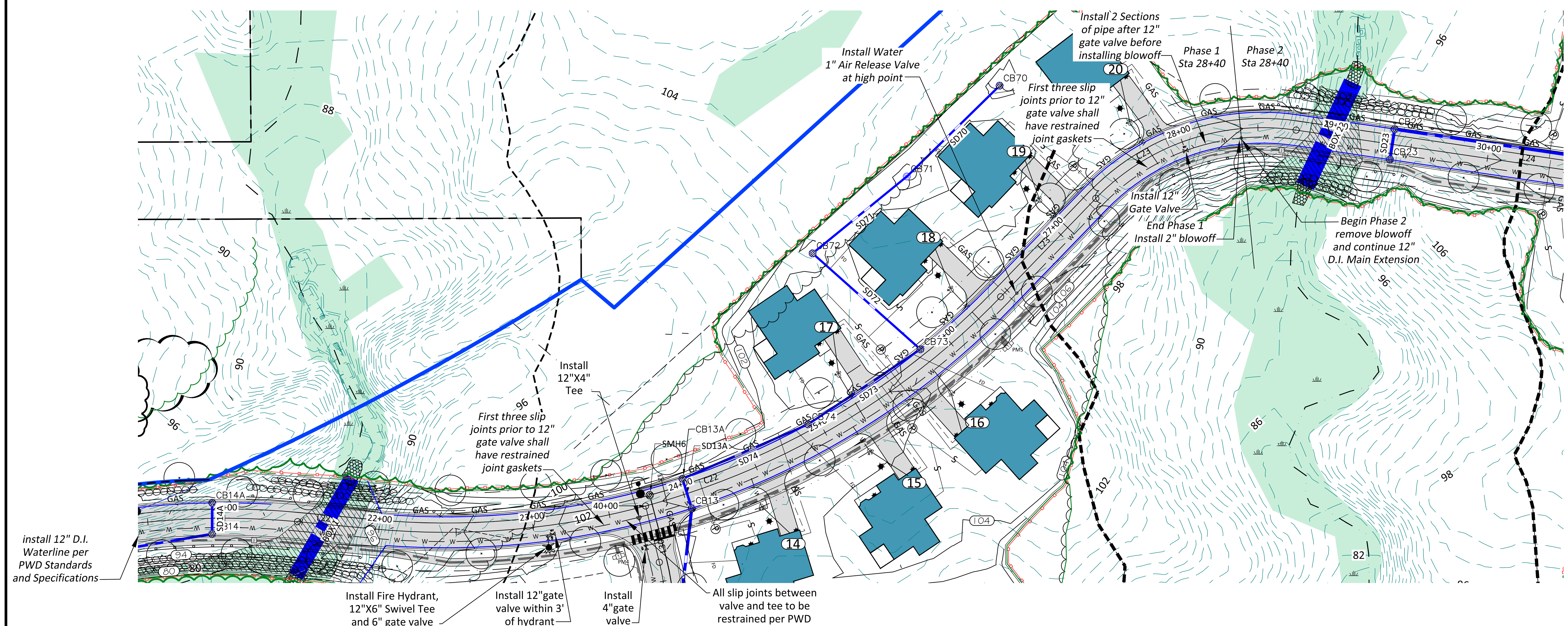
FIELD WK:	SCALE: 1"=40'	SHEET:
DRN BY:	JOB #: 109	C6
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

Little Acres Drive PROFILE





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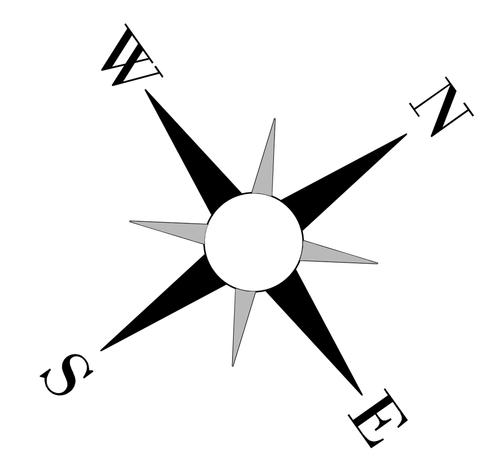

PROGRESS PLAN
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GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

5.	7-31-2018	PWD revisions, Submit to Town	CSB
4.	7-16-2018	PWD revisions, submit to PWD	CSB
3.	5-4-2018	PWD revisions, submit to DEP	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Plan and Profile
Little Acres Drive

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330

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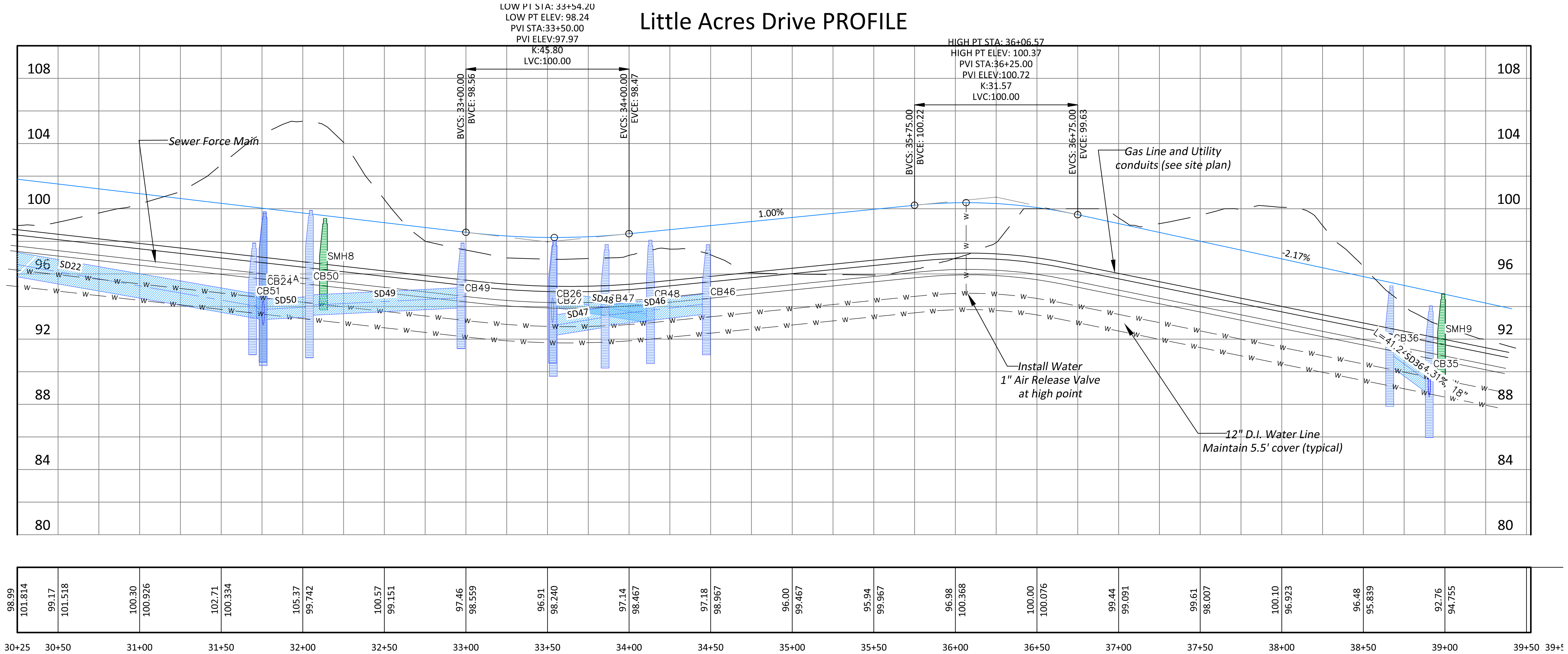
FIELD WK:	SCALE: 1"=40'	SHEET: C7
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



PROGRESS PLAN
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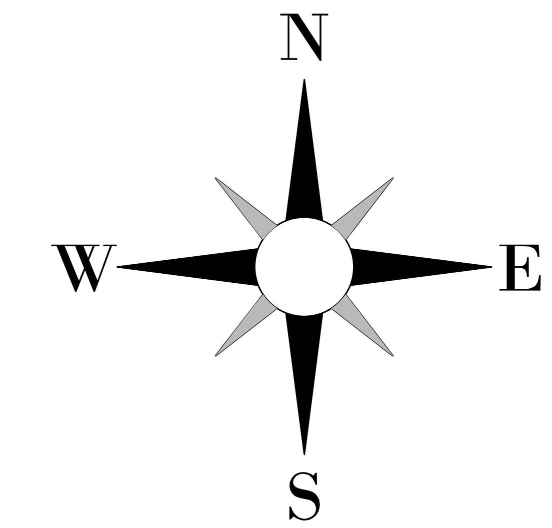
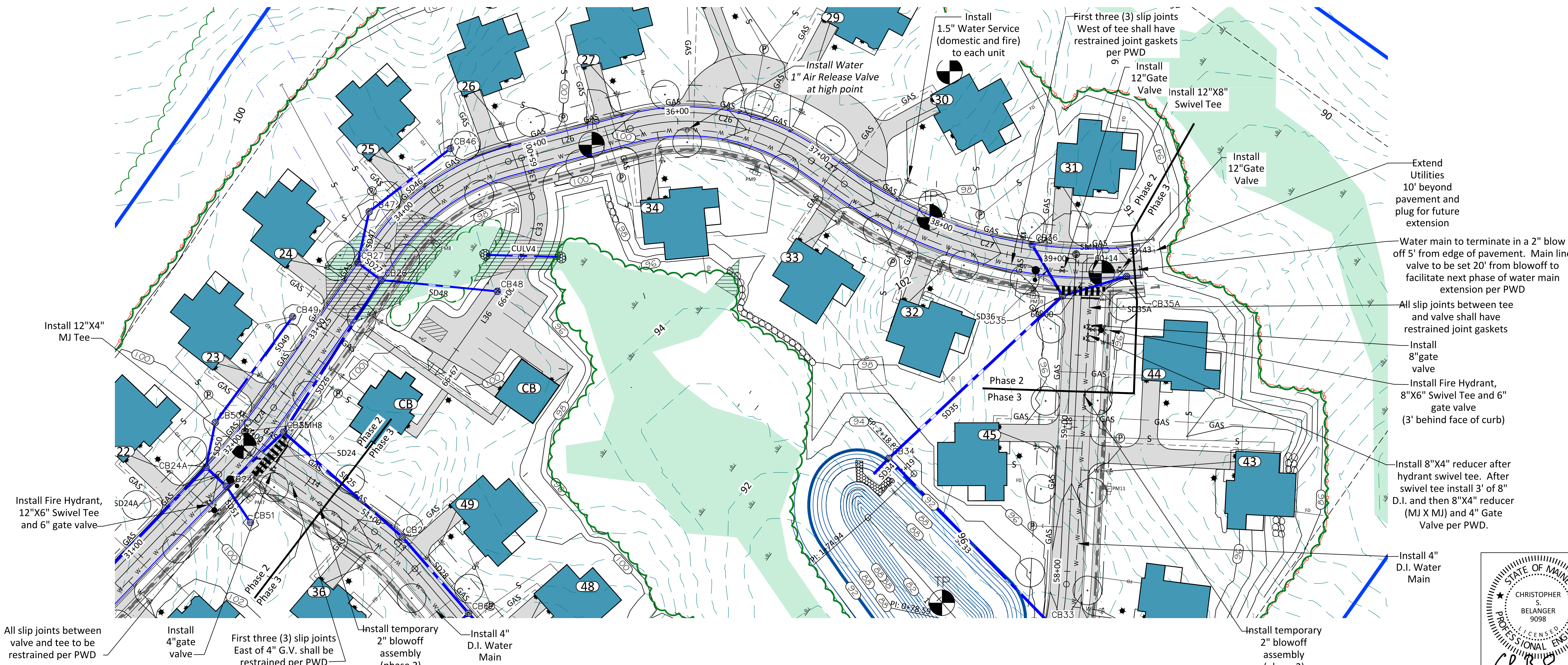


GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

PWD Phasing Notes
Water Main Installation

1. Mallard Way and Little Acres Drive Intersection Sta 32+00 +/-. Phase 2 includes installation 12"X4" Tee, 4" Gate Valve, and Temporary 2" Blowoff Assembly. Phase 3 shall include removal and blowoff (b.o.) and 4" main extension along Mallard Drive.
2. Mallard Way and Little Acres Drive Intersection Sta 39+00 +/-. Phase 2 includes installation 12"X8" Tee, 8" Gate Valve, Fire Hydrant Assembly, 8"X4" reducer, 4" Gate Valve and Temporary 2" Blowoff Assembly. Phase 3 shall include removal and blowoff (b.o.) and 4" main extension along Mallard Drive.



Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

6.	7-31-2018	PWD revisions, submit to Town	CSB
5.	7-16-2018	Revisions per PWD, re-submit	CSB
4.	5-4-2018	revisions per PWD, re-submit to DEP	CSB
3.	3-1-2018	Respond to Town Comments, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Plan and Profile
Little Acres Drive

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

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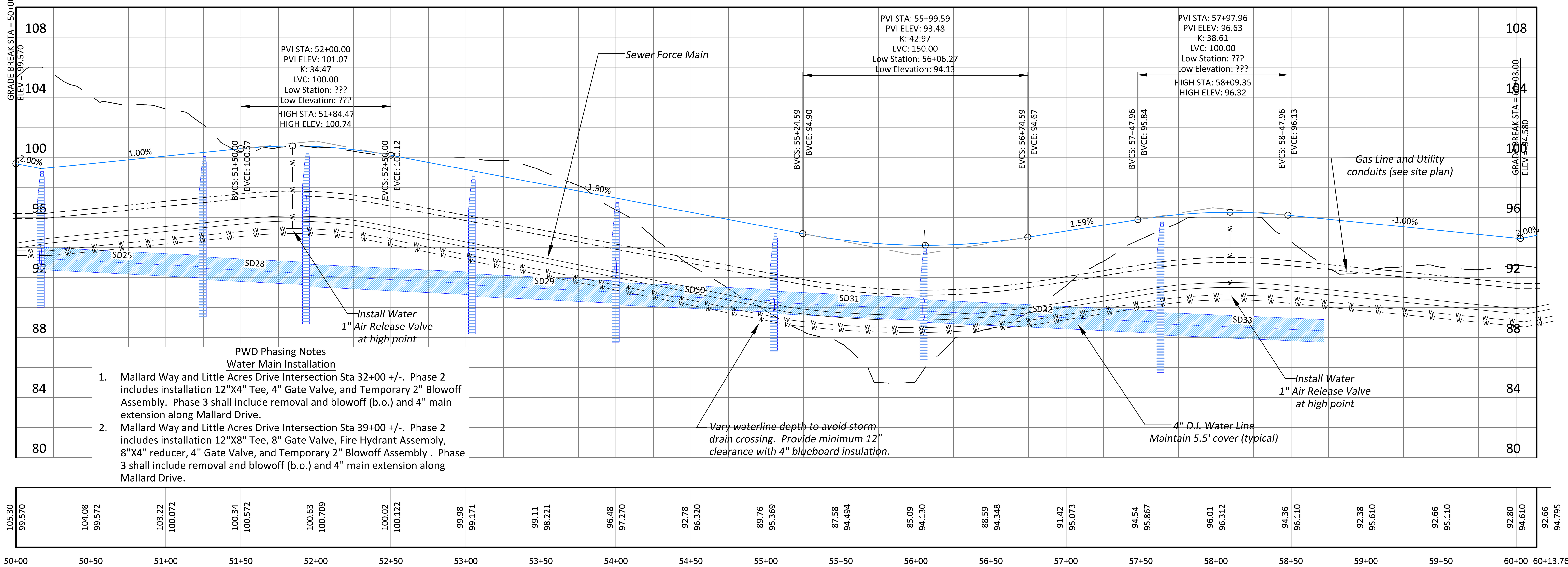
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE: 1"=40'	SHEET: C8
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

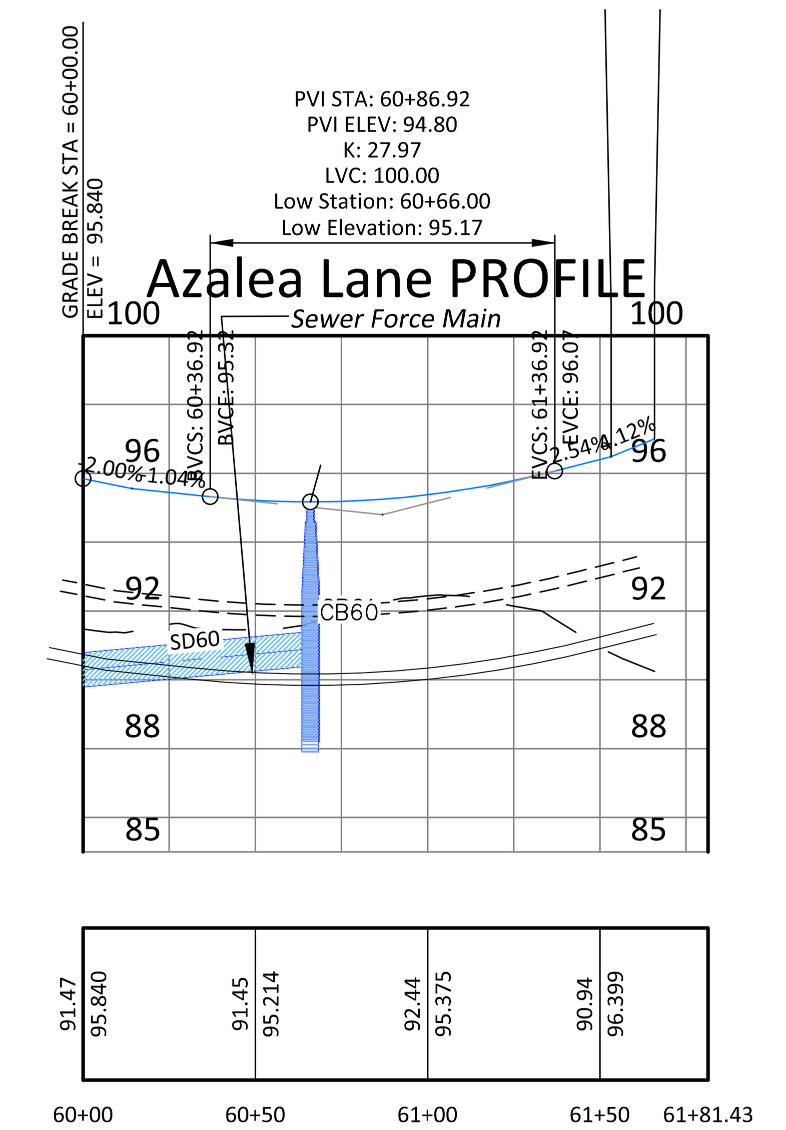
Mallard Way PROFILE



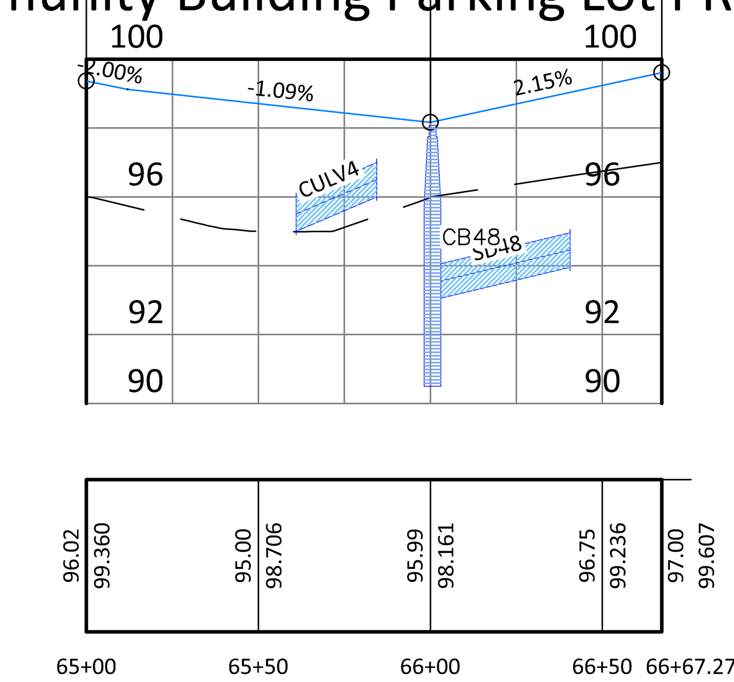
PWD Phasing Notes
Water Main Installation

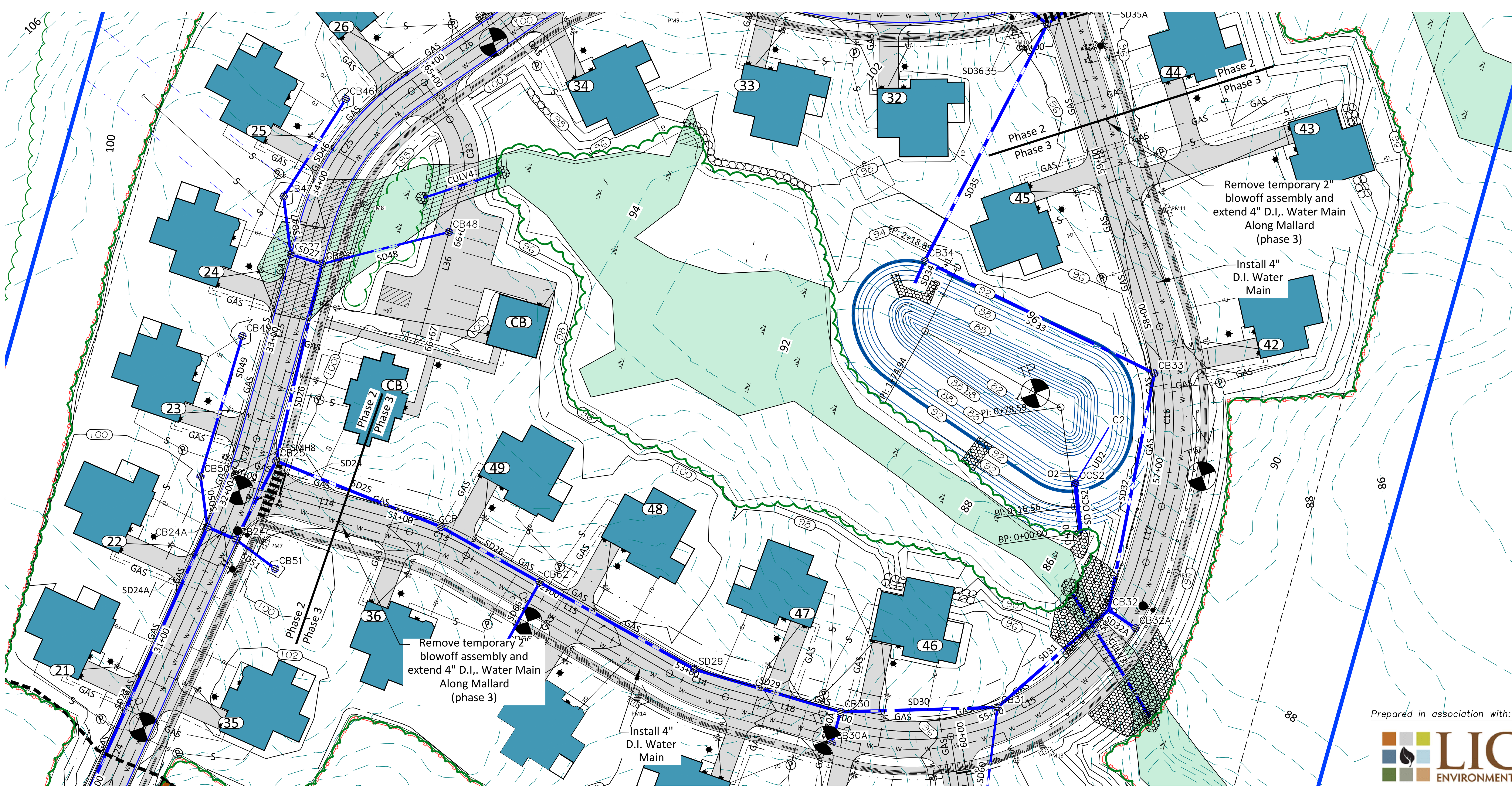
1. Mallard Way and Little Acres Drive Intersection Sta 32+00 +/-. Phase 2 includes installation 12"X4" Tee, 4" Gate Valve, and Temporary 2" Blowoff Assembly. Phase 3 shall include removal and blowoff (b.o.) and 4" main extension along Mallard Drive.
2. Mallard Way and Little Acres Drive Intersection Sta 39+00 +/-. Phase 2 includes installation 12"X8" Tee, 8" Gate Valve, Fire Hydrant Assembly, 8"X4" reducer, 4" Gate Valve, and Temporary 2" Blowoff Assembly. Phase 3 shall include removal and blowoff (b.o.) and 4" main extension along Mallard Drive.

Azalea Lane PROFILE



Community Building Parking Lot PROFILE





GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

6.	7-31-2018	PWD revisions, Submit to Town	CSB
5.	7-16-2018	PWD revisions, re-submit to PWD	CSB
4.	5-4-2018	PWD revisions, re-submit to DEP	CSB
3.	3-1-2018	Respond to Town comments, re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO MAINE DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

PROGRESS PLAN
NOT FOR CONSTRUCTION
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LICHT ENVIRONMENTAL DESIGN, LLC

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CHRISTOPHER S. BELANGER
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7-31-2018

Plan and Profile
Mallard Way

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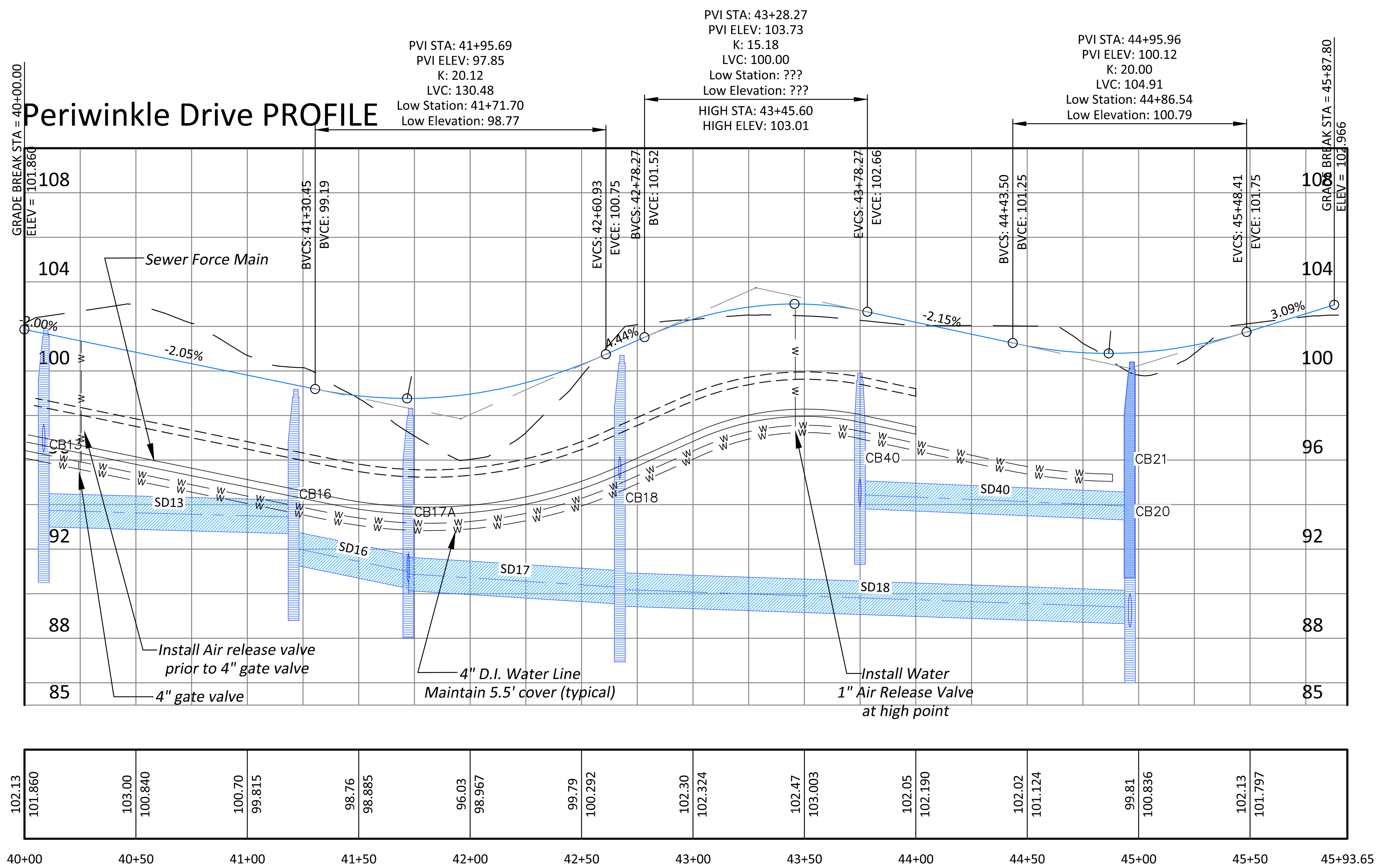
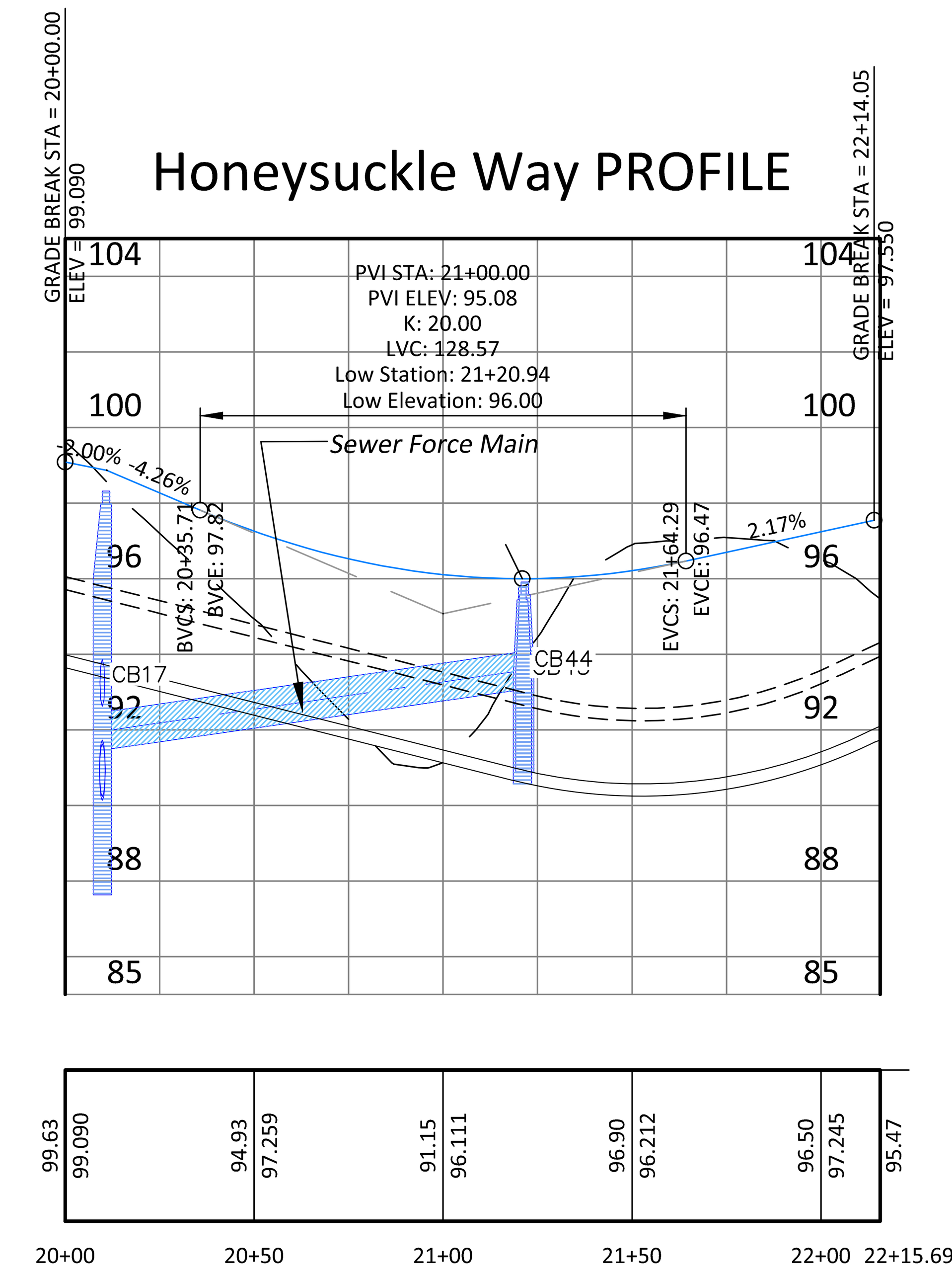
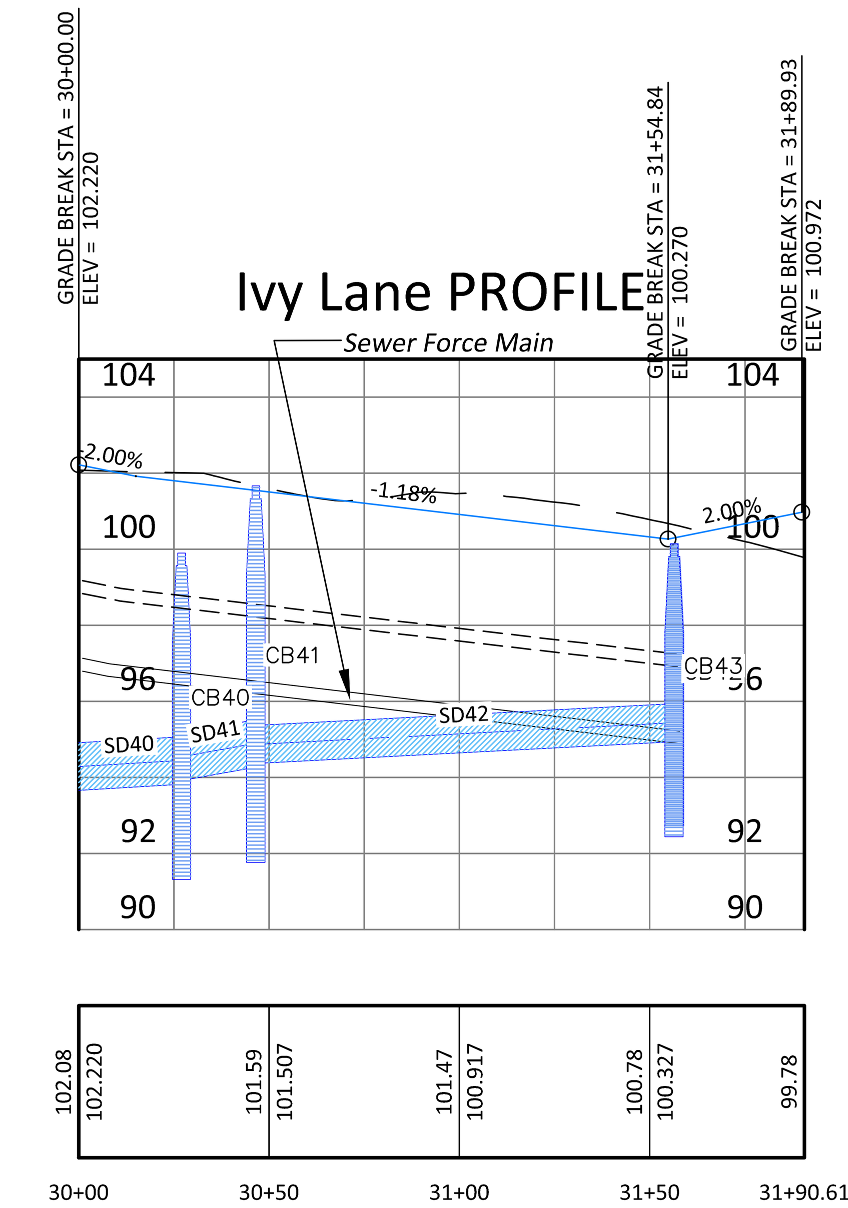
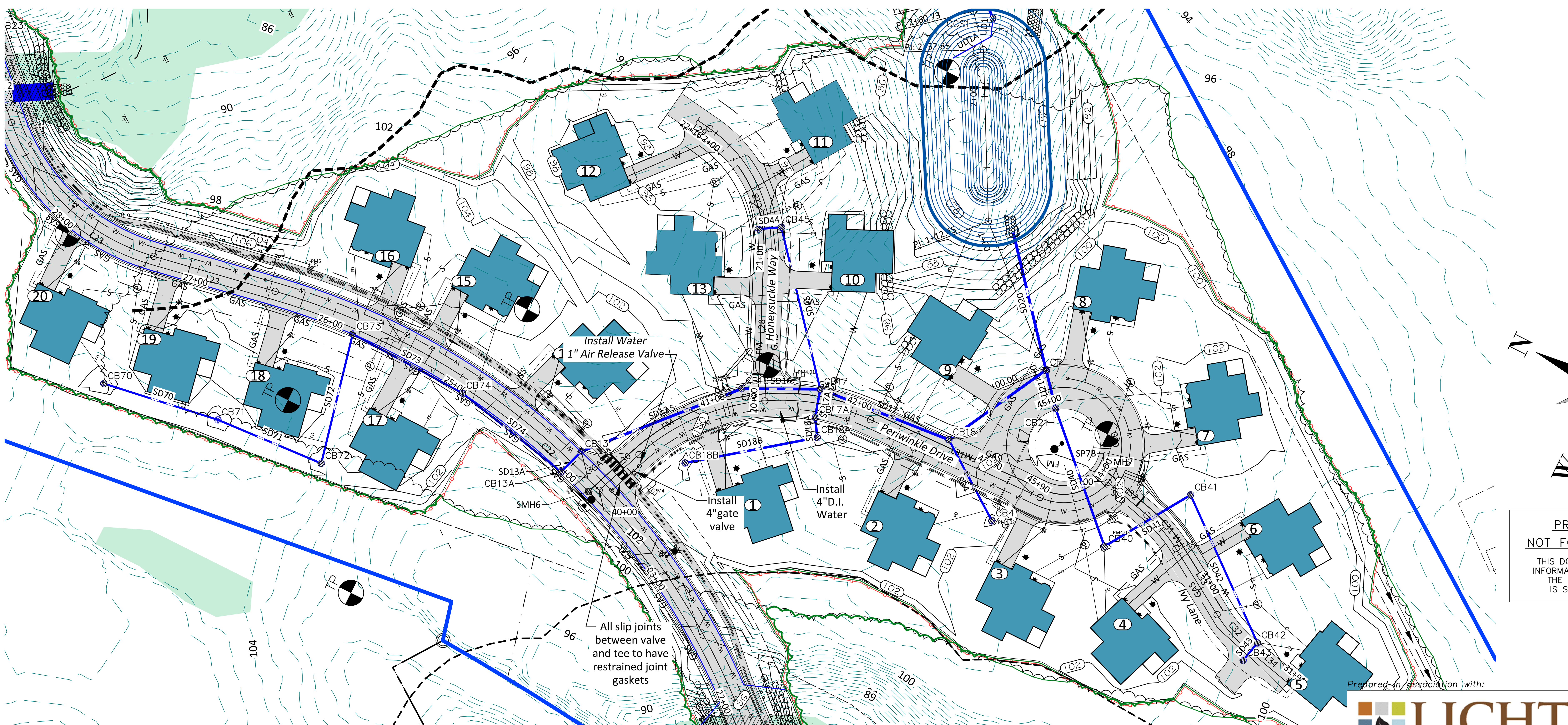
FIELD WK:	SCALE: 1"=40'	SHEET:
DRN BY:	JOB #: 109	C9
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	









GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

6.	7-31-2018	PWD revs, Submit to Town	CSB
5.	7-16-2018	PWD revisions, re-submit to PWD	CSB
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PROGRESS PLAN
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Prepared in association with:
LICHT ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

Plan and Profile
Periwinkle Way, Ivy Lane, Honeysuckle Way

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
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FIELD WK:	SCALE: 1"=40'	SHEET:
DRN BY:	JOB #: 109	C10
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

Buffer Tree and Shrub Specifications

[quantity as indicated following individual plant listings below (x)]

Trees:

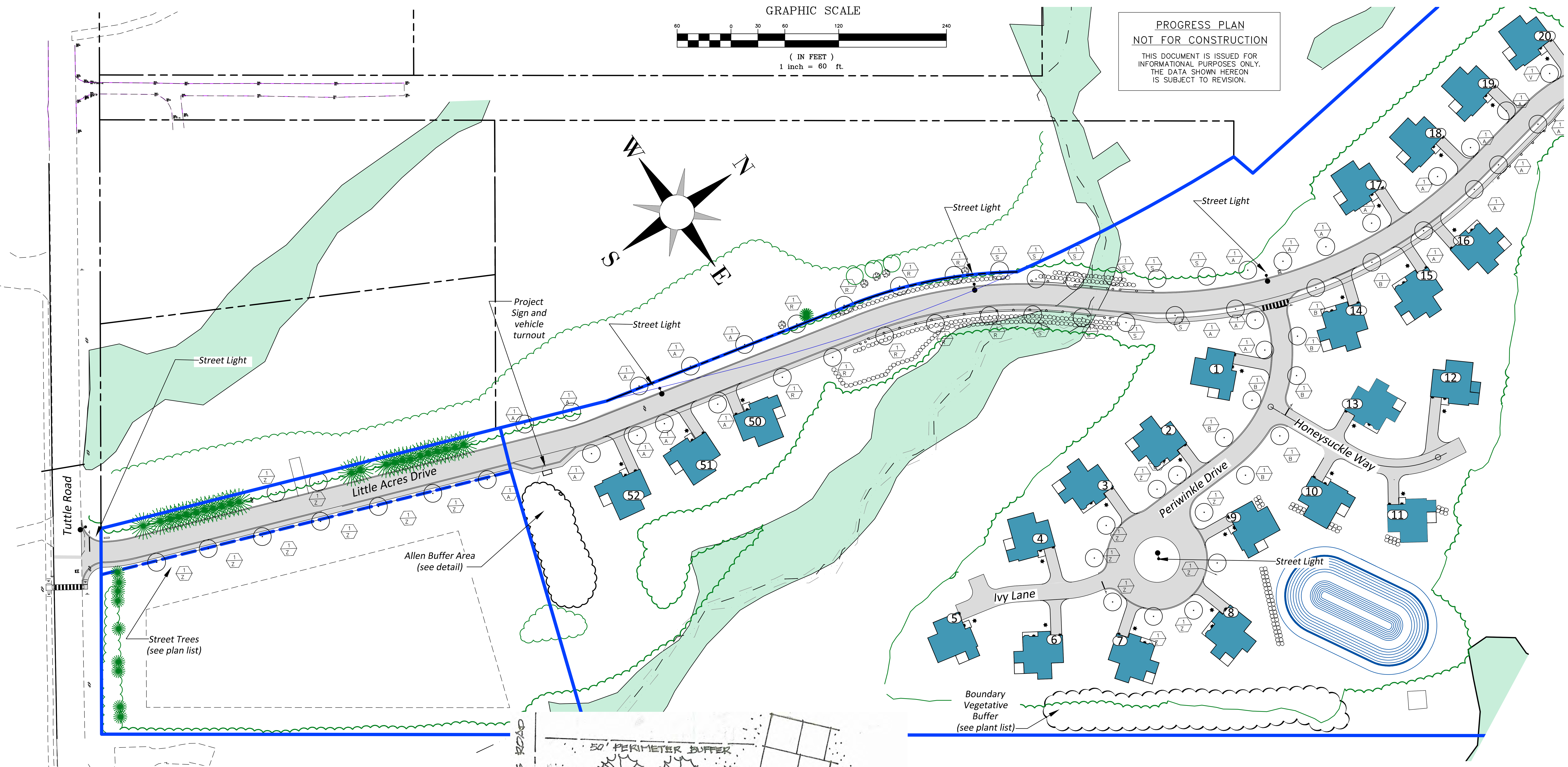
Abies balsamea phanerolepis	6-7 ft.	
Canaan Balsam Fir		
Acer pensylvanicum	#7 cont.	
Striped Maple		
Acer rubrum	2-2.5 in.	
Red/Swamp Maple		
Amelanchier x grandiflora	6-7 ft.	clump
Betula nigra "Heritage"	10-12 ft.	clump
Heritage River Birch		
Carpinus caroliniana	1.5-1.75 in.	
American Hornbeam		
Crataegus crus-galli inermis	1.5 in. cal.	
Cockspur Thornless Hawthorn		
Picea glauca	6-7 ft.	
White Spruce		
Picea abies	6-7 ft.	
Norway Spruce		
Pinus strobus	7-8 ft.	
White Pine		
Quercus alba	2.5-3 in.	
White Oak		
Quercus bicolor	2 in.	
Swamp White Oak		
Quercus rubrum	2.5-3 in.	
Red Oak		
Tsuga canadensis	6-7 ft.	
Canadian Hemlock		

Shrubs:

Aronia arbutifolia "Brilliantissima"	#3 cont.	
Red Chokeberry		
Azalea viscosum	#2 cont.	
Swamp Azalea		
Cephalanthus occidentalis	#3 cont.	
Buttonbush		
Clethra alnifolia	#3 cont.	
Sweet Pepperbush		
Cornus alternifolia	#5 cont.	
Pagoda Dogwood		
Cornus sericea "Baileyi"	#3 cont.	
Red Twig Dogwood		
Hamamelis intermedia "Pallida"	#3 cont.	
Pallida Witchhazel		
Ilex verticillata "Jim Dandy/Red Sprite"	#3 cont.	m/f
Winterberry (var.)		
Itea virginica "Little Henry"	#3cont.	
"Little Henry" Sweetspire		
Lindera benzoin	#3 cont.	
Spicebush		
Vaccinium corymbosum	#3 cont.	var.
Highbush Blueberry		
Viburnum cassinoides	#5 cont.	
Withrod Viburnum		
Viburnum dentatum "Christom"	#5 cont.	
Blue Muffin Arrowwood Viburnum		
Viburnum lentago	#5 cont.	
Nannyberry Viburnum		
Viburnum nudum "Brandywine"	#5 cont.	
Brandywine Viburnum		

Street Tree Plant Schedule

Key	Quan.	Botanical and Common Name	Ht.
A	37	Acer rubrum "Red Sunset" Red Sunset Maple	2-2.5" cal.
W	15	Quercus alba White Oak	2-2.5" cal.
S	17	Quercus bicolor Swamp White Oak	2-2.5" cal.
R	24	Quercus rubra Red Oak	2-2.5" cal.
B	9	Tilia americana Basswood	2-2.5" cal.
Z	16	Zelkova serrata "Green Vase" Green Vase Zelkova	2-2.5" cal.
V	13	Ulmus "Valley Forge" Valley Forge Elm	2-2.5" cal.



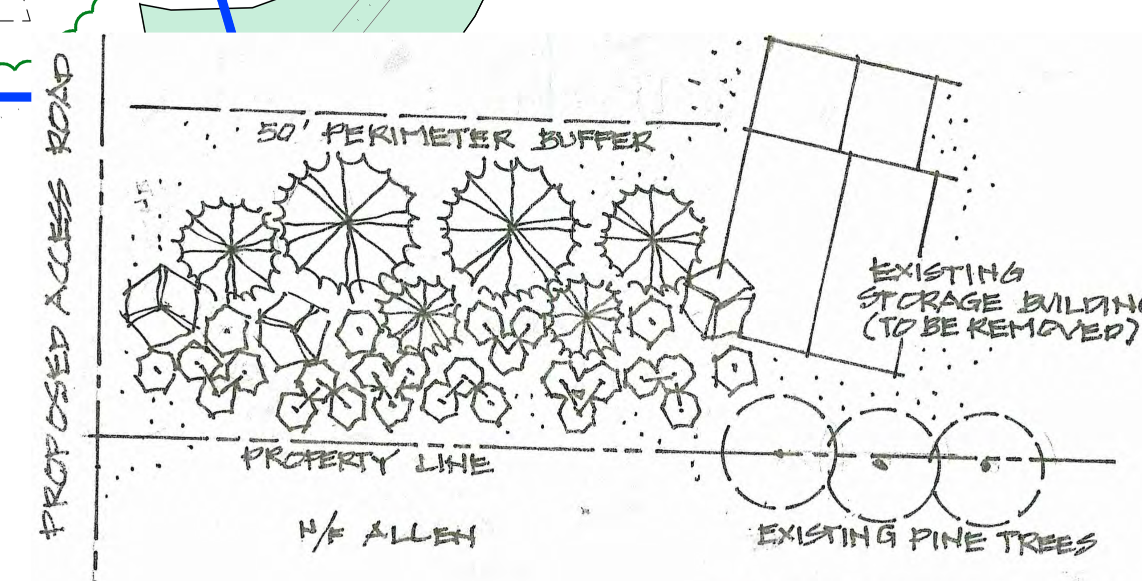
Native Vegetative Buffers

Trees and understory buffers around property perimeter and disturbed common areas such as around storm water management basins to be supplemented in various locations with indigenous plant materials as selected from, but not limited to, the following list. Placement of trees and shrubs to be field adjusted for "best fit" to supplement existing vegetation.

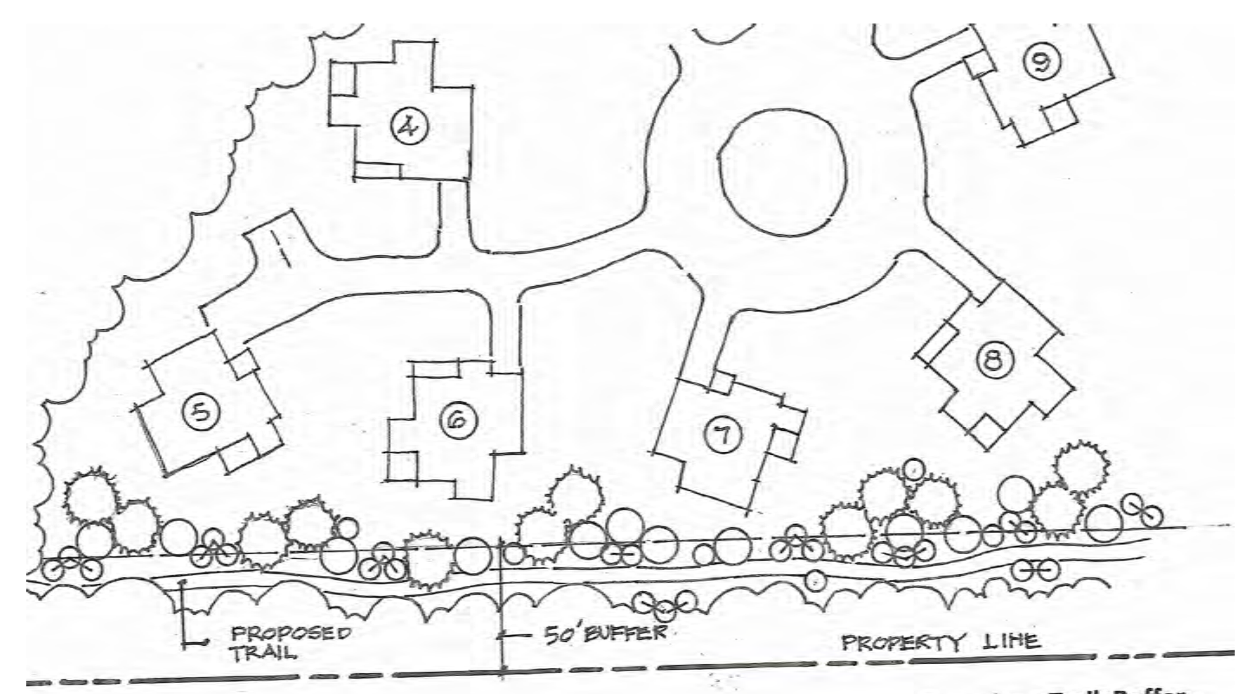
- Acer pensylvanicum - Striped Maple
- Acer rubrum - Red/Swamp Maple
- Pinus strobus - White Pine
- Betula nigra - River Birch
- Abies balsamea - Balsam Fir
- Picea glauca - White Spruce
- Quercus rubrum - Northern Red Oak
- Quercus bicolor - Swamp White Oak
- Amelanchier Canadensis - Shadblow
- Cornus alternifolia - Pagoda Dogwood
- Cornus sericea - Shrub Dogwood
- Hammamelis vernalis - Witchhazel
- Ilex verticillata - Winterberry
- Aronia (var.) - Chokeberry
- Clethra alnifolia - Summersweet
- Azalea viscosum - Swamp Azalea
- Vaccinium corymbosum - Highbush Blueberry
- Cephalanthus occidentalis - Buttonbush
- Viburnum (var.) - Viburnum

Allen Buffer Area:

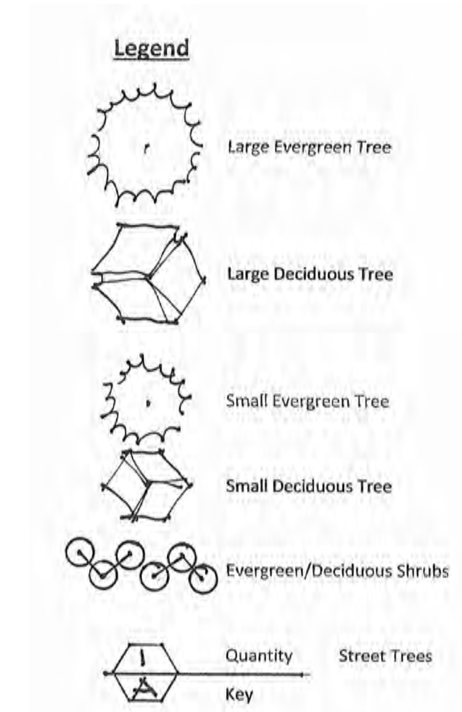
- White Pine (5)
- White Spruce (1)
- Norway Spruce (2)
- Balsam Fir (2)
- Hemlock (2)
- Red Oak (3)
- Red Maple (3)
- Hawthorn (2)
- River Birch (2)
- Serviceberry (2)
- Red Twig Dogwood (6)
- Sweet Pepperbush (3)
- Witchhazel (2)
- Winterberry (3)
- Blueberry (6)
- Spicebush (2)
- Withrod Viburnum (2)
- Brandywine Viburnum (2)
- Sweetspire (3)
- Chokeberry (3)



Allen Lot / Property Line Buffer



Boundary Trail Buffer



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REGISTERED LANDSCAPE ARCHITECT, STATE OF MAINE — J. DAVID HAYNES No. 5

STATE OF MAINE — CHRISTOPHER S. BELANGER 9098 — LICENSED PROFESSIONAL ENGINEER

7-31-2018

Landscape Plan

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

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63 Second Avenue , Augusta, Maine 04330 Email: cbelanger@roadrunner.com Ph 207-622-1462, Cell 207-242-5713

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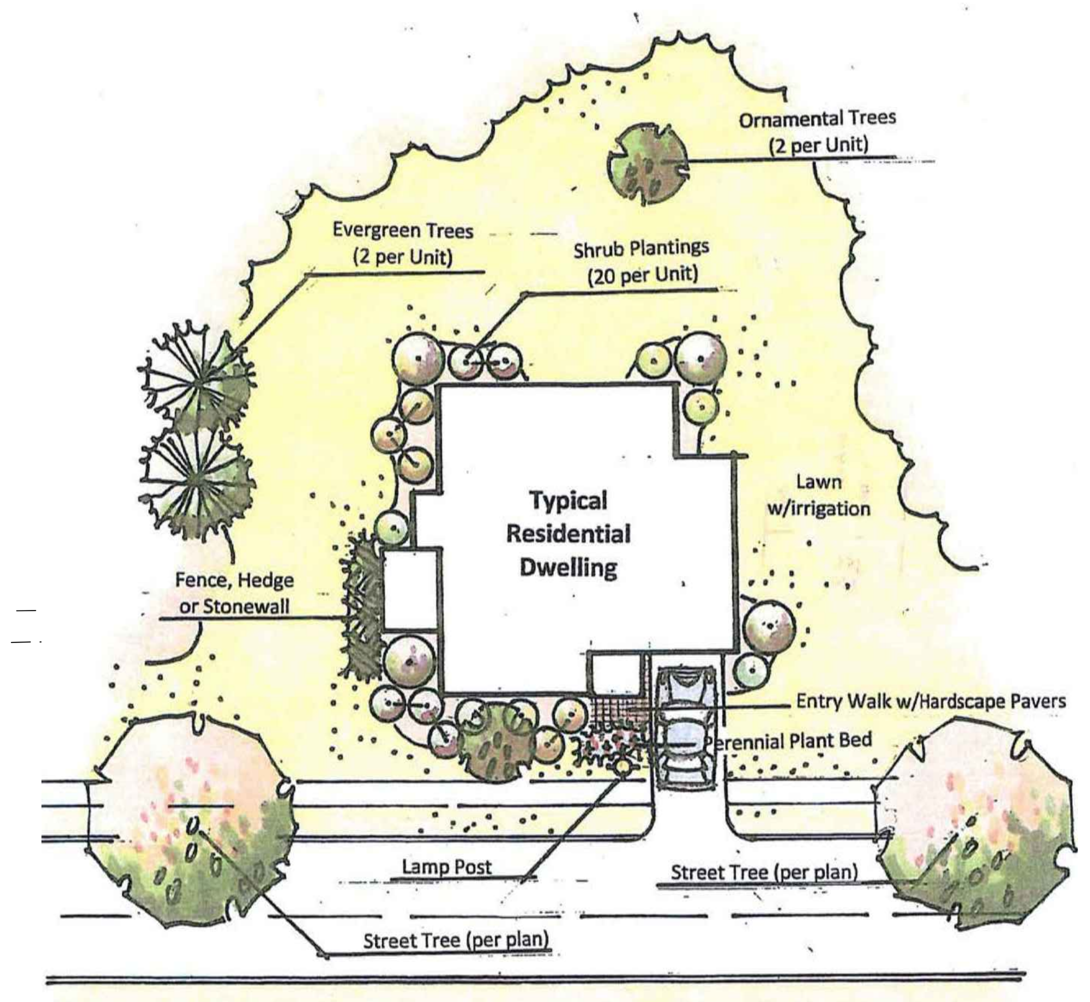
FIELD WK:	SCALE: 1"=60'	SHEET:
DRN BY:	JOB #: 109	C11A
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



Typical Residential Landscape Plan

Landscape Notes:

1. All disturbed construction areas to be re-vegetated with grass shall receive a minimum of 4 in. topsoil loam with hydro-seed or sod as indicated on plans.
2. Prior to plant installation the contractor shall meet with the landscape architect on site for a pre-construction meeting.
3. Plant beds shall receive 10-12 in. of prepared topsoil loam.
4. The landscape architect shall approve plant spacing and layout prior to planting.
5. Contractor shall verify plant schedule with planting plans. If conflicts exist, the contractor shall provide higher number of plants.
6. Installation of plant materials; materials and plantings shall meet requirements as specified by "American standard for nursery stock, may 2004 and as shown on construction detail drawings.
7. Landscape contractor shall construct curvilinear plant beds around and under all shrub plantings to outside limit of branching. plant beds shall be mulched with 3 in. deep dark decomposed mulch.
8. All tags, labels or other foreign material shall be removed from plant material limbs and stems.
9. All plant material substitutions shall be applied for in writing for approval by the landscape architect. Approval of plant variety substitutions shall be based on similar characteristics of the specified plant - mature size, color, bloom times, branching habit, shape, solar and soil preferences.
10. Final spacing of street trees to be field determined based upon driveway curb cuts, utility service stops, view sheds and landscape buffers to be preserved.
11. Precise locations of buffer plant materials to be field selected based on view sheds, existing plant materials and general field conditions. Placement of trees and shrubs to be field adjusted for "best fit" to supplement existing vegetation.

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

PROGRESS PLAN
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LICHT ENVIRONMENTAL DESIGN, LLC

REGISTERED LANDSCAPE ARCHITECT
J. DAVID HAYNES
No. 5
STATE OF MAINE

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

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Landscape Plan

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FIELD WK:	SCALE: 1"=60'	SHEET: C11B
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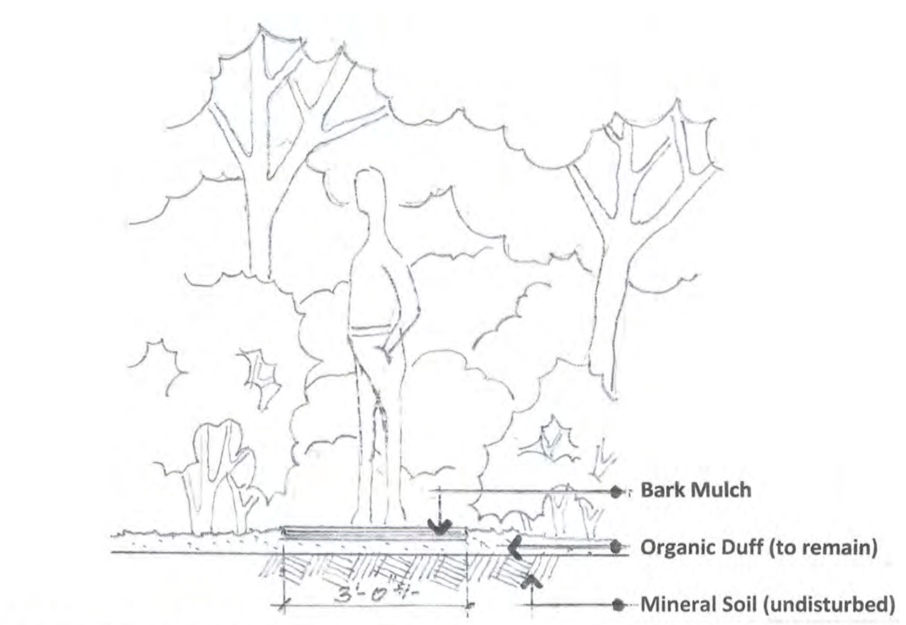
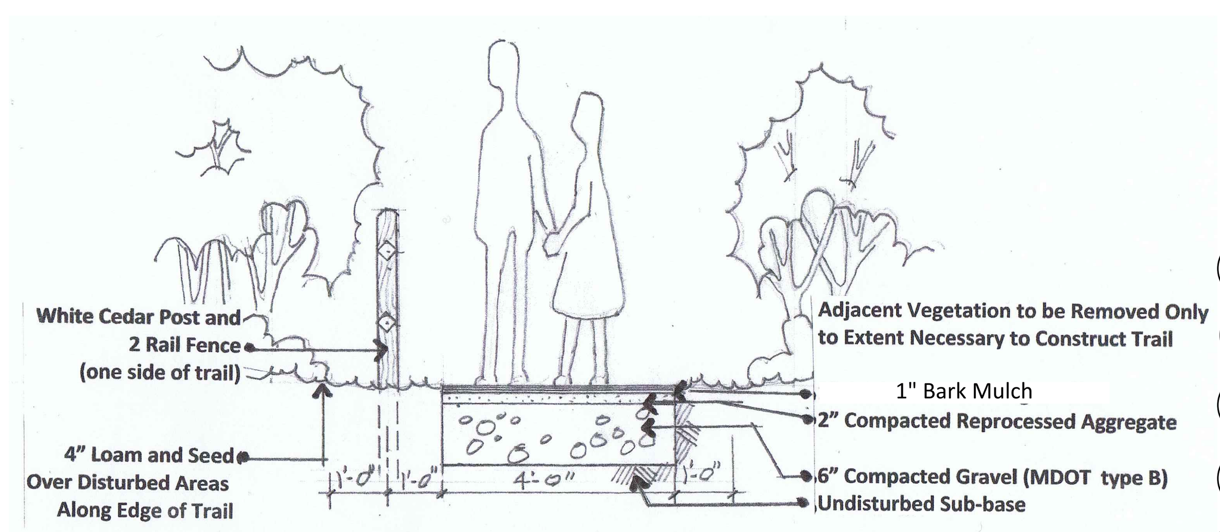


Construction Notes:

1. Alignment of trail to meander through woods along "path of least resistance".
2. Trail to be 3 ft. +/- wide.
3. Path of trail to be cleared of small trees and brush and grubbed to remove small stumps and roots.
4. Meandering trail surfacing to be 2-3 in. depth of wood chips and/or well rotted bark mulch.

Woodland Buffer Trail
Typical Section



Access Trail - Typical Section

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GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

Trail & Pedestrian Ways Key

- (A) *Existing Snowmobile and Pedestrian Trails*
- (B) *Proposed Sidewalk and Pedestrian Access*
- (C) *6-8' Wide Grass/Gravel Trail*
- (D) *4' Bark Mulch / Access Trail*
- (E) *3' Hand Cut/Woodland Buffer Trail*
- (F) *Proposed 6' Snowmobile Trail*
- *Proposed Boardwalk or Culvert*
- *Crosswalk*

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STATE OF MAINE ★ CHRISTOPHER S. BELANGER 9098 ★ LICENSED PROFESSIONAL ENGINEER

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Trail and Walkway Master Plan

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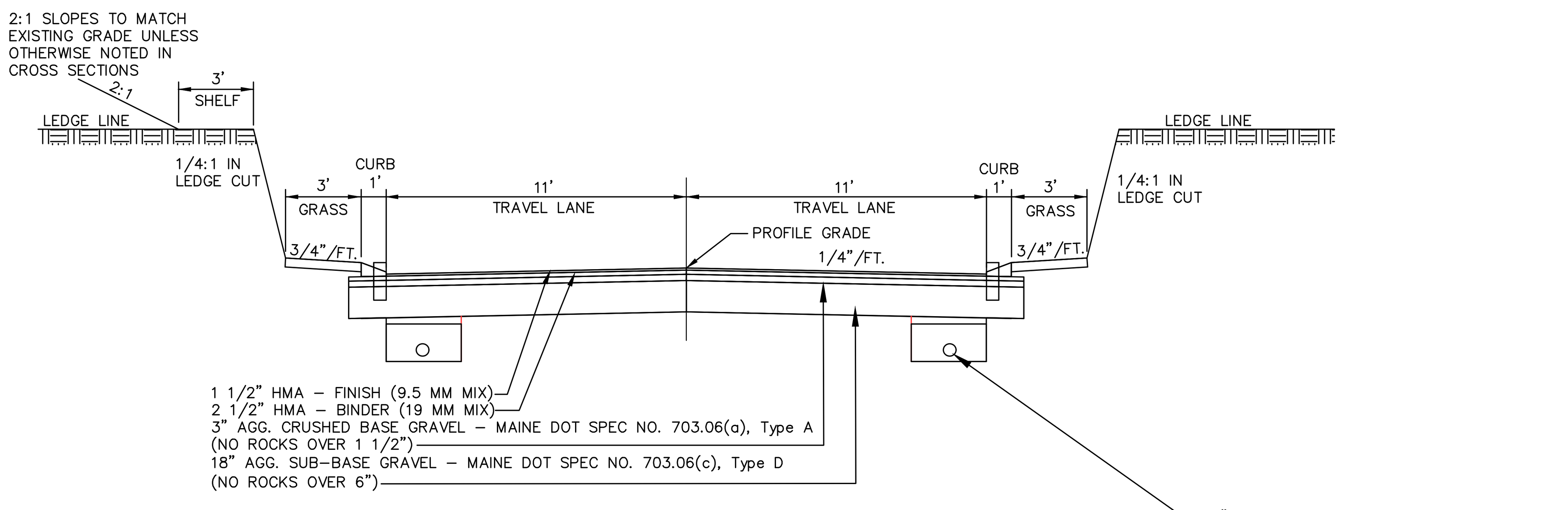
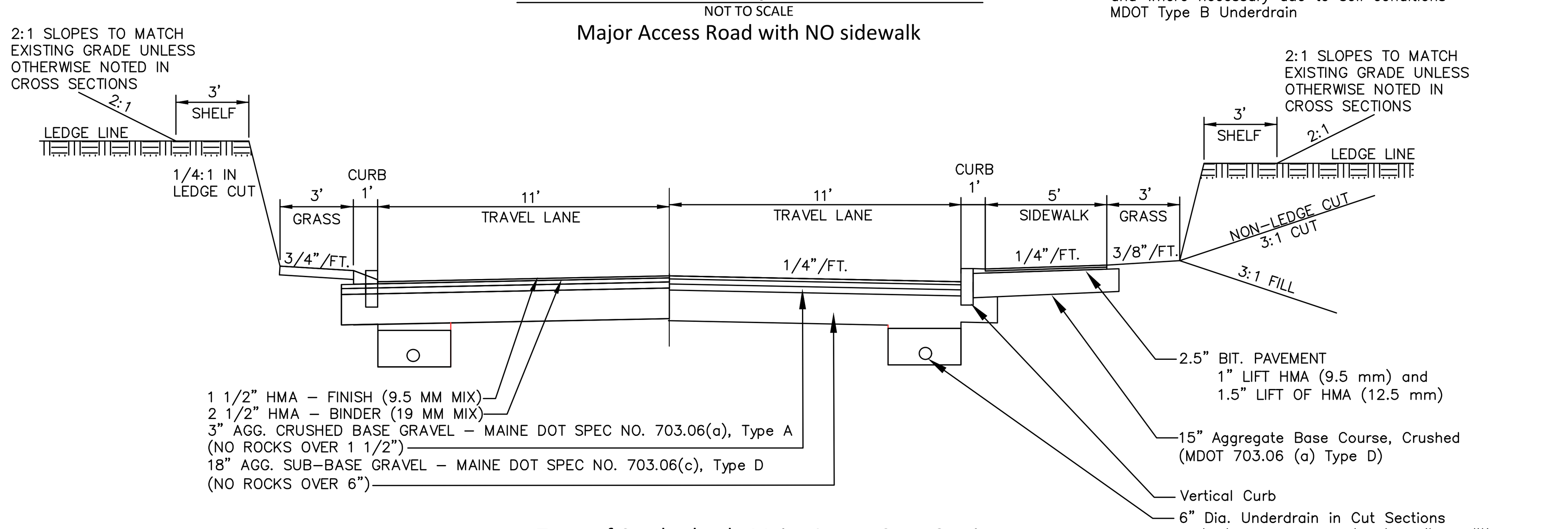
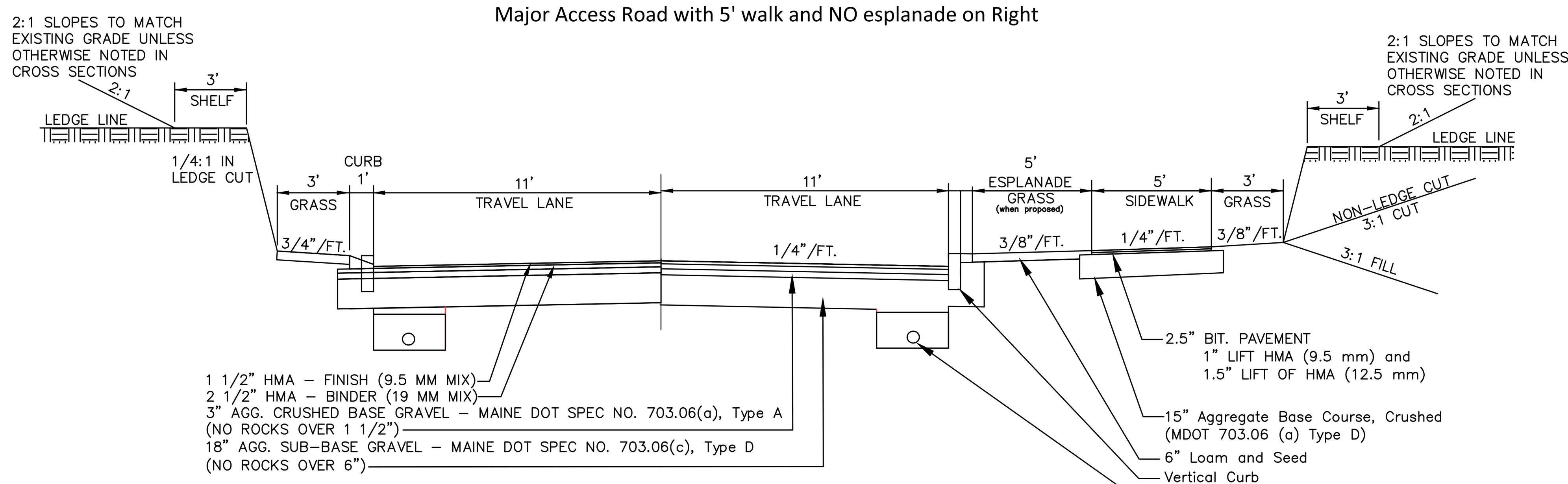


Town of Cumberland - Major Access Cross Section
NOT TO SCALE
Major Access Road with NO sidewalk



Town of Cumberland - Major Access Cross Section
NOT TO SCALE
Major Access Road with 5' walk and NO esplanade on Right



Town of Cumberland - Major Access Cross Section
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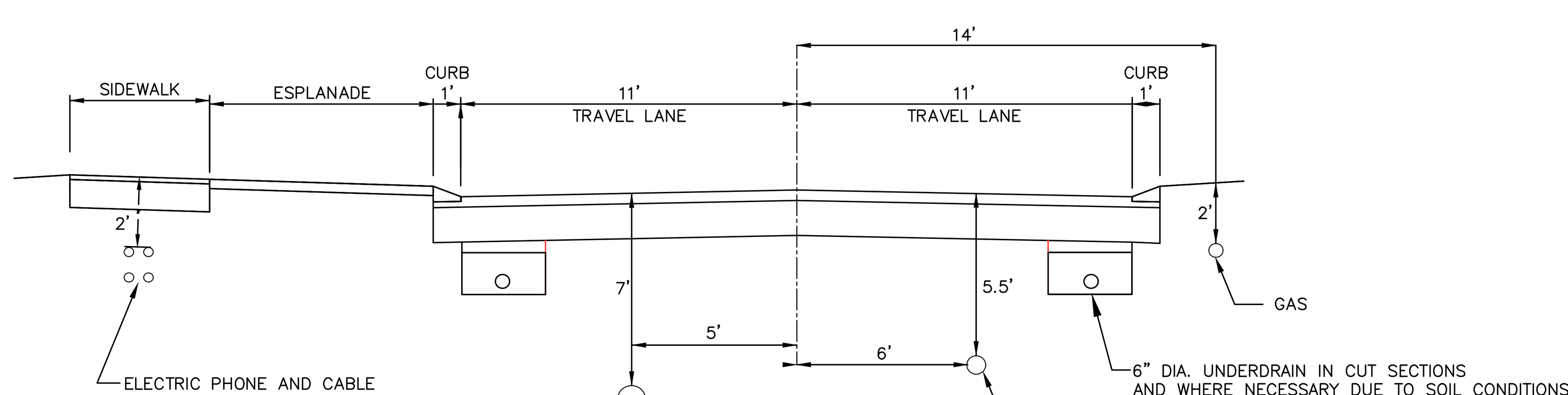
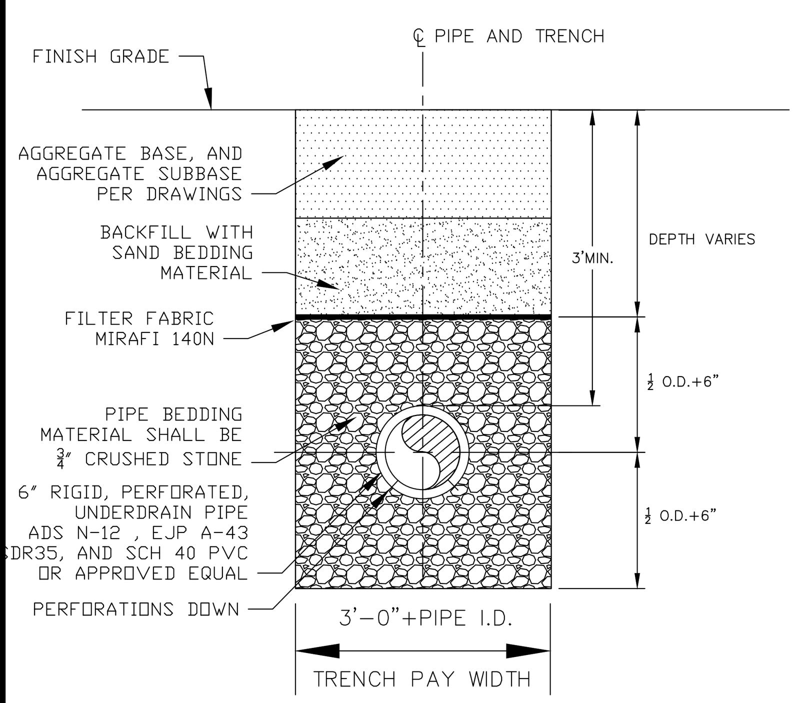
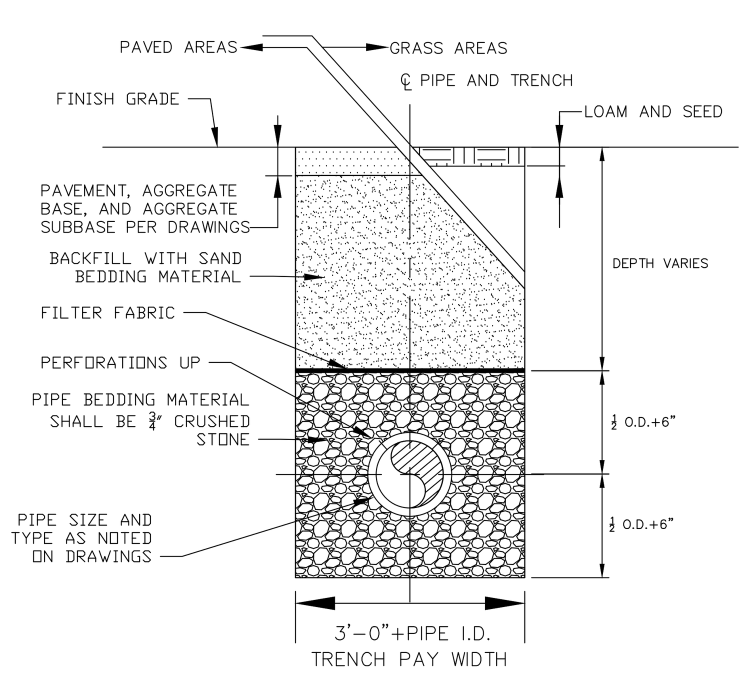
Major Access Road with 5' walk and esplanade on Right



TYPICAL UTILITY SECTION
NOT TO SCALE



MDOT TYPE "B" UNDERDRAIN TRENCH DETAIL
NOT TO SCALE



MDOT TYPE "C" UNDERDRAIN TRENCH DETAIL
NOT TO SCALE

ROAD CONSTRUCTION NOTES:

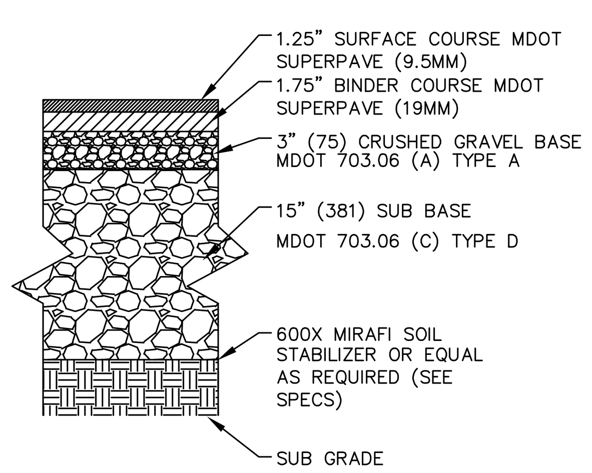
1. IN FILL AREAS 3:1 SLOPES ARE TO BE USED UNLESS ENOUGH USEABLE WASTE MATERIAL HAS BEEN STOCKPILED TO USE 4:1 FILL SLOPES.

2. IN FILL AREAS THE GRANULAR MATERIAL TO BE USED SHALL CONFORM TO SECTION 703.19 OF THE STATE OF MAINE STANDARDS SPECIFICATIONS FOR GRANULAR BORROW.

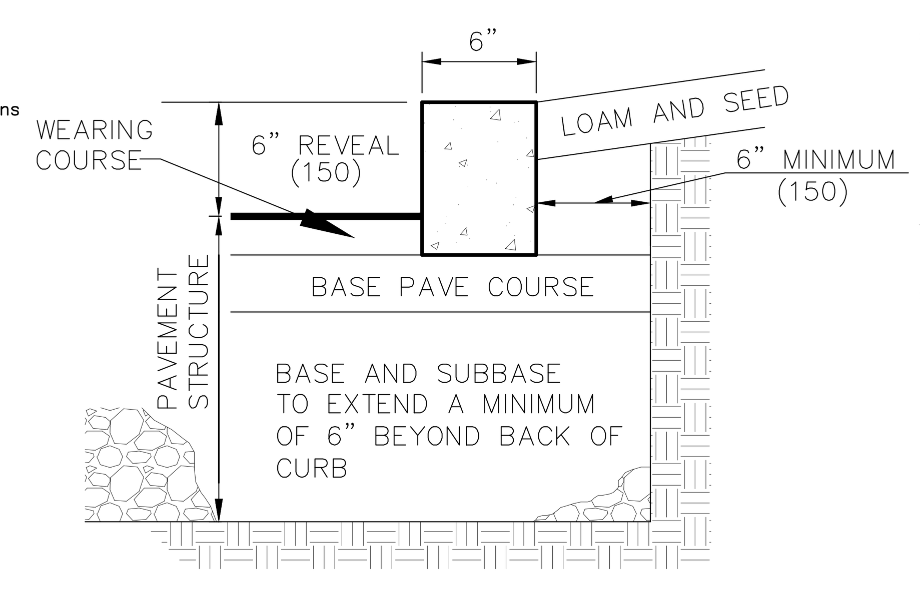
3. UNDERDRAIN SHALL BE INSTALLED IN ALL AREAS WHERE LEDGE IS ENCOUNTERED. CONTRACTOR SHALL ASSUME UNDERDRAIN IS REQUIRED IN CUT AND LEDGE CONDITIONS AND SHALL BE PART OF THE BASE BID.

4. INSTALL FABRIC UNDER ROAD BASE WHEN CLAY IS ENCOUNTERED.

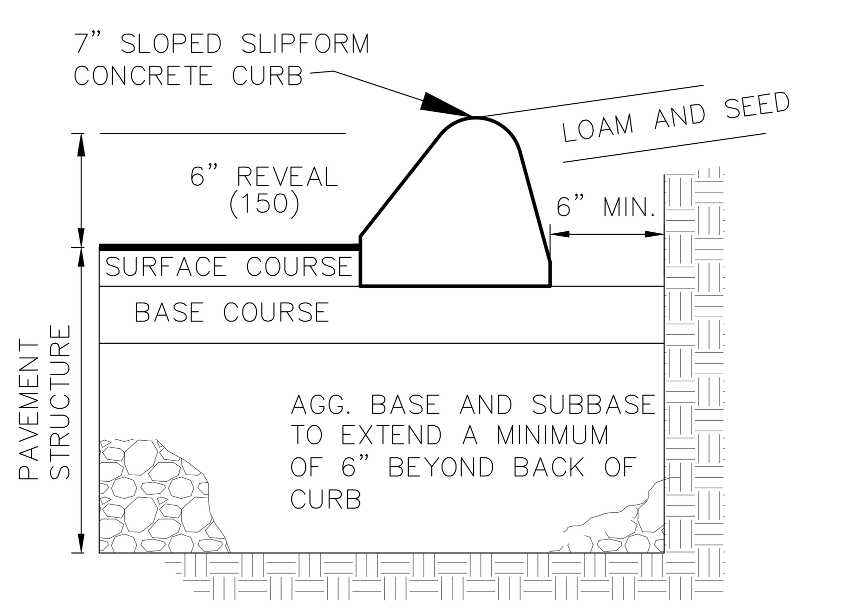
5. CONTRACTOR MAY PERFORATE STORM DRAIN IF AVAILABLE TO SUBSTITUTE UNDERDRAIN ON THAT SIDE OF ROAD. UNDERDRAIN IS STILL REQUIRED ON OTHER SIDE OF ROAD TO MEET TOWN SPECIFICATION. INSTALL TYPE C UNDERDRAIN WITH PERFORATED STORM DRAIN (HOLES UP). INSTALL TYPE B UNDERDRAIN FOR 6" UNDERDRAIN IS USED (HOLES DOWN). TIE UNDERDRAIN INTO CATCH BASINS AS AVAILABLE OR OUTLET TO DITCH OR SWALE.



BIUMINOUS CONCRETE DRIVE
NOT TO SCALE



VERTICAL SLIPFORM CONCRETE CURB
NOT TO SCALE – SIDEWALK SIDE PER TOWN STANDARDS



7" SLOPED SLIPFORM CONCRETE CURB
NOT TO SCALE – NON-SIDEWALK AREAS

EROSION CONTROL NOTES:

1. ALL EROSION CONTROL METHODS SHALL CONFORM TO THE MAINE EROSION AND SEDIMENT CONTROL HANDBOOK FOR CONSTRUCTION BEST MANAGEMENT PRACTICES BY THE CUMBERLAND COUNTY SOIL WATER CONSERVATION DISTRICT, AND THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

2. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL PLACE THE SILT FENCE. THE CONTRACTOR SHALL INSPECT THE BARRIER AND OTHER PREVENTATIVE MEASURES BI-WEEKLY, BEFORE ANY PREDICTED RAIN EVENT, AND AFTER ANY RAIN EVENT. THE CONTRACTOR SHALL REMOVE ANY ACCUMULATED SILT AND/OR MAKE REPAIRS AS NECESSARY.

3. ALL TOPSOIL SHALL BE SAVED TO LOAM LANDSCAPED AREAS TO A DEPTH OF 4". LOAM SHALL BE STOCKPILED ON SITE IN A LOCATION CONVENIENT TO THE CONTRACTOR. THE STOCKPILE WILL BE TEMPORARILY SEEDED WITH RYE GRASS AND MULCHED AT 75 90 LBS/1000SF. ALL SOIL STOCKPILES ARE TO BE ENCLOSED WITH SILT FENCE. STOCKPILES SHALL NOT BE LOCATED IN WETLAND STEEP SLOPES, OR AREAS OF CONCERTRATING FLOW.

4. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE PERMANENTLY SEEDED. SEEDING SHALL BE PERFORMED IN ACCORDANCE WITH MDOT SPECIFICATION: LIME AT 3 TONS/ACRE: FERTILIZER 10-10-10 AT 13.8LBS/1000 SF: SEED MDOT PARK MIX AT 3 LBS/1000 SF. - SEEDING SHALL BE PERFORMED BETWEEN APRIL 15 - JUNE 15 OR AUGUST 15 - SEPTEMBER 15, WINTER RYE SHALL BE USED AS TEMPORARY SEED BETWEEN SEPTEMBER 15 - OCTOBER 15. ALL FINISHED SLOPES EXCEEDING 15% SHALL ALSO HAVE MULCH NETTING INSTALLED AND PINNED DOWN. AFTER SEPTEMBER 15, THE SAME APPLIES TO ALL SLOPES EXCEEDING 8%.

5. ALL AREAS TO BE SEEDED SHALL BE MULCHED. MULCH SHALL BE LONG FIBERED HAY OR STRAW AND SPREAD UNIFORMLY. 1.5 TO 2.0 TONS PER ACRE. TO BE MAINTAINED MOIST TO MINIMIZE BLOWING AS NECESSARY. IN WINTER CONDITIONS, NO MULCH IS TO BE APPLIED OVER SNOW. THE SNOW MUST FIRST BE REMOVED AND THEN MULCH APPLIED ACCORDING TO SPECIFICATIONS STATED PRIOR. IN ALL CASES MULCH SHALL BE APPLIED SUCH THAT THE SOIL SURFACE IS NOT VISIBLE THROUGH THE MULCH. DURING NOVEMBER 1 THROUGH APRIL 1 MULCHING SHALL BE COMPLETED DAILY BY THE END OF THE WORK DAY.

6. PLACE SILT SACKS IN CATCH BASIN INLET DURING CONSTRUCTION. CONTACT AH HARRIS IN PORTLAND (207) 775-5764 OR AUGUSTA (207) 622-0821 SILT SACKS SHALL BE REMOVED AFTER FINAL PAVEMENT OVERLAY.

7. ALL SEDIMENT CONTROL FENCING AND SILT SACKS BARRIERS WILL REMAIN IN PLACE UNTIL SEEDLINGS HAVE BEEN ESTABLISHED.

8. ALL EARTH CHANGES WILL BE CONSTRUCTED AND COMPLETED IN SUCH A MANNER SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND WILL BE LIMITED TO THE SHORTEST PERIOD OF TIME POSSIBLE. THE CONTRACTOR SHALL COMPLETE FINAL GRADING, SEEDING, AND MULCHING IN CONJUNCTION WITH THE COMPLETION OF THE CORRESPONDING BUILDINGS WHENEVER POSSIBLE. IF FINAL GRADING CANNOT BE COMPLETED THEN THE CONTRACTOR IS TO MULCH ANY DISTURBED LAND AND WORK ON TOP OF THE MULCH. AREAS OF DISTURBED SOIL WILL BE TEMPORARILY MULCHED OR SEEDED WITHIN 30 DAYS OF INITIAL DISTURBANCE.

9. SEDIMENT CAUSED BY ACCELERATED SOIL EROSION WILL BE REMOVED FROM RUNOFF WATER BEFORE IT LEAVES THE DEVELOPMENT SITE.

10. ALL TEMPORARY OR PERMANENT FACILITY CONSTRUCTED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR FROM THE DEVELOPMENT SITE WILL BE CONSTRUCTED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.

11. PERMANENT SOIL EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA WILL BE COMPLETED WITHIN 15 DAYS AFTER FINAL GRADING HAS BEEN COMPLETED.

12. IN THE EVENT THAT TEMPORARY OR PERMANENT SEEDLINGS HAVE NOT BEEN ESTABLISHED (90% SURFACE COVERAGE) BY SEPTEMBER 15, TEMPORARY MULCHING SHALL BE APPLIED FOR PROTECTION OVER WINTER (PAST THE GROWING SEASON) IN ACCORDANCE WITH THE TEMPORARY MULCHING BMP OF THE MAINE EROSION AND SEDIMENT CONTROL HANDBOOK.
A. MULCHING FOR OVER WINTER PROTECTION WILL BE COMPLETED BY NOVEMBER 15.
B. WINTER MULCH ON SLOPES 8% OR GREATER WILL BE ANCHORED WITH NETTING.
C. ALL SOILS DISTURBED PRIOR TO NOVEMBER 1 AND NOT HAVING THE REQUIRED COVER OF VEGETATION WILL BE STABILIZED WITH ANCHORED MULCH BY NOVEMBER 15.

13. PROVIDE TWO TEMPORARY CMP RISERS AT EXISTING CATCH BASIN AND WRAP WITH EROSION CONTROL FABRIC TO CONTROL POTENTIAL SEDIMENTATION. INSTALL STONE BERM OR HAY BALES AROUND CATCH DURING CONSTRUCTION..

14. NO EARTH MOVING OR CONSTRUCTION OPERATIONS ARE ANTICIPATED ON THE EXISTING STEEP SLOPE EXCEPT FOR RIP-RAP SLOPE PROTECTION. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED IN ACCORDANCE WITH OTHER EROSION CONTROL NOTES.

15. DURING WINTER CONSTRUCTION THE CONTRACTOR SHALL INSTALL AN EROSION CONTROL FILTER BERM. THE CONTRACTOR SHALL INSTALL THE BERMS AS SEDIMENT BARRIERS DURING FROZEN GROUND CONDITIONS.

PAVING, GRADING & DRAINAGE NOTES:

1. VERTICAL DATUM IS NATIONAL GEODETIC DATUM 1929 DEFINITION. BENCHMARK LOCATIONS ARE SPECIFIED ON TITCOMB SURVEY.

2. CLEARING LIMITS WILL BE FLAGGED BY THE ENGINEER AND THE OWNER. THE CONTRACTOR SHALL NOT CUT BEYOND THE LIMITS OR REMOVE A TREE DESIGNATED TO BE SAVED WITHOUT THE OWNER'S AND ENGINEER'S CONSENT.

3. ALL CURBS AND WALKS SHALL BE STAKED OUT BY THE CONTRACTOR AND APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. SIDEWALKS TO BE 4' WIDE FROM DRIVEWAY TO THE FRONT DOOR AND SET BACK 4' FROM THE HOUSE.

4. DRIVEWAYS TO BE 24' WIDE AT THE GARAGE DOOR AND MAY TRANSITION TO 20' WIDTH AS APPROPRIATE TO MEET SITE CONDITIONS.

TRAIL SYSTEM NOTES:

1. A TRAIL SYSTEM SHALL BE INSTALLED THROUGH OCEANVIEW AT CUMBERLAND PROPERTY TO PROVIDE PEDESTRIAN ACCESS. THE TRAIL SYSTEM WILL FORM LINKS TO ABUTTING PARCELS AND CONNECTION TO TOWN TRAIL SYSTEMS. THE TRAIL SYSTEM WILL BE AVAILABLE FOR PUBLIC & PRIVATE USE. THE DETAILED DESIGN WILL BE COORDINATED WITH THE TOWN PLANNER, PLANNING BOARD, AND THE OWNER.

VERIZON NOTES:

1. ALL CONSTRUCTION TO BE IN COMPLIANCE WITH VERIZON CONSTRUCTION STANDARDS.

2. ALL TRENCHING, CONDUIT AND BACK FILLING IS THE CONTRACTOR'S RESPONSIBILITY.

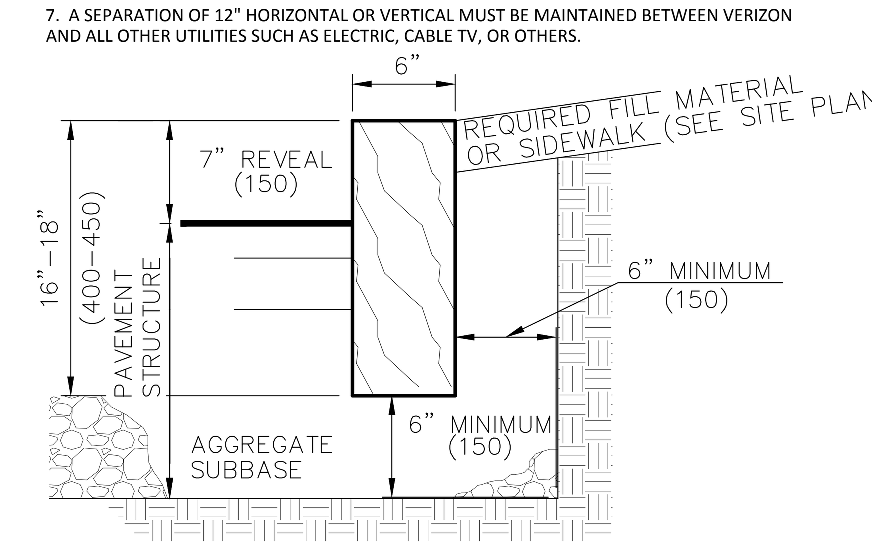
3. ALL CABLES SHALL BE IN CONDUIT UNDER ALL PAVED ROADS, DRIVEWAYS AND WALKWAYS. 4" FOR THE MAIN CABLE AND 2" FOR SERVICE WIRES.

4. CONDUITS FOR SERVICE WIRES SHOULD BE INSTALLED AT ALL LOCATIONS WHERE REQUIRED DURING THE INITIAL INSTALLATION OF THE MAIN CABLE.

5. THE TRENCH MUST BE FILLED WITH "SUITABLE" BACK FILL, I.E. , SAND BACK FILL WITH NO STONE LARGER THAN 1/4" IN DIAMETER.

6. VERIZON WILL SUPPLY THE CABLE AND LABOR TO INSTALL SAME.

7. A SEPARATION OF 12" HORIZONTAL OR VERTICAL MUST BE MAINTAINED BETWEEN VERIZON AND ALL OTHER UTILITIES SUCH AS ELECTRIC, CABLE TV, OR OTHERS.



VERTICAL GRANITE CURB
NOT TO SCALE AT ALL ROAD ENTRANCE RADII AT INTERSECTIONS

UTILITIES GENERAL NOTES:

1. ALL UTILITIES TO BE LOCATED UNDERGROUND.

2. THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS NOT GUARANTEED. THE CONTRACTOR SHALL VERIFY THE LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES WITH THE RESPECTIVE OWNERS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF UTILITY AN STRUCTURE OWNERS REGARDING NOTIFICATION OF WORK AND PROTECTION OF EXISTING FACILITIES.

3. CONTRACTOR SHALL VERIFY ALL CRITICAL DIMENSIONS AND GRADES TO HIS SATISFACTION BEFORE WORK BEGINS. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE OWNER'S REPRESENTATIVE.

4. ALL UTILITIES ARE TO BE CONSTRUCTED TO THE STANDARDS SET BY THE RESPECTIVE UTILITY. PRE- CONSTRUCTION CONFERENCE MUST BE HELD WITH ALL UTILITY REPRESENTATIVES.

5. A MINIMUM OF 12" HORIZONTAL SPACING IS NECESSARY BETWEEN CABLES.

6. 4" CABLE & TELEPHONE SERVICE WILL BE CONSTRUCTED IN THE SAME TRENCH AS ELECTRIC.

7. THE ROAD CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ELECTRIC, TELEPHONE, & CABLE UP TO AND INCLUDING THE INSTALLATION OF JUNCTION BOXES AND TRANSFORMER PADS. THE ROAD CONTRACTOR SHALL INSTALL ANY ADDITIONAL CONDUIT NEEDED WHERE INDIVIDUAL UNIT SERVICES CROSS THE ROADWAY. THE SITE CONTRACTOR SHALL BE RESPONSIBLE TO EXTEND INDIVIDUAL SERVICE FROM THE TRANSFORMER PAD TO THE BUILDING. THE SITE CONTRACTOR IS REQUIRED TO INSTALL CONDUIT AT ALL PAVEMENT CROSSINGS OTHER THAN THE ROADWAY.

8. THE ROADWAY CONTRACTOR SHALL SET UP A SCOPING MEETING WITH THE SITE CONTRACTOR TO CONFIRM LIMITS OF WORK, SCHEDULING, AND CONSTRUCTION SEQUENCE BEFORE CONSTRUCTION.

CMP NOTES:

1. THE PROPOSED DISTRIBUTION SYSTEM PLAN SHALL BE COORDINATED WITH CENTRAL MAINE POWER COMPANY.

2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CMP'S CONSTRUCTION STANDARDS AND THE LATEST REVISION OF THE NATIONAL ELECTRICAL SAFTEY CODE.

3. ALL TRENCHING, CONDUIT AND BACK FILLING IS THE CONTRACTOR'S RESPONSIBILITY.

4. CONDUITS SHALL BE A MINIMUM OF SCHEDULE 40 PVC OR EQUIVALENT.

5. ALL CABLES SHALL BE IN CONDUIT UNDER ALL PAVED AREAS, ROADWAYS, AND DRIVEWAYS. PRIMARY CABLES ARE TO BE INSTALLED IN CONDUIT IF DRIVEWAYS ARE NOT ROUGH GRADED.

6. CONDUITS FOR SECONDARY CABLES SHOULD BE INSTALLED AT ALL LOCATIONS WHERE REQUIRED DURING THE INITIAL INSTALLATION OF THE PRIMARY CABLE.

7. PRIMARY CABLE TO BE #2 AL 15 KV.

8. SEE CMP'S CONTRACTOR HANDBOOK, SECTION IX, PARAGRAPHS 910, 911, AND 912 FOR SPECIFICATIONS ON BACK-FILL MATERIALS AND DEPTHS, ETC.

9. ALL TRANSFORMER PADS MUST BE SUPPLIED AND INSTALLED BY THE CONTRACTOR. PAD DESIGNS MUST CONFORM TO CMP SPECIFICATIONS. SEE ILLUSTRATIONS NO. 19, NO. 20, NO. 21 IN SECTION XII OF THE CONTRACTOR'S HANDBOOK.

10. ALL JUNCTION BOXES WILL BE PURCHASED AND INSTALLED BY THE CONTRACTOR. CMP WILL PROVIDE THE JUNCTION BOX, HOWEVER, THE EXCESS COST WILL BE BILLED TO THE OWNER.FIBERGLASS OR CONCRETE PADS REQUIRED FOR STELL CABINETS AND JUNCTION BOXES.

11. CMP WILL SUPPLY THE CABLE, TRANSFORMERS AND LABOR TO INSTALL SAME.

12. ALL METERING ENCLOSURES WILL BE PUNCHED AND INSTALLED BY THE CONTRACTOR.

13. A SEPARATION OF 12" MUST BE MAINTAINED BETWEEN CMP AND ALL OTHER UTILITIES AND/OR TELEPHONE, CABLE ETC.

CABLE TV NOTES:

1. ALL TRENCHING, CONDUIT & BACK FILLING IS THE CONTRACTORS RESPONSIBILITY.

2. CONDUITS SHALL BE SCHEDULE 40 PVC AND WILL BE ROPED WITH 1/4" ROPE.

3. ALL CABLES SHALL BE IN CONDUIT UNDER ALL PAVED ROADS, DRIVEWAYS AND WALKWAYS AS NOTED OR SHOWN ON THE PLAN; 4" FOR THE MAIN CABLE AND 2" FOR THE SERVICE WIRES.

4. CONDUITS FOR SERVICE WIRES SHOULD BE INSTALLED AT ALL LOCATIONS WHERE REQUIRED DURING THE INSTALLATION OF THE MAIN CABLE.

5. THE CABLE COMPANY WILL SUPPLY THE MAIN CABLE AND PEDESTALS AND THE LABOR TO INSTALL SAME.

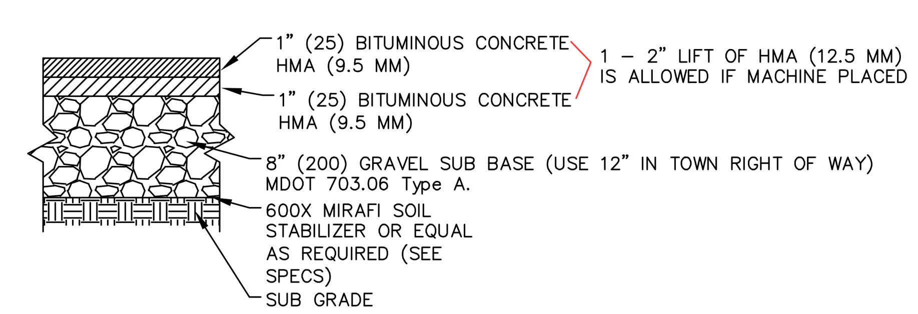
6. THE CABLE COMPANY WILL SUPPLY THE SERVICE WIRES.

7. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE CABLE COMPANY FOR INTERNAL WIRING SPECIFICATIONS AND SERVICE WIRE INSTALLATIONS.

8. ALL SERVICE WIRE INSTALLATIONS AND INTERIOR WIRING SHALL CONFORM TO THE CABLE COMPANY SPECIFICATIONS.

9. A SEPARATION OF 12" HORIZONTAL OR VERTICAL MUST BE MAINTAINED BETWEEN THE CABLE COMPANY AND ALL OTHER UTILITIES SUCH AS ELECTRIC, TELEPHONE OR OTHERS.

10. CONTRACTOR SHALL EXPOSE GROUND ROD AT ALL PAD LOCATIONS TO INSURE PROPER GROUNDING FOR THE CABLE COMPANY.



BIUMINOUS CONCRETE WALK

SEWER CONSTRUCTION NOTES:

1. SEWER LINE CONSTRUCTION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF CUMBERLAND STANDARD SPECIFICATIONS.

2. MINIMUM DIAMETER FOR MAINLINE SEWER IS EIGHT INCH (8") WITH A MINIMUM SLOPE OF 0.005.

3. SANITARY SEWER SERVICE STUBS TO BE SIX INCH (6") DIAMETER MINIMUM AND TO BE INSTALLED BEYOND THE EDGE OF PAVEMENT, AND UTILITY TRENCH AS SHOWN ON PLAN.

4. SANITARY SEWER SERVICE STUBS TO BE CONNECTED TO THE MAIN LINE BY USE OF 8X8X6 WYES. TEE STUBS WILL NOT BE ALLOWED.

5. SANITARY SEWER MANHOLES TO BE PER ASTM SPECIFICATIONS, WITH TWO (2) COATS OF BITUMINOUS COATING, WITH SMOOTH CHANNELED INVERTS, AND PROPERLY SIZED AND ORIENTED PRECAST PIPE OPENINGS WITH FLEXIBLE PIPE BOOTS. STEPS TO BE INSTALLED PARALLEL TO INVERT CHANNEL. SERVICE CONNECTIONS TO BE INCORPORATED IN INVERT CHANNEL.

6. MANHOLE FRAMES AND COVERS TO BE SUITABLE FOR HIGHWAY LOADING AND TO BE TO DISTRICT STANDARDS.

7. DESIGN AND CONSTRUCTION OF PROJECT SANITARY SEWER UTILITY WILL BE CARRIED OUT TO SPECIFICALLY EXCLUDE THE INTRODUCTION OF NON-SANITARY GROUND AND / OR SURFACE WATER INTO THE SANITARY SEWER SYSTEM.

8. ALL GRAVITY SEWER TO BE LOW PRESSURE AIR AND DEFLECTION TESTED AFTER BACK FILLING AND COMPACTION AND PRIOR TO CONNECTION OF BUILDING SEWER.

9. PRIOR TO THE START OF CONSTRUCTION, DEVELOPER TO PROVIDE TO DISTRICT TWO (2) COPIES OF UTILITY PLAN.

10. MINIMUM HORIZONTAL CLEARANCES TO BE MAINTAINED BETWEEN UTILITIES, TO PERMIT FUTURE MAINTENANCE OPERATIONS WITHOUT DISTURBING ADJACENT UTILITIES,

WATER CONSTRUCTION NOTES:

1. TEST PITS SHALL BE EXCAVATED AT CROSSINGS OF UTILITIES TO DETERMINE LOCATION AND DEPTH SUFFICIENTLY IN ADVANCE OF WATER MAIN CONSTRUCTION TO PERMIT ADJUSTMENT OF WATER MAIN LOCATION BY DEFLECTION OF THE PIPE.

2. MINIMUM DEPTH OF COVER FOR ALL WATER LINES SHALL BE 5.5' FROM FINISHED GRADE UNLESS OTHERWISE DIRECTED.

3. PROPOSED PIPELINE, VALVE, AND HYDRANT LOCATIONS ARE APPROXIMATE. FINAL LOCATION MAY BE ADJUSTED AS REQUIRED TO AVOID CONFLICTS WITH OTHER UTILITIES AND STRUCTURES. NO ADDITIONAL PAYMENT WILL BE MADE FOR EXCAVATION AND BACK FILL BEYOND THE TRENCH LIMITS SHOWN.

4. ANY EXISTING PIPELINE , UTILITY OR STRUCTURE, INCLUDING EXISTING WATER MAINS, DAMAGED BY CONTRACTOR'S OPERATIONS SHALL BE IMMEDIATELY REPAIRED BY CONTRACTOR AT NO ADDITIONAL COST TO OWNER.

5. ALL PROPERTY REMOVED, DAMAGED OR ALTERED IN THE COURSE OF THE WORK SHALL BE REPLACED OR RESTORED TO EQUAL OR BETTER CONDITION TO THAT WHICH EXISTED BEFORE THE WORK COMMENCED.

6. ALL FITTINGS, VALVES, AND HYDRANTS SHALL HAVE MECHANICAL JOINTS RESTRAINED WITH GRIP-RING RETAINER GLANDS.

7. CONSTRUCTION SHALL FOLLOW PORTLAND WATER DISTRICT STANDARDS. ALL MATERIALS FOR THE PROJECT INCLUDING PIPE, COUPLINGS, VALVES, FITTINGS, HYDRANTS, TAPPING SLEEVES AND VALVES, VALVE BOXES, CORPORATION STOPS, CURB STOPS, SERVICE PIPING, CURB BOXES, RETAINER GLANDS, AND ACCESSORIES SUCH AS GASKETS, BOLTS, NUTS, AND GLANDS AS REQUIRED TO MAKE THE PIPING SYSTEMS COMPLETE SHALL MEET PWD SPECIFICATIONS. ALL CONCRETE AND EARTH MATERIALS INCLUDING CRUSHED STONE, GRAVEL, SAND, AND BORROW SHALL BE FURNISHED BY THE CONTRACTOR.

8. A SEPARATION OF 12" VERTICAL CLEARANCE MUST BE MAINTAINED BETWEEN THE WATER MAIN AND ALL OTHER UTILITIES.

9. ALL WATER MAIN SIZES ARE AS INDICATED ON THE PLAN/PROFILES. EACH UNIT SHALL BE SERVICED BY A 1 1/2" LINE OFF THE MAIN, SPLIT AT THE UNIT TO PROVIDE A 1"CTS DOMESTIC SUPPLY AND A 1 1/2" SPRINKLER SUPPLY INSTALLED IN ACCORDANCE WITH THE STANDARDS OF THE PORTLAND WATER DISTRICT. SIZES SHALL BE CONFIRMED BY THE SPRINKLER INSTALLER PRIOR TO CONSTRUCTION.

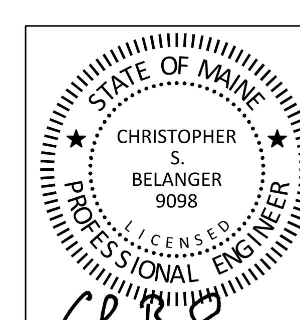
10. THE COMPLETE PIPING SYSTEM SHALL BE FLUSHED, CHLORINATED, AND PRESSURE TESTED BY THE CONTRACTOR PRIOR TO ACCEPTANCE BY THE OWNER. SERVICES SHALL BE INSTALLED UNDER LINE PRESSURE AFTER THE MAIN HAS BEEN SUCCESSFULLY PRESSURE TESTED.

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No Changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Roadway Sections and Details

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine



7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C13
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

STRUCTURE TABLE

STRUCTURE NAME:	RIM ELEVATION	INV. IN:	INV. OUT	STA / OFFSET
C2	RIM = 87.57		INV OUT =87.00	Sta 38+36.10, Offset 274.81, R
CB2	RIM = 89.36	INV IN =84.80 INV IN =84.56	INV OUT =84.55	Sta 12+51.28, Offset -9.94, L
CB2A	RIM = 89.36		INV OUT =84.76	Sta 12+50.68, Offset 9.57, R
CB3	RIM = 94.58	INV IN =82.93 INV IN =89.09	INV OUT =82.80	Sta 15+59.44, Offset 44.49, R
CB3A	RIM = 94.58	INV IN =82.70	INV OUT =82.50	Sta 15+73.95, Offset 10.00, R
CB4	RIM = 99.40		INV OUT =95.80	Sta 43+18.20, Offset 28.98, R
CB5	RIM = 93.50		INV OUT =89.50	Sta 15+33.30, Offset -17.98, L
CB13	RIM = 101.90	INV IN =96.36	INV OUT =93.00	Sta 24+02.07, Offset 10.00, R
CB13A	RIM = 101.90	INV IN =96.85	INV OUT =96.56	Sta 24+02.31, Offset -10.00, L
CB14	RIM = 94.19	INV IN =89.60	INV OUT =89.50	Sta 20+91.54, Offset 10.14, R
CB14A	RIM = 94.19		INV OUT =89.81	Sta 20+91.95, Offset -10.00, L
CB16	RIM = 99.17	INV IN =92.69	INV OUT =91.30	Sta 43+87.04, Offset 37.16, R
CB17	RIM = 98.32	INV IN =90.24 INV IN =92.62 INV IN =91.47	INV OUT =90.14	Sta 44+34.93, Offset 10.13, R
CB17A	RIM = 98.33	INV IN =90.52	INV OUT =92.82	Sta 44+41.65, Offset 29.06, R
CB18	RIM = 100.70	INV IN =89.54 INV IN =95.15	INV OUT =89.44	Sta 42+67.13, Offset -10.11, L
CB18A	RIM = 99.90	INV IN =91.96	INV OUT =91.80	Sta 44+50.00, Offset 40.60, R
CB18B	RIM = 99.90		INV OUT =93.00	Sta 22+68.58, Offset 219.16, R
CB20	RIM = 100.41	INV IN =88.65 INV IN =93.07	INV OUT =88.50	Sta 0+00.60, Offset -0.11, L
CB21	RIM = 100.40	INV IN =93.31	INV OUT =93.21	Sta 46+79.11, Offset -41.43, L
CB22	RIM = 102.55	INV IN =97.80	INV OUT =97.34	Sta 28+99.93, Offset -9.87, L
CB23	RIM = 102.55		INV OUT =98.00	Sta 28+99.71, Offset 9.96, R
CB24	RIM = 99.74	INV IN =93.00 INV IN =93.00	INV OUT =92.87	Sta 31+75.71, Offset 9.43, R
CB24A	RIM = 99.84	INV IN =93.20 INV IN =93.20	INV OUT =93.10	Sta 31+75.58, Offset -9.82, L
CB25	RIM = 99.04	INV IN =92.60 INV IN =92.60	INV OUT =92.50	Sta 31+90.51, Offset 15.48, R
CB26	RIM = 98.07	INV IN =93.59	INV OUT =93.04	Sta 33+15.17, Offset 10.00, R
CB27	RIM = 98.06	INV IN =92.21	INV OUT =93.79	Sta 33+53.53, Offset -10.18, L
CB28	RIM = 100.04	INV IN =91.95 INV IN =92.09	INV OUT =91.85	Sta 51+24.60, Offset -9.12, L
CB30	RIM = 96.97	INV IN =90.26 INV IN =92.00	INV OUT =90.16	Sta 31+66.96, Offset 396.00, R
CB30A	RIM = 96.97		INV OUT =92.35	Sta 31+56.84, Offset 397.97, R
CB31	RIM = 94.95	INV IN =89.67 INV IN =89.67	INV OUT =89.57	Sta 55+05.31, Offset -9.64, L
CB32	RIM = 93.92	INV IN =89.11 INV IN =89.14	INV OUT =89.00	Sta 56+05.12, Offset -9.95, L
CB32A	RIM = 93.92		INV OUT =89.34	Sta 38+31.41, Offset 399.48, R
CB33	RIM = 95.70	INV IN =88.25	INV OUT =88.15	Sta 57+62.97, Offset -9.57, L
CB34	RIM = 92.25	INV IN =87.68 INV IN =87.66	INV OUT =87.58	Sta 37+77.85, Offset 157.72, R
CB35	RIM = 94.04	INV IN =88.60 INV IN =88.60	INV OUT =88.46	Sta 38+90.42, Offset 23.37, R
CB35A	RIM = 93.76		INV OUT =89.65	Sta 39+32.52, Offset 9.99, R
CB36	RIM = 95.28		INV OUT =90.38	Sta 38+28.26, Offset -9.62, L
CB40	RIM = 99.90	INV IN =93.92	INV OUT =93.82	Sta 30+26.99, Offset 35.97, R
CB41	RIM = 101.67	INV IN =94.37	INV OUT =94.27	Sta 30+46.50, Offset -31.32, L
CB42	RIM = 100.14	INV IN =95.04	INV OUT =94.94	Sta 19+74.10, Offset 344.74, R
CB43	RIM = 100.15		INV OUT =95.24	Sta 31+56.47, Offset 7.82, R
CB44	RIM = 95.91		INV OUT =93.37	Sta ???, Offset ???, ???
CB45	RIM = 95.78	INV IN =93.17	INV OUT =93.07	Sta 21+21.00, Offset 7.90, R
CB46	RIM = 97.80		INV OUT =93.54	Sta 34+47.33, Offset -22.99, L
CB47	RIM = 97.80	INV IN =92.83	INV OUT =92.73	Sta 33+85.28, Offset -24.50, L
CB48	RIM = 98.07		INV OUT =93.00	Sta 66+00.63, Offset 0.01, R
CB49	RIM = 97.90		INV OUT =93.91	Sta 32+96.95, Offset -25.50, L
CB50	RIM = 99.90	INV IN =93.46	INV OUT =93.36	Sta 32+04.01, Offset -25.78, L
CB51	RIM = 97.90		INV OUT =93.54	Sta 31+69.18, Offset 38.89, R
CB60	RIM = 94.93	INV IN =90.50	INV OUT =90.40	Sta 60+65.91, Offset -8.03, L

Pipe Table

NAME	SIZE	LENGTH	SLOPE	Inv. in	Inv. out	MATERIAL
BOX 1	96"	73.28'	0.68%	Inv. in=79.50	Inv. out=79.00	96 x 84 inch Concrete Box Culvert (clamshell) Set base 2' below stream bed stream elev 81.5 to 81.0
BOX 2	120"	73.61'	2.04%	Inv. in=88.00	Inv. out=86.50	120 x 108 inch Concrete Box Culvert set base 2' below stream bed stream elev 90.0 to 88.5
Culv1	15"	63.38'	0.63%	Inv. in=83.50	Inv. out=83.10	15 inch Corrugated HDPE Pipe
CULV3	18"	90.56'	0.55%	Inv. in=82.50	Inv. out=82.00	18 inch Corrugated HDPE Pipe
CULV4	12"	51.30'	1.95%	Inv. in=96.00	Inv. out=95.00	12" N-12 ADS
CULV5	12"	46.36'	3.66%	Inv. in=86.50	Inv. out=84.80	12 inch Corrugated HDPE Pipe
CULV5 (1)	12"	46.36'	3.66%	Inv. in=86.50	Inv. out=84.80	12 inch Corrugated HDPE Pipe
CULV5 (2)	12"	46.36'	3.66%	Inv. in=86.50	Inv. out=84.80	12 inch Corrugated HDPE Pipe
O1	6"	3.04'	0.99%	Inv. in=74.78	Inv. out=74.75	6" ORIFICE CORED INTO STRUCTURE
O2	6"	2.73'	0.00%	Inv. in=89.50	Inv. out=89.50	Cut 6"X6" Notch into top Outlet Control Structure
SD FP1	6"	15.08'	1.00%	Inv. in=83.50	Inv. out=83.35	6" Perforated Drain under Focal Point
SD FP2	4"	13.15'	0.98%	Inv. in=82.00	Inv. out=81.87	12 inch Corrugated HDPE Pipe
SD OCS1	18"	58.06'	6.89%	Inv. in=74.00	Inv. out=70.00	18 inch Corrugated HDPE Pipe
SD OCS2	24"	31.08'	1.61%	Inv. in=86.50	Inv. out=86.00	24" N-12 ADS HDPE Pipe
SD OCS3	18"	12.94'	1.00%	Inv. in=81.50	Inv. out=81.37	18" N12 ADS
SD RTANK INLET	15"	11.44'	0.87%	Inv. in=85.00	Inv. out=84.90	15" N-12 ADS
SD RTANK OUTLET	15"	4.56'	0.69%	Inv. in=82.50	Inv. out=82.47	6" N-12 ADS
SD Treatment	6"	4.64'	1.00%	Inv. in=83.50	Inv. out=83.45	6" overflow
SD2	18"	322.01'	0.50%	Inv. in=84.55	Inv. out=82.93	18 inch Corrugated HDPE Pipe
SD2A	18"	19.52'	1.03%	Inv. in=84.76	Inv. out=84.56	18 inch Corrugated HDPE Pipe
SD3	18"	20.07'	0.50%	Inv. in=82.80	Inv. out=82.70	
SD3A	18"	166.37'	0.63%	Inv. in=82.50	Inv. out=81.45	18 inch Corrugated HDPE Pipe
SD4	12"	64.31'	1.00%	Inv. in=95.80	Inv. out=95.15	
SD5	15"	40.68'	1.00%	Inv. in=89.50	Inv. out=89.09	
SD13	18"	121.11'	0.25%	Inv. in=93.00	Inv. out=92.69	18 inch Corrugated HDPE Pipe
SD13A	15"	20.00'	1.00%	Inv. in=96.56	Inv. out=96.36	
SD14	15"	114.39'	1.01%	Inv. in=89.50	Inv. out=88.35	15 inch Corrugated HDPE Pipe
SD14A	15"	20.14'	1.04%	Inv. in=89.81	Inv. out=89.60	15" N-12 ADS
SD15	15"	15.43'	1.00%	Inv. in=88.20	Inv. out=88.05	15 inch Corrugated HDPE Pipe
SD16	18"	54.99'	1.93%	Inv. in=91.30	Inv. out=90.24	18 inch Corrugated HDPE Pipe
SD17	18"	97.00'	0.61%	Inv. in=90.14	Inv. out=89.54	18 inch Corrugated HDPE Pipe
SD17A	15"	20.09'	0.98%	Inv. in=92.82	Inv. out=92.62	
SD18	18"	83.89'	0.95%	Inv. in=89.44	Inv. out=88.65	18 inch Corrugated HDPE Pipe
SD18A	15"	14.24'	8.96%	Inv. in=91.80	Inv. out=90.52	15 inch Corrugated HDPE Pipe
SD18B	15"	94.43'	1.10%	Inv. in=93.00	Inv. out=91.96	15 inch Corrugated HDPE Pipe
SD20	18"	99.00'	5.56%	Inv. in=88.50	Inv. out=83.00	18 inch Corrugated HDPE Pipe
SD21	18"	27.90'	0.50%	Inv. in=93.21	Inv. out=93.07	18 inch Corrugated HDPE Pipe
SD22	18"	237.72'	1.74%	Inv. in=97.34	Inv. out=93.20	18 inch Corrugated HDPE Pipe
SD23	18"	19.83'	1.00%	Inv. in=98.00	Inv. out=97.80	18 inch Corrugated HDPE Pipe
SD24	18"	54.62'	0.50%	Inv. in=92.87	Inv. out=92.60	18 inch Corrugated HDPE Pipe
SD24A	18"	19.24'	0.50%	Inv. in=93.10	Inv. out=93.00	
SD25	18"	109.74'	0.50%	Inv. in=92.50	Inv. out=91.95	18 inch Corrugated HDPE Pipe
SD26	18"	125.13'	0.35%	Inv. in=93.04	Inv. out=92.60	18 inch Corrugated HDPE Pipe
SD27	15"	20.18'	1.00%	Inv. in=93.79	Inv. out=93.59	15" N-12 ADS
SD28	18"	70.01'	0.50%	Inv. in=91.85	Inv. out=91.50	18 inch Corrugated HDPE Pipe
SD28 (1)	18"	109.90'	0.50%	Inv. in=91.38	Inv. out=90.83	18 inch Corrugated HDPE Pipe
SD29	18"	94.09'	0.50%	Inv. in=90.73	Inv. out=90.26	18 inch Corrugated HDPE Pipe
SD30	18"	97.03'	0.50%	Inv. in=90.16	Inv. out=89.67	18 inch Corrugated HDPE Pipe
SD30A	15"	20.25'	1.73%	Inv. in=92.35	Inv. out=92.00	
SD31	18"	91.58'	0.50%	Inv. in=89.57	Inv. out=89.11	18 inch Corrugated HDPE Pipe
SD32	18"	149.07'	0.50%	Inv. in=89.00	Inv. out=88.25	18 inch Corrugated HDPE Pipe
SD32A	18"	20.01'	1.00%	Inv. in=89.34	Inv. out=89.14	18 inch Corrugated HDPE Pipe
SD33	18"	158.21'	0.30%	Inv. in=88.15	Inv. out=87.68	18 inch Corrugated HDPE Pipe
SD34	18"	14.96'	0.50%	Inv. in=87.58	Inv. out=87.51	18 inch Corrugated HDPE Pipe
SD35	18"	164.82'	0.49%	Inv. in=88.46	Inv. out=87.66	18 inch Corrugated HDPE Pipe
SD35A	15"	46.37'	2.27%	Inv. in=89.65	Inv. out=88.60	
SD36	18"	41.24'	4.31%	Inv. in=90.38	Inv. out=88.60	18 inch Corrugated HDPE Pipe
SD40	15"	102.52'	0.50%	Inv. in=93.82	Inv. out=93.31	15" N-12 ADS
SD41	15"	70.34'	0.50%	Inv. in=94.27	Inv. out=93.92	
SD42	12"	113.86'	0.50%	Inv. in=94.94	Inv. out=94.37	12" N-12 ADS

STRUCTURE TABLE

STRUCTURE NAME:	RIM ELEVATION	INV. IN:	INV. OUT	STA / OFFSET
CB61	RIM = 94.92		INV OUT =90.70	Sta 60+66.20, Offset 8.17, R
CB62	RIM = 100.42	INV IN =91.50 INV IN =96.30	INV OUT =91.38	Sta 32+12.04, Offset 193.70, R
CB66	RIM = 101.26		INV OUT =96.76	Sta 51+94.51, Offset 37.51, R
CB70	RIM = 103.50		INV OUT =99.40	Sta 27+38.17, Offset -95.62, L
CB71	RIM = 103.50	INV IN =98.98	INV OUT =98.88	Sta 26+57.70, Offset -97.73, L
CB72	RIM = 103.50	INV IN =98.49	INV OUT =98.39	Sta 25+62.78, Offset -101.76, L
CB73	RIM = 104.20	INV IN =97.93	INV OUT =97.83	Sta 25+82.15, Offset -10.00, L
CB74	RIM = 103.11	INV IN =97.32	INV OUT =97.22	Sta 24+92.84, Offset -10.00, L
DMH15	RIM = 96.27	INV IN =88.35 INV IN =90.50	INV OUT =88.20	Sta 19+74.10, Offset 14.21, R
DMHFP1	RIM = 88.57	INV IN =83.35 INV IN =84.90 INV IN =83.45		Sta 19+29.59, Offset 41.58, R
J1	RIM = 75.18	INV IN =74.64	INV OUT =74.64	Sta 47+54.66, Offset 219.28, R
OCS1	RIM = 79.02	INV IN =74.75 INV IN =74.50	INV OUT =74.00	Sta 2+52.46, Offset 11.88, R
OCS2	RIM = 90.50	INV IN =89.50 INV IN =86.50	INV OUT =86.50	Sta 38+22.42, Offset 304.39, R
OCS3	RIM = 89.00	INV IN =81.87 INV IN =82.47	INV OUT =81.50	Sta 19+21.51, Offset 50.83, R
SD29	RIM = 98.81	INV IN =90.83	INV OUT =90.73	Sta 31+63.17, Offset 302.18, R

STRUCTURE TABLE

STRUCTURE NAME:	RIM ELEVATION	INV. IN:	INV. OUT	STA / OFFSET
SMH1	RIM = 85.63	INV IN =78.00		Sta 10+06.62, Offset -3.43, L
SMH2	RIM = 86.32	INV IN =81.50	INV OUT =81.40	Sta 10+47.61, Offset -2.21, L
SMH3	RIM = 94.92	INV IN =87.77	INV OUT =87.60	Sta 15+81.70, Offset -4.68, L
SMH4	RIM = 97.77		INV OUT =90.60	Sta 17+68.97, Offset -6.05, L
SMH6	RIM = 99.40	INV IN =95.10 INV IN =95.10	INV OUT =95.10	Sta 23+78.56, Offset -6.00, L
SMH7	RIM = 101.94	INV IN =96.80 INV IN =96.80		Sta 44+00.72, Offset -7.45, L
SMH8	RIM = 99.41	INV IN =94.40 INV IN =94.40	INV OUT =94.30	Sta 32+12.64, Offset -6.00, L
SMH9	RIM = 94.78	INV IN =90.00 INV IN =90.00	INV OUT =90.00	Sta 38+60.04, Offset -6.00, L

Pipe Table

NAME	SIZE	LENGTH	SLOPE	Inv. in	Inv. out	MATERIAL
SD43	12"	15.83'	1.27%	Inv. in=95.24	Inv. out=95.04	12" N-12 ADS
SD44	12"	16.05'	1.23%	Inv. in=93.37	Inv. out=93.17	
SD45	12"	116.83'	1.37%	Inv. in=93.07	Inv. out=91.47	12" N-12 ADS
SD46	15"	71.38'	1.00%	Inv. in=93.54	Inv. out=92.83	12" N-12 ADS
SD47	15"	36.19'	1.42%	Inv. in=92.73	Inv. out=92.21	15" N-12 ADS
SD48	12"	182.40'	0.50%	Inv. in=93.00	Inv. out=92.09	12 inch Corrugated HDPE Pipe
SD49	15"	90.73'	0.50%	Inv. in=93.91	Inv. out=93.46	15 inch Corrugated HDPE Pipe
SD50	15"	31.56'	0.50%	Inv. in=93.36	Inv. out=93.20	15 inch Corrugated HDPE Pipe
SD51	15"	30.18'	1.79%	Inv. in=93.54	Inv. out=93.00	15 inch Corrugated HDPE Pipe
SD60	12"	82.29'	0.89%	Inv. in=90.40	Inv. out=89.67	
SD61	12"	16.21'	1.24%	Inv. in=90.70	Inv. out=90.50	
SD66	15"	45.94'	1.00%	Inv. in=96.76	Inv. out=96.30	
SD70	12"	84.00'	0.50%	Inv. in=99.40	Inv. out=98.98	12" N-12 ADS
SD71	12"	78.64'	0.50%	Inv. in=98.88	Inv. out=98.49	12" N-12 ADS
SD72	12"	93.34'	0.49%	Inv. in=98.39	Inv. out=97.93	12" N-12 ADS
SD73	12"	87.40'	0.58%	Inv. in=97.83	Inv. out=97.32	12" N-12 ADS
SD74	12"	88.60'	0.42%	Inv. in=97.22	Inv. out=96.85	12" N-12 ADS
UD ROAD	6"	4.62'	10.81%	Inv. in=91.00	Inv. out=90.50	6" UNDERDRAIN
UD1	6"	12.96'	1.07%	Inv. in=74.64	Inv. out=74.50	6.0 inch PERF. PVC Pipe

Pipe Table

NAME	SIZE	LENGTH	SLOPE	Inv. in	Inv. out	MATERIAL
SP2	8"	40.55'	8.37%	Inv. in=81.40	Inv. out=78.00	8" SDR35
SP3	8"	533.45'	1.14%	Inv. in=87.60	Inv. out=81.50	8" SDR35
SP4	8"	187.04'	1.51%	Inv. in=90.60	Inv. out=87.77	8" SDR35
SP6A	3"	2.89'	-3298.38%	Inv. in=-0.12	Inv. out=95.10	4" FM
SP6B	3"	3.19'	2987.12%	Inv. in=95.10	Inv. out=-0.12	4" HDPE FM
SP6C	3"	2.99'	180.86%	Inv. in=100.50	Inv. out=95.10	3 inch HDPE Pipe
SP7A	3"	3.58'	29.65%	Inv. in=97.86	Inv. out=96.80	3 inch HDPE Pipe
SP7B	3"	3.27'	45.95%	Inv. in=98.30	Inv. out=96.80	3 inch HDPE Pipe
SP8A	4"	5.53'	1.00%	Inv. in=94.30	Inv. out=94.24	4" FM
SP8B	4"	3.00'	12.50%	Inv. in=94.77	Inv. out=94.40	4" HDPE Pipe
SP8C	3"	3.15'	11.10%	Inv. in=94.75	Inv. out=94.40	2" HDPE FM
SP9A	3"	3.76'	0.00%	Inv. in=90.00	Inv. out=90.00	3 inch HDPE Pipe
SP9B	3"	3.46'	0.00%	Inv. in=90.00	Inv. out=90.00	3 inch HDPE Pipe
SP9C	3"	3.57'	0.00%	Inv. in=90.00	Inv. out=90.00	3 inch HDPE Pipe

Little Acres Drive

Number	Radius	Length	Line/Chord Direction
L19		24.33	N35° 42' 05.55"E
C17	150.00	38.55	N28° 20' 23.11"E
L20		494.63	N20° 58' 40.67"E
C18	300.00	38.64	N17° 17' 17.96"E
L21		313.39	N13° 35' 55.24"E
L22		48.62	N40° 49' 16.85"E
C22	500.00	448.37	N15° 07' 54.05"E
L23		88.59	N10° 33' 28.75"W
C23	150.00	142.20	N16° 36' 00.12"E
L24		303.30	N43° 45' 28.98"E
C24	400.00	59.82	N39° 28' 24.96"E
L25		137.03	N35° 11' 20.94"E
C25	150.00	104.10	N55° 04' 11.47"E
L26		87.70	N74° 57' 02.00"E
C26	150.00	131.52	S79° 55' 48.53"E
L27		27.92	S54° 48' 39.06"E
C27	300.00	217.18	S75° 32' 59.23"E

Mallard Way

Number	Radius	Length	Line/Chord Direction	A Value
L14		107.82	S54° 48' 39.06"E	
C13	150.00	37.97	S47° 33' 30.29"E	
L15		145.26	S40° 18' 21.52"E	
C14	150.00	37.97	S47° 33' 30.29"E	
L16		77.97	S54° 48' 39.06"E	
C15	150.00	235.62	N80° 11' 20.94"E	
L17		35.81	N35° 11' 20.94"E	
C16	200.00	112.67	N19° 03' 03.11"E	
L18		222.67	N2° 54' 45.29"E	

Periwinkle Drive

Number	Radius	Length	Line/Chord Direction	A Value
L30		37.50	S68° 23' 45.76"E	
C29	150.00	173.83	S35° 11' 49.84"E	
L31		130.86	S1° 59' 53.93"E	
C30	40.41	247.52	N2° 31' 31.13"E	

6.	7–31–2018	No changes this sheet, re-submit to Town	CSB
5.	7–16–2018	Re-submit to PWD for final review	CSB
4.	5–4–2018	PWD revisions, re-submit to DEP	CSB
3.	3–1–2018	Respond to Town Comments, re-submit to Town	CSB
2.	2–7–2018	SUBMIT TO DEP	CSB
1.	1–31–2018	Respond to Town Memos, submit to Town and DEP	CSB

Structure and Pipe Tables

Oceanview at Cumberland
277Tuttle Road, Cumberland, Maine

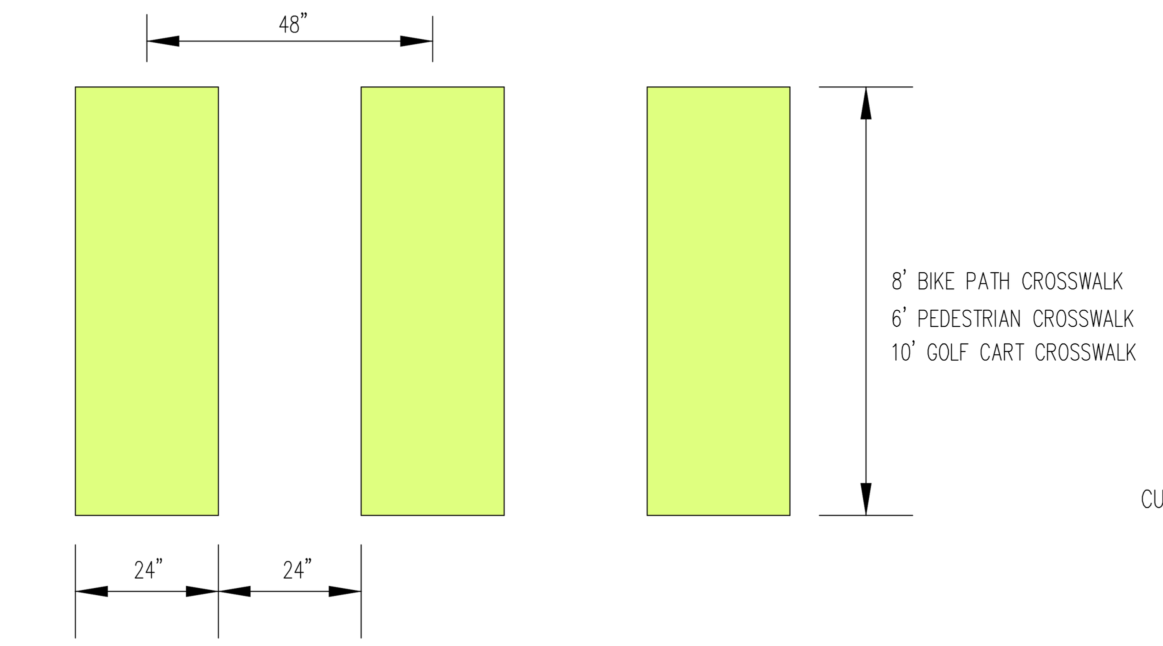
Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

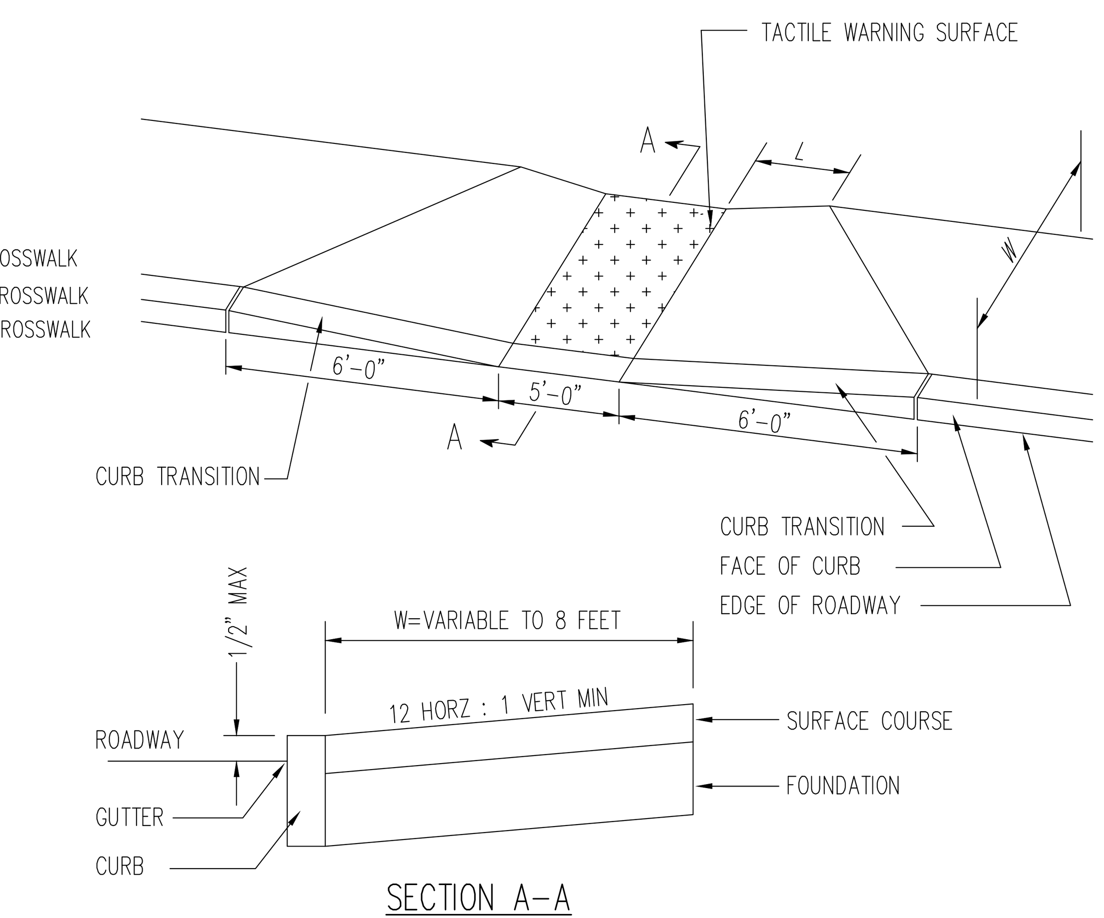
FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #:	C13A
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



CROSSWALK

NOT TO SCALE

RD-MARKS-CROSSWALK/10-02



NOTES:

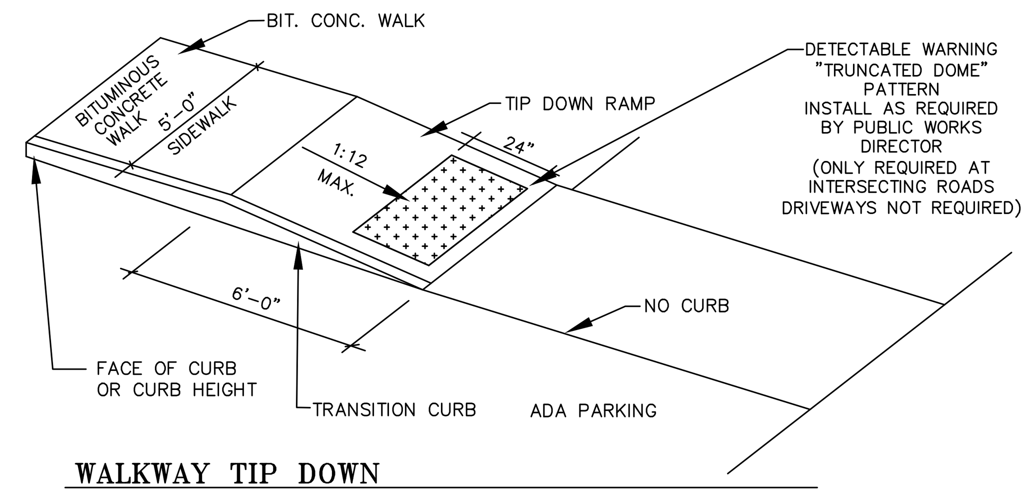
1. THE DIMENSIONS SHOWN AT ROADWAY EDGE ARE FIXED DISTANCES.
2. RAMP CROSS SECTION TO BE SAME AS ADJACENT SIDEWALK; I.E. DEPTH OF SURFACE AND FOUNDATION.
3. IN NO CASE ARE THE RAMPS TO BE PLACED BEHIND THE STOP LINE.

W	L
4'-0"	3'-6"±
5'-0"	2'-9"±
6'-0"	2'-0"±
7'-0"	1'-3"±
8'-0"	0'-0"

WHEEL CHAIR RAMP

NOT TO SCALE

HC-RAMP-CONC-GCURB/5-95

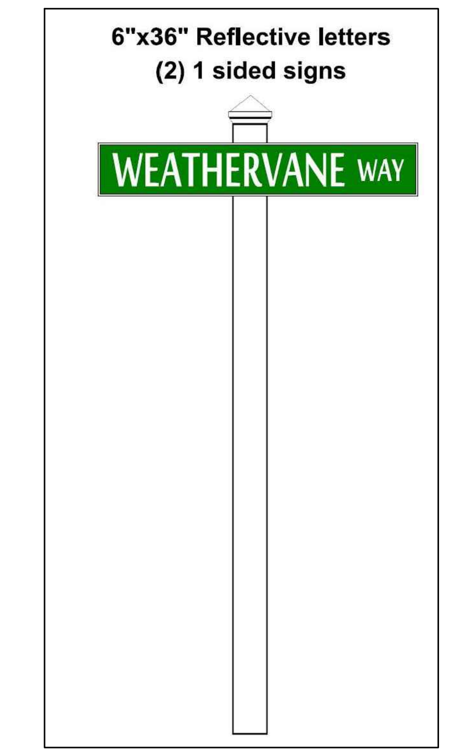


WALKWAY TIP DOWN

N.T.S.

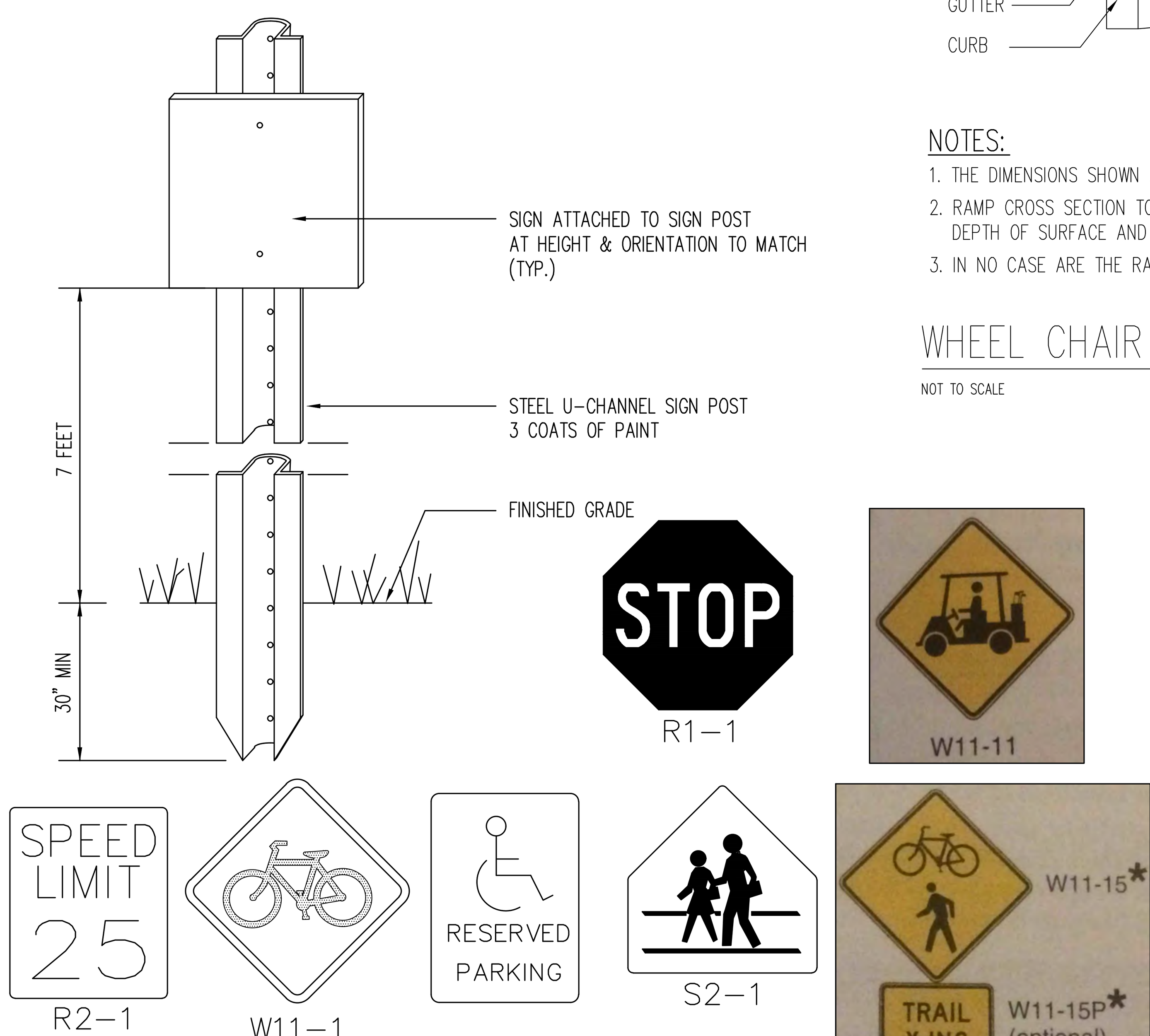
TYPICAL STORMWATER BUFFER SIGN

NOT TO SCALE



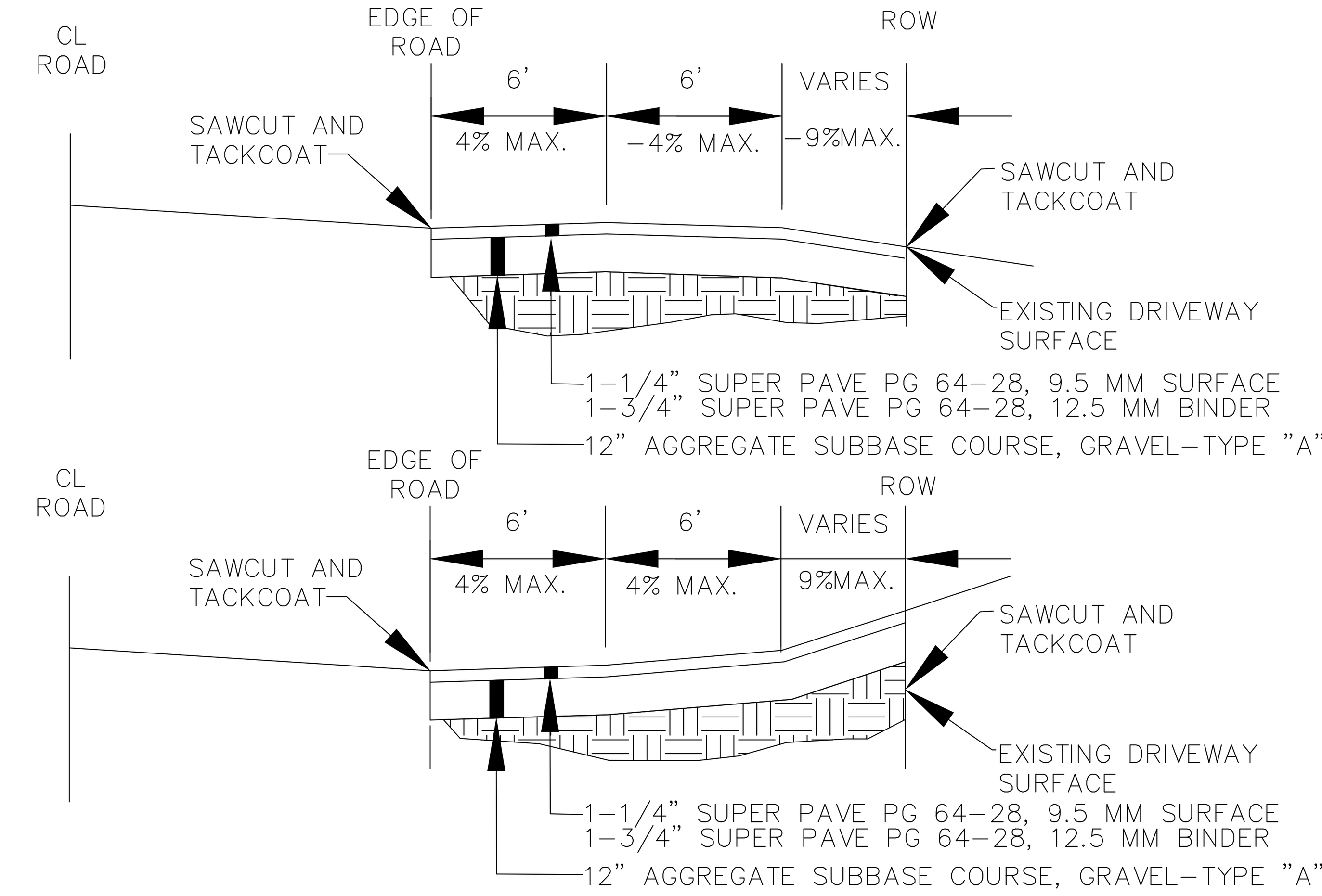
TYPICAL STREET SIGN

NOT TO SCALE



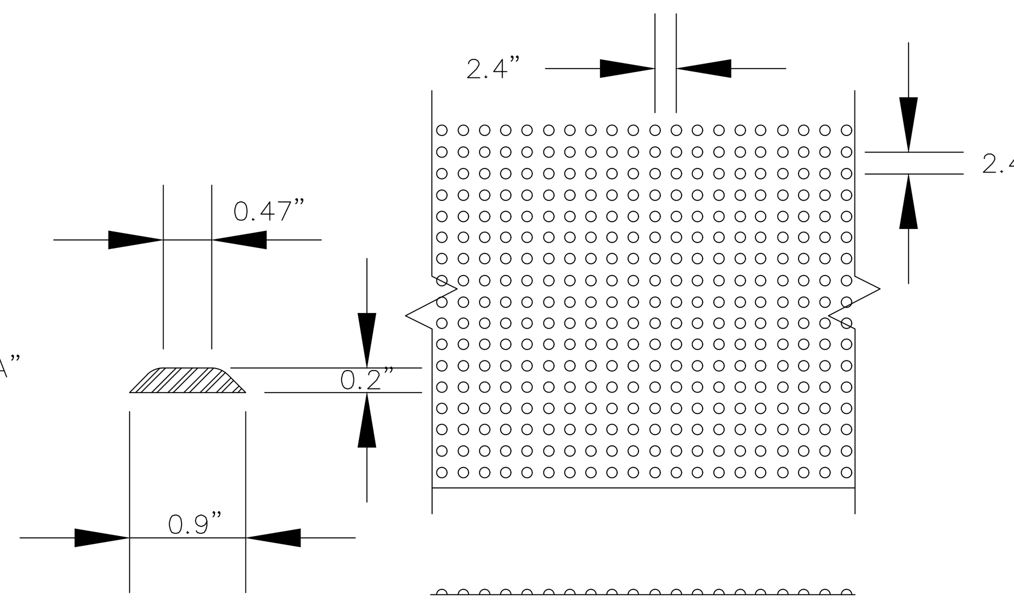
SIGN & POST

NOT TO SCALE



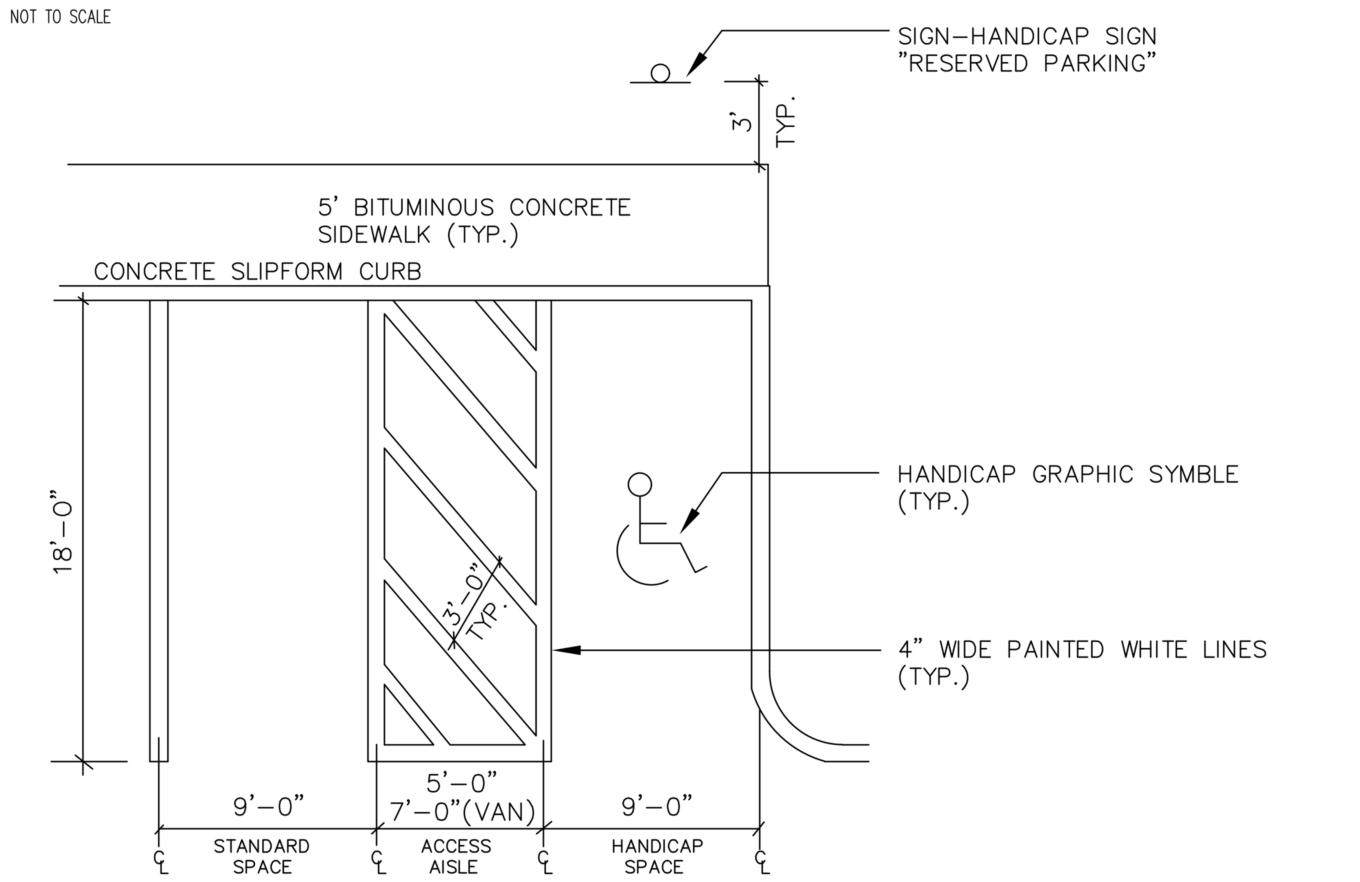
DRIVEWAY APRON DETAIL

NOT TO SCALE



TRUNCATED DOME DETAIL

NOT TO SCALE



NOTE:

1. SYMBOLS AND PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WITH DISABILITIES ACT.

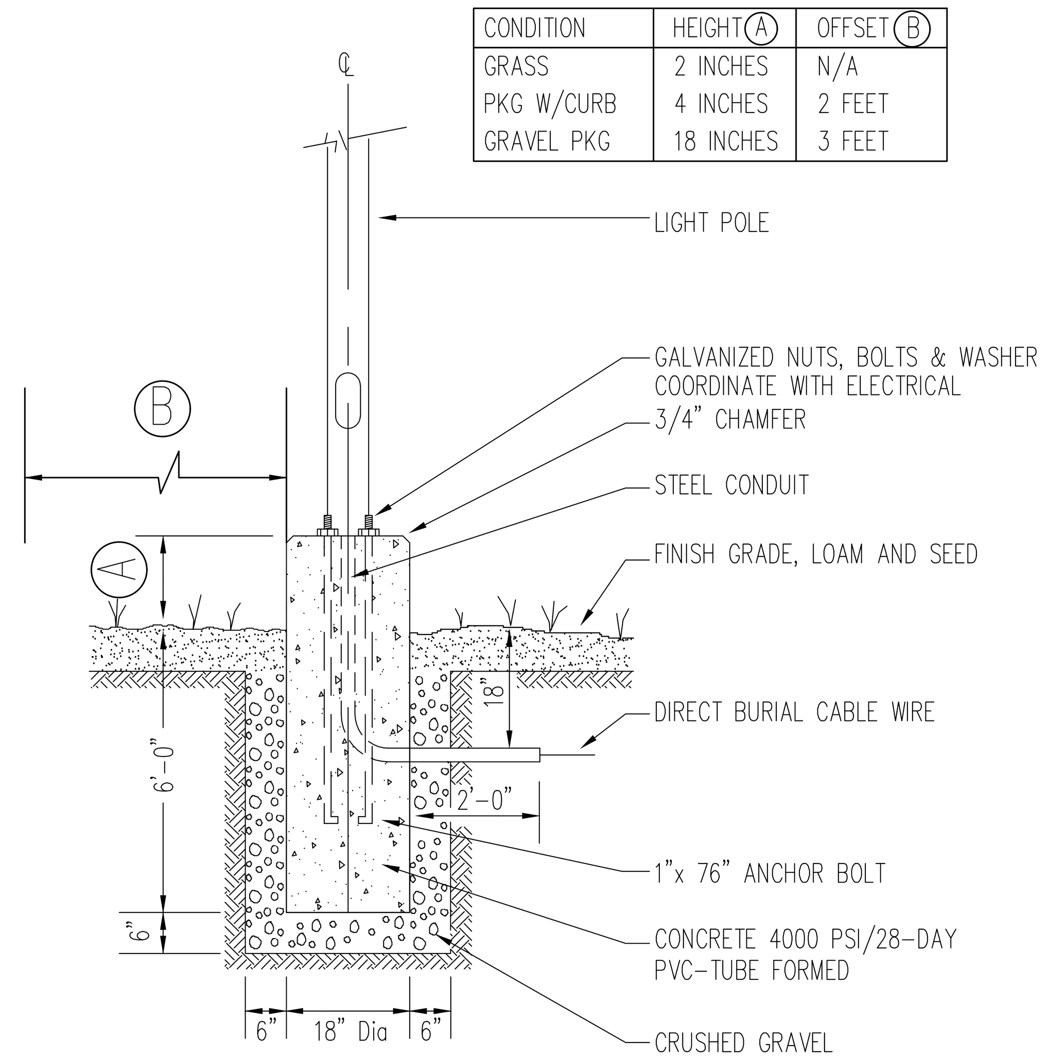
2. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT WITH SILICA SAND FOR SKID RESISTANCE, MEETING THE REQUIREMENTS OF OSHTA M248-TYPE N. PAINT SHALL BE APPLIED AS SPECIFIED BY THE MANUFACTURER.

PARKING SPACE LAYOUT

NOT TO SCALE

BASE LOCATION

CONDITION	HEIGHT (A)	OFFSET (B)
GRASS	2 INCHES	N/A
PKG W/CURB	4 INCHES	2 FEET
GRAVEL PKG	18 INCHES	3 FEET

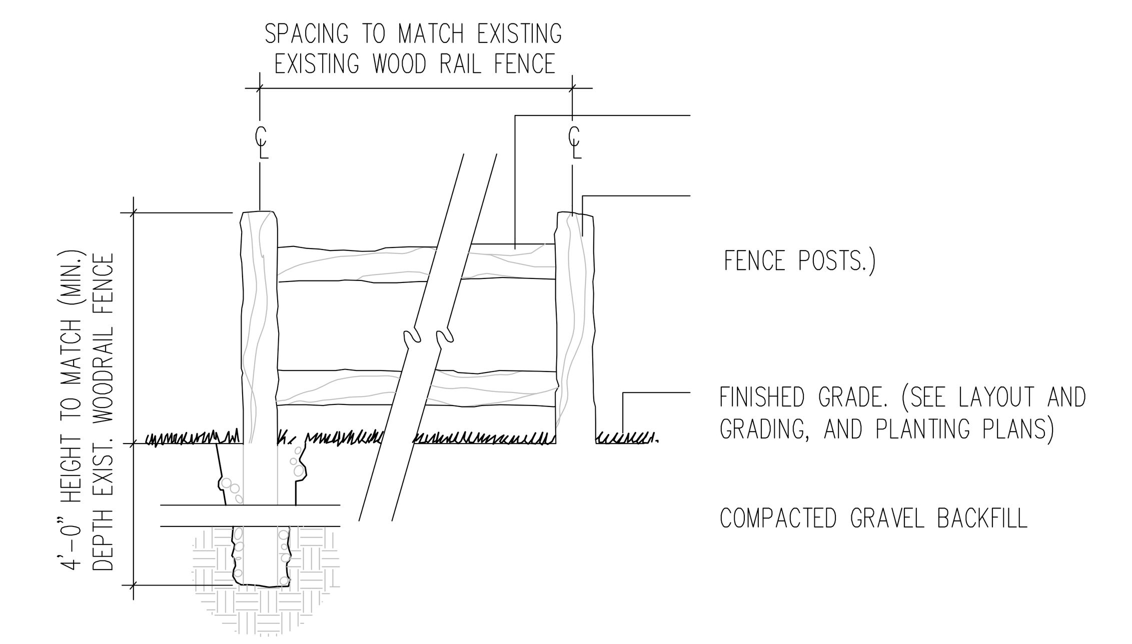


NOTES:

1. SUBMIT SHOP DRAWING FOR APPROVAL PRIOR TO INSTALLATION.
2. COORDINATE WITH ELECTRICAL SPECIFICATIONS.
3. COLD-GALVANIZE ALL CUTS.
4. FORM WITH FIBERGLASS OR PVC SMOOTH-FACED FORMS.
5. SEE ELECTRICAL PLANS FOR SIZES

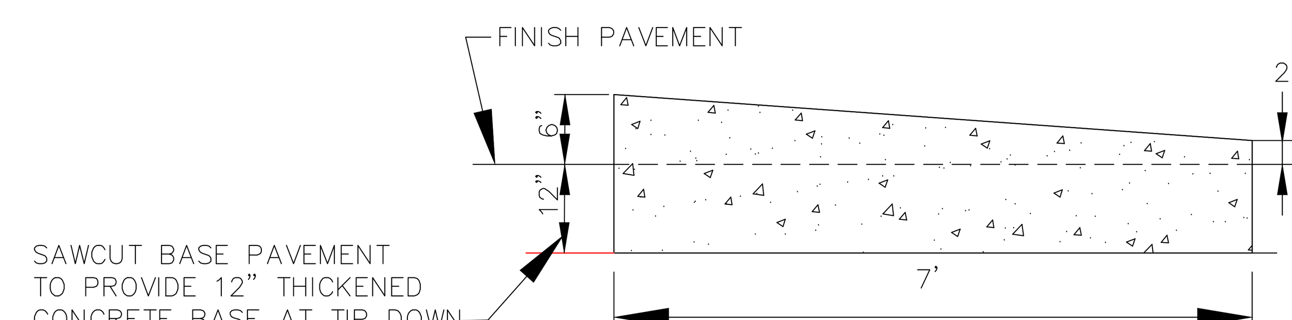
CONCRETE LIGHT POLE BASE

NOT TO SCALE



NEW & REINSTALLED WOOD RAIL FENCE

NOT TO SCALE



TYPICAL TIPDOWN CURB INSTALLATION

NOT TO SCALE

6.	7-31-2018	Revise Crosswalk striping, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Civil Details

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

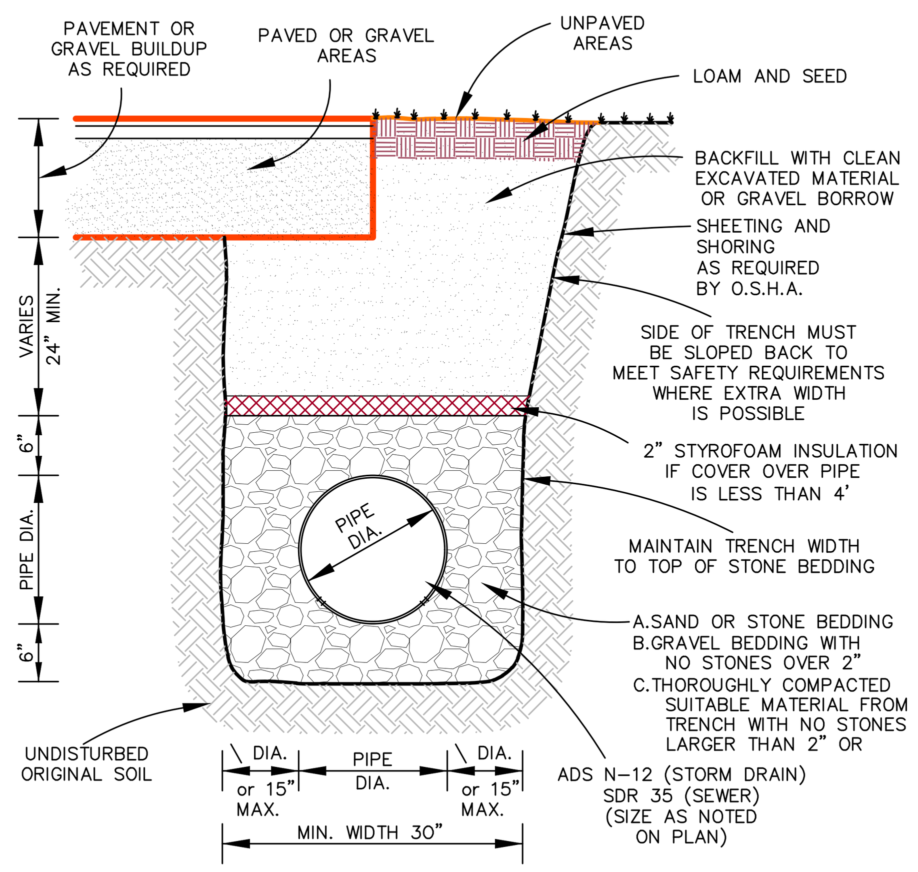
STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

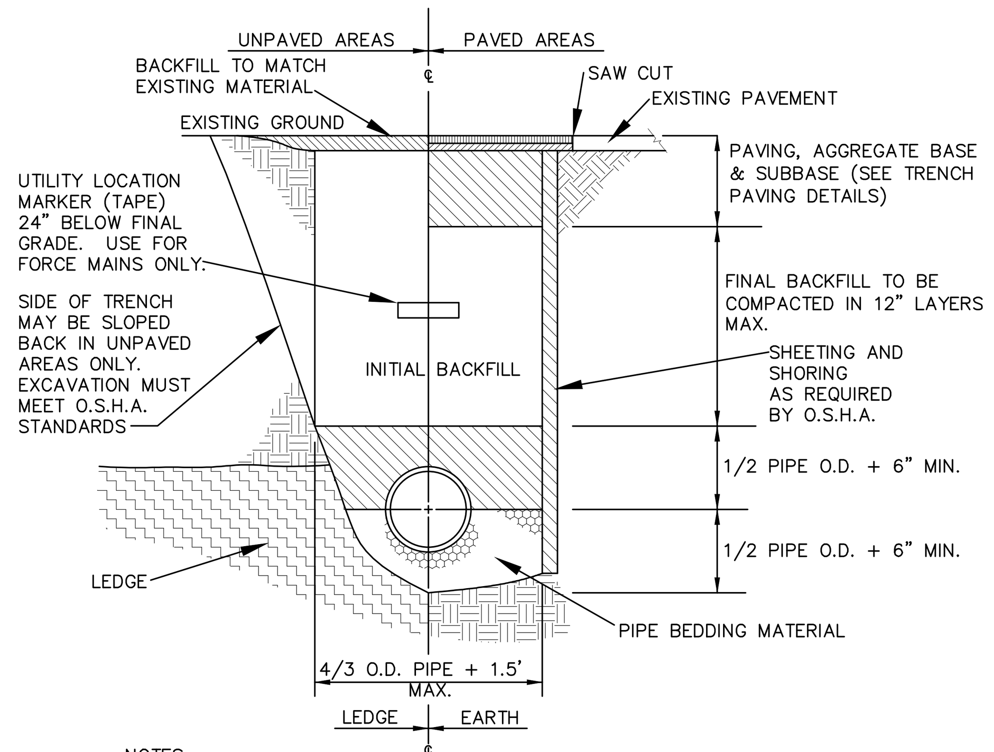
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C14
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

PROGRESS PLAN
NOT FOR CONSTRUCTION
THIS DOCUMENT IS ISSUED FOR INFORMATIONAL PURPOSES ONLY. THE DATA SHOWN HEREON IS SUBJECT TO REVISION.

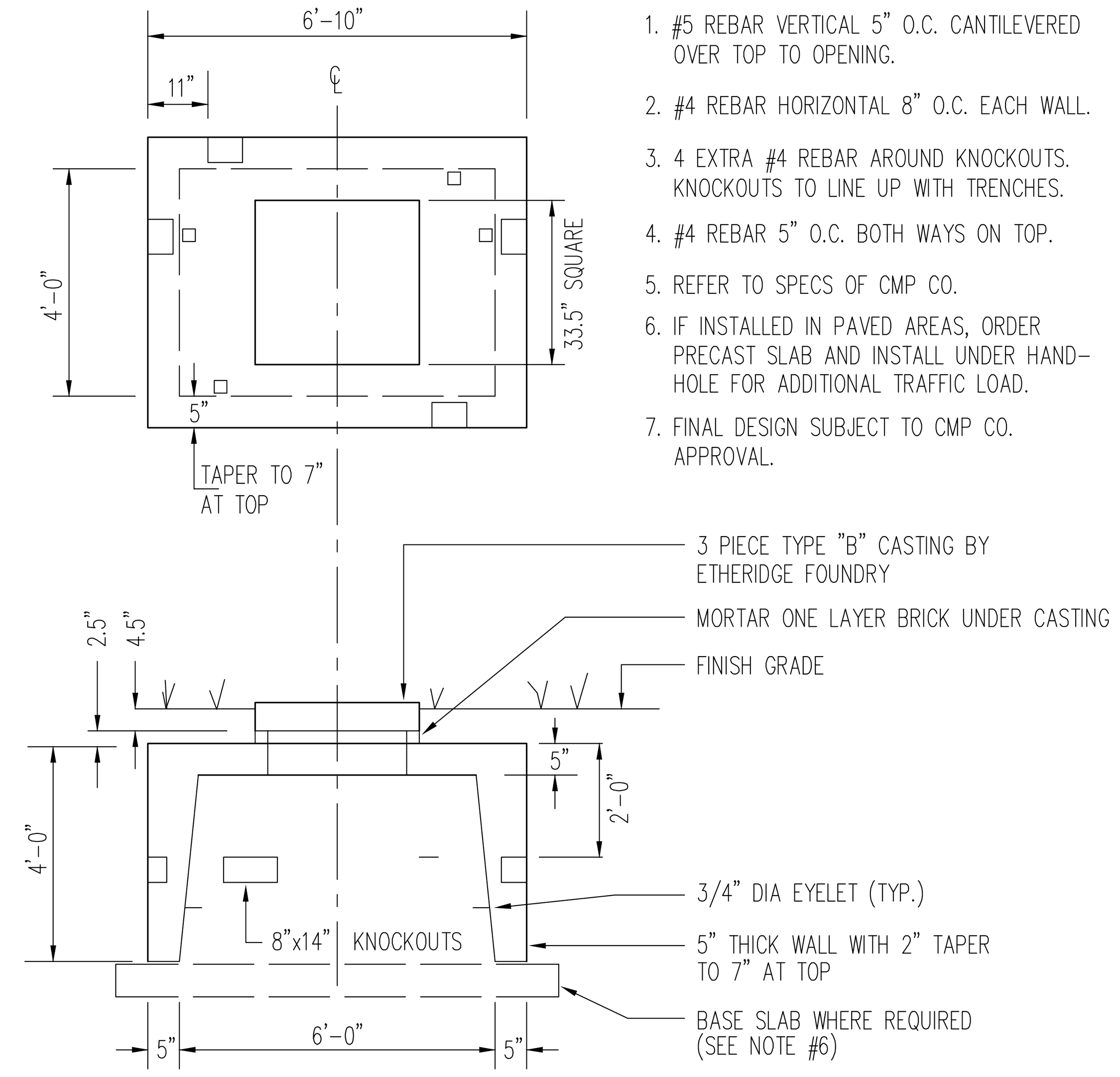


STORM DRAIN / SEWER TRENCH DETAIL
NOT TO SCALE



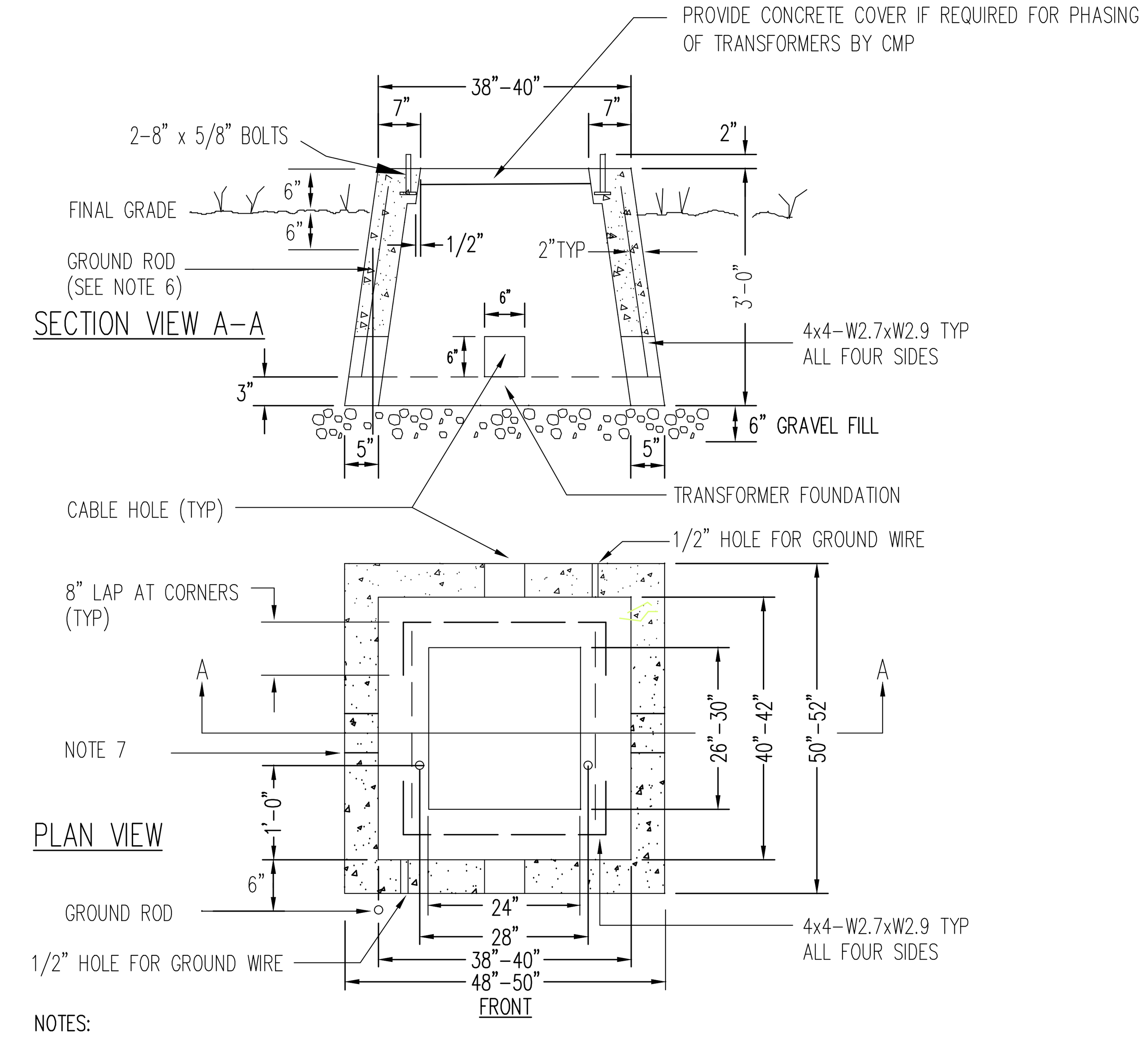
NOTES:
1. INSTALL 3 FOOT LONG IMPERVIOUS DAMS IN BEDDING/INITIAL BACKFILL MATERIAL EVERY 100 FEET TO PREVENT TRENCH GROUNDWATER FROM BEING CHANNELED ALONG BEDDING/INITIAL BACKFILL
2. REFER TO LATEST MDOT SPECIFICATIONS FOR BEDDING AND BACKFILL REQUIREMENTS.
3. INITIAL BACKFILL TO BE 12 INCHES OVER TOP OF PVC PIPE ONLY.

TYPICAL TRENCH DETAIL
NOT TO SCALE



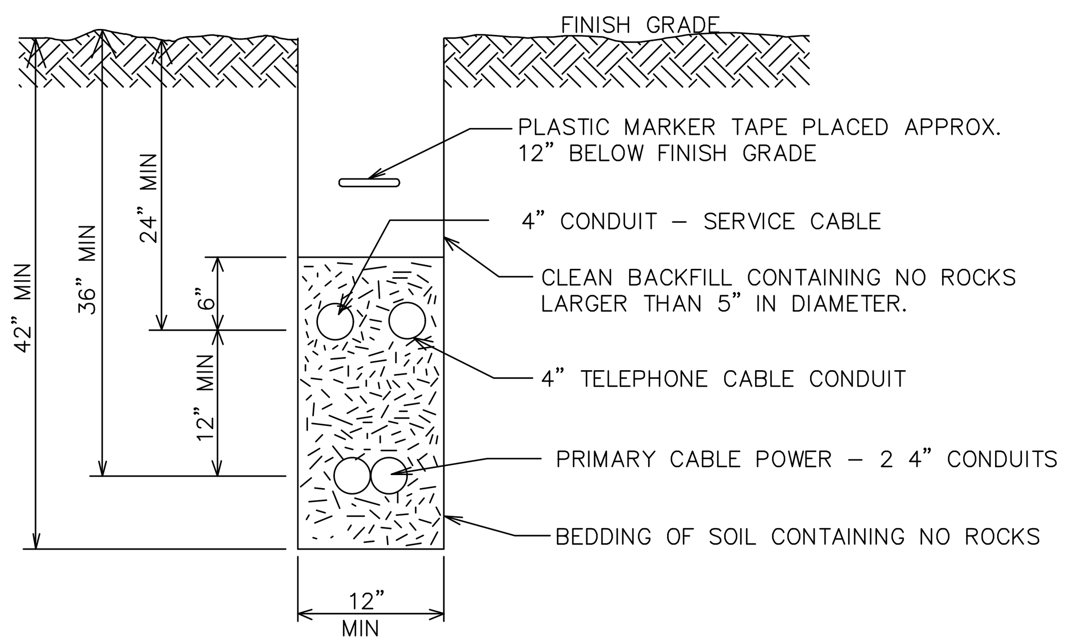
NOTES:
1. #5 REBAR VERTICAL 5" O.C. CANTILEVERED OVER TOP TO OPENING.
2. #4 REBAR HORIZONTAL 8" O.C. EACH WALL.
3. 4 EXTRA #4 REBAR AROUND KNOCKOUTS. KNOCKOUTS TO LINE UP WITH TRENCHES.
4. #4 REBAR 5" O.C. BOTH WAYS ON TOP.
5. REFER TO SPECS OF CMP CO.
6. IF INSTALLED IN PAVED AREAS, ORDER PRECAST SLAB AND INSTALL UNDER HAND-HOLE FOR ADDITIONAL TRAFFIC LOAD.
7. FINAL DESIGN SUBJECT TO CMP CO. APPROVAL.

ELECTRIC PULLBOX DETAIL
NOT TO SCALE



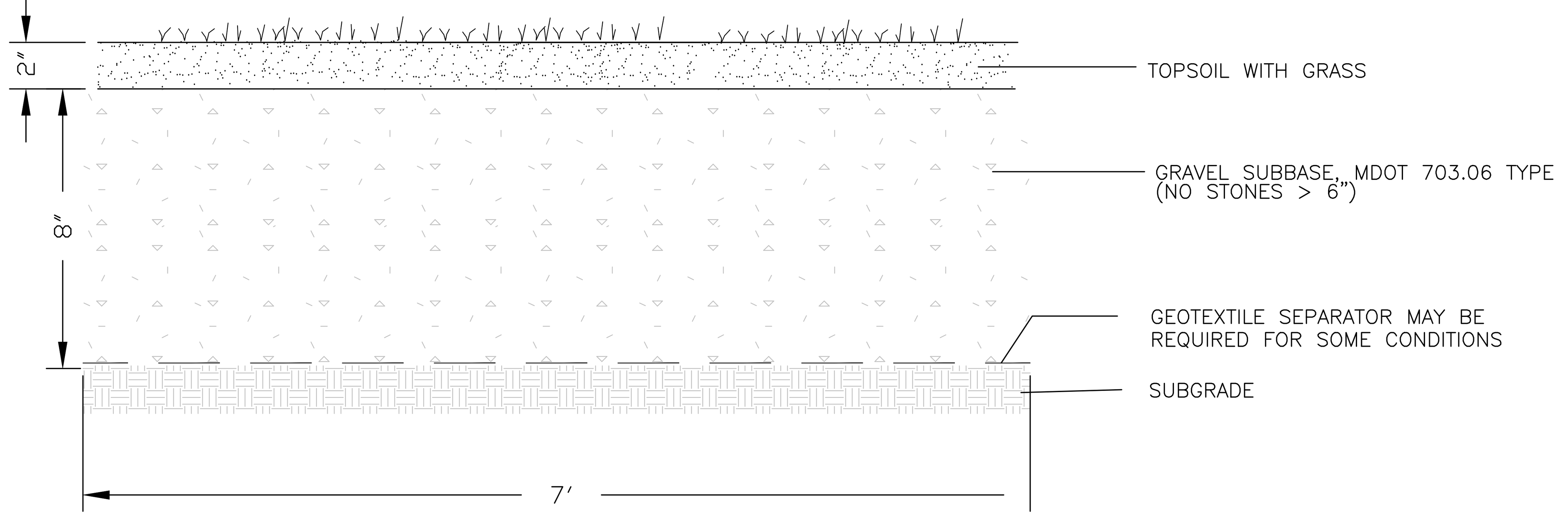
NOTES:
1. CONCRETE FOUNDATION IS SUITABLE FOR BOTH 7200/12470 VOLT & 20/34.5 KV SINGLE-PHASE TRANSFORMER & PRIMARY JUNCTION BOX INSTALLATIONS.
2. SET FOUNDATION ON SUITABLE GRAVEL FILL AND PROVIDE ADEQUATE DRAINAGE. LOCATION TO BE ACCESSIBLE BY TRUCK & SUITABLY PROTECTED FROM PLOW AND TRAFFIC DAMAGE.
3. FRONT DENOTES THE SIDE ON WHICH THE ACCESS DOORS ARE LOCATED. THE FOUNDATION MUST BE INSTALLED SO THE "FRONT" IS READILY ACCESSIBLE.
4. OTHER CMP-APPROVED PADMOUNT TRANSFORMER FOUNDATIONS MAY BE USED.
5. PROVIDE 6" SQUARE CABLE HOLES (BOND OUT) 3" UP THE WALL FROM THE BASE. ONE PER WALL, LINE UP W/TRENCHES.
6. CMPCO. TO FURNISH A 3/4"x8' GALVANIZED ROD TO BE INSTALLED 6" IN FRONT OF THE LEFT FRONT CORNER OF TRANSFORMER FOUNDATION. THE TOP OF THE GROUND ROD IS TO BE 6" BELOW FINAL GRADE.
7. PULLING EYE INSERT, FOR USE WITH 3/4" NATIONAL COURSE THREAD EYE-BOLT (RICHMOND LCB-1 OR EQ.) LOCATED OPPOSITE EACH CABLE HOLE & APPROX. 16" FROM THE BOTTOM.
8. CAN BE USED AS A FOUNDATION FOR 3 PHASE JUNCTION CABINET CU UDCUT3 (S/C 62-1490) WITH CU UDCUT3S (S/C 67-3921) SKIRT.

TRANSFORMER PAD DETAIL 25 TO 167 KVA 1 Φ
NOT TO SCALE

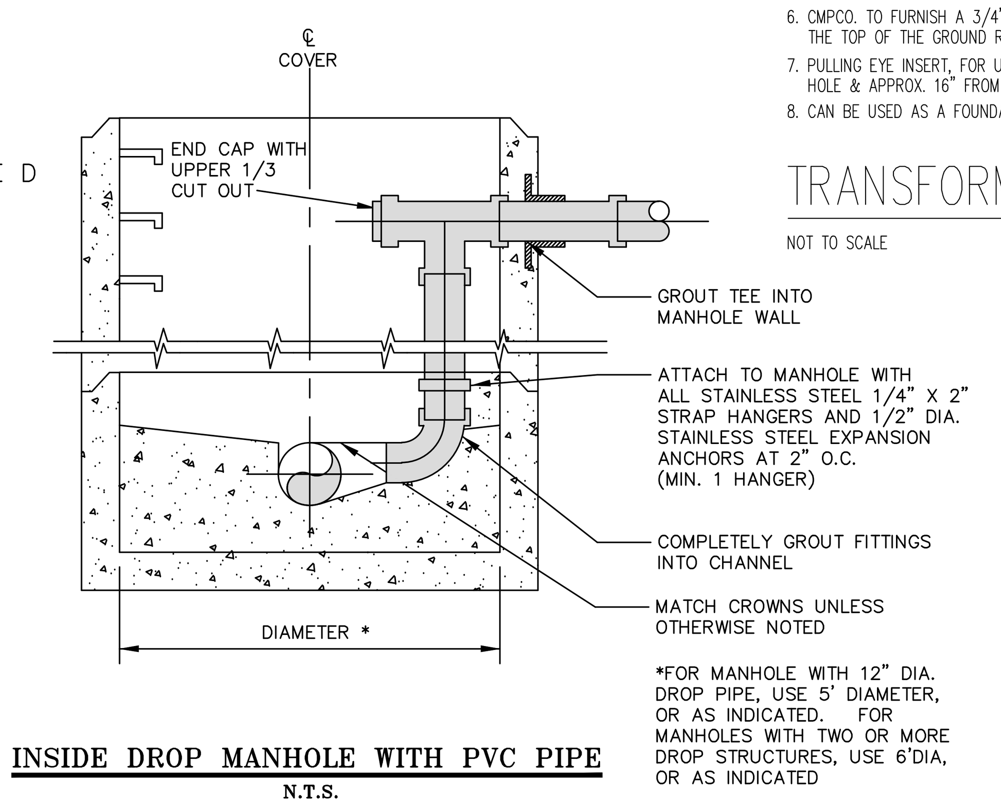


NOTES:
1. SECONDARY OR SERVICE CABLES AND COMMUNICATION CABLES MAY BE PLACED IN THE SAME TRENCH AT THE SAME DEPTH WITHOUT A REQUIRED CLEARANCE OR SEPARATION BETWEEN THE CABLES.
2. INSTALLATION SHOULD NOT ALLOW THE INTER-TWINING OF CABLES.
3. BEDDING AND BACKFILL SHALL BE FREE OF ROCKS, STUMPS AND OTHER DEBRIS.

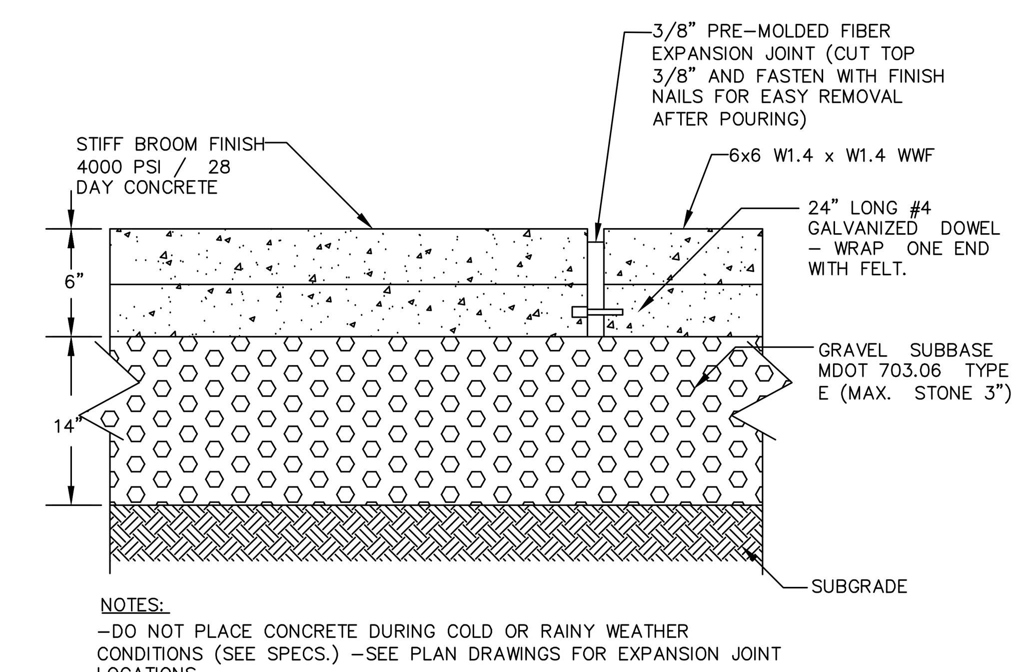
TYPICAL ELECTRICAL TRENCH
NOT TO SCALE



TYPICAL SECTION THRU STABILIZED TRAIL / CART PATH
NOT TO SCALE

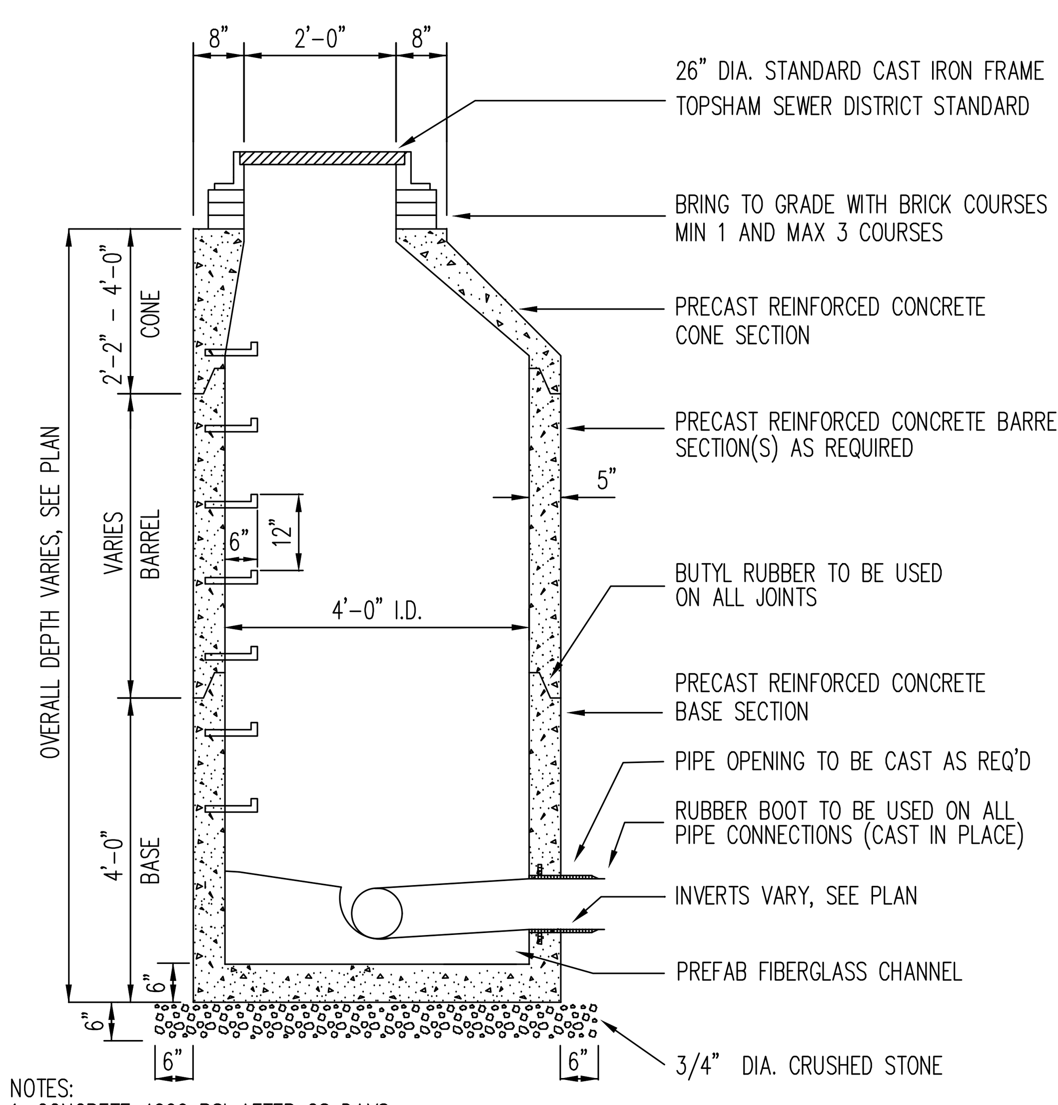


INSIDE DROP MANHOLE WITH PVC PIPE
N.T.S.



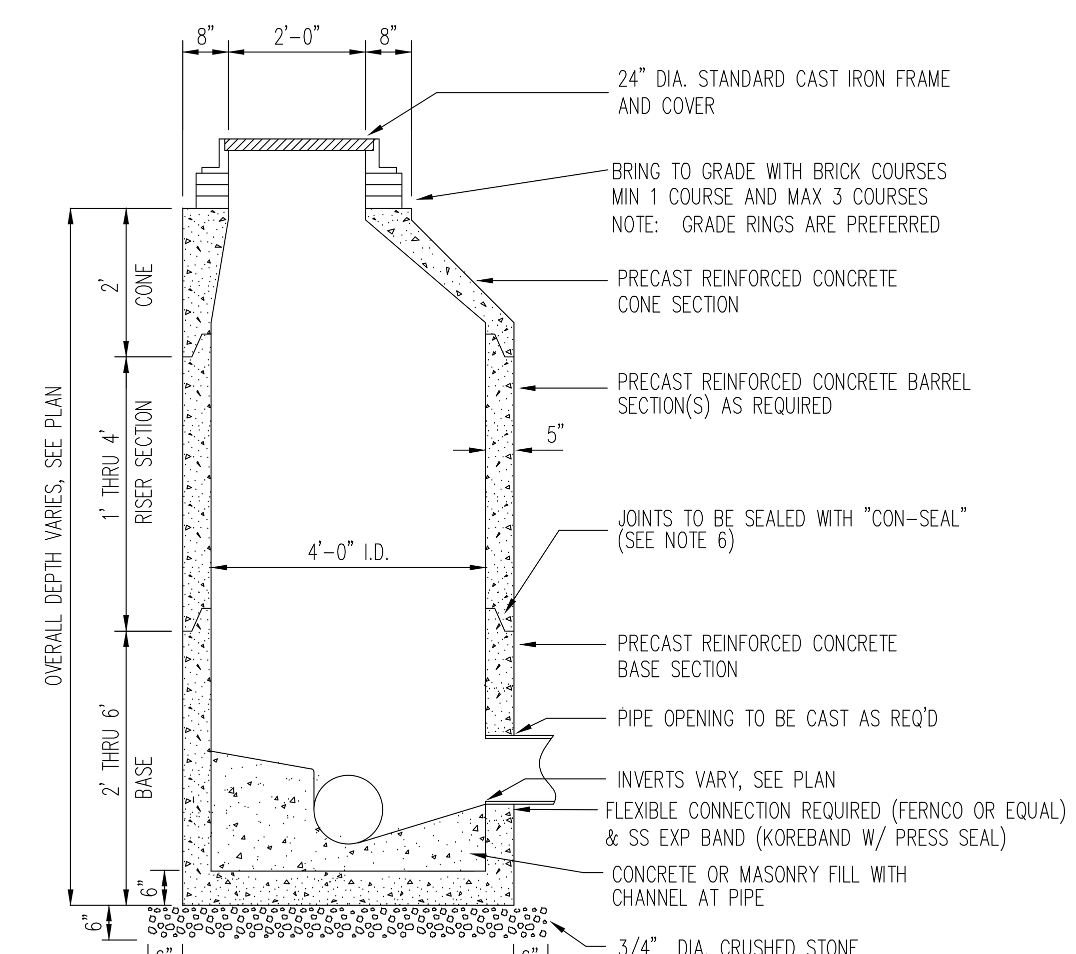
NOTES:
–DO NOT PLACE CONCRETE DURING COLD OR RAINY WEATHER CONDITIONS (SEE SPECS.) –SEE PLAN DRAWINGS FOR EXPANSION JOINT LOCATIONS.

CONCRETE PAD – SECTION
NOT TO SCALE



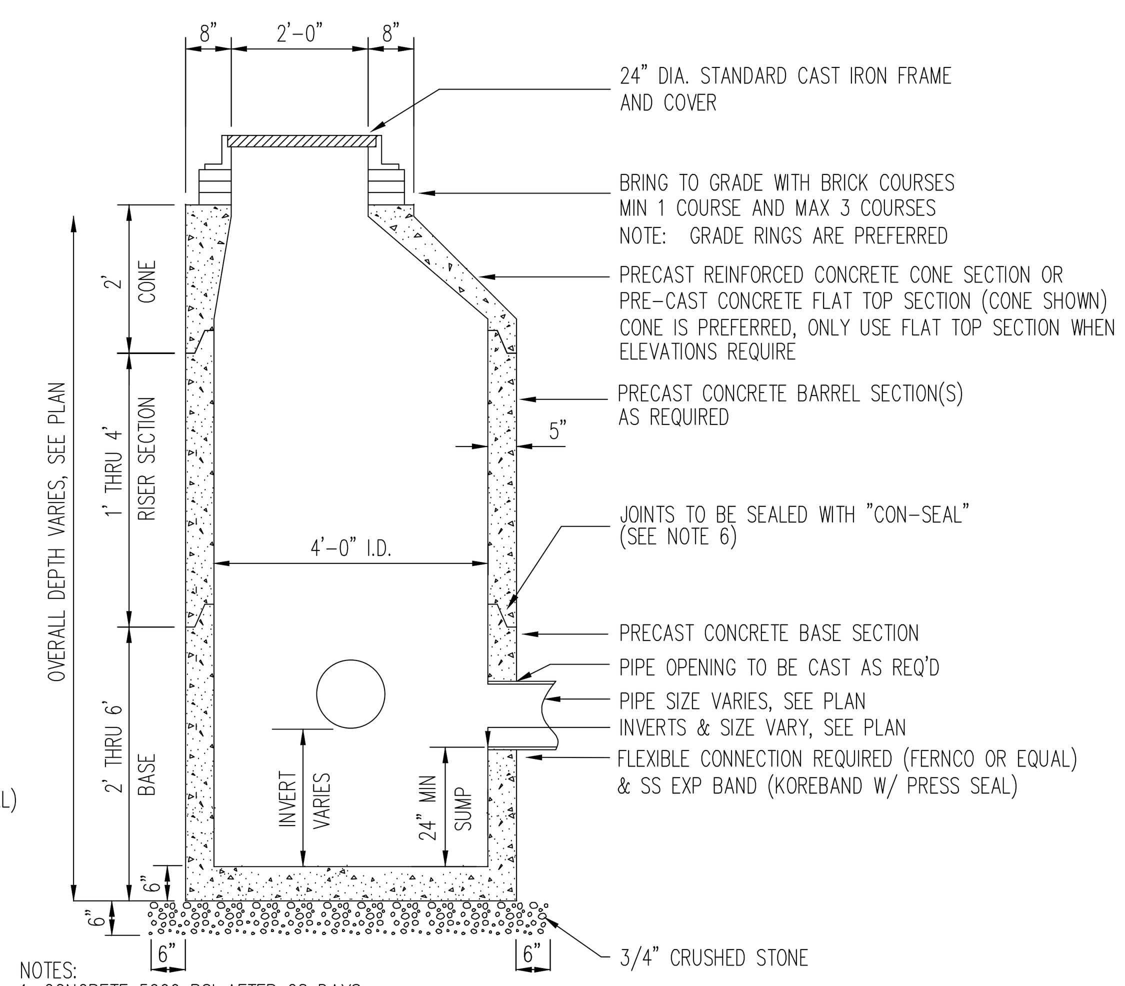
NOTES:
1. CONCRETE 4000 PSI AFTER 28 DAYS.
2. REINFORCING H-20 LOADING 4x4 / 4x4 WWM.
3. EACH CASTING TO HAVE LIFTING HOLES TO BE FILLED WITH NON-SHRINK MORTAR.
4. MANHOLE STEPS TO BE ALUMINUM OR HIGH IMPACT PLASTIC.
5. APPLY TWO COATS OF BITUMASTIC PAINT ON ALL EXTERIOR SECTIONS.

SANITARY SEWER MANHOLE
NOT TO SCALE



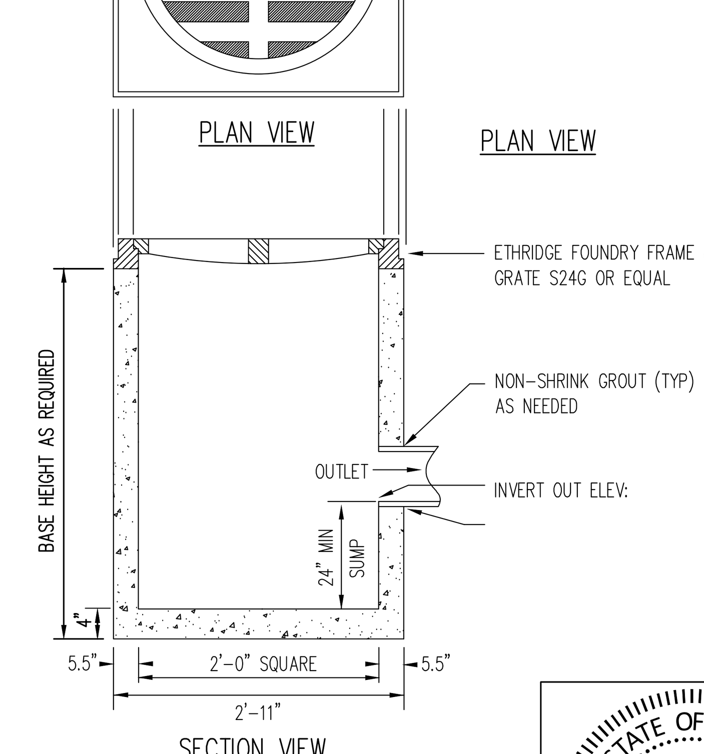
NOTES:
1. CONCRETE 5000 PSI AFTER 28 DAYS.
2. REINFORCING H-20 LOADING 4x4 / 4x4 WWM. SLAB TOP – NO. 5 BARS.
3. EACH CASTING TO HAVE LIFTING HOLES TO BE FILLED WITH NON-SHRINK MORTAR.
4. ONE POUR MONOLITHIC BASE SECTION
5. CEMENT: TYPE III PER ASTM C150-81.
6. JOINTS TO BE SEALED WITH "CON-SEAL". (CONFORMS TO ASTM C443 SPEC. AND FEDERAL SPEC. SS-S-210A)
7. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-20 LOADING.

PRECAST CONCRETE DRAIN MANHOLE
NOT TO SCALE
ST-DMH/9-02



NOTES:
1. CONCRETE 5000 PSI AFTER 28 DAYS.
2. REINFORCING H-20 LOADING 4x4 / 4x4 WWM. SLAB TOP – NO. 5 BARS.
3. EACH CASTING TO HAVE LIFTING HOLES TO BE FILLED WITH NON-SHRINK MORTAR.
4. ONE POUR MONOLITHIC BASE SECTION
5. CEMENT: TYPE III PER ASTM C150-81.
6. JOINTS TO BE SEALED WITH "CON-SEAL". (CONFORMS TO ASTM C443 SPEC. AND FEDERAL SPEC. SS-S-210A)
7. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-20 LOADING.

TYPICAL PRECAST CONCRETE CATCH BASIN
NOT TO SCALE



NOTES:
1. CONCRETE 5000 PSI AFTER 28 DAYS.
2. REINFORCING: 1 LAYER 4x4 / 4x4 WWM.
3. FIELD INLET IS USED FOR SHALLOW, OFF-DRIVE, DEAD END DRAINAGE AREAS.

FIELD INLET
NOT TO SCALE

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Civil Details

Oceanview at Cumberland LLC
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue, Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C15
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

EROSION AND SEDIMENTATION NOTES:

1. The Site Contractor shall follow the "Maine Erosion and Sediment Control BMPs" published by the Maine DEP in 2003 and the "Maine Erosion and Sediment Control Practices Field Guide for Contractors published in 2016 or most current update". The manuals can be found on the Maine DEP web site. A Link to the field guide is shown below:

http://www.maine.gov/dep/land/erosion/escbmps/index.html

THE CONTRACTOR SHALL ALSO FOLLOW THE GUIDELINES LISTED IN APPENDICES A, B, C IN MAINE DEP CHAPTER 500 RULES (2015 NOTES PROVIDED ON THIS SHEET).

GENERAL EROSION AND SEDIMENTATION CONTROL PRACTICES:

EROSION/SEDIMENT CONTROL DEVICES:

THE FOLLOWING EROSION SEDIMENTATION CONTROL DEVICES ARE PROPOSED FOR CONSTRUCTION ON THIS PROJECT. INSTALL THESE DEVICES AS INDICATED ON THE PLANS.

1 SILT FENCE: SILT FENCE WILL BE INSTALLED ALONG THE DOWN GRADING EDGES OF DISTURBED AREAS TO TRAP RUNOFF BORNE SEDIMENTS UNTIL THE SITE IS STABILIZED. IN AREAS WHERE STORMWATER DISCHARGES THE SILT FENCE WILL BE REINFORCED WITH HAY BALES TO HELP MAINTAIN THE INTEGRITY OF THE SILT FENCE AND TO PROVIDE ADDITIONAL TREATMENT.

2. HAY BALES: HAY BALES TO BE PLACED IN LOW FLOW DRAINAGE SWALES AND PATHS TO TRAP SEDIMENTS AND REDUCE RUNOFF VELOCITIES. DO NOT PLACE HAY BALES IN FLOWING WATER OR STREAMS.

3. RIPRAP: PROVIDE RIPRAP IN AREAS WHERE CULVERTS DISCHARGE OR AS SHOWN ON THE PLANS.

4. LOAM, SEED, & MULCH: ALL DISTURBED AREAS, WHICH ARE NOT OTHERWISE TREATED, SHALL RECEIVE PERMANENT SEEDING AND MULCH TO STABILIZE THE DISTURBED AREAS. THE DISTURBED AREAS WILL BE REVEGETATED WITHIN 5 DAYS OF FINAL GRADING. SEEDING REQUIREMENTS ARE PROVIDED AT THE END OF THIS SPECIFICATION.

5. STRAW AND HAY MULCH: USED TO COVER DENUDED AREAS UNTIL PERMANENT SEED OR EROSION CONTROL MEASURES ARE IN PLACE. MULCH BY ITSELF CAN BE USED ON SLOPES LESS THAN 15% IN SUMMER AND 8% IN WINTER. JUTE MESH IS TO BE USED OVER MULCH ONLY. CURLEX II AND EXCELSIOR MAY BE USED IN PLACE OF JUTE MESH OVER MULCH.

6. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 8%.

TEMPORARY EROSION/SEDIMENTATION CONTROL MEASURES:

PROVIDE THE FOLLOWING TEMPORARY EROSION/SEDIMENTATION CONTROL MEASURES DURING CONSTRUCTION OF THE DEVELOPMENT:

1. SILTATION FENCE ALONG THE DOWNGRADIENT SIDE OF THE PARKING AREAS AND OF ALL FILL SECTIONS. THE SILTATION FENCE WILL REMAIN IN PLACE UNTIL THE SITE IS 90% REVEGETATED. REMOVE SILTATION FENCE, WITHIN 30 DAYS AFTER PERMANENT STABILIZATION IS ATTAINED. REMOVE ANY ACCUMULATED SEDIMENT AND STABILIZE.

2. HAY BALES PLACED AT KEY LOCATIONS TO SUPPLEMENT THE SILT FENCE.

3. PROTECT TEMPORARY STOCKPILES OF STUMPS, GRUBBINGS, OR COMMON EXCAVATION AS FOLLOWS:
  A. SOIL STOCKPILE SIDE SLOPES SHALL NOT EXCEED 2:1.
  B. AVOID PLACING TEMPORARY STOCKPILES IN AREAS WITH SLOPES OVER 10 PERCENT, OR NEAR DRAINAGE SWALES. SEE ITEM 3 IN CONSTRUCTION PHASE NOTES BELOW.
  C. STABILIZE STOCKPILES WITHIN 15 DAYS BY TEMPORARILY SEEDING WITH A HYDROSEED METHOD CONTAINING AN EMULSIFIED MULCH TACKIFIER OR BY COVERING THE STOCKPILE WITH MULCH.
  D. SURROUND STOCKPILE SOIL WITH SILTATION FENCE AT BASE OF PILE.

4. ALL DENUDED AREAS WHICH HAVE BEEN ROUGH GRADED AND ARE NOT LOCATED WITHIN THE BUILDING PAD, OR PARKING AND DRIVEWAY SUBBASE AREA THAT WILL NOT BE WORKED FOR MORE THAN 7 DAYS SHALL RECEIVE MULCH OR NON-ERODABLE COVER. STABILIZE AREAS WITHIN 75 FEET OF A WETLAND OR WATERBODY WITHIN 48 HOURS OF THE INITIAL DISTURBANCE OR THE SOIL OR PRIOR TO ANY STORM EVENT, WHICHEVER COMES FIRST. IN THE EVENT THE CONTRACTOR COMPLETES FINAL GRADING AND INSTALLATION OF LOAM AND SOD WITHIN THE TIME PERIODS PRESENTED ABOVE, INSTALLATION OF MULCH AND NETTING, WHERE APPLICABLE, IS NOT REQUIRED.

5. IF WORK IS CONDUCTED BETWEEN OCTOBER 15 AND APRIL 15, ALL DENUDED AREAS ARE TO BE COVERED WITH HAY MULCH, APPLIED AT TWICE THE NORMAL APPLICATION RATE, AND ANCHORED WITH FABRIC NETTING. THE PERIOD BETWEEN FINAL GRADING AND MULCHING SHALL BE REDUCED TO A 15 DAY MAXIMUM.

6. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE SITE HAS BEEN STABILIZED OR IN AREAS WHERE PERMANENT EROSION CONTROL MEASURES HAVE BEEN INSTALLED.

PERMANENT EROSION CONTROL MEASURES:

THE FOLLOWING PERMANENT CONTROL MEASURES ARE REQUIRED BY THIS EROSION/SEDIMENTATION CONTROL PLAN:

1. ALL AREAS DISTURBED DURING CONSTRUCTION, BUT NOT SUBJECT TO OTHER RESTORATION (PAVING, RIPRAP, ETC.), WILL BE LOAMED, LIMED, FERTILIZED AND SEEDED. NATIVE TOPSOIL SHALL BE STOCKPILED AND REUSED FOR FINAL RESTORATION WHEN IT IS OF SUFFICIENT QUALITY.

2. IF AN AREAS WILL NOT BE WORKED FOR MORE THAN ONE YEAR OR HAS BEEN BROUGHT TO FINAL GRADE, THEN PERMANENTLY STABILIZE THE AREA WITHIN 7 DAYS BY PLANTING VEGETATION, SEEDING, SOD, OR THROUGH THE USE OF PERMANENT MULCH, OR RIPRAP, OR ROAD SUB-BASE. IF USING VEGETATION FOR STABILIZATION, SELECT THE PROPER VEGETATION FOR THE LIGHT, SOIL, AND MOISTURE CONDITIONS; AMEND AREAS OF DISTURBED SUBSOILS WITH TOPSOIL, COMPOST, OR FERTILIZERS; PROTECT SEEDED AREAS WITH MULCH OR, IF NECESSARY, EROSION CONTROL BLANKETS; AND SCHEDULE SODDING, PLANTING, AND SEEDING TO AVOID DIE-OFF FROM SUMMER DROUGHT AND FALL FROSTS. NEWLY SEEDED OR SODDED AREAS MUST BE PROTECTED FROM VEHICLE TRAFFIC, EXCESSIVE PEDESTRIAN TRAFFIC, AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. IF NECESSARY, AREAS MUST BE SEEDED AND MULCHED AGAIN IF GERMINATION IS SPARCE, PLANT COVERAGE IS SPOTTY, OR TOPSOIL EROSION IS EVIDENT. ONE OR MORE OF THE FOLLOWING MAY APPLY TO A PARTICULAR SITE.

(a) Seeded areas. For seeded areas, permanent stabilization means a 90% cover of 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 a 90% cover of healthy vegetation, with a well-graded riprap lining, or with another non-erosive lining such as concrete or asphalt pavement. There must be no evidence of slumping of the channel lining, undercutting of the channel banks, or down-cutting of the channel.

3. SLOPES GREATER THAN 2:1 WILL RECEIVE RIPRAP.

POST-CONSTRUCTION REVEGETATION:

THE FOLLOWING GENERAL PRACTICES WILL BE USED TO PREVENT EROSION AS SOON AS AN AREA IS READY TO UNDERGO FINAL GRADING.

1. A MINIMUM OF 4" OF LOAM WILL BE SPREAD OVER DISTURBED AREAS AND GRADED TO A UNIFORM DEPTH AND NATURAL APPEARANCE, OR STONE WILL BE PLACED ON SLOPES TO STABILIZE SURFACES.

2. IF FINAL GRADING IS REACHED DURING THE NORMAL GROWING SEASON (4/15 TO 9/15), PERMANENT SEEDING WILL BE DONE AS SPECIFIED BELOW. PRIOR TO SEEDING, LIMESTONE SHALL BE APPLIED AT A RATE OF 138 LBS/1000 SQ. FT. AND 10:20:20 FERTILIZER AT A RATE OF 18.4 LBS/1000 SQ.FT WILL BE APPLIED. BROADCAST SEEDING AT THE FOLLOWING RATES:

LAWNS	SWALES
KENTUCKY BLUEGRASS 0.46 LBS/1000 SF.	RED TOP 0.05 LBS/1000 SF.
CREEPING RED FESCUE 0.46 LBS/1000 SF.	TALL FESCUE 0.46 LBS/1000 SF.
PERENNIAL RYE GRASS 0.11 LB/1000 SF.	

3. AN AREA SHALL BE MULCHED IMMEDIATELY AFTER IS HAS BEEN SEEDED. MULCHING SHALL CONSIST OF HAY MULCH, HYDRO-MULCH, JUTE NET OVER MULCH, PRE-MANUFACTURED EROSION MATS OR ANY SUITABLE SUBSTITUTE DEEMED ACCEPTABLE BY THE DESIGNER.
  A. HAY MULCH SHALL BE APPLIED AT THE RATE OF 2 TONS PER ACRE. HAY MULCH SHALL BE SECURED BY EITHER: (NOTE: SOIL SHALL NOT BE VISIBLE)
    I. BEING DRIVEN OVER BY TRACKED CONSTRUCTION EQUIPMENT ON GRADES OF 5% AND LESS.
    II. BLANKETED BY TACKED PHOTODEGRADABLE/BIODEGRADABLE NETTING, OR WITH SPRAY, ON GRADES GREATER THAN 5%.
    III. SEE NOTE 6, GENERAL NOTES, AND NOTE 8, WINTER CONSTRUCTION.
  B. HYDRO-MULCH SHALL CONSIST OF A MIXTURE OF EITHER ASPHALT, WOOD FIBER OR PAPER FIBER AND WATER SPRAYED OVER A SEEDED AREA. HYDRO-MULCH SHALL NOT BE USED BETWEEN 9/15 AND 4/15.

4. CONSTRUCTION SHALL BE PLANNED TO ELIMINATE THE NEED FOR SEEDING BETWEEN SEPTEMBER 15 AND APRIL 15. SHOULD SEEDING BE NECESSARY BETWEEN SEPTEMBER 15 AND APRIL 15 THE FOLLOWING PROCEDURE SHALL BE FOLLOWED. ALSO REFER TO NOTE 9 OF WINTER CONSTRUCTION.
  A. ONLY UNFROZEN LOAM SHALL BE USED.
  B. LOAMING, SEEDING AND MULCHING WILL NOT BE DONE OVER SNOW OR ICE COVER. IF SNOW EXISTS, IT MUST BE REMOVED PRIOR TO PLACEMENT OF SEED.
  C. WHERE PERMANENT SEEDING IS NECESSARY, ANNUAL WINTER RYE (1.2 LBS/1000 SQ.FT) SHALL BE ADDED TO THE PREVIOUSLY NOTED AREAS.
  D. WHERE TEMPORARY SEEDING IS REQUIRED, ANNUAL WINTER RYE (2.6 LBS/1000 SQ. FT.) SHALL BE SOWN INSTEAD OF THE PREVIOUSLY NOTED SEEDING RATE.
  E. FERTILIZING, SEEDING AND MULCHING SHALL BE APPLIED TO LOAM THE DAY THE LOAM IS SPREAD BY MACHINERY.
  F. ALTERNATIVE HAY MULCH SHALL BE SECURED WITH PHOTODEGRADABLE/BIODEGRADABLE NETTING. TRACKING BY MACHINERY ALONE WILL NOT SUFFICE.

5. FOLLOWING FINAL SEEDING, THE SITE WILL BE INSPECTED EVERY 30 DAYS UNTIL 90% COVER HAS BEEN ESTABLISHED. RESEEDING WILL BE CARRIED OUT BY THE CONTRACTOR WITHIN 10 DAYS OF NOTIFICATION BY THE ENGINEER THAT THE EXISTING CATCH IS INADEQUATE.

MONITORING SCHEDULE:

THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING, MONITORING, MAINTAINING, REPAIRING, REPLACING AND REMOVING ALL OF THE EROSION AND SEDIMENTATION CONTROLS OR APPOINTING A QUALIFIED SUBCONTRACTOR TO DO SO. MAINTENANCE MEASURES WILL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION CYCLE. AFTER EACH RAINFALL, A VISUAL INSPECTION WILL BE MADE OF ALL EROSION AND SEDIMENTATION CONTROLS AS FOLLOWS:

1. HAY BALE BARRIERS, SILT FENCE, AND STONE CHECK DAMS SHALL BE INSPECTED AND REPAIRED ONCE A WEEK OR IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL. SEDIMENT TRAPPED BEHIND THESE BARRIERS SHALL BE EXCAVATED WHEN IT REACHES A DEPTH OF 6" AND REDISTRIBUTED TO AREAS UNDERGOING FINAL GRADING. SHOULD THE HAY BALE BARRIERS PROVE TO BE INEFFECTIVE, THE CONTRACTOR SHALL INSTALL SILT FENCE BEHIND THE HAY BALES.

2. VISUALLY INSPECT RIPRAP ONCE A WEEK OR AFTER EACH SIGNIFICANT RAINFALL AND REPAIR AS NEEDED. REMOVE SEDIMENT TRAPPED BEHIND THESE DEVICES ONCE IT ATTAINS A DEPTH EQUAL TO 1/2 THE HEIGHT OF THE DAM OR RISER. DISTRIBUTE REMOVED SEDIMENT OFF-SITE OR TO AN AREA UNDERGOING FINAL GRADING.

3. REVEGETATION OF DISTURBED AREAS WITHIN 25' OF DRAINAGE-COURSE/STREAM WILL BE SEEDED WITH THE "MEADOW AREA MIX" AND INSPECTED ON A WEEKLY BASIS OR AFTER EACH SIGNIFICANT RAINFALL AND RESEEDED AS NEEDED. EXPOSED AREAS WILL BE RESEEDED AS NEEDED UNTIL THE AREA HAS OBTAINED 100% GROWTH RATE. PROVIDE PERMANENT RIPRAP FOR SLOPES IN EXCESS OF 3:1 AND WITHIN 25' OF DRAINAGE COURSE.

EROSION CONTROL DURING WINTER CONSTRUCTION:

1. WINTER CONSTRUCTION PERIOD: NOVEMBER 1 THROUGH APRIL 15.

2. WINTER EXCAVATION AND EARTHWORK SHALL BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.

3. EXPOSED AREA SHALL BE LIMITED TO THOSE AREAS TO BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT. AT THE END OF EACH WORK WEEK NO AREAS MAY BE LEFT UNSTABILIZED OVER THE WEEKEND.

4. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED, SUCH THAT NO LARGER AREA OF THE SITE IS WITHOUT EROSION CONTROL PROTECTION AS LISTED IN ITEM 2 ABOVE.

5. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR HAY AT A RATE OF 150 LB. PER 1000 S.F. (WITH OR WITHOUT SEEDING) OR DORMANT SEEDED, MULCHED AND ANCHORED SUCH THAT SOIL SURFACE IS NOT VISIBLE THROUGH THE MULCH. NOTE: AN AREA IS ALSO CONSIDERED STABLE IF SODDED, COVERED WITH GRAVEL (PARKING LOTS) OR STRUCTURAL SAND.

6. BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES THE SLOPES 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 1 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. IF CONSTRUCTION CONTINUES DURING FREEZING WEATHER, ALL EXPOSED AREAS SHALL BE CONTINUOUSLY GRADED BEFORE FREEZING AND THE SURFACE TEMPORARILY PROTECTED FROM EROSION BY THE APPLICATION OF MULCH. SLOPES SHALL NOT BE LEFT UNEXPOSED OVER THE WINTER OR ANY OTHER EXTENDED TIME OF WORK SUSPENSION UNLESS TREATED IN THE ABOVE MANNER. UNTIL SUCH TIME AS WEATHER CONDITIONS ALLOW, DITCHES TO BE FINISHED WITH THE PERMANENT SURFACE TREATMENT, EROSION SHALL BE CONTROLLED BY THE INSTALLATION OF BALES OF HAY, SILT FENCE OR STONE CHECK DAMS IN ACCORDANCE WITH THE STANDARD DETAILS SHOWN ON THE DESIGN DRAWINGS. NOTE: DORMANT SEEDING SHOULD NOT BE ATTEMPTED UNLESS SOIL TEMPERATURE REMAINS BELOW 50 DEGREES AND DAY TIME TEMPERATURES REMAIN IN THE 30'S.

7. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 8%. VEGETATED DRAINAGE SWALES SHALL BE LINED WITH EXCELSIOR OR CURLEX.

8. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH SLOPES GREATER THAN 15%. AFTER OCTOBER 1 THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.

9. BETWEEN THE DATES OF OCTOBER 15 TO NOVEMBER 1, WINTER RYE IS RECOMMENDED FOR STABILIZATION. AFTER NOVEMBER 1, WINTER RYE IS NOT EFFECTIVE. AROUND NOVEMBER 15 OR LATER, ONCE TEMPERATURES OF THE AIR AND SOIL PERMIT, DORMANT SEEDING IS EFFECTIVE.

10. IN THE EVENT OF SNOWFALL (FRESH OR CUMULATIVE) GREATER THAN 1 INCH DURING WINTER CONSTRUCTION PERIOD ALL SNOW SHALL BE REMOVED FROM THE AREAS OF SEEDING AND MULCHING PRIOR TO PLACEMENT.

Construction Plan

CONSTRUCTION OF THE PROJECT IS EXPECTED TO COMMENCE IN LATE SUMMER 2017 FOLLOWING ISSUE OF TOWN AND DEP PERMITS AND ONCE UNITS ARE PRE-SOLD. THE CONSTRUCTION OF THE ROAD AND UTILITY INFRASTRUCTURE IS EXPECTED TO CONTINUE INTO THE SPRING OF 2018. CONSTRUCTION OF UNITS WILL DEPEND ON MARKET CONDITIONS BUT BASED ON THE RECENT SUCCESS WE WOULD EXPECT THE UNITS TO BE CONSTRUCTED WITHIN 2-3 YEARS. CONSTRUCTION SEQUENCING WILL INCLUDE THE FOLLOWING:
- TREE CLEARING AND STUMP REMOVAL.
- REMOVAL OF THE THREE HOUSES AND ASSOCIATED DRIVES AND INFRASTRUCTURE.
- ROUGH GRADING, SITE BLASTING FOR ROADWAYS AND UNITS AND INSTALLATION OF UTILITIES AND STORMWATER SYSTEMS.
- FINISH GRAVELS AND SURFACES & PAVING
- LOAM, SEED AND STABILIZATION.

CONSTRUCTION PHASE:

THE FOLLOWING GENERAL PRACTICES WILL BE USED TO PREVENT EROSION DURING CONSTRUCTION OF THIS PROJECT.

1. ONLY THOSE AREAS UNDER ACTIVE CONSTRUCTION WILL BE CLEARED AND LEFT IN AN UNTREATED OR UNVEGETATED CONDITION. IF FINAL GRADING, LOAMING AND SEEDING WILL NOT OCCUR WITHIN 7 DAYS, SEE ITEM NO. 4.

2. PRIOR TO THE START OF CONSTRUCTION IN A SPECIFIC AREA, SILT FENCING AND/OR HAY BALES WILL BE INSTALLED AT THE TOE OF SLOPE AND IN AREAS AS LOCATED ON THE PLANS TO PROTECT AGAINST ANY CONSTRUCTION RELATED EROSION. IMMEDIATELY FOLLOWING CONSTRUCTION OF CULVERTS AND SWALES, RIP RAP APRONS SHALL BE INSTALLED, AS SHOWN ON THE PLANS.

3. TOPSOIL WILL BE STOCKPILED WHEN NECESSARY IN AREAS WHICH HAVE MINIMUM POTENTIAL FOR EROSION AND WILL BE KEPT AS FAR AS POSSIBLE FROM THE EXISTING DRAINAGE COURSE. NO STOCKPILE SHALL BE CLOSER THEN 100' OF A RESOURCE INCLUDING, BUT NOT LIMITED TO, WETLANDS, STREAMS, AND OPEN WATER BODIES. ALL STOCKPILES SHALL HAVE A SILTATION FENCE BELOW THEM REGARDLESS OF TIME OF PRESENCE. ALL STOCKPILES EXPECTED TO REMAIN LONGER THAN 15 DAYS SHALL BE:
  A. TREATED WITH ANCHORED MULCH (WITHIN 5 DAYS OF THE LAST DEPOSIT OF STOCKPILED SOIL).
  B. SEEDED WITH CONSERVATION MIX AND MULCHED IMMEDIATELY.
  C. INSTALL SILT FENCE AROUND STOCKPILE AT BASE OF PILE. STOCKPILES TO HAVE SILT FENCE INSTALLED AT TIME OF ESTABLISHMENT AT BASE OF PILE.

4. ALL DISTURBED AREAS THAT WILL NOT BE WORKED FOR MORE THAN 7 DAYS SHALL BE EITHER:
  A. TREATED WITH ANCHORED MULCH IMMEDIATELY, OR
  B. SEEDED WITH CONSERVATION MIX OF ANNUAL RYE GRASS (0.9 LBS/1000 SQ. FT) AND MULCHED IMMEDIATELY.

5. ALL GRADING WILL BE HELD TO A MAXIMUM 2:1 SLOPE WHERE PRACTICAL. ALL SLOPES WILL BE STABILIZED WITH PERMANENT SEEDING, OR WITH STONE, WITHIN 7 DAYS AFTER FINAL GRADING IS COMPLETE. (SEE POST-CONSTRUCTION REVEGETATION FOR SEEDING SPECIFICATION.)

6. ALL CULVERTS WILL BE PROTECTED WITH STONE RIPRAP (D50 = 6" UNLESS OTHERWISE SPECIFIED) AT INLETS AND OUTLETS.

Maine DEP Chapter 500, APPENDIX C. Housekeeping

These performance standards apply to all projects except for stormwater PBR projects.

1. Spill prevention. Controls must be used to prevent pollutants from construction and waste materials stored on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.

NOTE: Any spill or release of toxic or hazardous substances must be reported to the Department. For oil spills, call 1-800-482-0777 which is available 24 hours a day. For spills of toxic or hazardous material, call 1-800-452-4664 which is available 24 hours a day. For more information, visit the Department's website at : http://www.maine.gov/dep/spills/emergspillresp/

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. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

See Appendix D for license by rule standards for infiltration of stormwater.

NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

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, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

NOTE: Dewatering a stream without a permit from the Department may violate state water quality standards and the Natural Resources Protection Act.

4. Debris and other materials. Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.

NOTE: 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. Excavation de-watering. Excavation 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 removed from the ponded area, either through gravity or pumping, 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.

NOTE: Dewatering controls are discussed in the "Maine Erosion and Sediment Control BMPs, Maine Department of Environmental Protection."

6. Authorized Non-stormwater discharges. Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

(a) Discharges from firefighting activity;

(b) Fire hydrant flushings;

(c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);

(d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);

(e) Routine external building washdown, not including surface paint removal, that does not involve detergents;

(f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;

(g) Uncontaminated air conditioning or compressor condensate;

(h) Uncontaminated groundwater or spring water;

(i) Foundation or footer drain-water where flows are not contaminated;

(j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));

(k) Potable water sources including waterline flushings; and

(l) Landscape irrigation.

7. Unauthorized non-stormwater discharges . The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non_stormwater, other than those discharges in compliance with Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:

(a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;

(b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;

(c) Soaps, solvents, or detergents used in vehicle and equipment washing; and

(d) Toxic or hazardous substances from a spill or other release.

(8) Additional requirements. Additional requirements may be applied on a site-specific basis.

Maine DEP Chapter 500, APPENDIX A. Erosion and sedimentation control (2015 Update)

This appendix applies to all projects.

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 M.R.S. §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.

NOTE: Other requirements may apply, including, but not limited to the Natural Resources Protection Act 38 M.R.S. §480-B.

NOTE: The Department has prepared protocols for the control of erosion and sedimentation. See "Maine Erosion and Sediment Control BMPs Maine Department of Environmental Protection."

1. Pollution prevention. Minimize disturbed areas and protect natural downgradient buffer areas to the extent practicable. Control stormwater volume and velocity within the site to minimize soil erosion. Minimize the disturbance of steep slopes. Control stormwater discharges, including both peak flow rates and volume, to minimize erosion at outlets. The discharge may not result in erosion of any open drainage channels, swales, stream channels or stream banks, upland, or coastal or freshwater wetlands off the project site.

Whenever practicable, no disturbance activities should take place within 50 feet of any protected natural resource. If disturbance activities take place between 30 feet and 50 feet of any protected natural resource, and stormwater discharges through the disturbed areas toward the protected natural resource, perimeter erosion controls must be doubled. If disturbance activities take place less than 30 feet from any protected natural resource, and stormwater discharges through the disturbed areas toward the protected natural resource, perimeter erosion controls must be doubled and disturbed areas must be temporarily or permanently stabilized within 7 days.

NOTE: Buffers improve water quality by helping to filter pollutants in run-off both during and after construction. Minimizing disturbed areas through phasing limits the amount of exposed soil on the site through retention of natural cover and by retiring areas as permanently stabilized. Less exposed soil results in fewer erosion controls to install and maintain. If work within an area is not anticipated to begin within two weeks' time, consider leaving the area in its naturally existing cover.

NOTE: Many construction activities within 75 feet of a protected natural resource require a permit under the Natural Resources Protection Act prior to initiation. For more information regarding the applicability of the NRPA to your project, you can visit the Department's website at http://www.maine.gov/dep/land/nrpa/index.html or contact staff of the Division of Land Resource Regulation at the nearest regional office.

2. Sediment barriers. Prior to construction, properly install sediment barriers at the downgradient edge of any area to be disturbed and adjacent to any drainage channels within the disturbed area. Sediment barriers should be installed downgradient of soil or sediment stockpiles and stormwater prevented from running onto the stockpile. Maintain the sediment barriers by removing accumulated sediment, or removing and replacing the barrier, until the disturbed area is permanently stabilized. Where a discharge to a storm drain inlet occurs, if the storm drain carries water directly to a surface water and you have authority to access the storm drain inlet, you must install and maintain protection measures that remove sediment from the discharge.

3. Stabilized construction entrance. Prior to construction, properly install a stabilized construction entrance (SCE) at all points of egress from the site. The SCE is a stabilized pad of aggregate, underlain by a geotextile filter fabric, used to prevent traffic from tracking material away from the site onto public ROWs. Maintain the SCE until all disturbed areas are stabilized.

4. Temporary stabilization. Within 7 days of the cessation of construction activities in an area that will not be worked for more than 7 days, stabilize any exposed soil with mulch, or other non-erodible cover. Stabilize areas within 75 feet of a wetland or waterbody within 48 hours of the initial disturbance of the soil or prior to any storm event, whichever comes first.

5. Removal of temporary measures. Remove any temporary control measures, such as silt fence, within 30 days after permanent stabilization is attained. Remove any accumulated sediments and stabilize.

NOTE: It is recommended that silt fences be removed by cutting the fence materials at ground level to avoid additional soil disturbance.

6. Permanent stabilization. If the area will not be worked for more than one year or has been brought to final grade, then permanently stabilize the area within 7 days by planting vegetation, seeding, sod, or through the use of permanent mulch, or riprap, or road sub-base. If using vegetation for stabilization, select the proper vegetation for the light, moisture, and soil conditions; amend areas of disturbed subsoils with topsoil, compost, or fertilizers; protect seeded areas with mulch or, if necessary, erosion control blankets; and schedule sodding, planting, and seeding so to avoid die-off from summer drought and fall frosts. Newly seeded or sodded areas must be protected from vehicle traffic, excessive pedestrian traffic, and concentrated runoff until the vegetation is well-established with 90% cover by healthy vegetation. If necessary, areas must be reworked and restabilized if germination is sparse, plant coverage is spotty, or topsoil erosion is evident. One or more of the following may apply to a particular site.

(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, provided it is free of fine materials that may runoff with a rain event

(g) Ditches, channels, and swales. For open channels, permanent stabilization means the channel is stabilized with a 90% cover of healthy vegetation, with a well-graded riprap lining, turf reinforcement mat, or with another non-erosive lining such as concrete or asphalt pavement. There must be no evidence of slumping of the channel lining, undercutting of the channel banks, or down-cutting of the channel.

7. Winter Construction. "Winter construction" is construction activity performed during the period from November 1 through April 15. If disturbed areas are not stabilized with permanent measures by November 1 or new soil disturbance occurs after November 1, but before April 15, then these areas must be protected and runoff from them must be controlled by additional measures and restrictions.

(a) Site Stabilization. For winter stabilization, hay mulch is applied at twice the standard temporary stabilization rate. At the end of each construction day, areas that have been brought to final grade must be stabilized. Mulch may not be spread on top of snow.

(b) Sediment Barriers. All areas within 75 feet of a protected natural resource must be protected with a double row of sediment barriers.

(c) Ditch. 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.

(d) Slopes. Mulch netting must be used to anchor mulch on all slopes greater than 8% unless erosion control blankets or erosion control mix is being used on these slopes.

NOTE: The Department has prepared protocols for the control of erosion and sedimentation during the winter months. See "Maine Erosion and Sediment Control BMPs Maine Department of Environmental Protection."

8. Stormwater channels. Ditches, swales, and other open stormwater channels must be designed, constructed, and stabilized using measures that achieve long-term erosion control. Ditches, swales and other open stormwater channels must be sized to handle, at a minimum, the expected volume run-off. Each channel should be constructed in sections so that the section's grading, shaping, and installation of the permanent lining can be completed the same day. If a channel's final grading or lining installation must be delayed, then diversion berms must be used to divert stormwater away from the channel, properly-spaced check dams must be installed in the channel to slow the water velocity, and a temporary lining installed along the channel to prevent scouring. Permanent stabilization for channels is addressed under Appendix A(5)(g) above.

(a) The channel should receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side slopes.

(b) When the watershed draining to a ditch or swale is less than 1 acre of total drainage and less than ¼ acre of impervious area, diversion of runoff to adjacent wooded or otherwise vegetated buffer areas is encouraged where the opportunity exists.

9. Sediment basins. Sediment basins must be designed to provide storage for either the calculated runoff from a 2-year, 24-hour storm or provide for 3,600 cubic feet of capacity per acre draining to the basin. Outlet structures must discharge water from the surface of the basin whenever possible. Erosion controls and velocity dissipation devices must be used if the discharging waters are likely to create erosion. Accumulated sediment must be removed as needed from the basin to maintain at least ½ of the design capacity of the basin.

The use of cationic treatment chemicals, such as polymers, flocculants, or other chemicals that contain an overall positive charge designed to reduce turbidity in stormwater must receive prior approval from the Department. When requesting approval to use cationic treatment chemicals, you must describe appropriate controls and implementation procedures to ensure the use will not lead to a violation of water quality standards. In addition, you must specify the type(s) of soil likely to be treated on the site, chemicals to be used and how they are to be applied and in what quantity, any manufacturer's recommendations, and any training had by personnel who will handle and apply the chemicals.

10. Roads. Gravel and paved roads must be designed and constructed with crowns or other measures, such as water bars, to ensure that stormwater is delivered immediately to adjacent stable ditches, vegetated buffer areas, catch basin inlets, or street gutters.

NOTE: (1) Gravel and paved roads should be maintained so that they continue to conform to this standard in order to prevent erosion problems. (2) The Department recommends that impervious surfaces, including roads, be designed and constructed so that stormwater is distributed in sheet flow to natural vegetated buffer areas wherever such areas are available. Road ditches should be designed so that stormwater is frequently (at least every 100 to 200 feet) discharged via ditch turnouts in sheet flow to adjacent natural buffer areas wherever possible.

11. Culverts. Culverts must be sized to avoid unintended flooding of upstream areas or frequent overtopping of roadways. Culvert inlets must be protected with appropriate materials for the expected entrance velocity, and protection must extend at least as high as the expected maximum elevation of storage behind the culvert. Culvert outlet design must incorporate measures, such as aprons, to prevent scour of the stream channel. Outlet protection measures must be designed to stay within the channel limits. The design must take account of tailwater depth.

12. Parking areas. Parking areas must be constructed to ensure runoff is delivered to adjacent swales, catch basins, curb gutters, or buffer areas without eroding areas downslope. The parking area's subbase compaction and grading must be done to ensure runoff is evenly distributed to adjacent buffers or side slopes. Catch basins must be located and set to provide enough storage depth at the inlet to allow inflow of peak runoff rates without by-pass of runoff to other areas.

13. Additional requirements. Additional requirements may be applied on a site-specific basis.

Maine DEP Chapter 500, APPENDIX B. Inspection and maintenance (2015 Update)

This appendix applies to all projects, except that a project that is eligible for stormwater PBR need only meet the standards in Section 1.

See Appendix D(5) for additional maintenance requirements related to infiltration of stormwater.

1. During construction. The following standards must be met during construction.

(a) Inspection and corrective action. Inspect disturbed and impervious areas, erosion control measures, materials storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. Inspect these areas at least once a week as well as before and within 24 hours after a storm event (rainfall), and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct the inspections.

(b) Maintenance. If best management practices (BMPs) need to be repaired, the repair work should be initiated upon discovery of the problem but no later than the end of the next workday. If additional BMPs or significant repair of 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.

(c) Documentation. Keep a log (report) summarizing the inspections and any corrective action taken. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicles access points to the parcel. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken.

The log must be made accessible to Department staff and a copy must be provided upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

2. Post-construction. The following standards must be met after construction.

(a) Plan. Carry out an approved inspection and maintenance plan that is consistent with the minimum requirements of this section. The plan must address inspection and maintenance of the project's permanent erosion control measures and stormwater management system. This plan may be combined with the plan listed in Section 2(a) of this appendix. See Section 7(C)(2) for submission requirements.

(b) Inspection and maintenance. All measures must be maintained in effective operating condition. A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct the inspections. The following areas, facilities, and measures must be inspected and identified deficiencies must be corrected. Areas, facilities, and measures other than those listed below may also require inspection on a specific site. Inspection or maintenance tasks other than those discussed below must be included in the maintenance plan developed for a specific site.

NOTE: Expanded and more-detailed descriptions for specific maintenance tasks may be found in the Maine DEP's "Stormwater Management for Maine: Best Management Practices."

(i) 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. See permanent stabilization standards in Appendix A(5).

(ii) 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 sideslopes.

(iii) 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.

(iv) Inspect and clean out catch basins. Clean-out must include the removal and legal disposal of any accumulated sediments and debris at the bottom of the basin, at any inlet grates, at any inflow channels to the basin, and at any pipes between basins. If the basin outlet is designed to trap floatable materials, then remove the floating debris and any floating oils (using oil-absorptive pads).

(v) Inspect resource and treatment buffers once a year for evidence of erosion, concentrating flow, and encroachment by development. If flows are concentrating within a buffer, site grading, level spreaders, or ditch turn-outs must be used to ensure a more even distribution of flow into a buffer. Check down slope of all spreaders and turn-outs for erosion. If erosion is present, adjust or modify the spreader's or turnout's lip to ensure a better distribution of flow into a buffer. Clean-out any accumulation of sediment within the spreader bays or turn-out pools.

(vi) Inspect at least once per year, each stormwater management pond or basin, including the pond's embankments, outlet structure, and emergency spillway. Remove and dispose of accumulated sediments in the pond. Control woody vegetation on the pond's embankments.

(vii) Inspect at least one per year, each underdrained filter, including the filter embankments, vegetation, underdrain piping, and overflow spillway. Remove and dispose of accumulated sediments in the filter. If needed, rehabilitate any clogged surface linings, and flush underdrain piping.

(viii) Inspect each manufactured system installed on the site, including the system's inlet, treatment chamber(s), and outlet at least once per year, or in accordance with the maintenance guidelines recommended by the manufacturer based on the estimated runoff and pollutant load expected to the system from the project. Remove and dispose of accumulated sediments, debris, and contaminated waters from the system and, if applicable, remove and replace any clogged or spent filter media.

(c) Regular maintenance

(i) Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Grading of gravel roads, or grading of the gravel shoulders of gravel or paved roads, must be routinely performed to ensure that stormwater drains immediately off the road surface to adjacent buffer areas or stable ditches, and is not impeded by accumulations of graded material on the road shoulder or by excavation of false ditches in the shoulder. If water bars or open-top culverts are used to divert runoff from road surfaces, clean-out any sediments within or at the outlet of these structures to restore their function.

(ii) Manage each buffer's vegetation consistently with the requirements in any deed restrictions for the buffer. Wooded buffers must remain fully wooded and have no disturbance to the duff layer. Vegetation in non-wooded buffers may not be cut more than three times per year, and may not be cut shorter than six inches.

NOTE: Contact the Department's Division of Watershed Management (Maine DEP) for assistance developing inspection and maintenance requirements for other drainage control and runoff treatment measures installed on the site. The maintenance needs for most measures may be found in the Maine DEP's "Stormwater Management for Maine: Best Management Practices."

(d) Documentation. Keep a log (report) summarizing inspections, maintenance, and any corrective actions taken. The log must include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, indicate where the sediment and debris was disposed after removal. The log must be made accessible to Department staff and a copy provided to the Department upon request. The permittee shall retain a copy of the log for a period of at least five years from the completion of permanent stabilization.

3. Re-certification. Submit a certification of the following to the Department within three months of the expiration of each five-year interval from the date of issuance of the permit.

(a) Identification and repair of erosion problems. All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.

(b) Inspection and repair of stormwater control system. All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system.

(c) Maintenance. The erosion and stormwater maintenance plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the Department, and the maintenance log is being maintained.

Municipalities with separate storm sewer systems regulated under the Maine Pollutant Discharge Elimination System (MPDES) Program may report on all regulated systems under their control as part of their required annual reporting in lieu of separate certification of each system. Municipalities not regulated by the MPDES Program, but that are responsible for maintenance of permitted stormwater systems, may report on multiple stormwater systems in one report.

4. Duration of maintenance. Perform maintenance as described and required in the permit unless and until the system is formally accepted by the municipality or quasi-municipal district, or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system. If a municipality or quasi-municipal district chooses to accept a stormwater management system, or a component of a stormwater system, it must provide a letter to the Department stating that it assumes responsibility for the system. The letter must specify the components of the system for which the municipality or district will assume responsibility, and that the municipality or district agrees to maintain those components of the system in compliance with Department standards. Upon such assumption of responsibility, and approval by the Department, the municipality, quasi-municipal district, or association becomes a co-permittee for this purpose only and must comply with all terms and conditions of the permit.

5. Additional requirements. Additional requirements may be applied on a site-specific basis.

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Erosion Control Notes

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

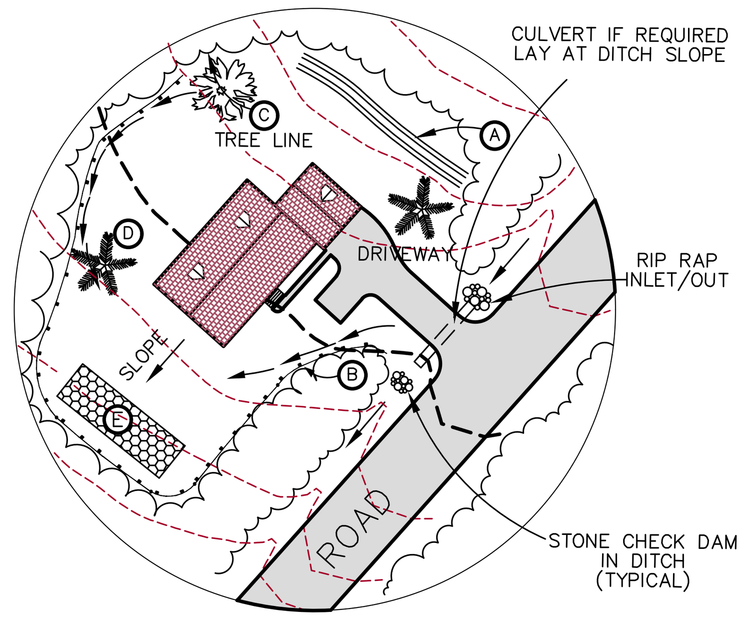
STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER

7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C16
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

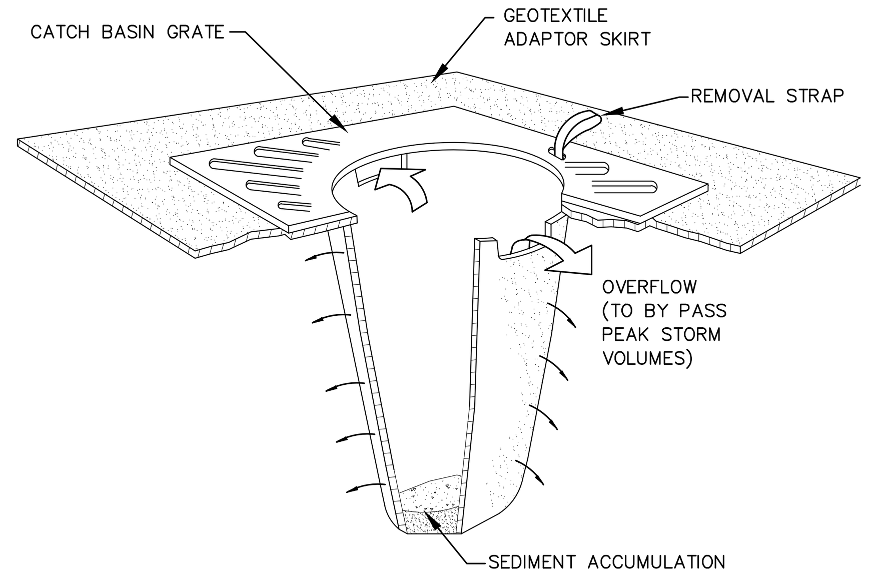


BUILDING SITE EROSION CONTROL

(TYPICAL DETAIL)

NOTES:
THIS SKETCH IS INDICATING THE INTENT OF THE SOIL EROSION MEASURES. ACTUAL SITE CONDITIONS AND LAYOUTS WILL VARY FROM SITE TO SITE. BUILDING CONTRACTORS MUST COMPLY WITH THE EROSION CONTROL NOTES SHOWN ON THESE DRAWINGS AND WITH THE "MAINE EROSION AND SEDIMENT CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES."

A.) CONSTRUCT DIVERSION DITCH TO KEEP UPSLOPE DRAINAGE AREA FROM ENTERING SITE.
B.) INSTALL SILT FENCE BELOW ALL DISTURBED AREAS.
C.) KEEP CLEARING TO A MINIMUM.
D.) RE-SEED ALL DISTURBED AREAS. SEE SEEDING NOTES.



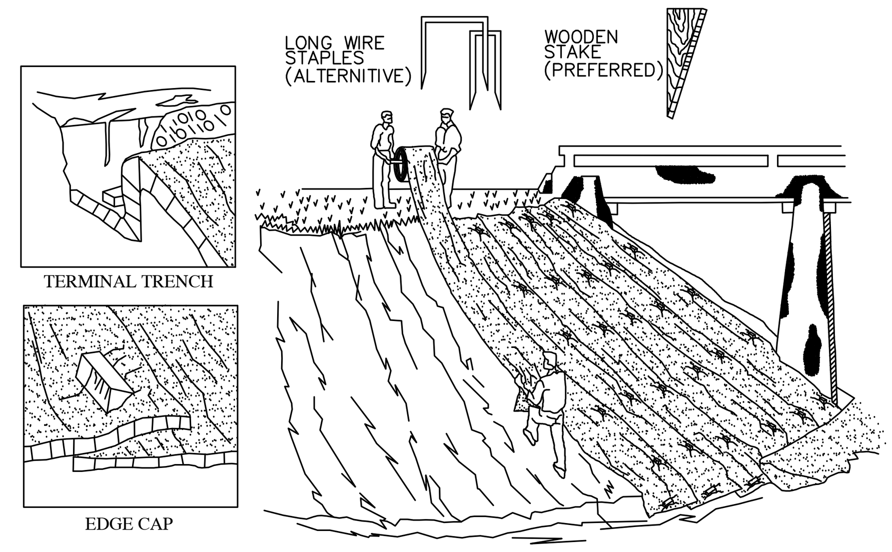
NOTES:
1. CATCH BASIN PROTECTION TO BE "SILTSTACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES).

2. INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN IN ACCORDANCE WITH MANUFACTURES SPECIFICATIONS.

3. INSTALL SILT SACK SEDIMENT BARRIER IN ALL CATCH BASIN AND MAINTAIN UNTIL PROJECT COMPLETION.

TEMPORARY INLET PROTECTION

NOT TO SCALE



-UNROLL MAT ONTO GROUND IN DIRECTION OF WATER FLOW.
-MAT SHOULD LIE FLAT. DO NOT STRETCH MAT OVER GROUND. STRETCHING MAY CAUSE MAT TO BRIDGE DEPRESSIONS IN THE SURFACE AND ALLOW EROSION UNDERNEATH.
-BURY TRANSVERSE TERMINAL ENDS OF MAT TO SECURE AND PREVENT EROSIVE FLOW UNDERNEATH.
-SECURE MAT SNUGLY INTO ALL TRANSVERSE CHECK SLOTS.
-BACKFILL AND COMPACT TRENCHES AND CHECK SLOTS AFTER STAKING THE MAT IN BOTTOM OF TRENCH.
-OVERLAP ROLL ENDS BY THREE (3) FEET (MIN.) WITH UPSLOPE MAT ON TOP TO PREVENT UPLIFT OF MAT END BY WATER FLOW. IF INSTALLING IN THE DIRECTION OF A CONCENTRATED WATER FLOW, START NEW ROLLS IN A TRANSVERSE DITCH.
-WOOD STAKES ARE RECOMMENDED FOR PINNING MAT TO THE GROUND SURFACE. STAKES SHOULD BE 1"x 3" NOMINAL STOCK CUT IN A TRIANGULAR SHAPE. STAKES SHOULD BE 12" TO 18" LONG, DEPENDING ON SOIL DENSITY.
-DRIVE WOODEN STAKES TO WITHIN THREE (3) INCHES OF GROUND SURFACE. DO NOT DRIVE FLUSH TO SURFACE.
-IN ALL TRANSVERSE TERMINAL TRENCHES AND CHECK SLOTS, STAKE EACH MAT AT IS CENTER AND OVERLAP EDGES BEFORE BACKFILLING AND COMPACTING.
-STAKE OVERLAPS LONGITUDINALLY AT THREE (3) TO FIVE (5) FOOT INTERVALS.

GENERAL INSTALLATION GUIDELINES
FOR EROSION CONTROL BLANKET

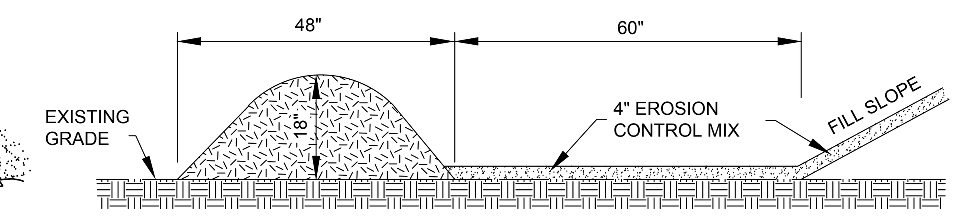
NOT TO SCALE

THE FILTER BERM SHALL CONSIST OF AN EROSION CONTROL MIX/BARK MULCH MIX OR RECYCLED COMPOSTED BARK FLUME GRIT AND FRAGMENTED WOOD GENERATED FROM WATER FLUME LOG HANDLING SYSTEMS. COMPARABLE COMPOSTED MIXES CAN BE USED UPON WRITTEN APPROVAL OF THE ENGINEER.

THE MIX SHALL CONFORM TO THE FOLLOWING: pH BETWEEN 5.0-8.0, PARTICLE SIZE - 100% PASSING THROUGH A 6" SCREEN AND 80% RETAINED ON A 3/4" SCREEN, SOLUBLE SALTS CONTENT SHALL BE LESS THAN 4.0 mmhos/cm.

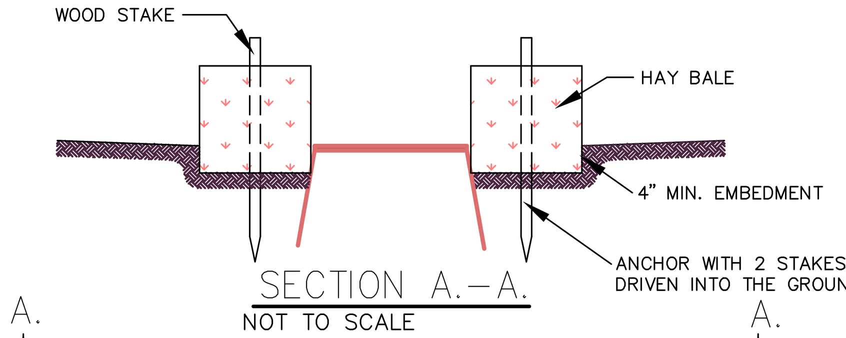
THE COMPOSTED BERM SHALL BE PLACED, UNCOMPACTED, ALONG A RELATIVELY LEVEL CONTOUR.

THE BERM MAY BE USED IN COMBINATION WITH SILT FENCE TO IMPROVE SEDIMENT REMOVAL AND PREVENT CLOGGING OF THE BERM BY LARGER SEDIMENT PARTICLES (SILT FENCE PLACED ON THE UPHILL SIDE OF BERM).



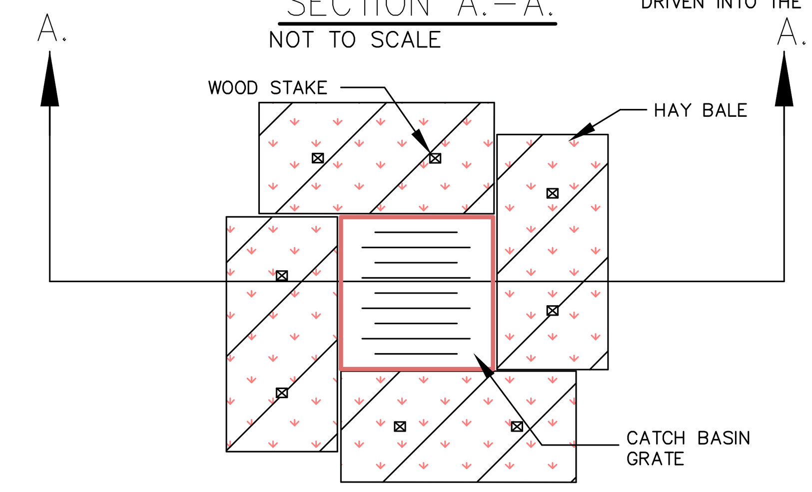
Erosion Control Mix Filter Berm

NOT TO SCALE



SECTION A.-A.

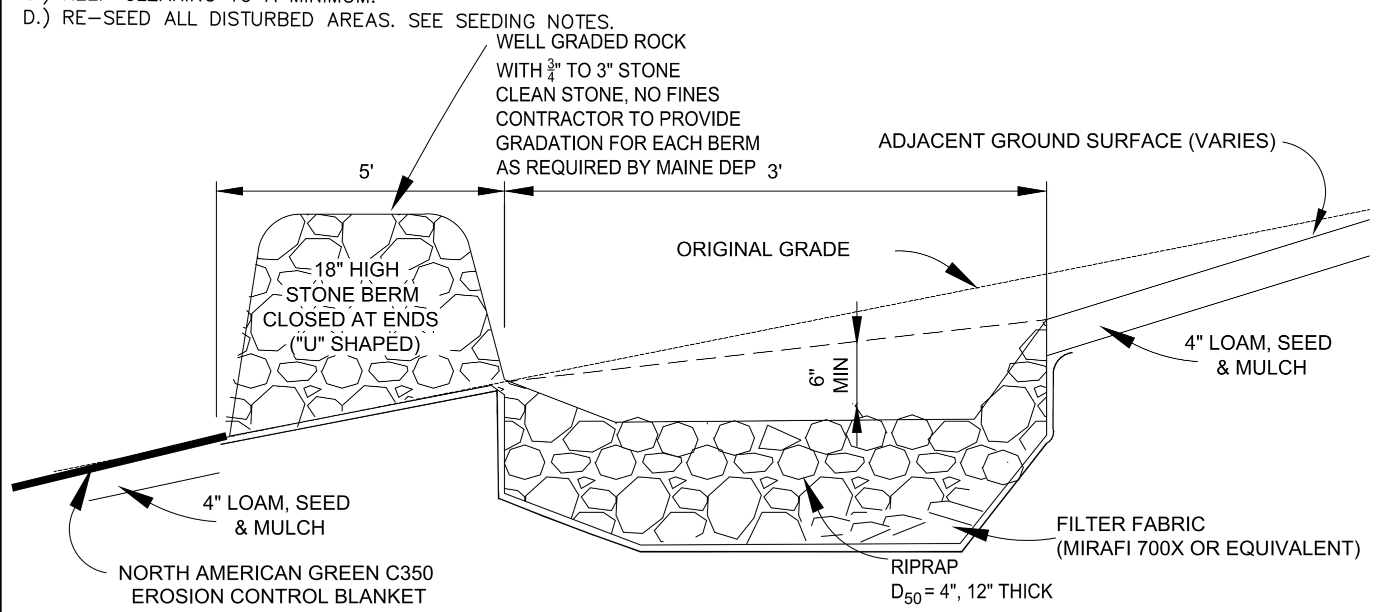
NOT TO SCALE



NOTE: INSTALL BARRIER AT EACH CATCH BASIN

CATCH BASIN
HAY BALE BARRIER
DETAIL

NOT TO SCALE



NOTE: THE DESIGN ENGINEER SHALL OVERSEE THE LOCATION AND INSTALLATON OF THE STONE BERM LEVEL SPREADER

THE STONE BERM SHALL BE INSTALLED ALONG THE CONTOUR TO THE EXTENT POSSIBLE

THE BERM MUST BE WELL-GRADED AND CONTAIN SOME SMALL STONE TO FORCE FLOWS TO SPREAD OUT BEHIND THE BERM

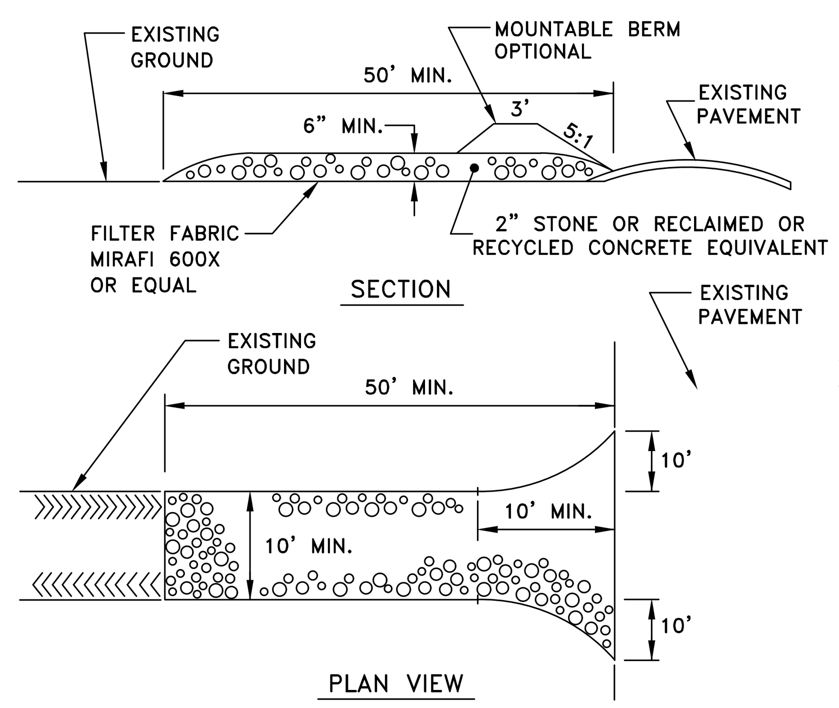
STONE BERM MUST BE AT LEAST 1.5' HIGH AND 2' ACROSS THE TOP WIDTH WITH 2:1 SIDE SLOPES.

SEE MAINE DEP BMP 5.2.2 BUFFER WITH STONE BERMED LEVEL LIP SPREADER

STONE BERM LEVEL SPREADER

NOT TO SCALE

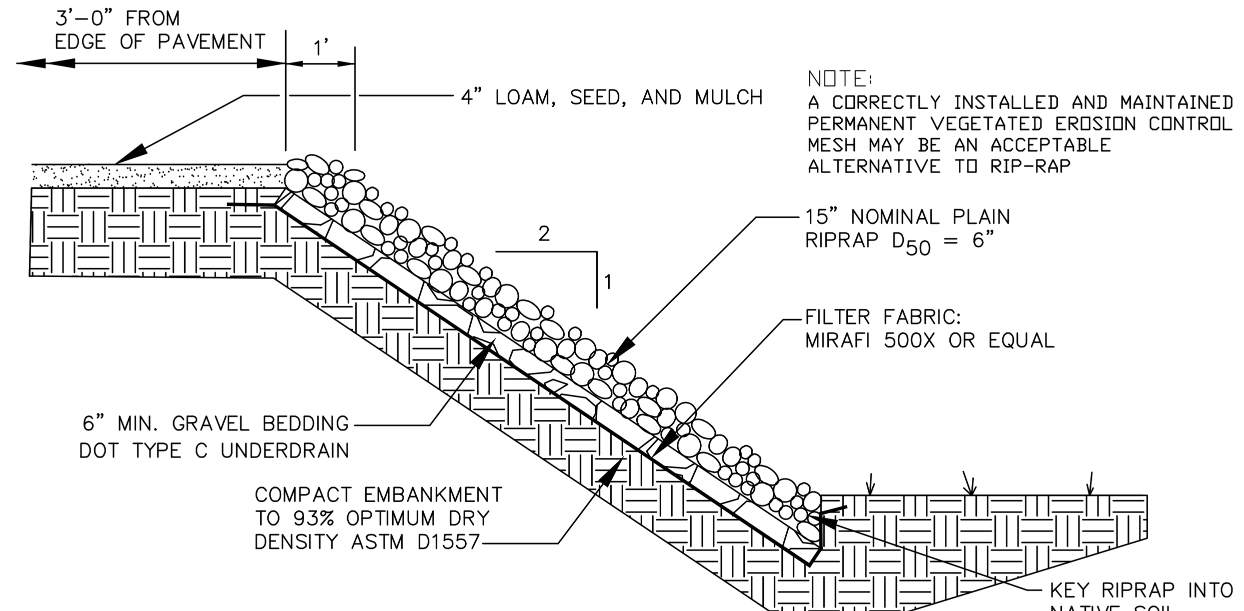
Construction Oversight:
"The applicant will retain the services of a professional engineer to inspect the construction and stabilization of the stone bermed level spreaders to be built on the site. The engineer shall inspect the stone berm material and its placement, and the upgradient conveyance structure construction. If necessary, the inspecting engineer will interpret the stone bermed level lip spreader's location and construction plan for the contractor. Once the stone bermed level lip spreaders are constructed and stabilized, the inspecting engineer will notifiJ the department in writing within 30 days to state that the level lips have 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, the items inspected on each visit, and include any testing data or sieve analysis data of the berm media."



NOTE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH AGGREGATE WHICH DRAINS INTO AN APPROVED SEDIMENT OR WATERWAYS.

STABILIZED CONSTRUCTION ENTRANCE

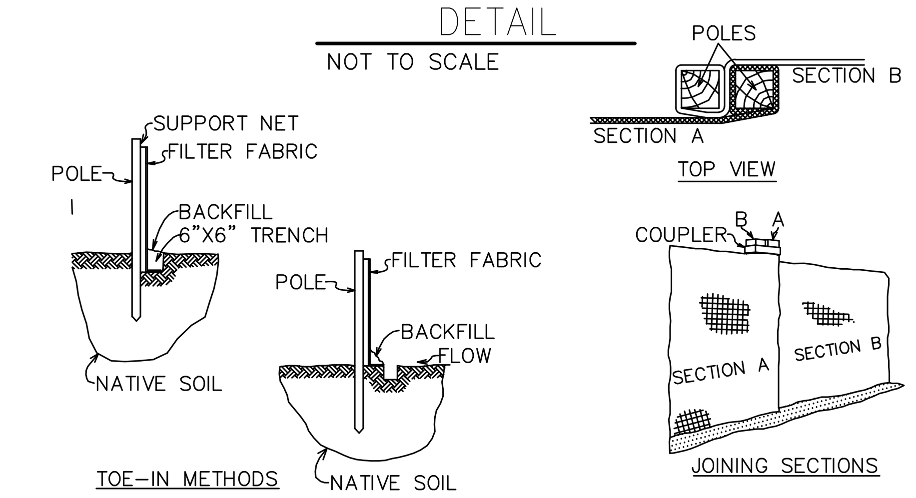
N.T.S.



NOTE:
A CORRECTLY INSTALLED AND MAINTAINED PERMANENT VEGETATED EROSION CONTROL MESH MAY BE AN ACCEPTABLE ALTERNATIVE TO RIP-RAP

RIPRAP SLOPE DETAIL

NOT TO SCALE

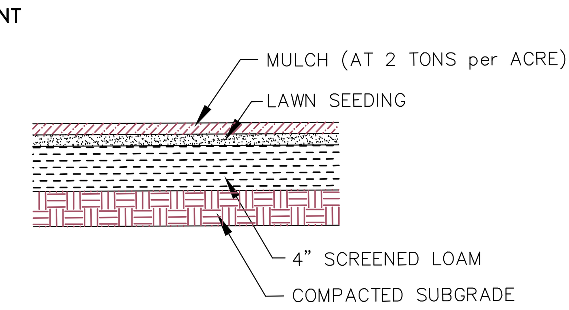


SILTATION FENCING

1. INSTALL DOWNSLOPE OF ALL CONSTRUCTION ACTIVITIES AS NECCESSARY.

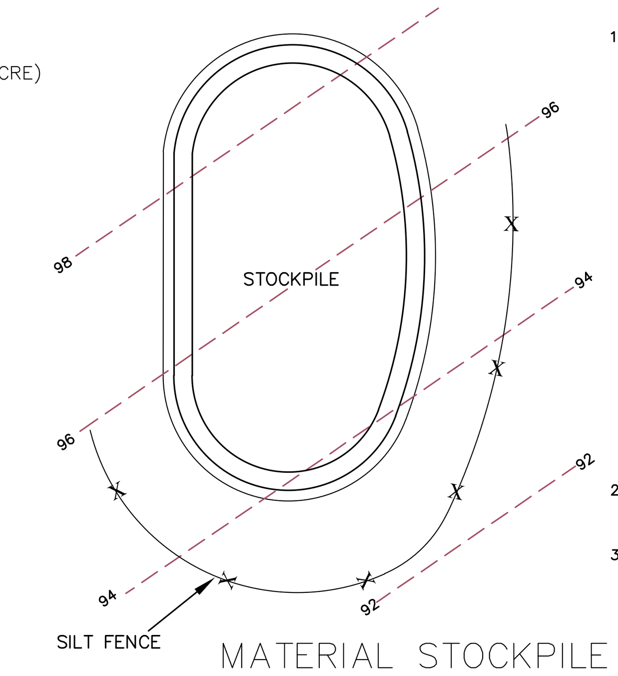
2. INSPECTION SHOULD BE FREQUENT AND REPAIR OR REPLACEMENT MADE PROMPTLY AS NEEDED. CHECK AFTER EACH RAINFALL.

3. BARRIERS SHOULD BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, BUT NOT BEFORE THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.



LOAM AND SEED

NOT TO SCALE



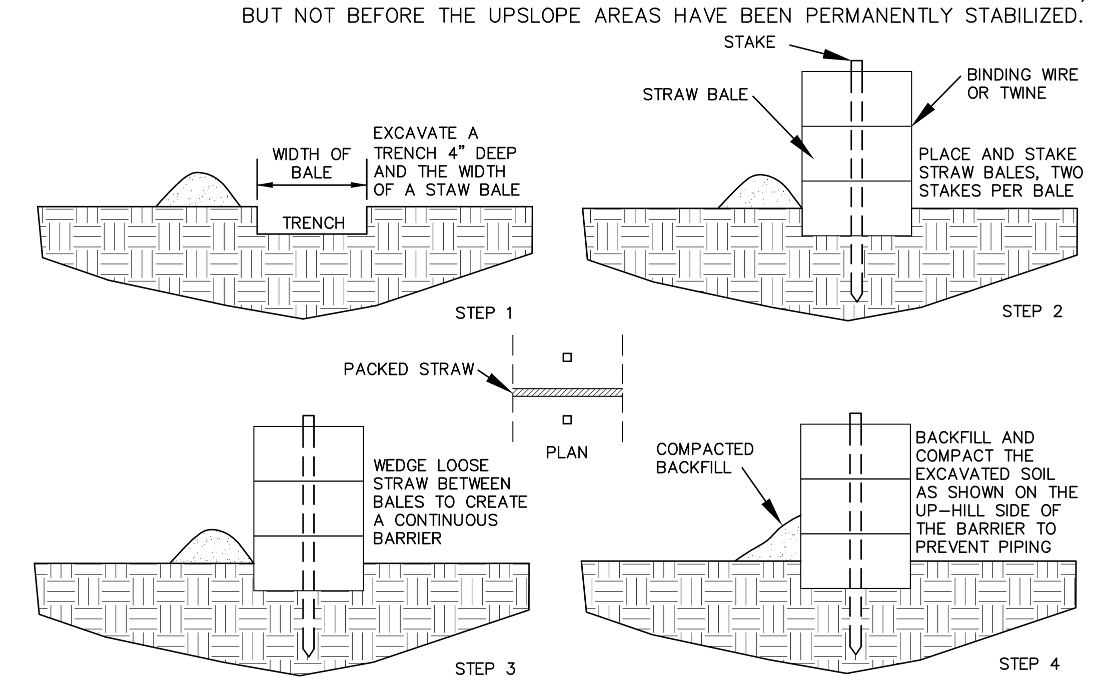
1) SEED TOPSOIL STOCKPILE WITH WINTER RYE AT THE RATE OF 3lbs PER 1000 sq.ft. BY OCTOBER 1st OF CONSTRUCTION SEASON. APPLY HAY MULCH AT THE RATE OF 100lbs PER 1000 sq,ft. OR APPLY A TACKIFIER BY HYDRO SEEDING METHODS AFTER SEEDING. MULCH SHALL BE REAPPLIED ON THE STOCKPILE IF GRASS GROWTH DOES NOT COVER AT LEAST 75% OF THE STOCKPILE SURFACE WITH SEEDLINGS AT LEAST 3" HIGH BY NOVEMBER 1st. THE USE OF RYE FOR STABILIZING STOCKPILES IS LIMITED TO TEMPORARY PILES STANDING NO LONGER THAN 1 YEAR OR CONSERVATION MIX FOR TIMES LONGER.

2) SILT FENCE TO BE INSTALLED PER THE SILT FENCE DETAIL.

3) ACCUMULATED SEDIMENTS WILL BE REMIXED INTO THE TOPSOIL.

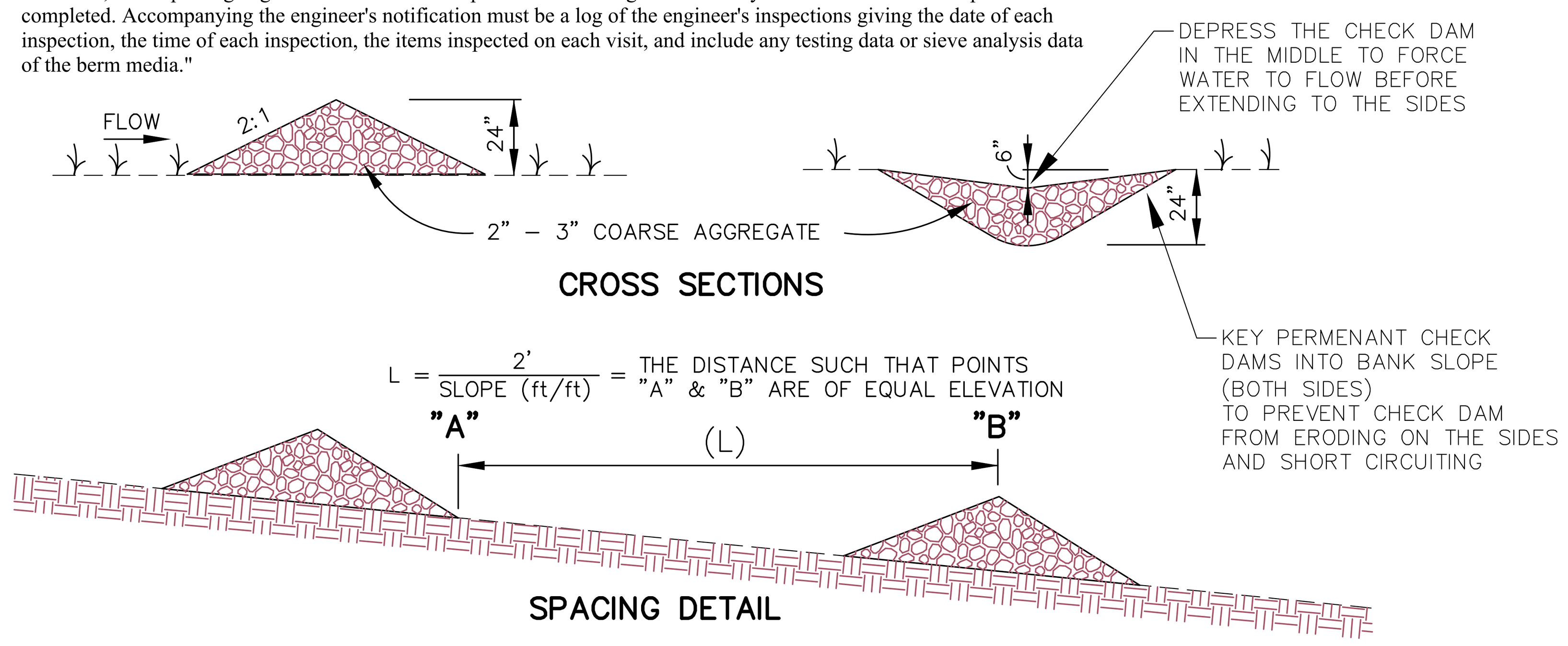
MATERIAL STOCKPILE
EROSION PREVENTION DETAIL

NOT TO SCALE



HAY BALE BARRIER
INSTALLATION IN DITCHES

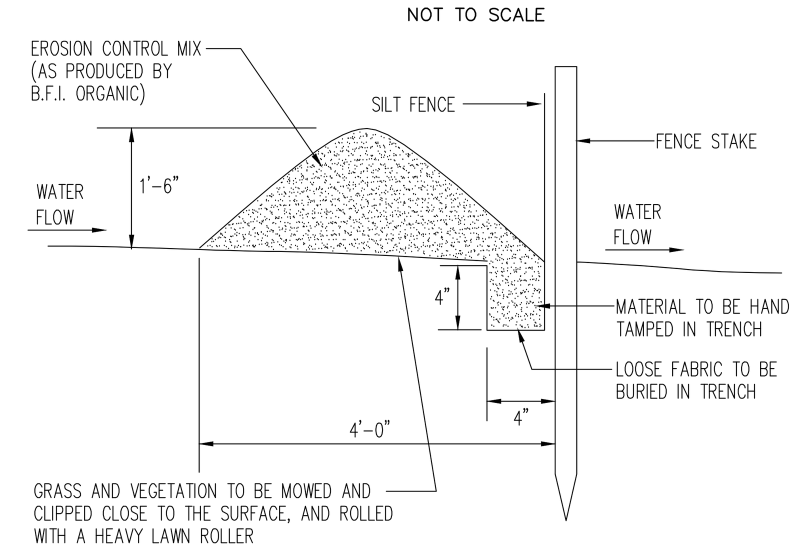
NOT TO SCALE



STONE CHECK DAM DETAILS

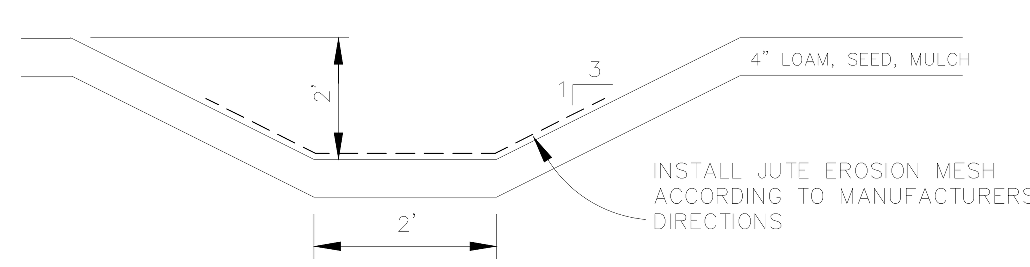
NOT TO SCALE

PROGRESS PLAN
NOT FOR CONSTRUCTION
THIS DOCUMENT IS ISSUED FOR INFORMATIONAL PURPOSES ONLY. THE DATA SHOWN HEREON IS SUBJECT TO REVISION.



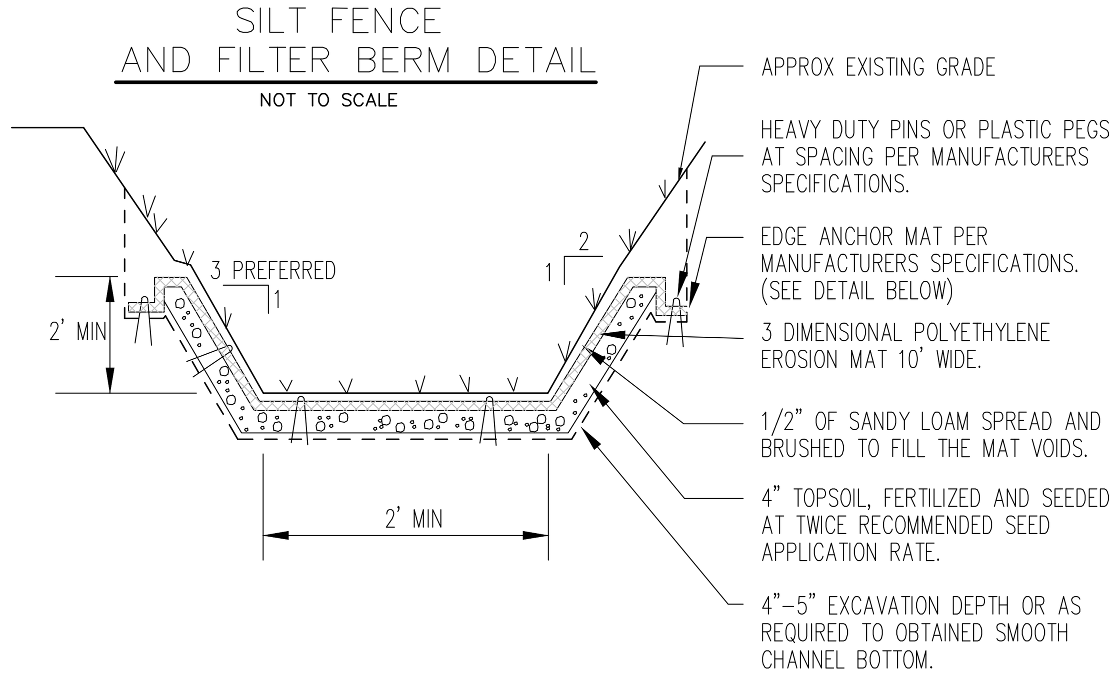
SILT FENCE
AND FILTER BERM DETAIL

NOT TO SCALE



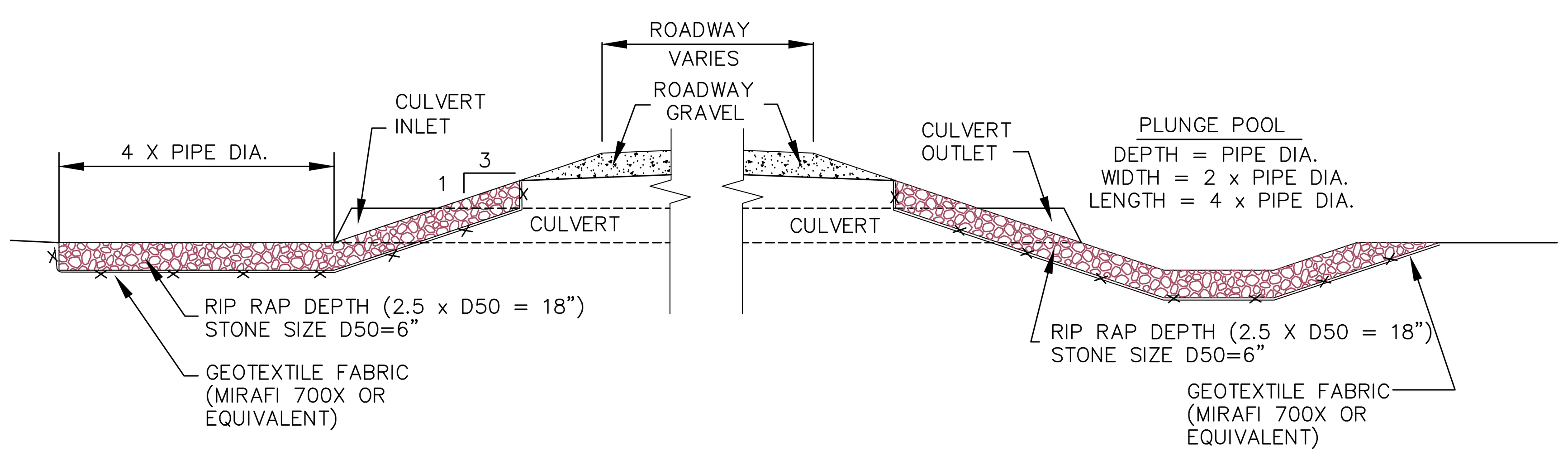
GRASSED DITCH CROSS SECTION

NOT TO SCALE



EROSION MAT
INSTALLATION IN DITCHES

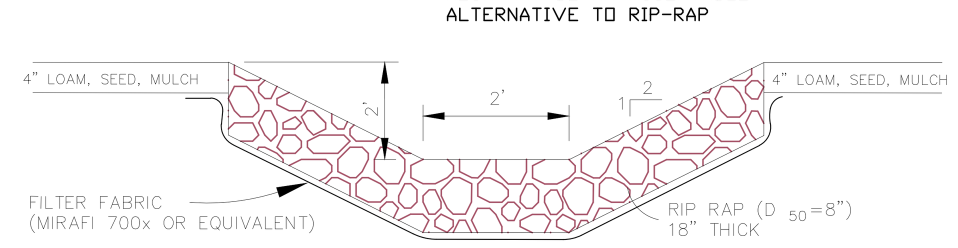
NOT TO SCALE



TYPICAL CULVERT INLET & OUTLET DETAIL

NOT TO SCALE

NOTE:
A CORRECTLY INSTALLED AND MAINTAINED PERMANENT VEGETATED EROSION CONTROL MESH MAY BE AN ACCEPTABLE ALTERNATIVE TO RIP-RAP



RIP RAP DITCH CROSS SECTION

NOT TO SCALE

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Erosion Control Details

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE:	SHEET: C17
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

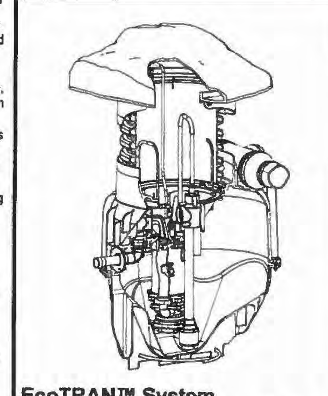
EcoTRAN™ System
Simplex

BARNES® PRESSURE SYSTEMS
www.cranepumps.com

EcoTRAN™ System

Specifications:
inches (mm)

- **BASIN** ..... Engineered Polypropylene Copolymer, 2-piece construction, factory assembled with preformed corrosion resistant rebar installed. Includes POD for pump support and orientation
- **RISER** ..... HDPE 18" Dia. (457mm) corrugated drainpipe, day-of-installation adjustment sets basin depth [limit 9ft. 6inches (2.9m) to bottom of basin]
- **DISCHARGE OUTLET** ..... 1-1/4" NPT Flexible, stainless steel. Connects to a basin mounted bronze tank receiver.
- **INLET** ..... 3 positions, 4" (Sch 40/80 or SDR35) Flexible Inlet Flange (For Field Installation)
- **COVER** ..... Rock-Shaped Polyethylene Cover, interlocking with Riser Adapter, vented or unvented. Keyed lock included. Load rating of 150 lb per sq ft.
- **ALARM BOX** ..... Model1500 Alarm Panel, NEMA 4X Non-metallic Enclosure with Keyed Lock, Alarm Light, Alarm Horn w/Push Button, Pump and Alarm Circuit Breakers
- **DIRECT BURIAL CABLE** ..... 12/5 Type TC, STOOW Round U.L. Listed. 30ft (9m) length standard
- **MOVEABLE DISCHARGE FITTING w/ CHECK VALVE:** (Removed with Pump)
  - *Housing* ..... Powder Coated Cast Iron
  - *Diaphragm* ..... Fiber Reinforced Neoprene
  - *Flapper* ..... Fiber Reinforced Nitrile
  - *Size* ..... 1-1/4" Full Port
  - *Valve Seat* ..... Bronze
- **BALL VALVE:** ..... Toggle actuated via polypropylene harness from top side, removable without basin entry
  - *Material* ..... Bronze, with Stainless Steel ball & stem, and Teflon seats
  - *Size* ..... 1-1/4" Full Port
- **LIFTING HARNESS** ..... 1/8" x 3/4" Polypropylene (POD). 1/2" Dia. Polypropylene (PUMP) Breaking strength 3750 lbs.
- **HARDWARE** ..... 300 Series Stainless Steel
- **LEVEL CONTROL** ..... ESPS™ – Environmentally sealed pressure switch with CPVC housing, Nitrile diaphragm, Custom molded quick connect for sealing and strain relief.
- **ANTI-SIPHON** ..... Integral to cast iron motor housing
  - *Flapper* ..... Fiber Reinforced Nitrile
  - *Seat* ..... Valox with stainless steel rivet
- **PUMP** ..... OGP2022CE (Std), 240 Volt, 1 Phase
- **OPTIONS** ..... Direct Burial Cable lengths, Rock Cover Vented or Flood Plain, Depth, OGVF2022CE Pump, Model 1550 Alarm Panel w/Generator Receptacle



EcoTRAN™ System
For use with OGP and OGV pumps, 1¼" NPT

Vented 52"-74" Depth
Vented 76"-114" Depth
Flood Plain 52"-74" Depth
Flood Plain 76"-114" Depth

This product may be covered by one or more of the following patents and other patent(s) pending: US Patent 7,357,341 & US Patent 7,578,657

LR16567 NSF 46

CERTIFIED TO NSF / ANSI 46

BARNES® ECOTRAN SYSTEM

UL LISTED BASIN ASSEMBLY E151664 2N87 UL1951

CRANE PUMPS & SYSTEMS
A Crane Co. Company USA: (937) 778-8947 • Canada: (905) 457-6223 • International: (937) 615-3598

SECTION ECO
PAGE 1
DATE 10/09

6-23-14

EcoTRAN™ System
Simplex

BARNES® PRESSURE SYSTEMS
www.cranepumps.com

EcoTRAN™ System

1. Depth
52"-74" (1.3m-1.8m) Vented
76"-114" (1.9m-2.9m) Vented
52"-74" (1.3m-1.8m) Flood Plain
76"-114" (1.9m-2.9m) Flood Plain

2. Pump Type (240V / 1 Phase)
2 HP OGP2022CE (STD.)
2 HP OGVF2022CE

3. Direct Burial Cable Length
30 Feet (STD.)
50 Feet
100 Feet

4. Rock Cover Options (Select One)
Sandstone
Flood Plain, Sandstone

5. Alarm Box Options
Model 1500 w/Alarm Light, Horn, Silence Button & Circuit Breaker
Model 1550, includes 1500 features, Plus Generator Receptacle and Automatic Transfer Switch

NOTES!

1. Unit shipped boxed complete including Basin Package, Pump, Level Control and Alarm Box (Riser shipped separately).
2. Riser depth can be shortened in the field during installation.
3. All moving parts and seals serviceable from ground level without entry into the basin.

CRANE PUMPS & SYSTEMS
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SECTION ECO
PAGE 3
DATE 12/08

EcoTRAN™ System
Simplex

BARNES® PRESSURE SYSTEMS
www.cranepumps.com

Short Set EcoTRAN Package - Vented Cover

Direct Burial Cable Length	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	122848	NS	122854	CF	122851	NS	122857	CF
50 Ft.	122849	NS	122855	CF	122852	NS	122858	CF
100 Ft.	122850	NS	122856	CF	122853	NS	122859	CF

Long Set EcoTRAN Package - Vented Cover

Direct Burial Cable	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	124146	NS	124152	CF	124149	NS	124155	CF
50 Ft.	124147	NS	124153	CF	124150	NS	124156	CF
100 Ft.	124148	NS	124154	CF	124151	NS	124157	CF

~~Short Set EcoTRAN Package - Non-Vented Cover~~

Direct Burial Cable	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	122860	CF	122866	CF	122863	CF	122869	CF
50 Ft.	122861	CF	122867	CF	122864	CF	122870	CF
100 Ft.	122862	CF	122868	CF	122865	CF	122871	CF

Long Set EcoTRAN Package - Non-Vented Cover

Direct Burial Cable	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	124158	CF	124164	CF	124161	CF	124167	CF
50 Ft.	124159	CF	124165	CF	124162	CF	124168	CF
100 Ft.	124160	CF	124166	CF	124163	CF	124169	CF

SECTION ECO
PAGE 2
DATE 12/08

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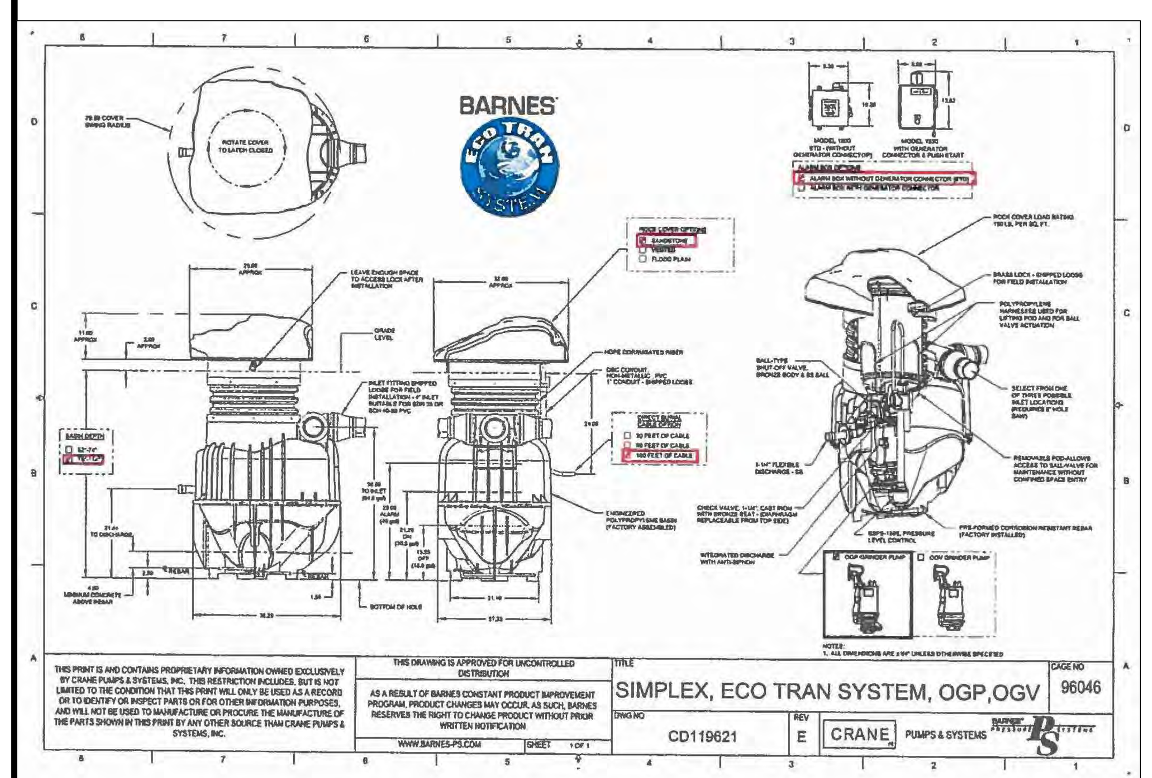
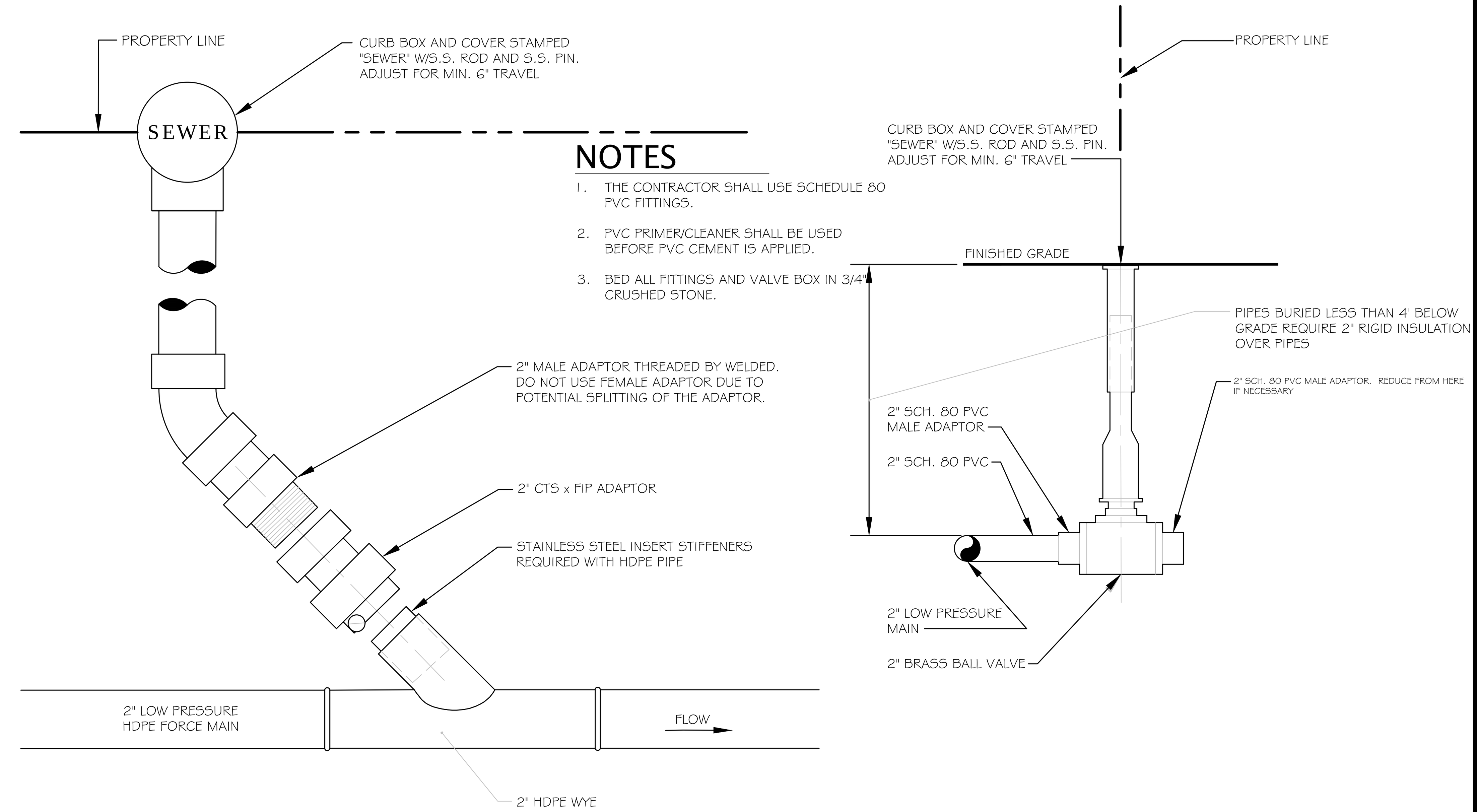




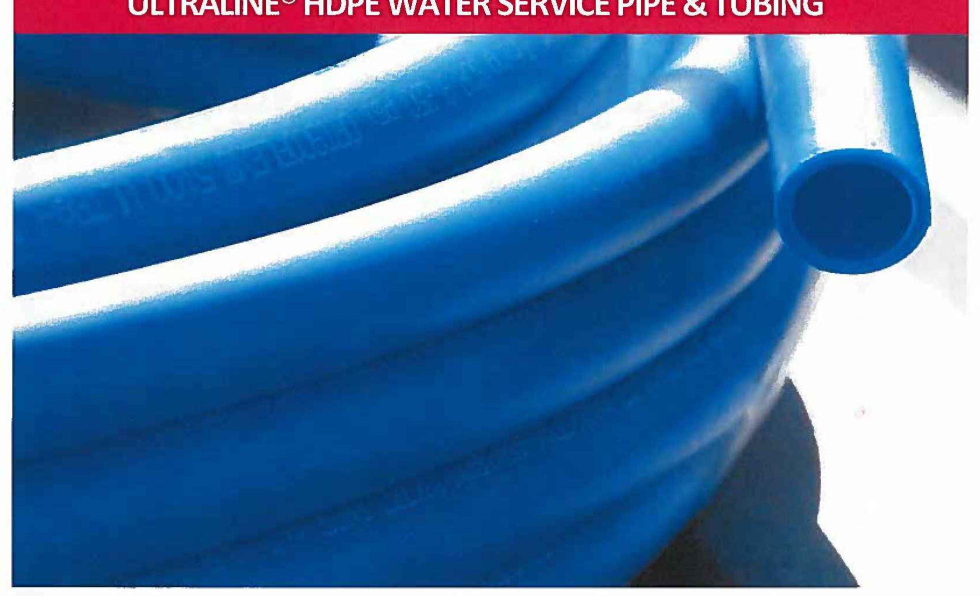
NOTES

1. THE CONTRACTOR SHALL USE SCHEDULE 80 PVC FITTINGS.
2. PVC PRIMER/CLEANER SHALL BE USED BEFORE PVC CEMENT IS APPLIED.
3. BED ALL FITTINGS AND VALVE BOX IN 3/4" CRUSHED STONE.

PLAN VIEW

PROFILE VIEW

LOW PRESSURE SEWER CONNECTION SERVICE DETAIL
NOT TO SCALE



PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

ULTRALINE® HDPE WATER SERVICE PIPE & TUBING

DRISCOPLEX® 5100 ULTRALINE® WATER SERVICE PIPE & TUBING
Produced to AWWA C901 from PE4710 HDPE
Certified to NSF 14 / NSF 61
Certified to ISO 9001

Available in ASTM D2239 SIDR ID sizes
ASTM D2737 CTS sizes
ASTM D3350 IPS OD sizes

AWWA MEMBER — NSF

When Performance Matters Rely on *Performance Pipe*

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PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

ULTRALINE® HDPE WATER SERVICE PIPE & TUBING

ASTM D2239 Inside Diameter Controlled HDPE Pipe (IPS / SIDR)

SIZE	SIDR	NOMINAL OD / ID	COIL LENGTH / PALLET QTY	COIL LENGTH / PALLET QTY	WEIGHT LB/100FT	PRESSURE CLASS
3 / 4 "	7	1.074 / .824	100' / 1800'	400' / 4000'	16	250 psi
1"	7	1.367 / 1.049	100' / 1800'	300' / 2400'	25	250 psi
1 – 1 / 4 "	7	1.798 / 1.380	100' / 1500'	300' / 2100'	43	250 psi
1 – 1 / 2 "	7	2.098 / 1.610	100' / 1400'	300' / 1800'	59	250 psi
2 "	7	2.692 / 2.067	100' / 1000'	300' / 2100'	97	250 psi

ASTM D2737 Outside Diameter Controlled HDPE Tubing (CTS)

SIZE	SDR	NOMINAL OD / ID	COIL LENGTH / PALLET QTY	COIL LENGTH / PALLET QTY	WEIGHT LB/100FT	PRESSURE CLASS
3 / 4 "	9	0.875 / 0.669	100' / 1800'	500' / 7500'	10	250 psi
1"	9	1.125 / 0.860	100' / 1600'	300' / 4200'	17	250 psi
1 – 1 / 4 "	9	1.375 / 1.051	100' / 1400'	300' / 2400'	26	250 psi
1 – 1 / 2 "	9	1.625 / 1.241	100' / 1300'	300' / 2400'	36	250 psi
2 "	9	2.125 / 1.625	100' / 1300'	300' / 2700'	61	250 psi

ASTM D3035 Outside Diameter Controlled HDPE Pipe (IPS/SDR)

SIZE	SDR	NOMINAL OD / ID	COIL LENGTH / PALLET QTY	COIL LENGTH / PALLET QTY	WEIGHT LB/100FT	PRESSURE CLASS
3/ 4 "	11	1.050"/0.849"	150' / 1800'	500' / 3500'	13	200 psi
1"	11	1.315"/1.061"	150' / 1800'	500' / 3000'	20	200 psi
1-1/4"	11	1.660"/1.358"	150'/ 1500'	500' / 6000'	31	200 psi
1-1/2"	11	1.900"/1.554"	250'/ 2500'	500' / 4000'	41	200 psi
2"	13.5	2.375"/2.002"	150' / 1800'	500' / 3500'	53	160 psi
2"	11	2.375"/1.917"	150' / 1800'	500' / 3500'	64	200 psi
3"	17	3.500"/3.063"	250' / 1750'	1000' / 2000'	94	125 psi
3"	13.5	3.500"/2.951"	250' / 1750'	1000' / 2000'	116	160 psi
3"	11	3.500"/2.826"	250' / 1750'	1000' / 2000'	140	200 psi

Contact your Performance Pipe representative for additional sizes and information.

Performance Pipe Ultraline® Water Service Pipe and Tubing is intended for applications to 80°F, contact Performance Pipe for guidance on operating at higher temperatures.

See the PPI 'Field Service Manual for Municipal Water' for installation guidance. Available as a free download at www.PerformancePipe.com in the Water/Wastewater section.

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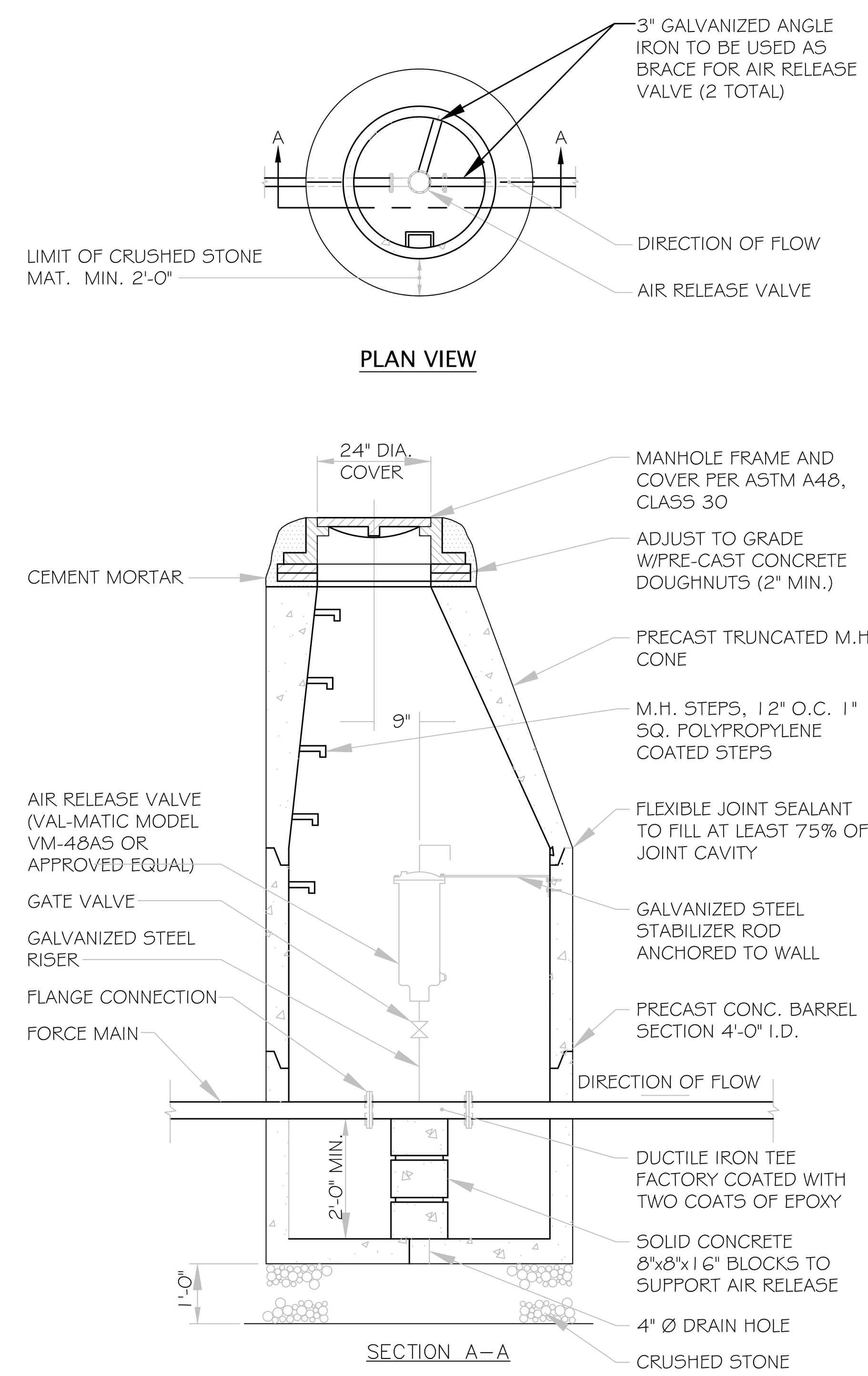

AIR RELEASE MANHOLE
NOT TO SCALE

No.	Date	Revision	By
6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
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2.	2-7-2018	SUBMIT TO MAINE DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Low Pressure Sewer Pump Details

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

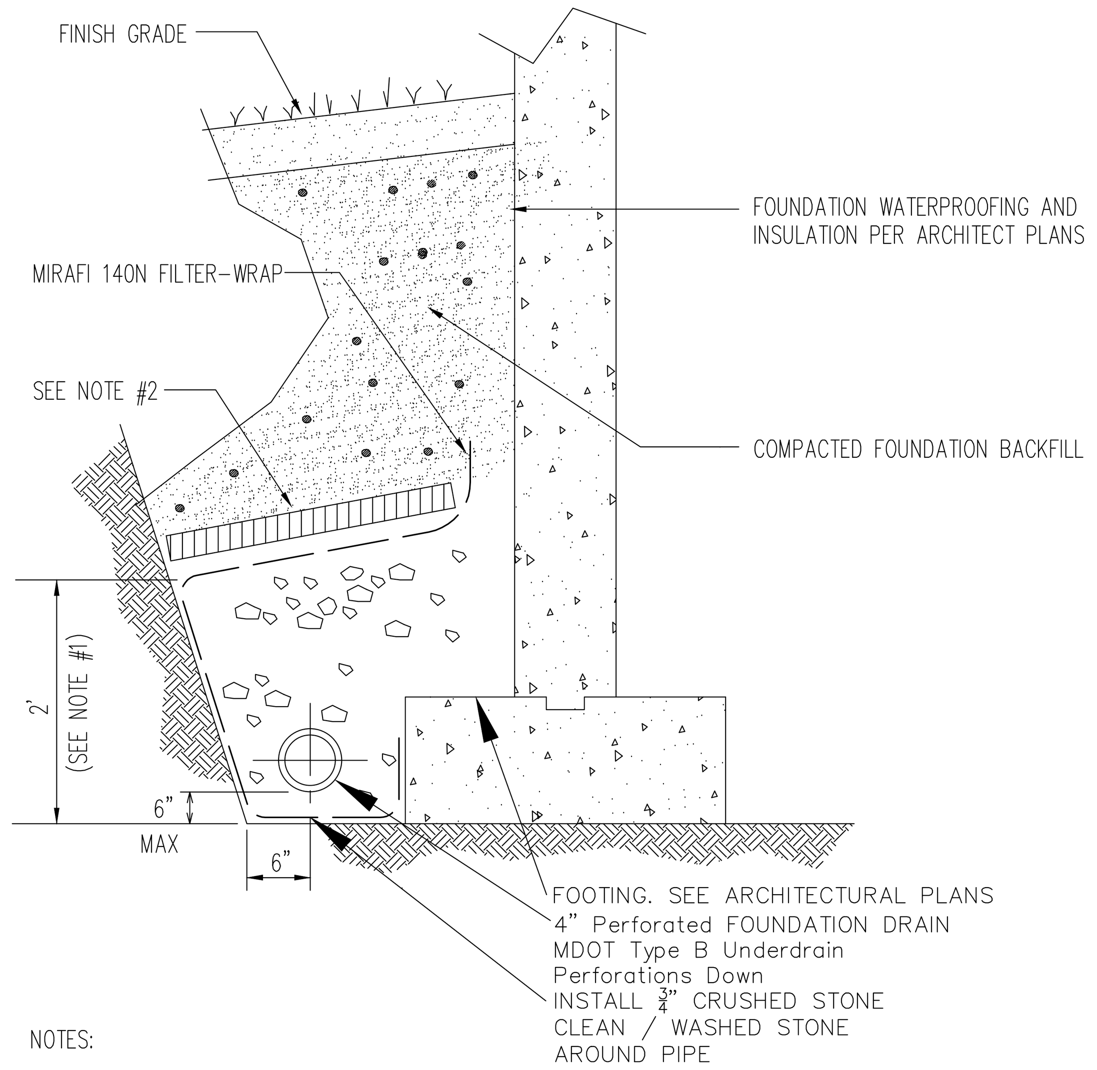
Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330 Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C18
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

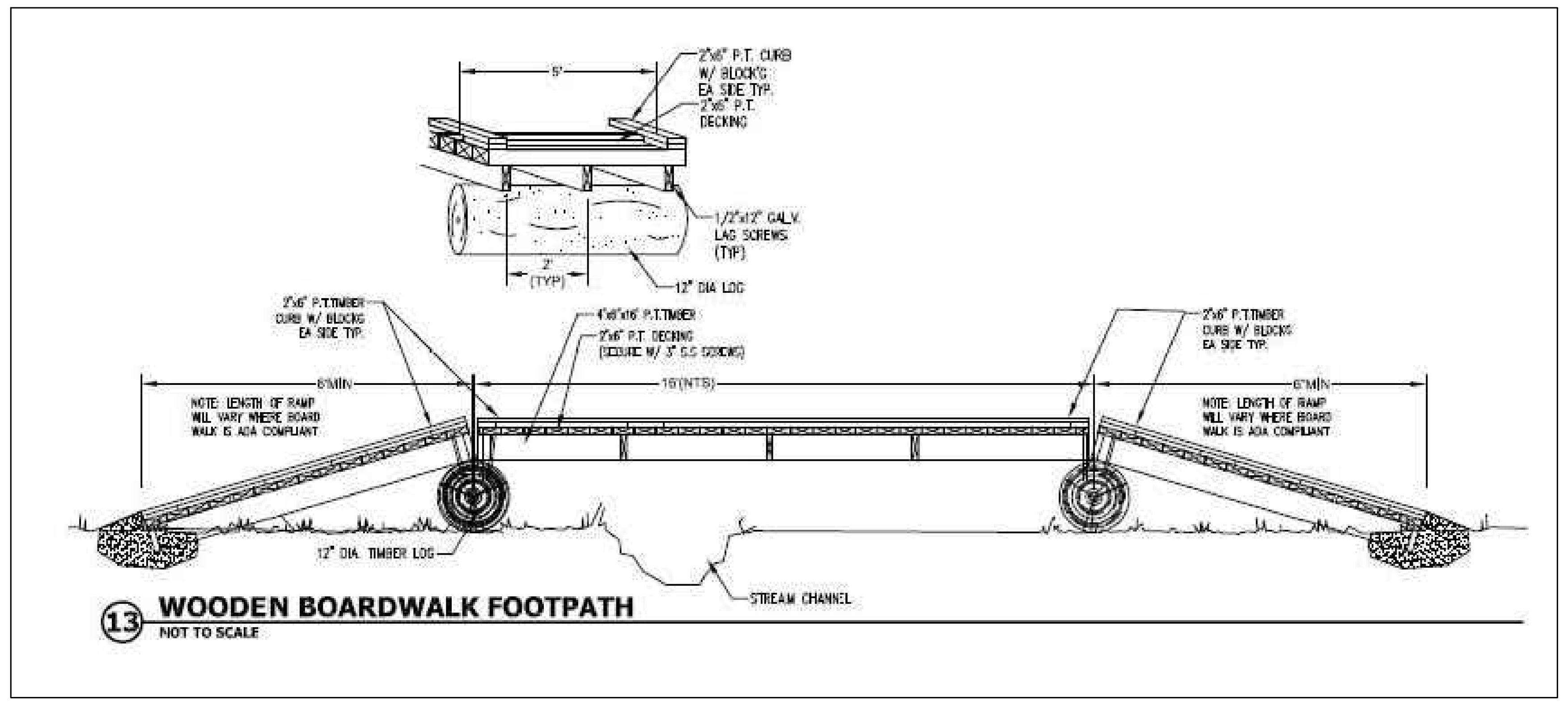


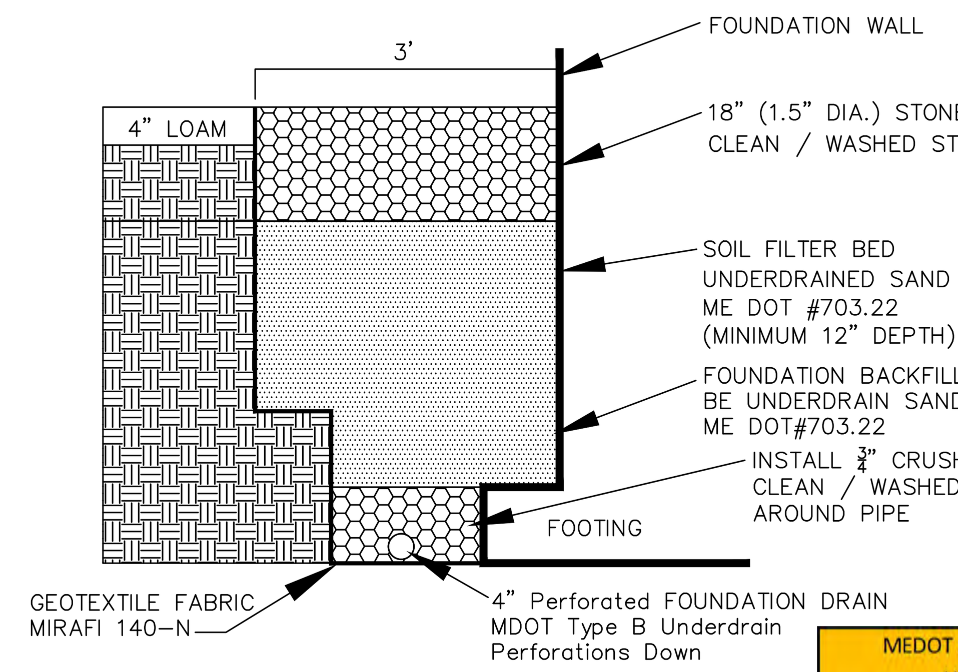
NOTES:

1. IN LEDGE THIS DEPTH MAY BE REDUCED IF FINISH GRADE IS LESS THAN 2 FT ABOVE FOOTING.
2. PROVIDE POLYSTYRENE INSULATION BOARD OVER PIPE WHERE COVER IS LESS THAN 4 FT AND/OR AS NOTED ON PLANS.
3. SEE PLANS FOR LOCATIONS OF DRAINBOARD AND PERIMETER DRAINS.

PERIMETER OR FOUNDATION DRAIN DETAIL

NOT TO SCALE ST-UD-FOUND/02-97





ROOF DRIPLINE BMP DETAIL

NOT TO SCALE OV @ CUMBERLAND SENIOR HOUSING

MEDOT Specifications for Underdrains (ME DOT #703.22)	
Sieve Size	% Passing by Weight
Underdrain Type B	
1"	90-100
1/2"	75-100
#4	50-100
#20	15-80
#50	0-15
#200	0-5
Underdrain Type C	
1"	100
3/4"	90-100
3/8"	0-75
#4	0-25
#10	0-5

CONSTRUCTION OVERSIGHT ROOF DRIPLINE INSTALLATION

The Contractor will retain the services of a professional engineer of the clients choosing to inspect the construction and stabilization of all stormwater management structures to be built as part of the project. If necessary, the inspecting engineer will interpret the construction plans 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 structures have been completed. Accompanying the engineer's notification must be a copy of the test results for any soil fill, aggregate, or mulch materials used in the construction of the stormwater management structures and 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.

Roof Dripline Filtration

Construction inspections: At a minimum, the professional engineer's inspection will occur after foundation soil preparation but prior to placement of the geotextile lining, after the foundation drain pipe is installed but not yet backfilled, after the pipe bedding gravel is placed but prior to the placement of the gravel filter media, after the gravel filter media has been placed but prior to installing the crushed stone surface layer, and after the surface crushed stone surface layer is installed.

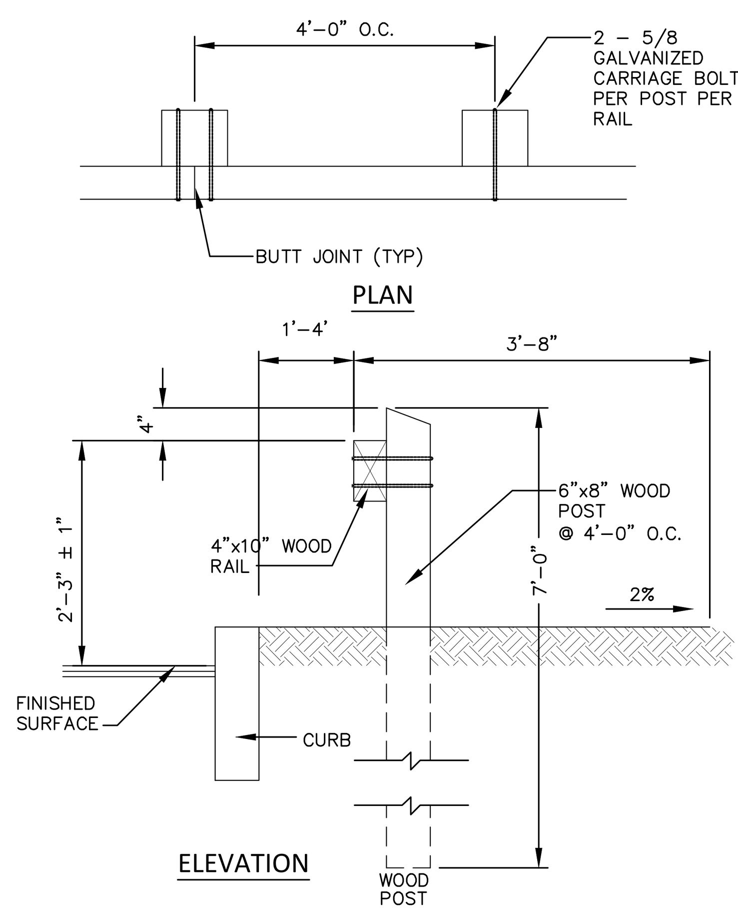
Testing and submittals: The gravel filter media and pipe bedding media used in the roof dripline filtration BMP must be confirmed as suitable by testing. The contractor shall identify the source of these gravels and obtain samples for testing. All testing must be done by a certified laboratory. All results of field and laboratory testing shall be submitted to the project engineer for confirmation. It shall be the contractor's responsibility to ensure completion of the following sampling and testing before the gravel is placed as part of the dripline filter's construction.

- Obtain a sample of the gravel filter media. The sample must be a composite of three different locations (grabs) from the gravel stockpile. The sample size required will be determined by the testing laboratory. Perform a sieve analysis conforming to ASTM C136 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 1996A) of the sand filter media showing it meets the following gradation:

Sieve Size	% Passing by Weight
3"	100
#200	4-7

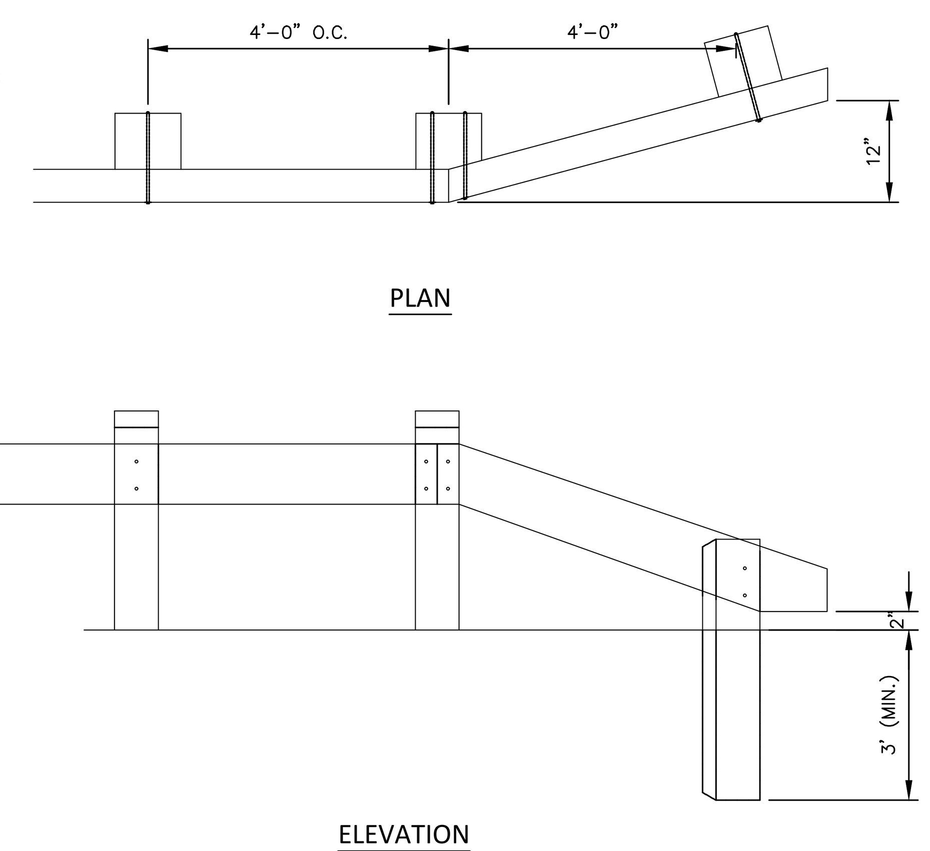
- If the underdrain pipes will be bedded in gravel, obtain a sample of the gravel fill to be used for the pipe bedding. The sample must be a composite of three different locations (grabs) from the stockpile or pit face. The sample size required will be determined by the testing laboratory. Perform a sieve analysis conforming to ASTM C136 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 1996A) of the gravel to be used for the underdrain pipe bedding. The gravel fill must conform to MEDOT specification 703.22 Underdrain Type B.

If the underdrain pipes will be bedded in crushed stone, obtain a sample of the crushed stone to be used for the pipe bedding. The sample must be a composite of three different locations (grabs) from the stockpile. The sample size required will be determined by the testing laboratory. Perform a sieve analysis conforming to ASTM C136 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 1996A) of the crushed stone to be used for the underdrain pipe bedding. The crushed stone fill must conform to MEDOT specification 703.22 Underdrain Type C.



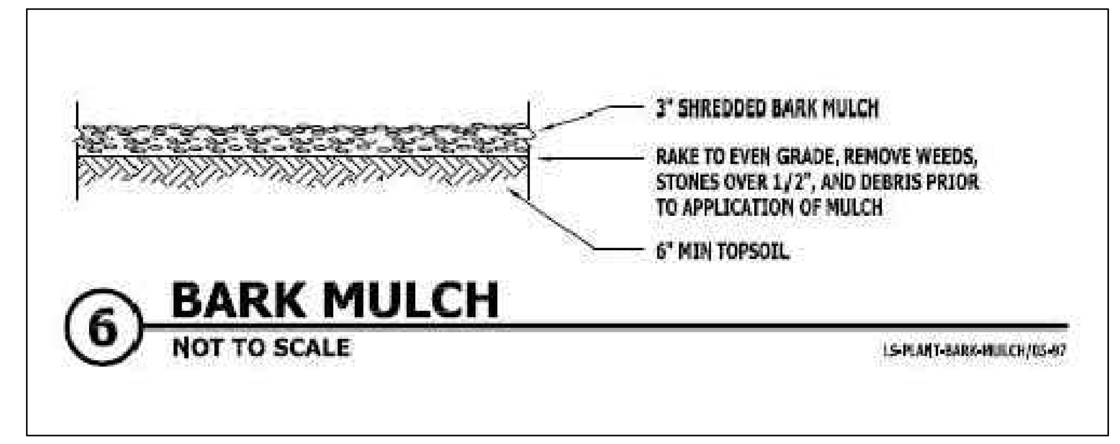
WOOD GUARD RAIL

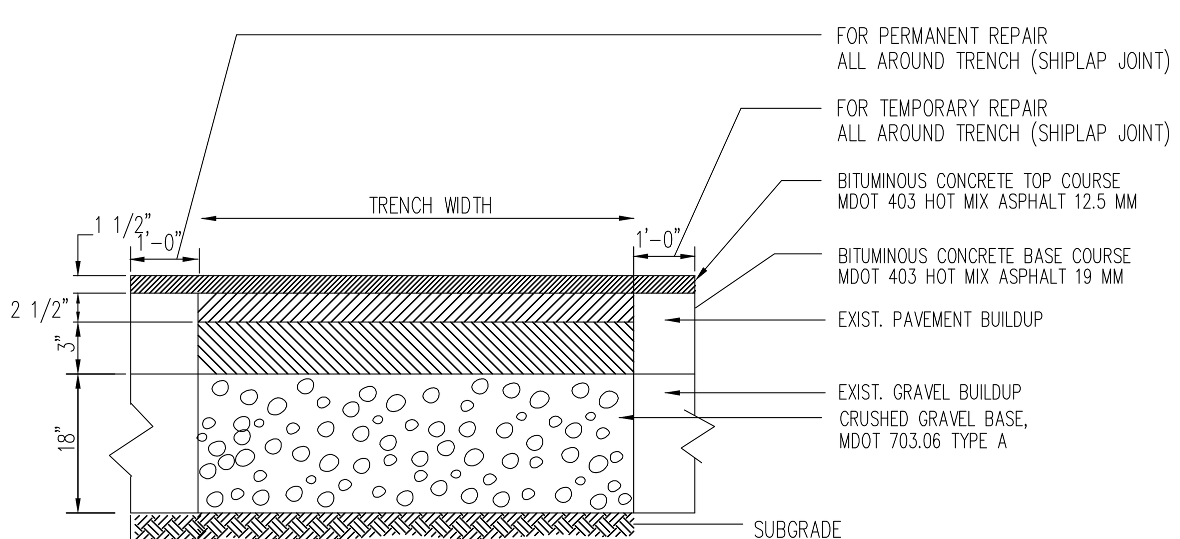
NOT TO SCALE



WOOD GUARD RAIL- TAPERED END

NOT TO SCALE

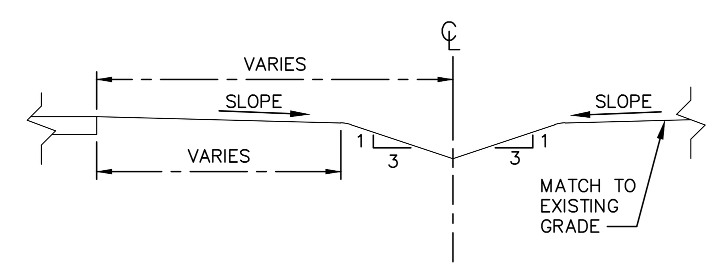




NOTE:
TRENCH REPAIR TO MEET TOWN OF CUMBERLAND DPW REQUIREMENTS

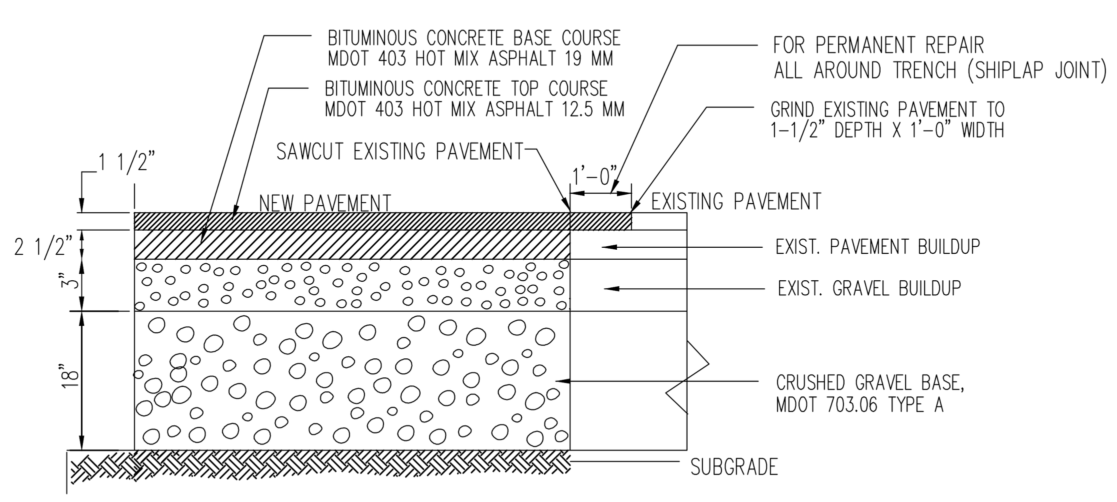
TRENCH REPAIR
BITUMINOUS CONCRETE

NOT TO SCALE



TYPICAL DRAINGE SWALE

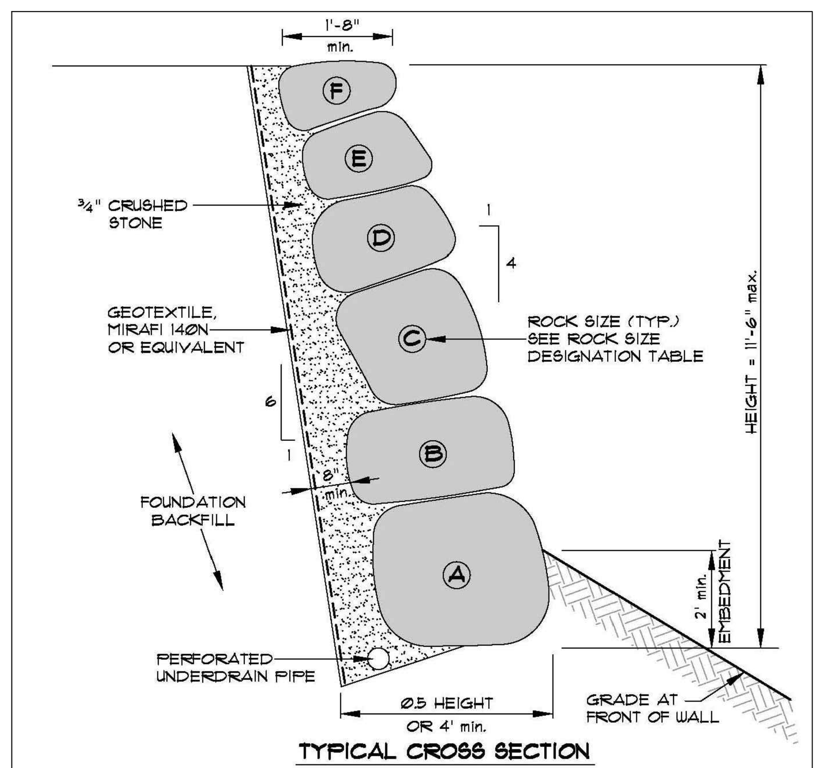
N.T.S.



NOTE:
TRENCH REPAIR TO MEET TOWN OF CUMBERLAND DPW REQUIREMENTS

PAVEMENT BUTT JOINT DETAIL
BITUMINOUS CONCRETE

NOT TO SCALE



WALL HEIGHT	A	B	C	D	E	F
Ø TO 3'-3"	2	1	-	-	-	-
3'-3" TO 6'-6"	3	2	1	-	-	-
6'-6" TO 9'-9"	3	3	2	1	-	-
TALLER THAN 9'-9"	4	3	2	2	1	1

NUMBER IN TABLE CORRESPONDS TO ROCK TYPE

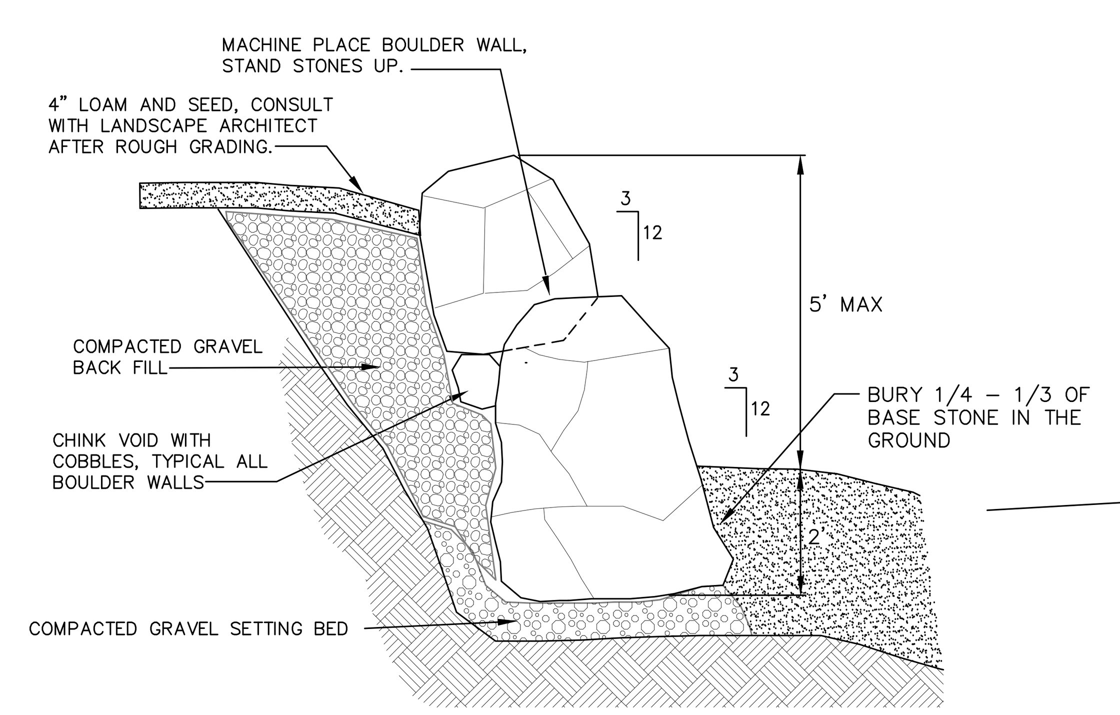
ROCK TYPE DESIGNATION

ROCK TYPE	ROCK WEIGHT (POUNDS)	AVERAGE DIMENSION
1	2ØØ - 66Ø	1'-6" TO 2'-4"
2	66Ø - 2ØØØ	2'-4" TO 3'-Ø"
3	2ØØØ - 4ØØØ	3'-Ø" TO 4'-Ø"
4	4ØØØ - 6ØØØ	4'-Ø" TO 4'-6"

ROCK SIZING

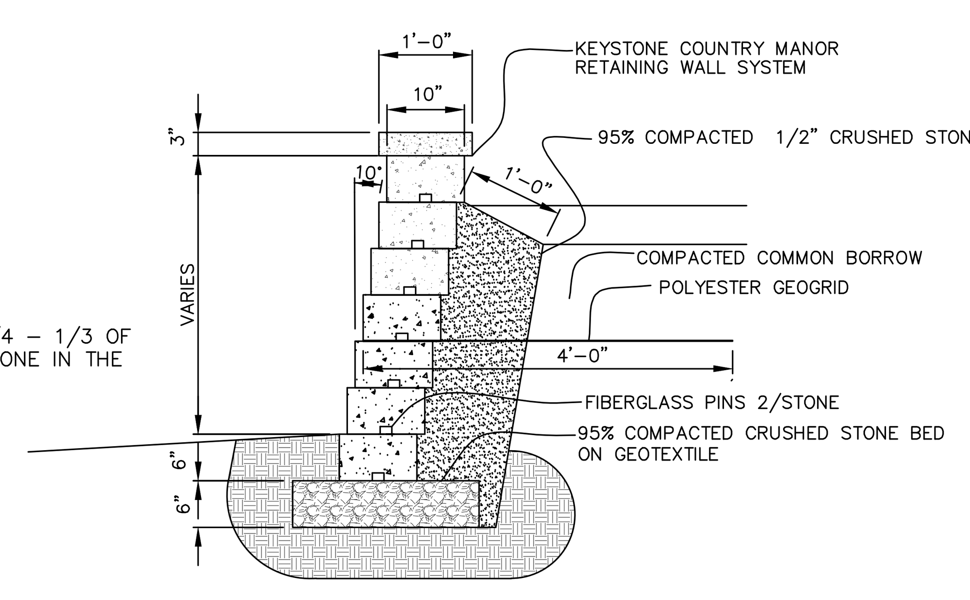
BOULDER RETAINING WALL 4–11' HIGH

NOT TO SCALE



RETAINING BOULDER WALL

NOT TO SCALE



KEYSTONE COUNTRY MANOR
SEGMENTAL RETAINING WALL

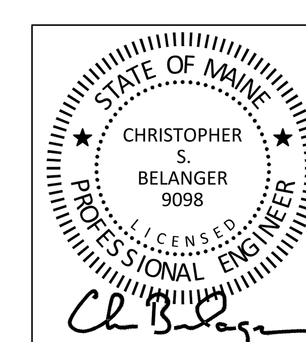
NOT TO SCALE

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

Roof Dripline BMP and Misc. Details

Oceanview at Cumberland
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine



7-31-2018

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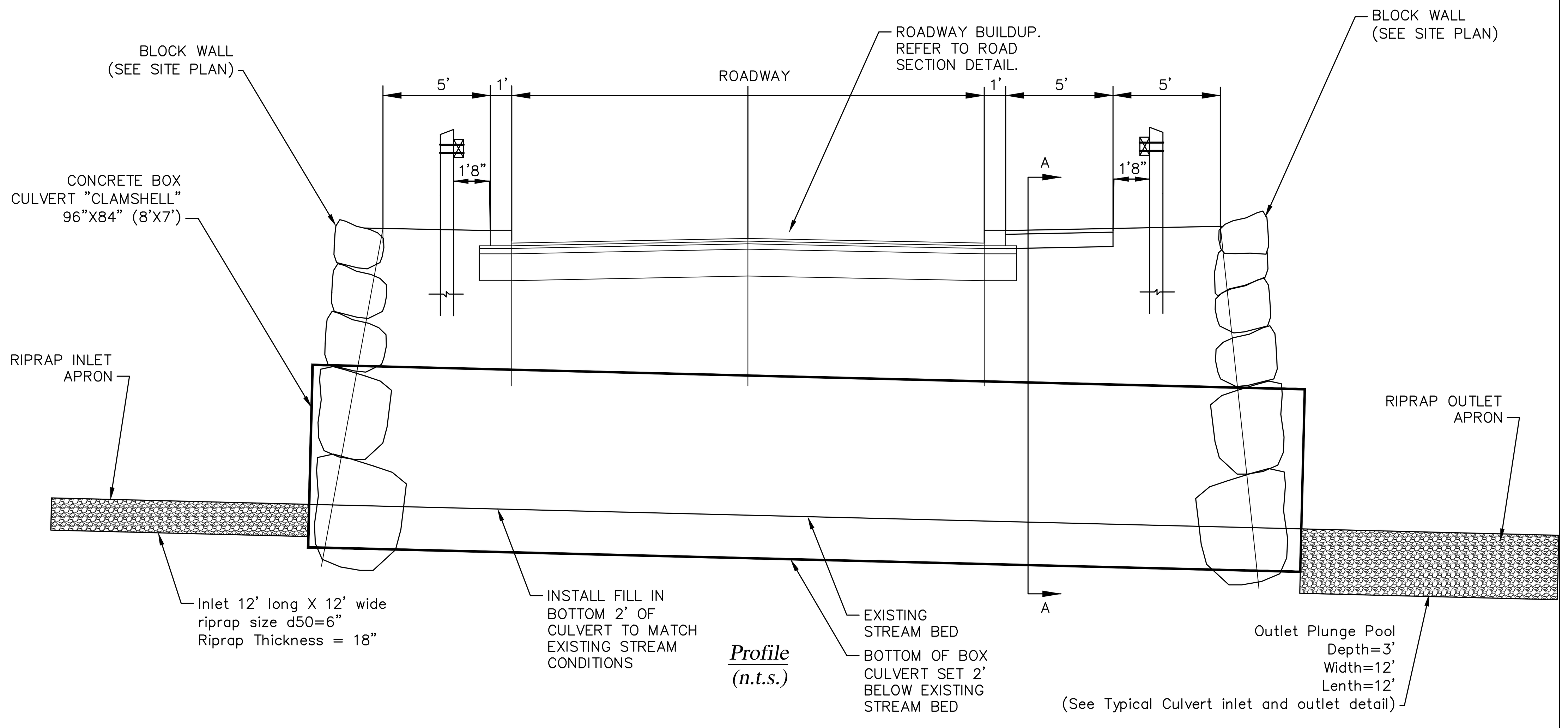
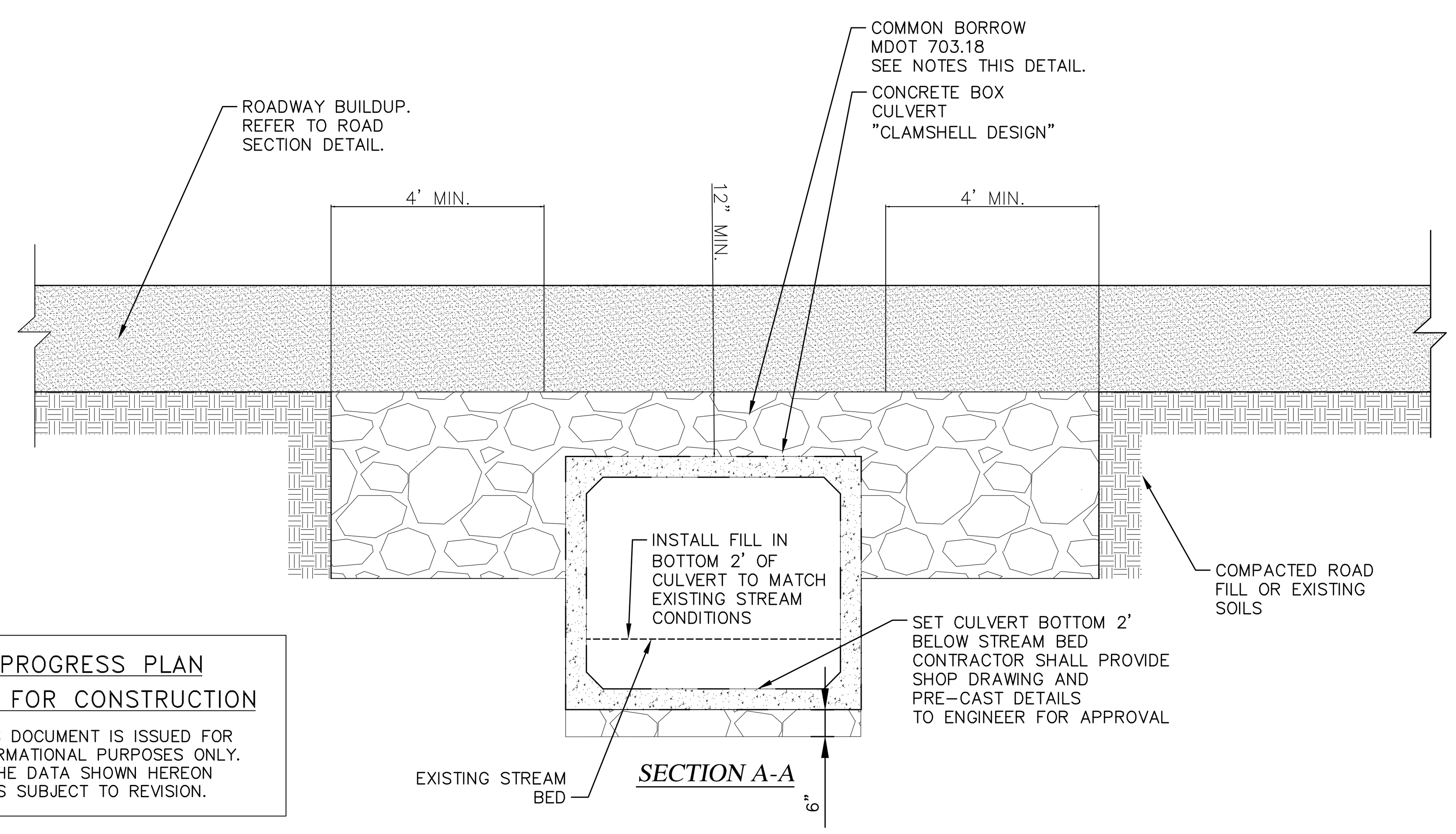
FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C19
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

NOTES:
1. COMMON BORROW USED FOR BACKFILL SHALL CONSIST OF EARTH, SUITABLE FOR EMBANKMENT CONSTRUCTION. IT SHALL BE FREE FROM FROZEN MATERIAL, PERISHABLE RUBISSH, PEAT, AND OTHER UNSUITABLE MATERIALS INCLUDING MATERIAL CURRENTLY OR PREVIOUSLY CONTAMINATED BY CHEMICAL, RADIOLOGICAL, OR BIOLOGICAL AGENTS. ALL MATERIAL SHALL HAVE NO ROCKS WITH A MAXIMUM DIMENSION OVER 6 INCHES. ON-SITE MATERIAL MAY BE USED IF IT MEETS THE ABOVE SPECIFIED REQUIREMENTS.



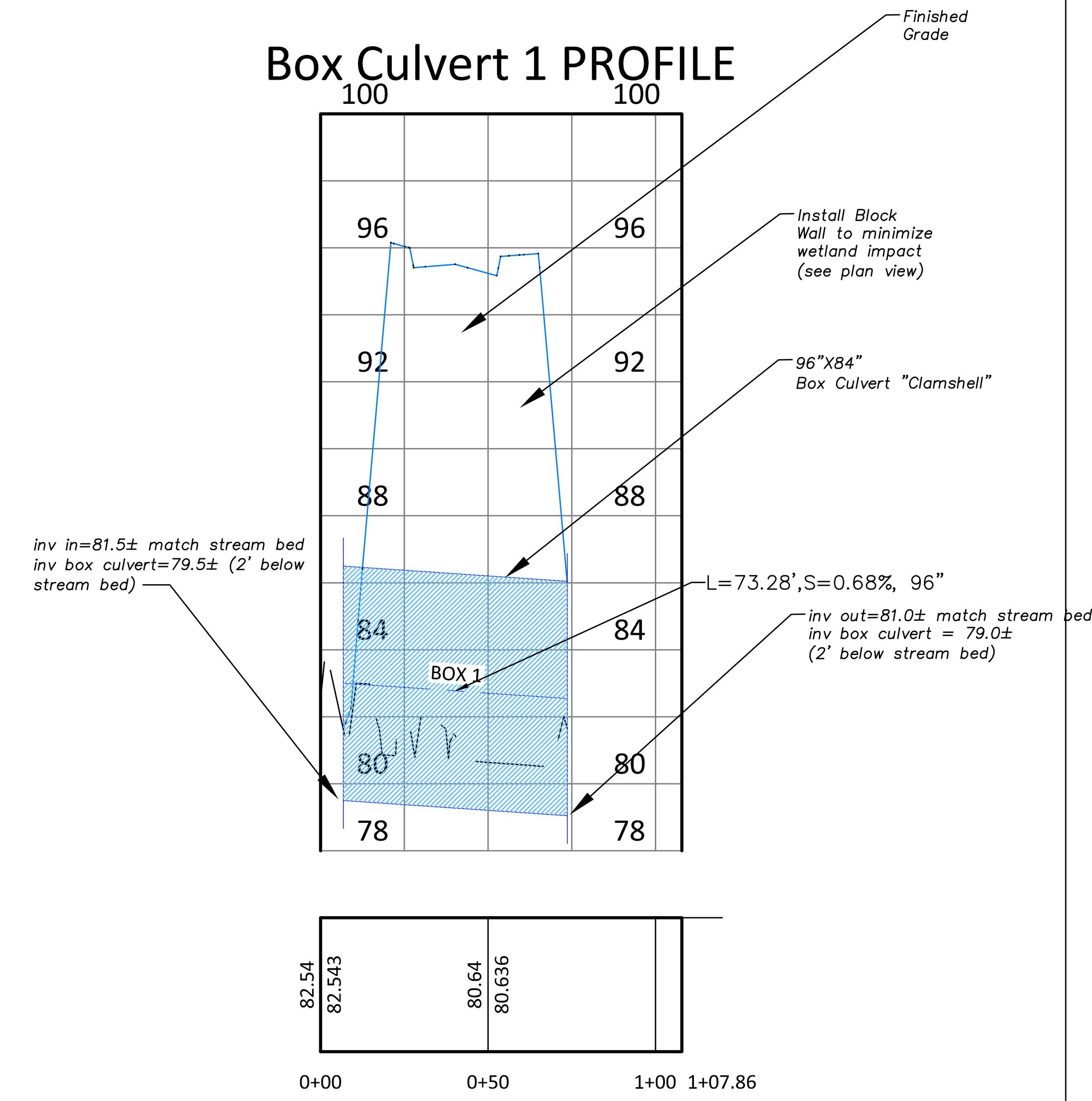
Profile
(n.t.s.)



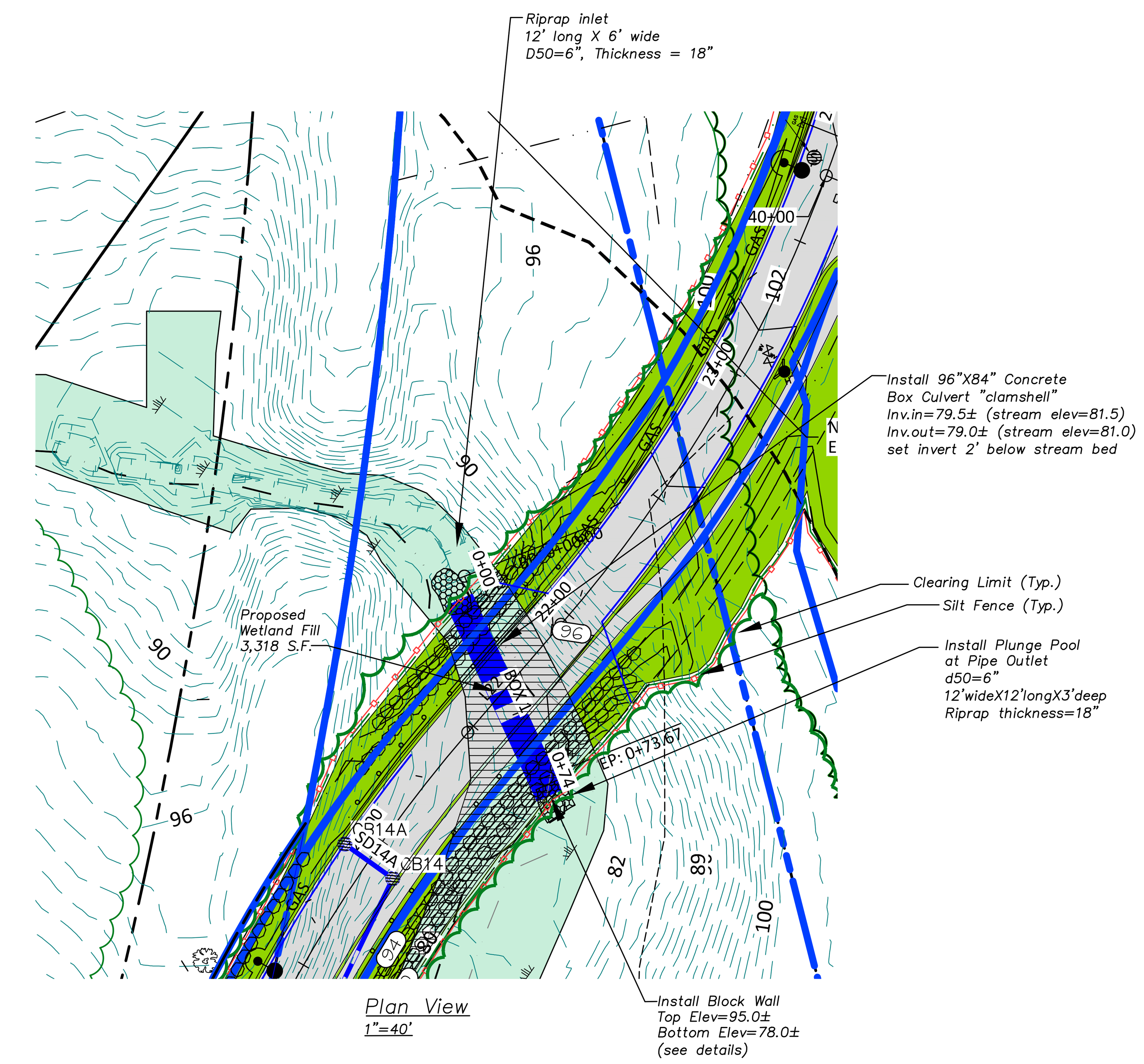
SECTION A-A

PROGRESS PLAN
NOT FOR CONSTRUCTION
THIS DOCUMENT IS ISSUED FOR INFORMATIONAL PURPOSES ONLY. THE DATA SHOWN HEREON IS SUBJECT TO REVISION.

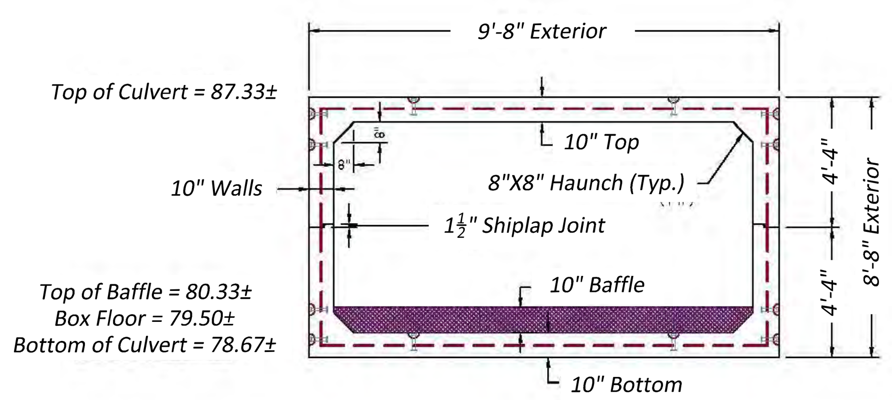
Box Culvert 1 PROFILE



Profile View
1"=40'Horizontal
1"=4'Vertical

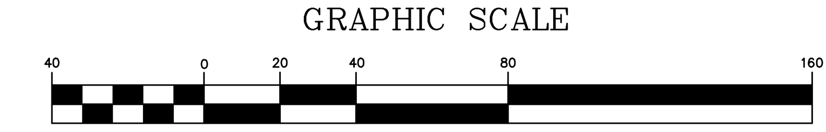


Plan View
1"=40'



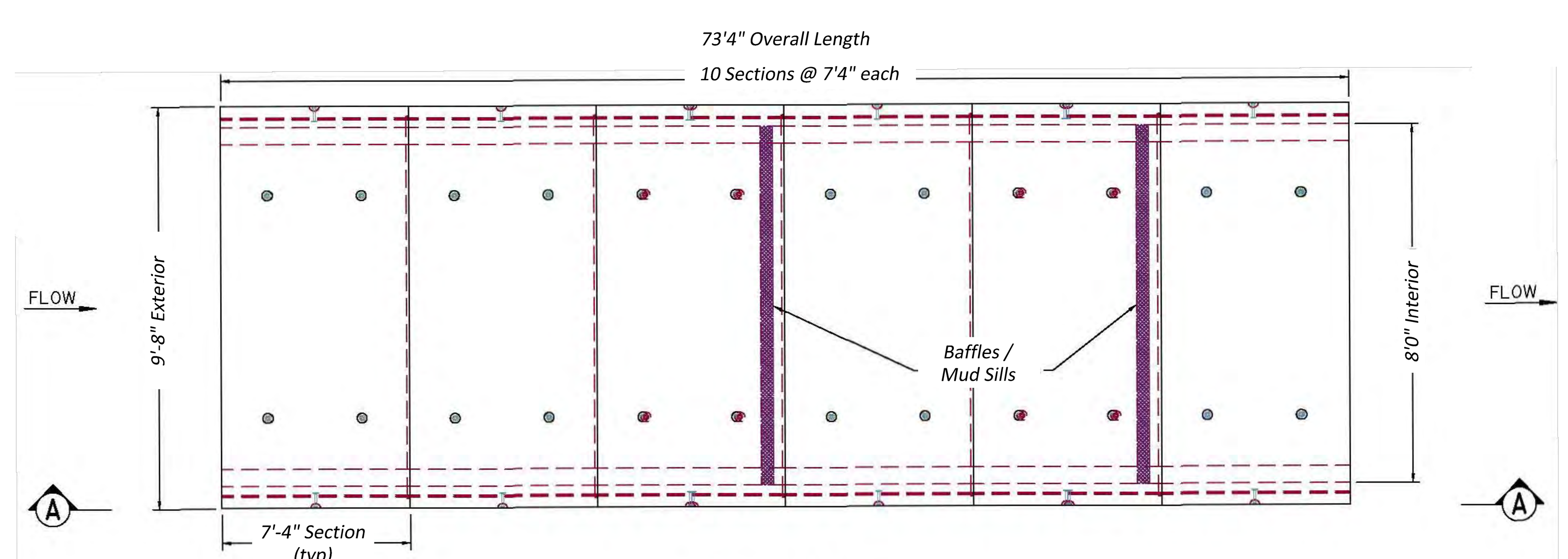
END VIEW @inlet

GRAPHIC SCALE

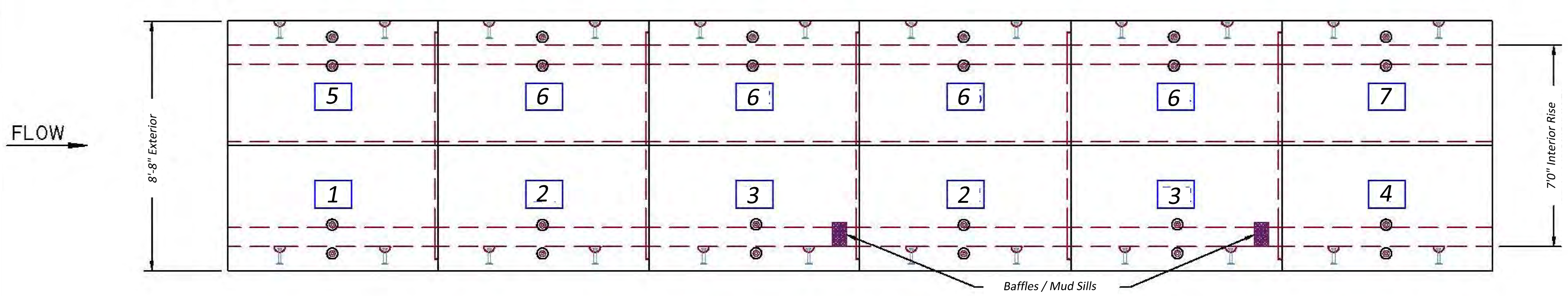


(IN FEET)
1 inch = 40 ft.

Note:
1. CONTRACTOR SHALL PROVIDE SHOP DRAWING TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.



PLAN VIEW



ELEVATION A-A

American Concrete Industries
1717 Stillwater Ave. Veazie , ME
Tel: 207-947-8334
Fax: 207-947-3580

982 Minot Ave. Auburn, ME
Tel: 207-784-1388
Fax: 207-783-4039

ITEM	QTY	BILL OF MATERIALS
1	(1)	7'-4" UPSTREAM END BOTTOM (21,150 #)
5	(1)	7'-4" UPSTREAM END TOP (20,975 #)
2	(4)	7'-4" MID SECTION BOTTOM (21,350 # EA)
6	(8)	7'-4" MID SECTION TOP (21,150 # EA)
3	(4)	7'-4" MID BOTTOM W/ MUDSILL (22,200 # EA)
4	(1)	7'-4" DOWNSTREAM END BOTTOM (21,550 #)
7	(1)	7'-4" DOWNSTREAM END TOP (21,350 #)

Prepared in association with:

LICHT
ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	Convert to Box Culvert, Re-submit to ACOE and DEP	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

Box Culvert (clamshell) Details
Sta 21+75

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

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Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C20
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

NOTES:
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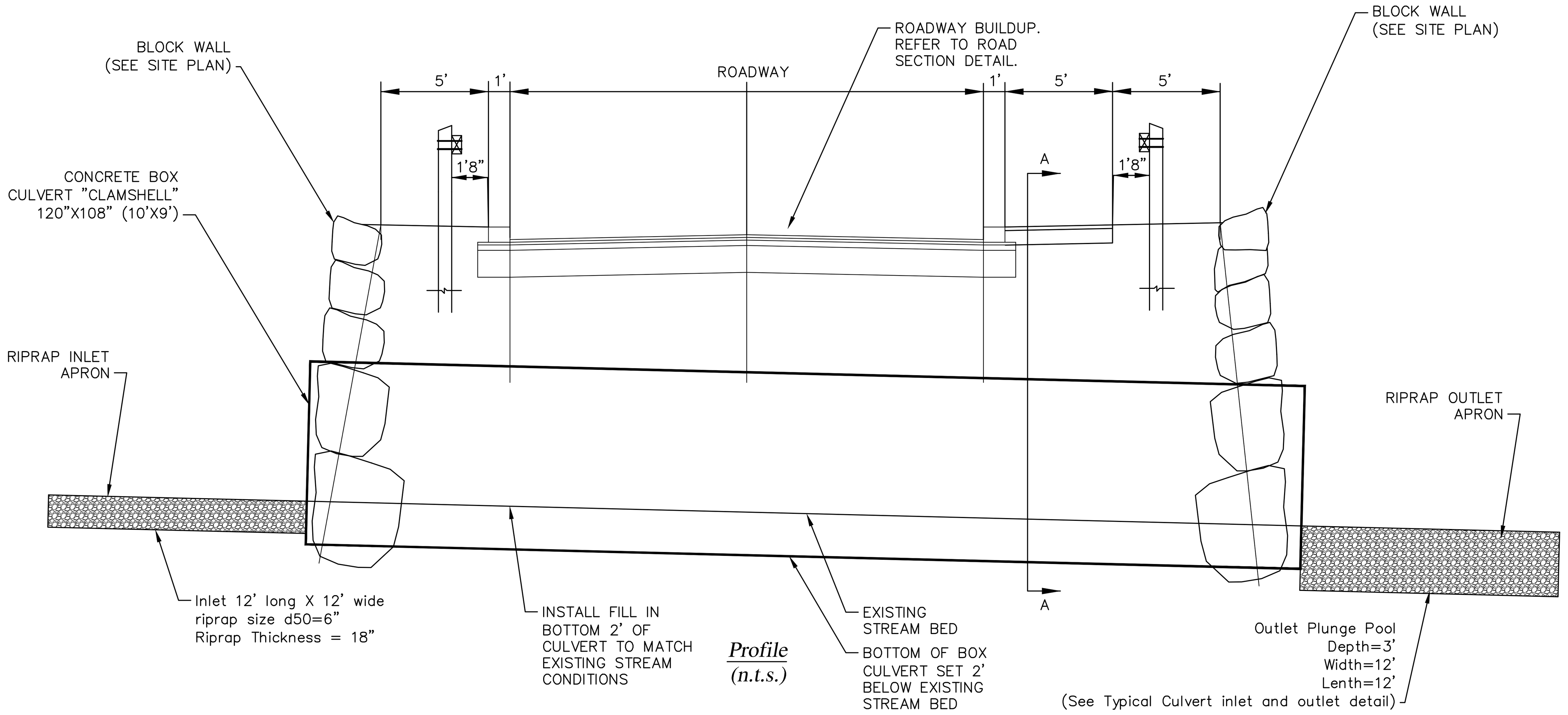
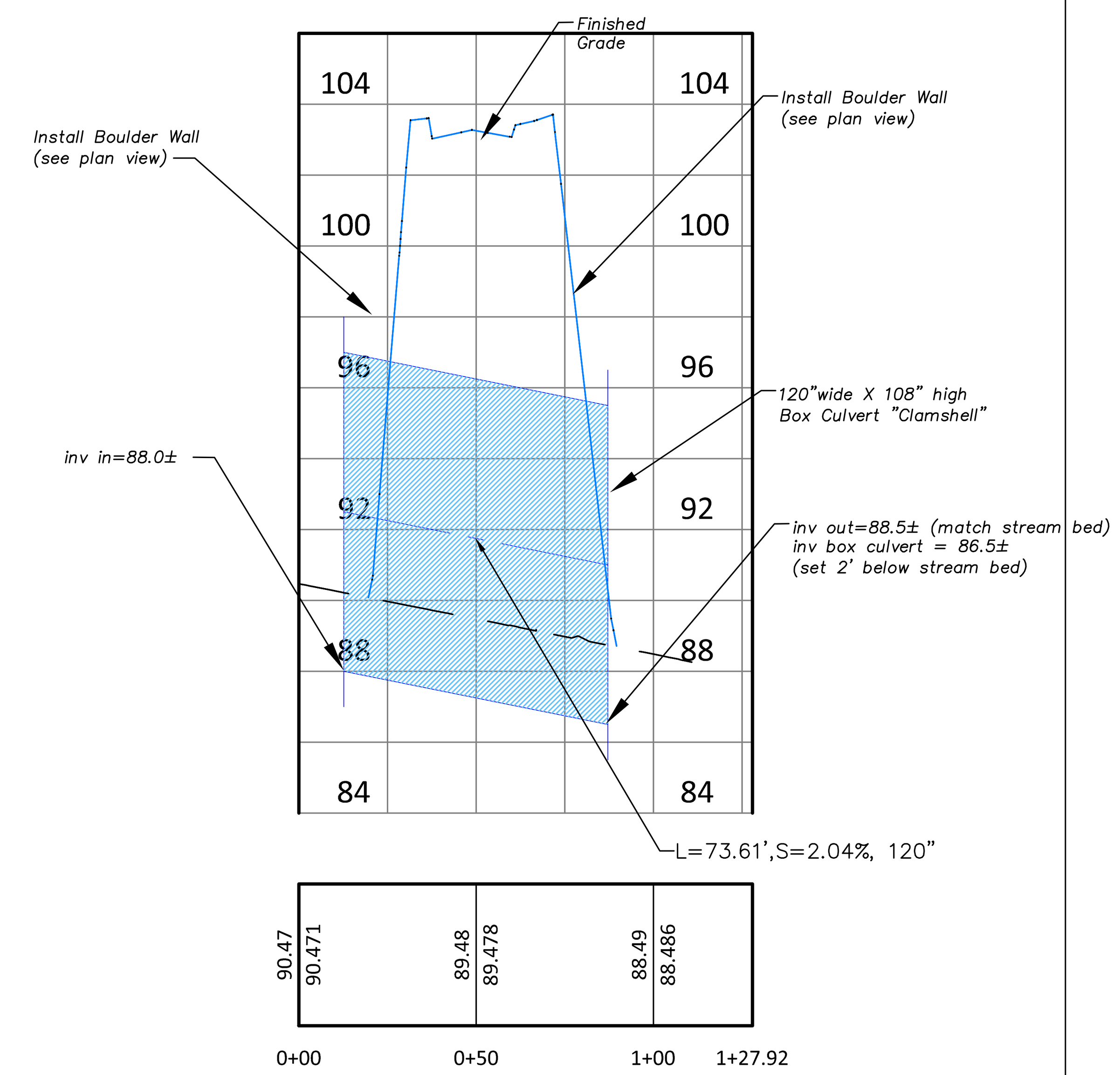
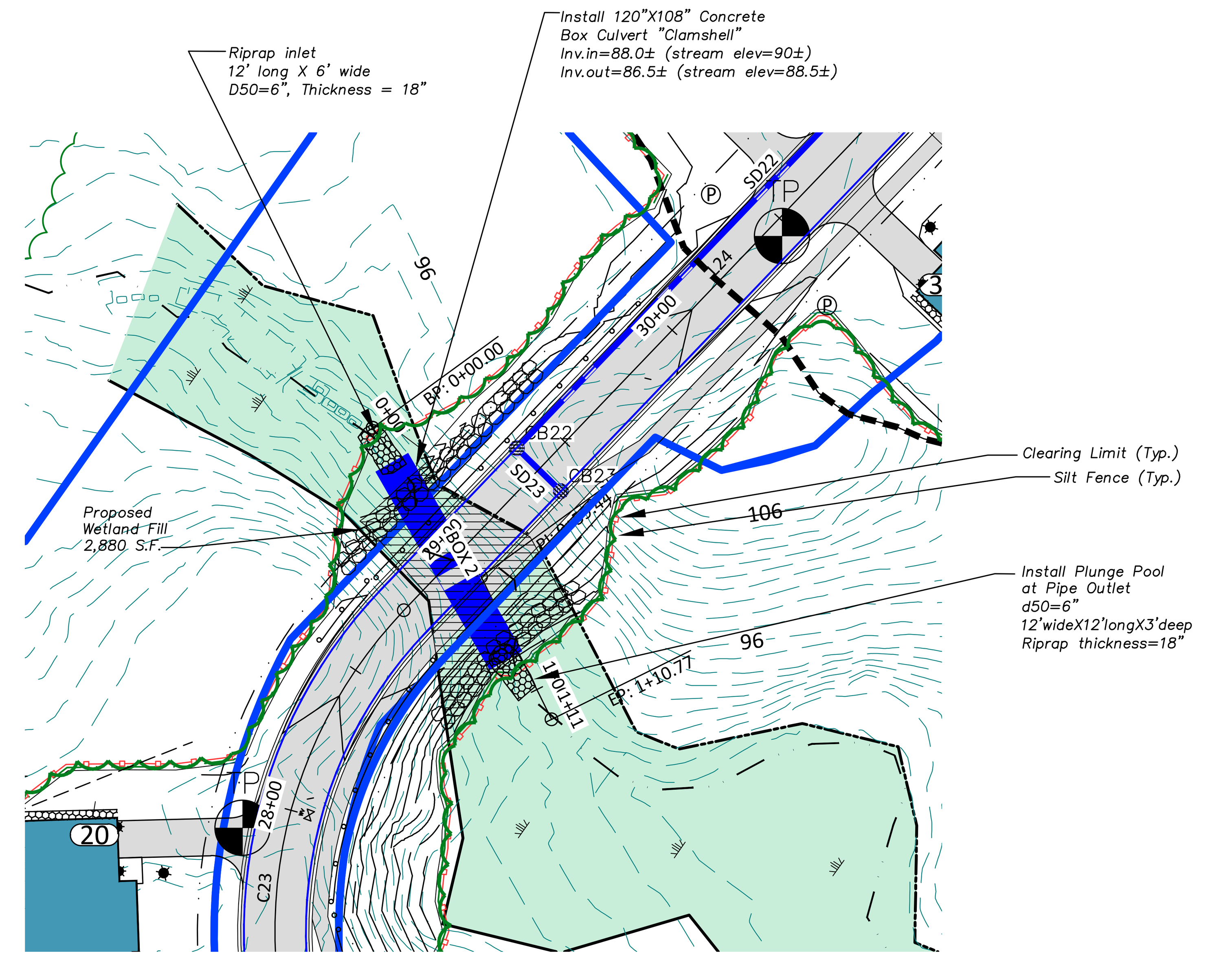


Profile
(n.t.s.)

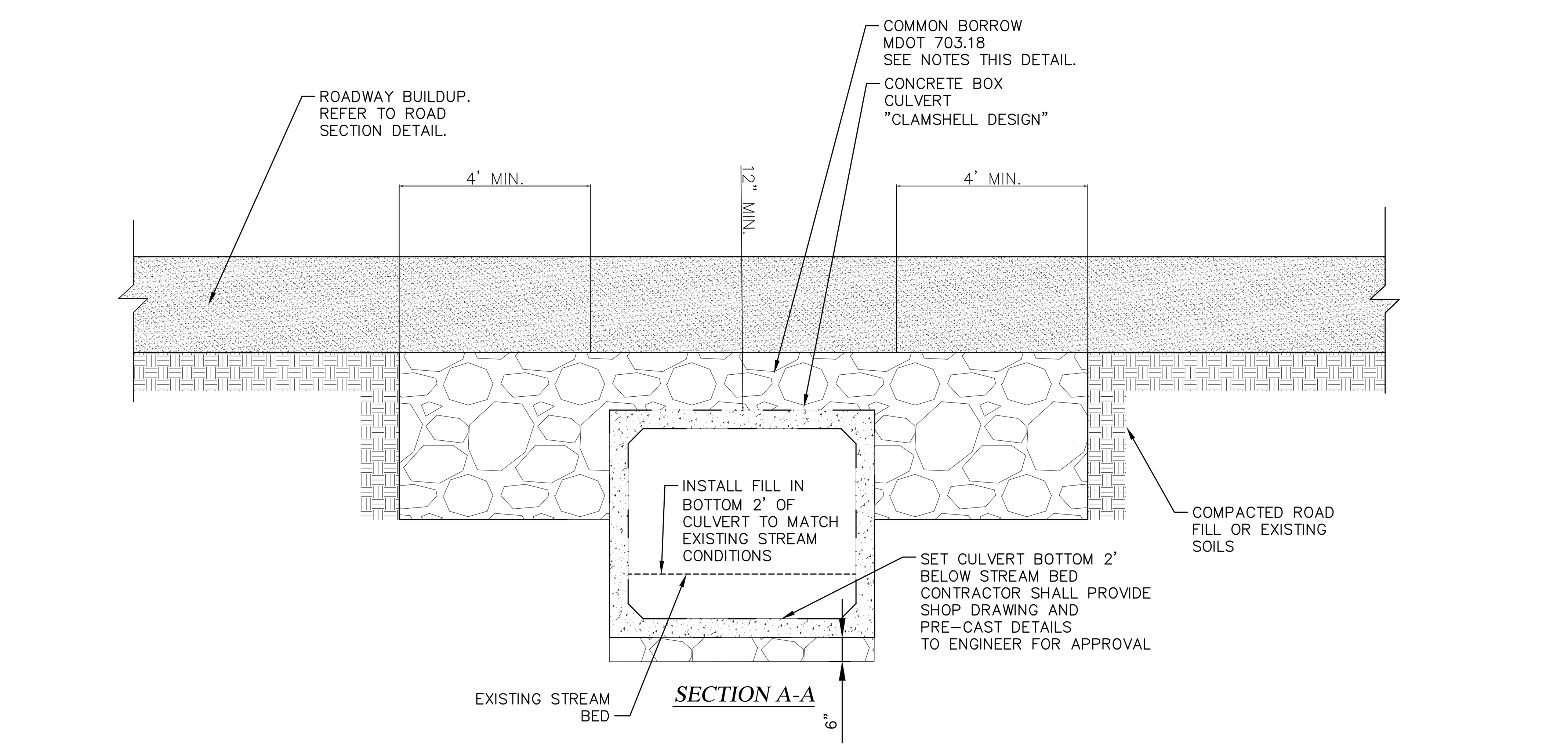
Box Culvert 2 PROFILE



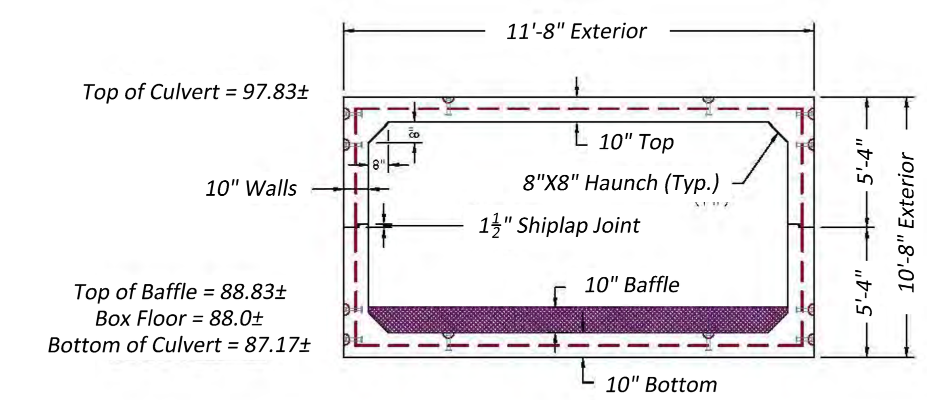
Profile View
1"=40'Horizontal
1"=4'Vertical



Plan View
1"=40'

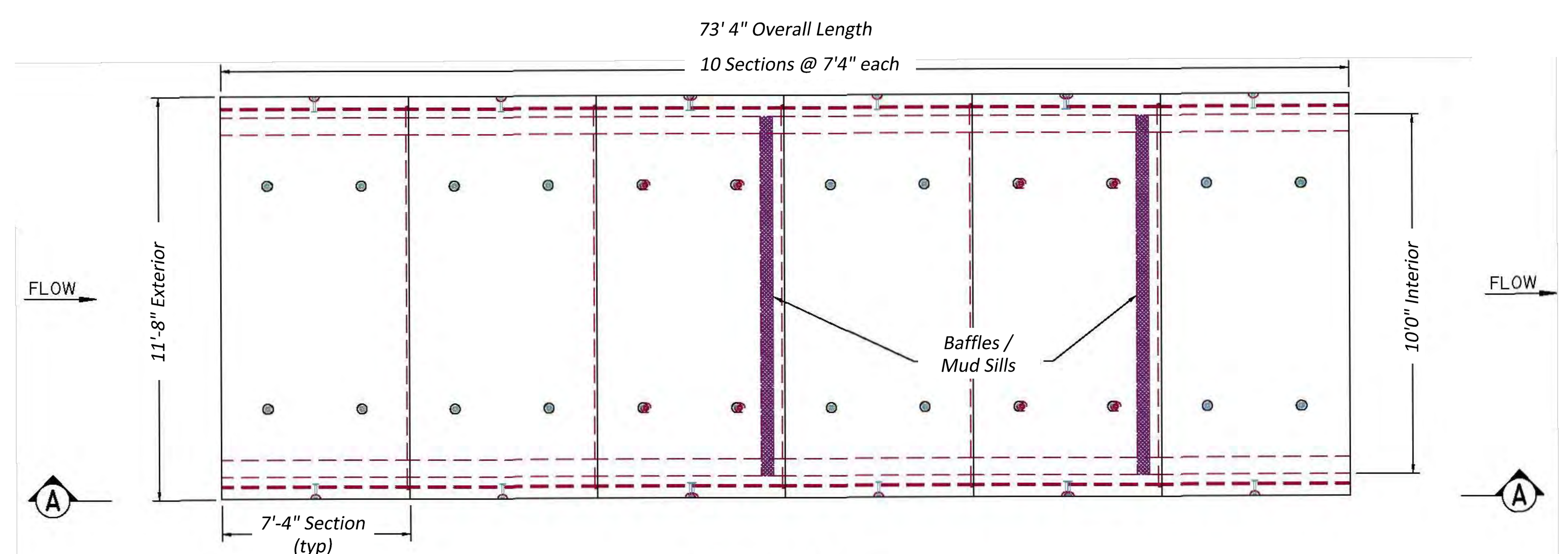


SECTION A-A

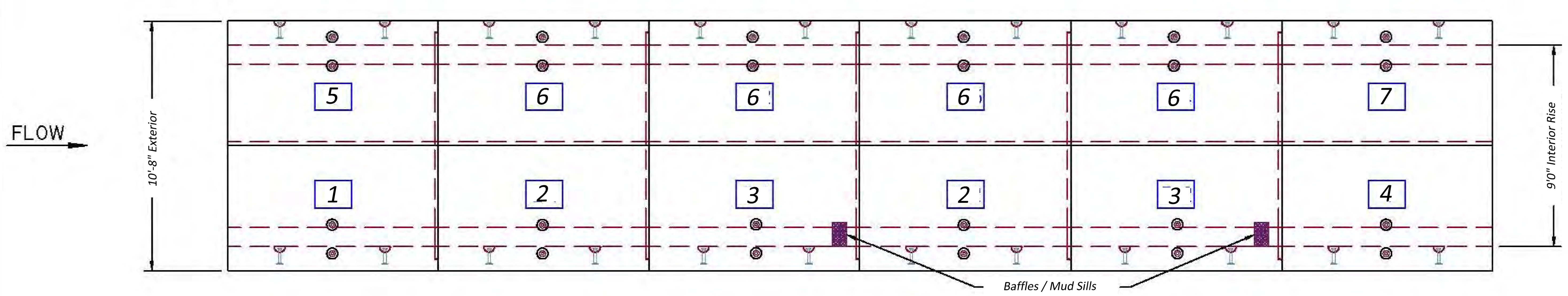


END VIEW @inlet

Note:
1. CONTRACTOR SHALL PROVIDE SHOP DRAWING TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.



PLAN VIEW



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Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

7.	7-31-2018	No changes this sheet, re-submit to Town	CSB
6.	7-16-2018	No changes this sheet	CSB
5.	6-14-2018	Adjust end view detail to match culvert dimensions	CSB
4.	5-4-2018	Convert to Box Culvert, re-submit to ACOE and DEP	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Box Culvert 2 Details
Sta 29+00 Little Acres Drive

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

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CHRISTOPHER S. BELANGER
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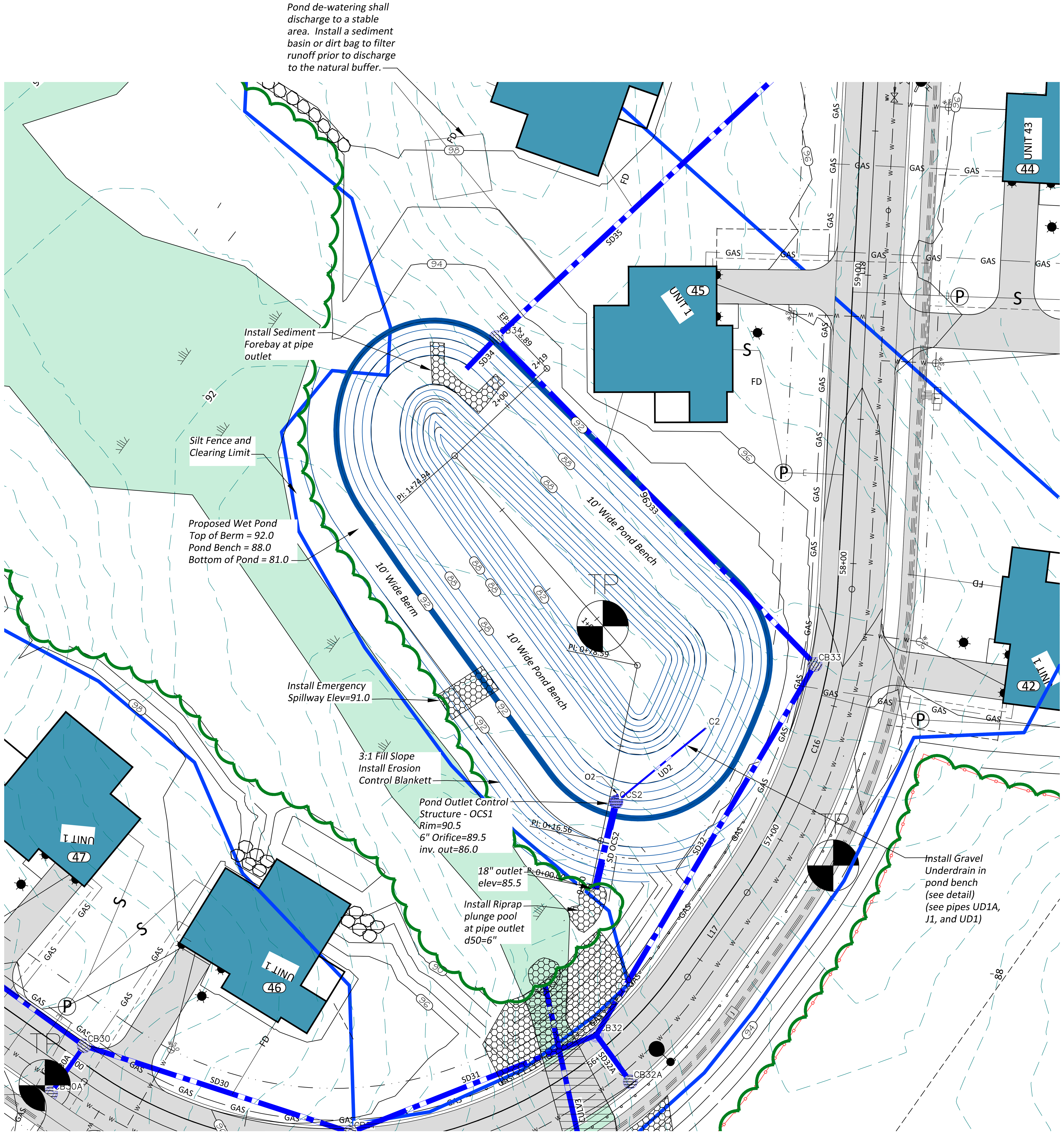
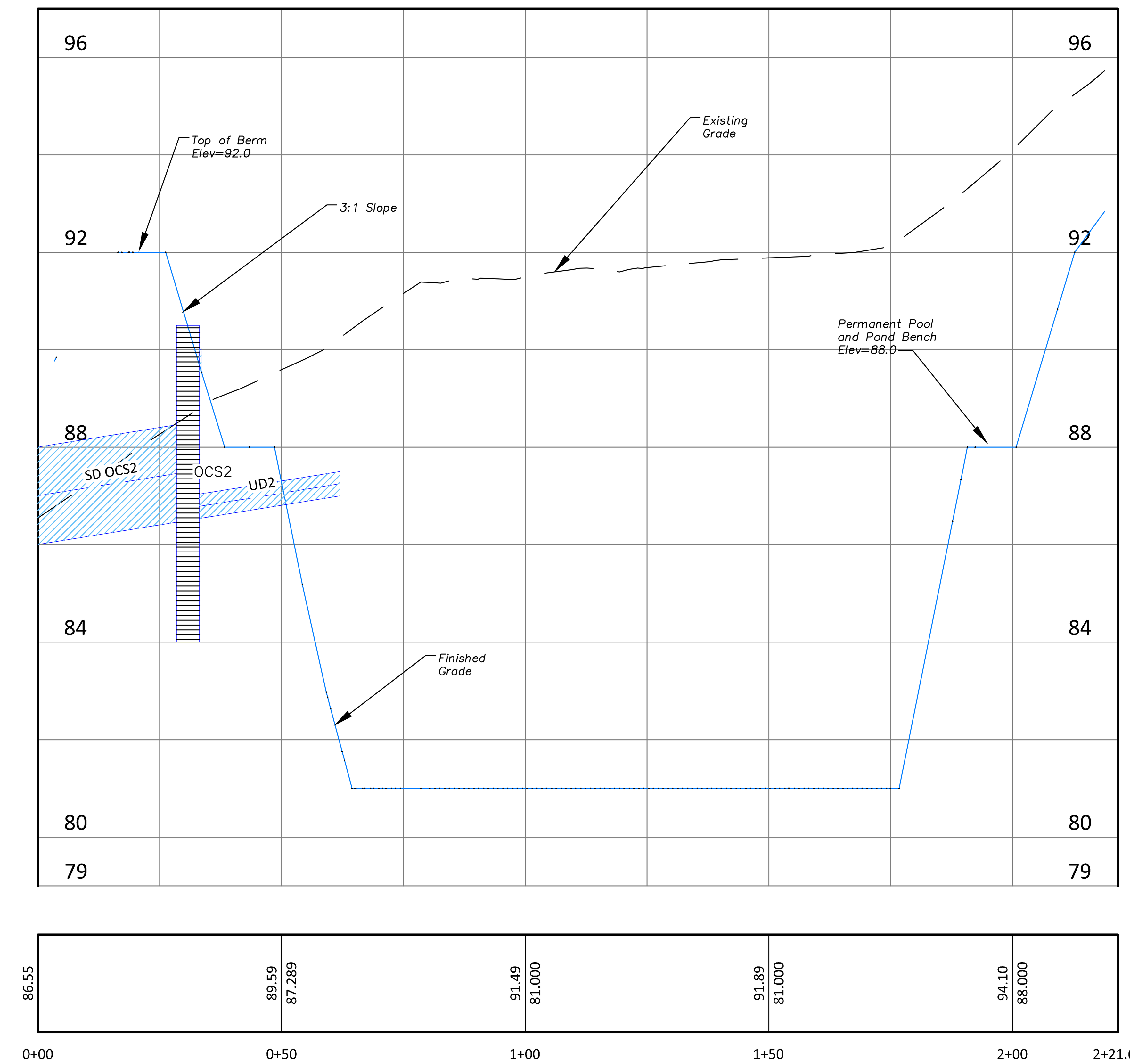
FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C21
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.



PROGRESS PLAN
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Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Mallard Way Wet Pond Plan and Profile

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

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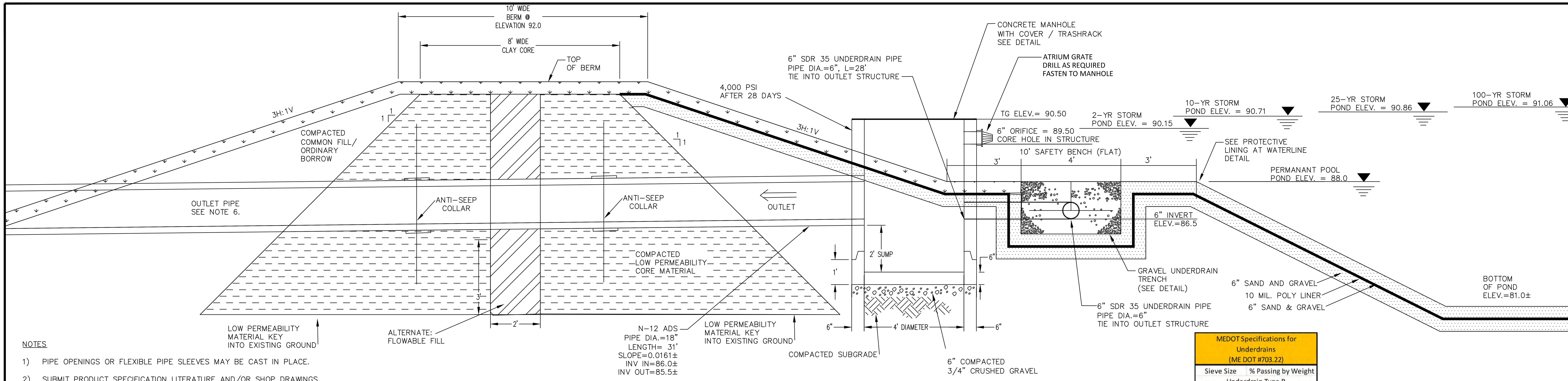
FIELD WK:	SCALE: 1"=20'	SHEET:
DRN BY:	JOB #: 109	C22
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



1 WET POND AND OUTLET STRUCTURE

(SCALE: 1"=2')

NOTES

1) PIPE OPENINGS OR FLEXIBLE PIPE SLEEVES MAY BE CAST IN PLACE.

2) SUBMIT PRODUCT SPECIFICATION LITERATURE AND/OR SHOP DRAWINGS FOR OUTLET STRUCTURE.

BASIN LINER SHALL CONSIST OF AT LEAST 10 MIL POLY LINER, COVERED WITH 6" OF CLEAN SAND AND GRAVEL BELOW THE PERMANENT POOL ELEVATION; AND 6" OF CLAYEY LOAM AND SEED ABOVE THE PERMANENT POOL ELEVATION.

1) THE BASIN LINER SHALL BE INSTALLED ON ALL AREAS WITHIN THE BASIN TO 2' ABOVE THE OUTLET STRUCTURE TOP OF GRATE.

2) EMBANKEMENT CONSTRUCTION NOTES:
A. CONSTRUCTION OF COMMON BORROW MATERIAL MEETING M.D.O.T. SPECIFICATION
B. PLACE BORROW MATERIAL IN 12" LIFTS COMPACTED TO 95% OF MAX DRY DENSIITY
C. INSTALL RIPRAP AND EROSION CONTROL MESH WHERE SPECIFIED ON PLANS
D. LOAM, SEED, AND STABILIZE IN ACCORDANCE WITH SEDIMENTATION AND EROSION CONTROL PLAN.

6) WHERE PIPES PENETRATE THE LOW PERMEABILITY CORE, PIPE SHALL BE BEDDED IN THE LOW PERMEABILITY CORE MATERIAL.

CONSTRUCTION OVERSIGHT

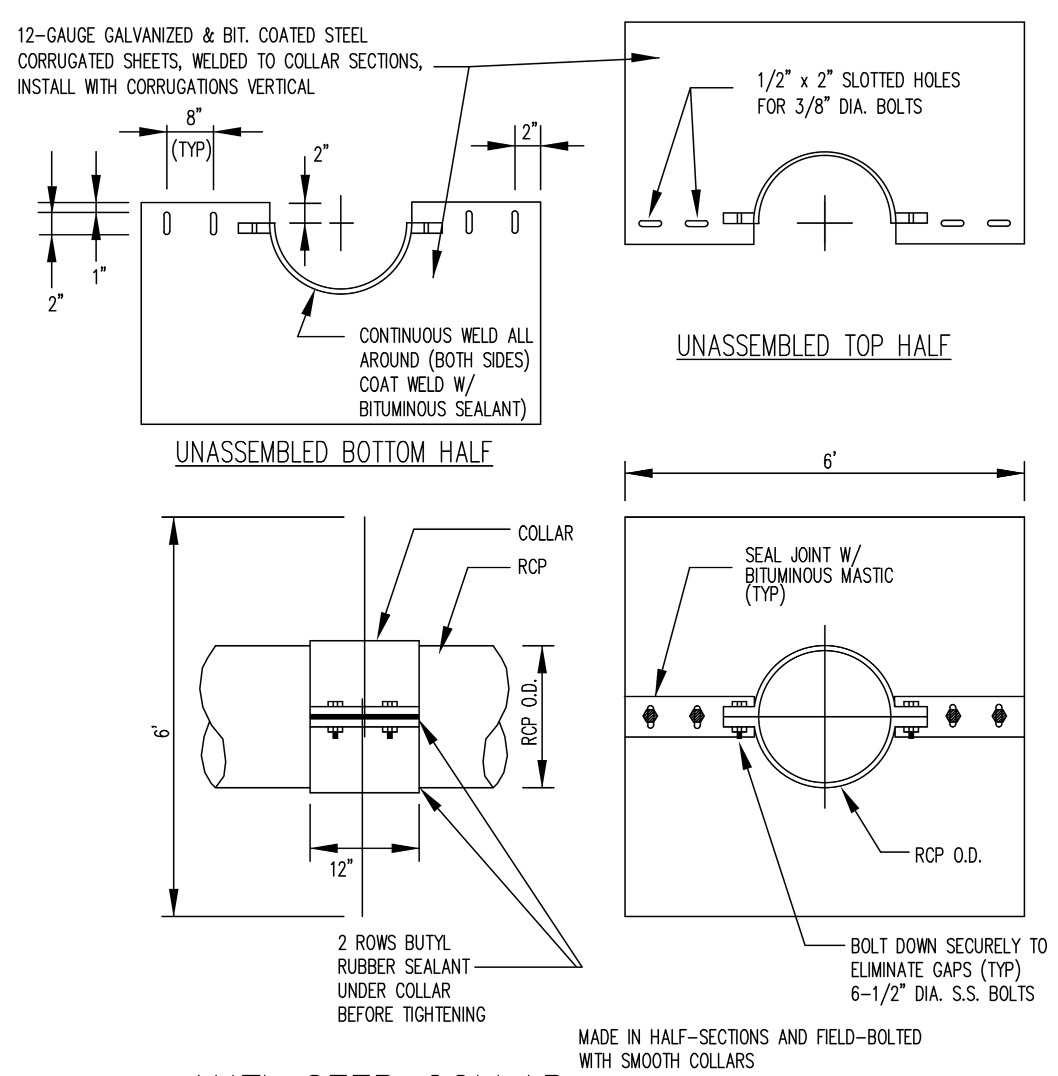
The contractor will retain the services of a professional engineer selected by the owner to inspect the construction and stabilization of all stormwater management structures to be built as part of the project. If necessary, the inspecting engineer will interpret the construction plans for the contractor. 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 structures have been completed. Accompanying the engineer's notification must be a copy of the test results for any soil fill, aggregate, or mulch materials used in the construction of the stormwater management structures and 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.

WetPonds with UNDERDRAINED GRAVEL TRENCH OUTLET

Construction inspections: Inspection by a professional engineer will consist of weekly visits to the site by the engineer to inspect the embankment foundation preparation, the placement of the embankment fill, the construction of the underdrained gravel trench outlet, the installation of the outlet control structure, the placement of the clay or geosynthetic liner (if applicable), and the construction of the emergency spillway from initial ground disturbance to final stabilization of the wetpond.

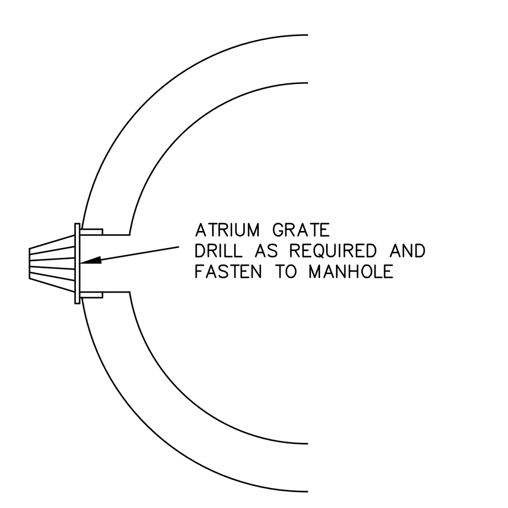
Testing and Submittals: All soil and aggregate used for the construction of the wetpond's impoundment embankment and the underdrained gravel trench outlet must be confirmed as suitable by testing. The contractor shall identify the location of the source of each fill or aggregate and obtain samples for testing. All testing must be done by a certified laboratory. All results of field and laboratory testing shall be submitted to the project engineer for confirmation. It shall be the contractor's responsibility to ensure completion of the following sampling and testing before the fill or aggregate is placed as part of the wetpond's construction.

- Obtain a sample of the embankment fill material. The sample must be a composite of three different locations (grabs) from the stockpile or pit face. The sample size required will be determined by the testing laboratory. Perform a sieve analysis conforming to ASTM C136 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 1996A) of the embankment fill. The embankment fill must conform to the gradation specified on the project plans and must be approved by the design engineer.
- Obtain a sample of the gravel fill to be used for the underdrained gravel trench outlet. The sample must be a composite of three different locations (grabs) from the stockpile or pit face. The sample size required will be determined by the testing laboratory. Perform a sieve analysis conforming to ASTM C136 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 1996A) of the fill for the underdrained gravel trench outlet. The fill must conform to MEDOT 703.22 Type B but with 10% to15% by weight passing the #50 sieve.



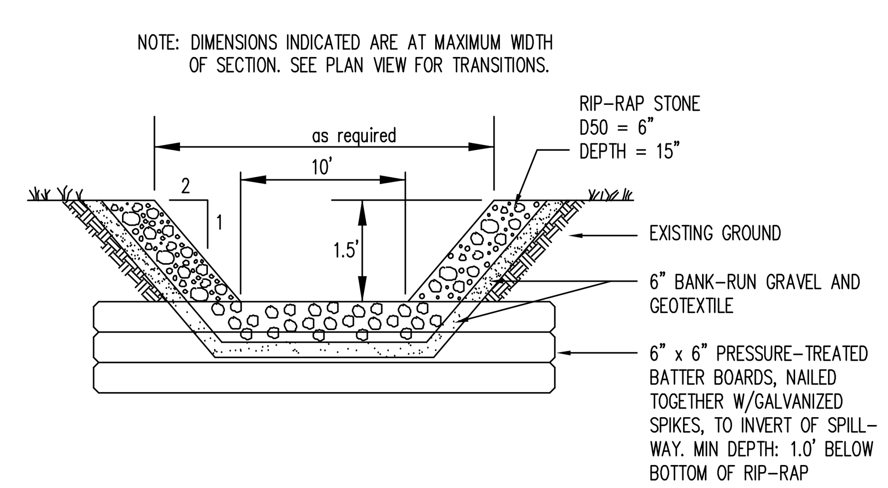
3 ANTI-SEEP COLLAR

NOT TO SCALE



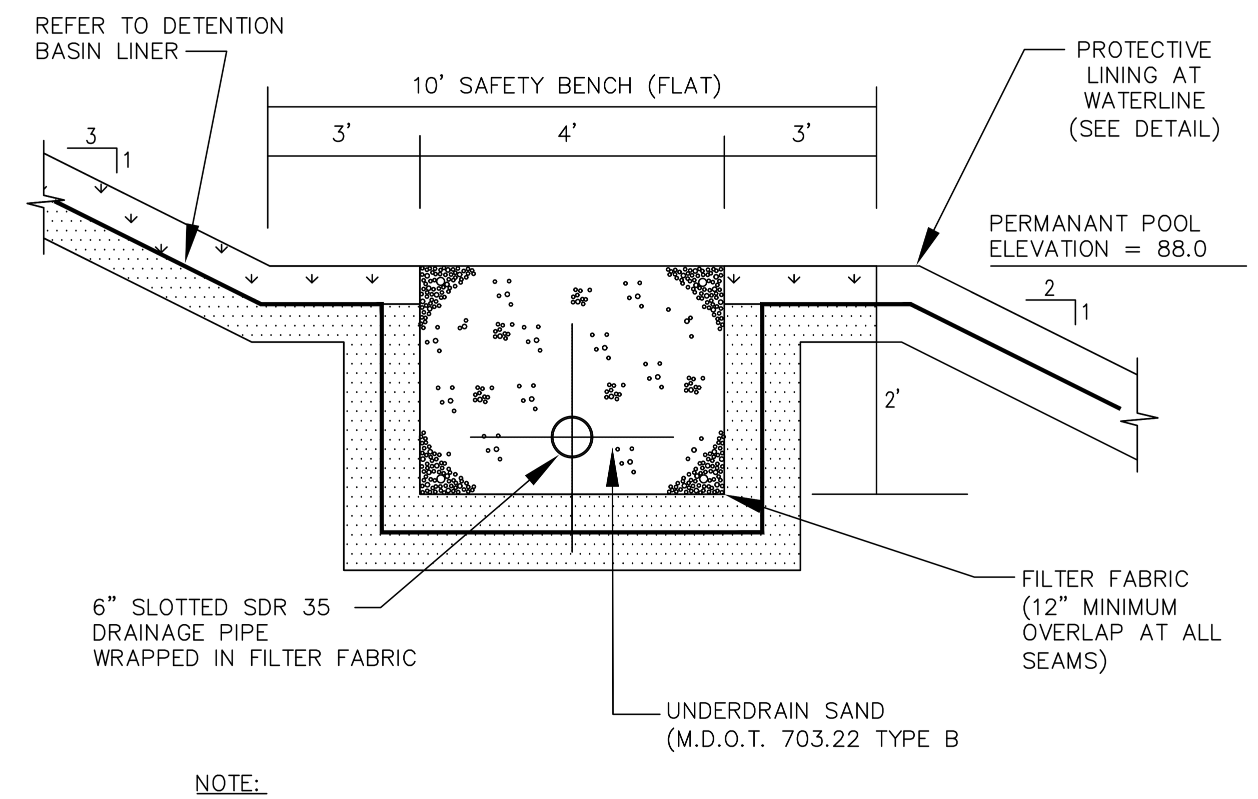
3 ATRIUM GRATE DETAIL

NOT TO SCALE



8 TYPICAL EMERGENCY SPILLWAY SECTION

NOT TO SCALE

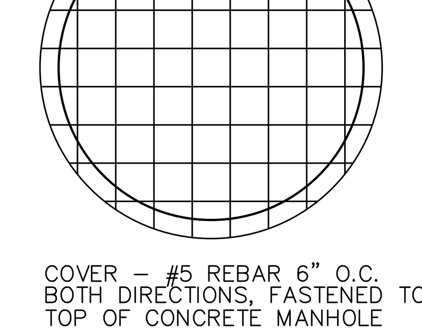


NOTE:

FILTER FABRIC SHALL BE MIRAFI 140N OR APPROVED EQUAL.

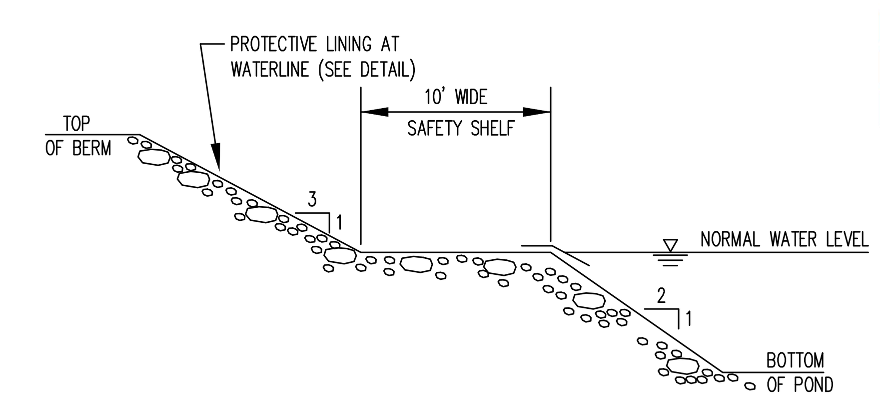
6 GRAVEL UNDERDRAIN TRENCH DETAIL

NOT TO SCALE



3 TRASH RACK / MANHOLE COVER

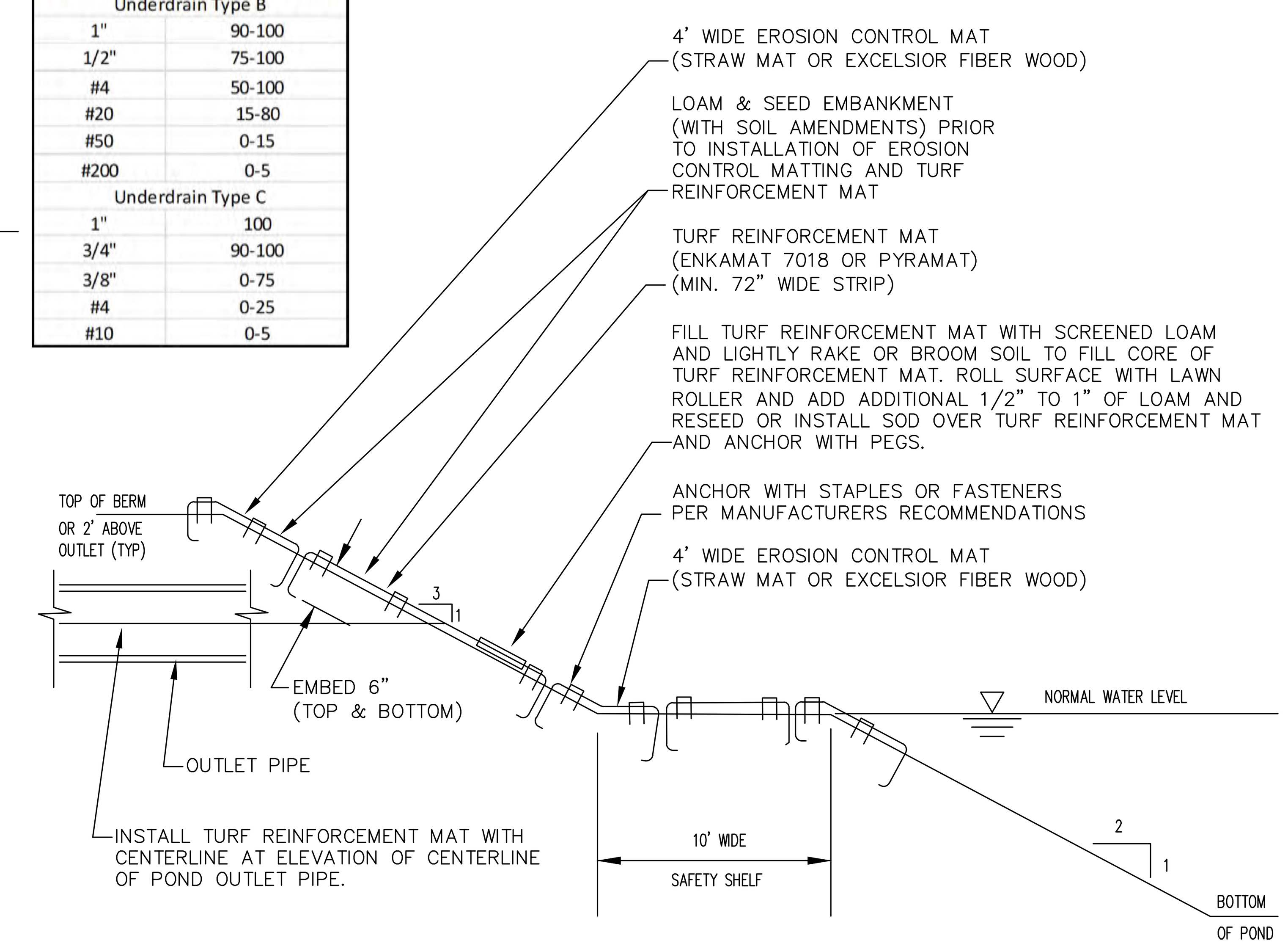
NOT TO SCALE



4 TYPICAL POND GRADING

NOT TO SCALE

MEDOT Specifications for Underdrains (ME DOT #703.22)	
Sieve Size	% Passing by Weight
Underdrain Type B	
1"	90-100
1/2"	75-100
#4	50-100
#20	15-80
#50	0-15
#200	0-5
Underdrain Type C	
1"	100
3/4"	90-100
3/8"	0-75
#4	0-25
#10	0-5



2 PROTECTIVE LINING AT WATERLINE

NOT TO SCALE

PROGRESS PLAN
NOT FOR CONSTRUCTION
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6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

Mallard Way Wet Pond Details

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
• COMMERCIAL PROJECTS
• RESIDENTIAL SUBDIVISIONS
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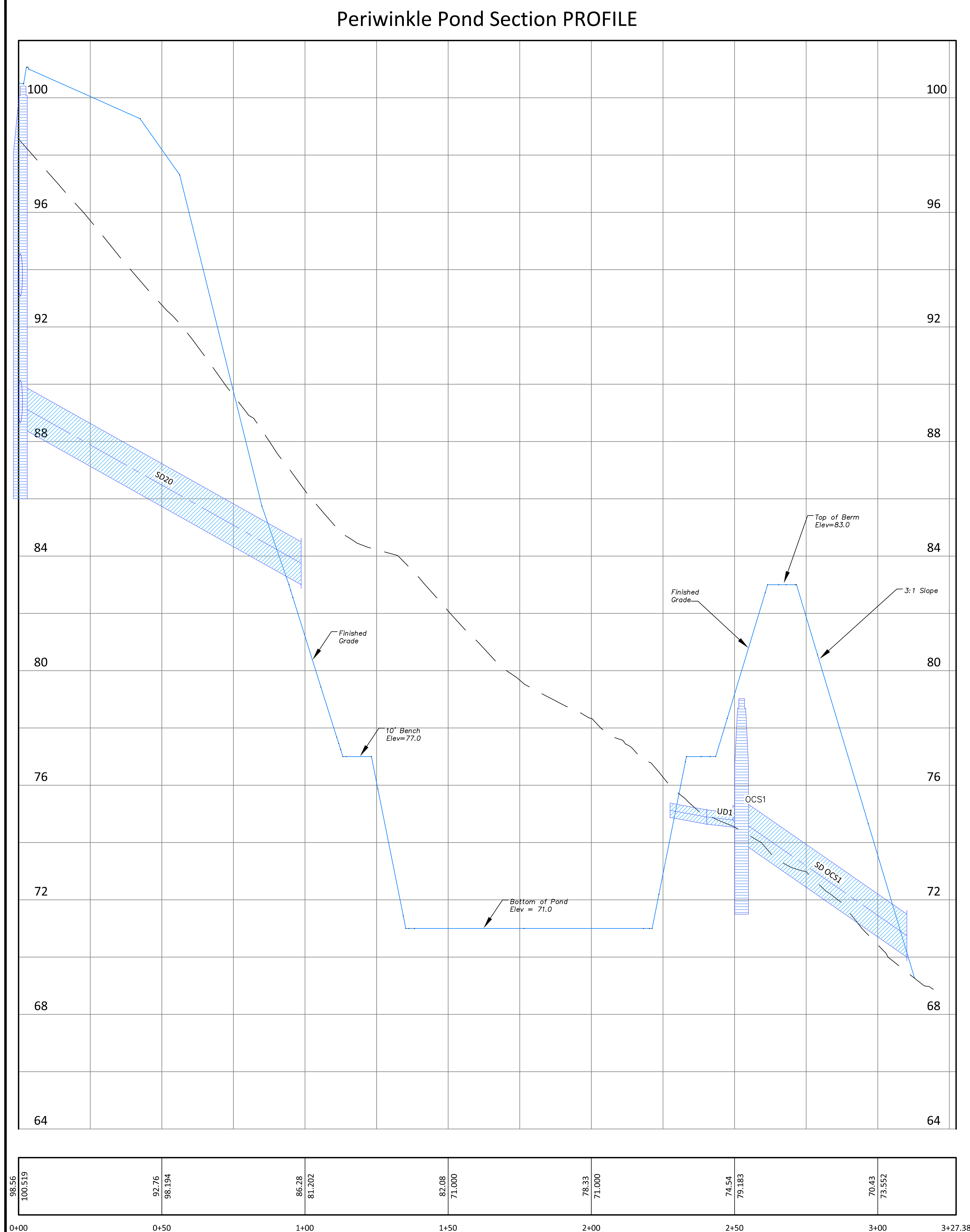
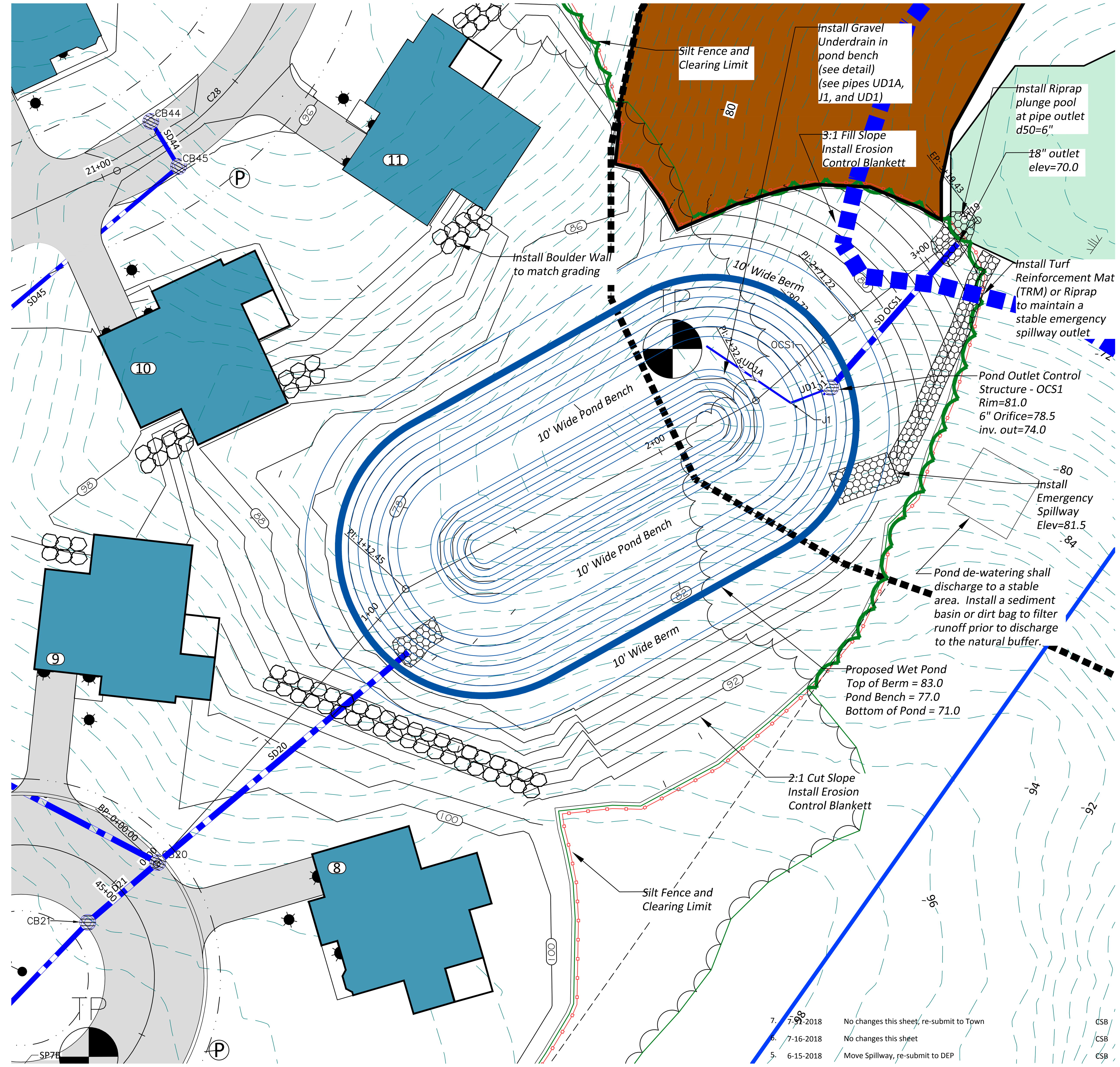
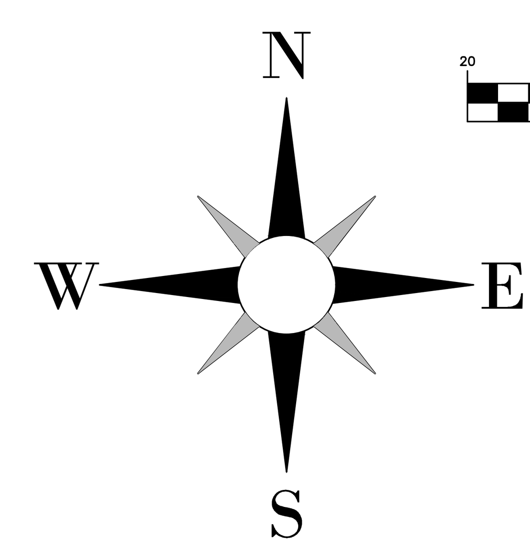
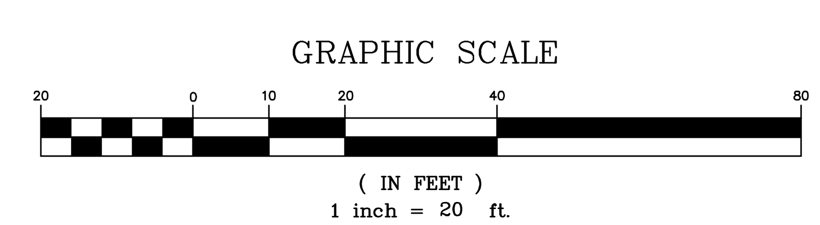
• SITE PLANNING & DESIGN
• STORMWATER MANAGEMENT
• ROAD AND UTILITY DESIGN
• EROSION CONTROL PLANS
Email: cbelanger@roadrunner.com
63 Second Avenue , Augusta, Maine 04330 Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C23
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	









PROGRESS PLAN
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LICHT ENVIRONMENTAL DESIGN, LLC

7.	7-31-2018	No changes this sheet, re-submit to Town	CSB
6.	7-16-2018	No changes this sheet	CSB
5.	6-15-2018	Move Spillway, re-submit to DEP	CSB
4.	5-4-2018	Respond to DEP Comments	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Periwinkle Wet Pond Plan and Profile

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

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- COMMERCIAL PROJECTS
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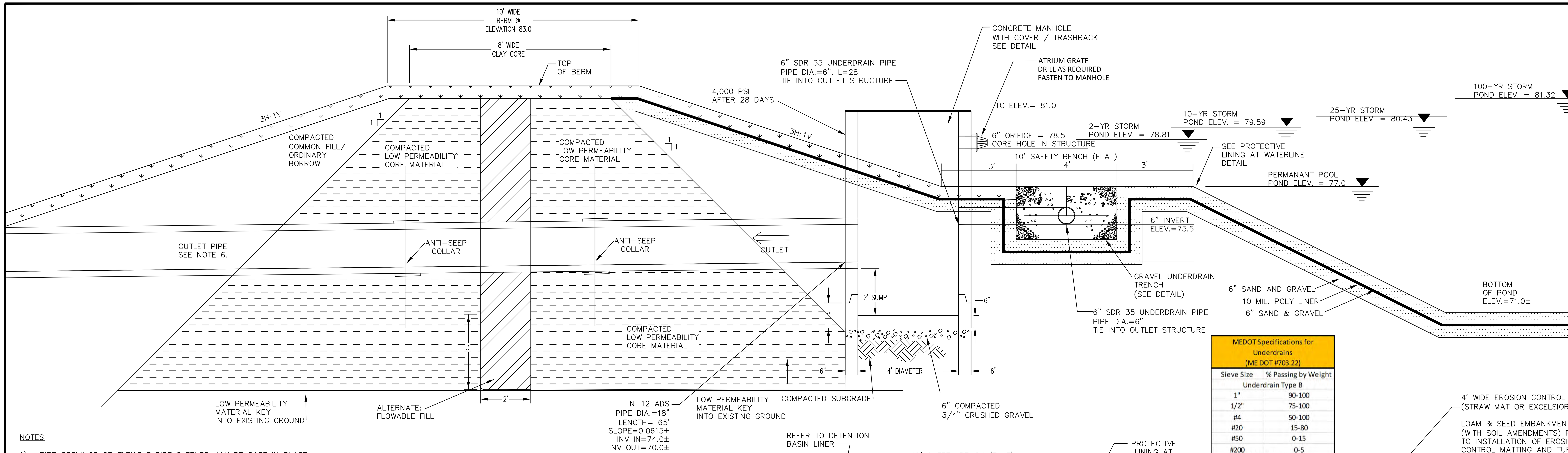
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE: 1"=20'	SHEET:
DRN BY:	JOB #: 109	C24
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



NOTES

1) PIPE OPENINGS OR FLEXIBLE PIPE SLEEVES MAY BE CAST IN PLACE.

2) SUBMIT PRODUCT SPECIFICATION LITERATURE AND/OR SHOP DRAWINGS FOR OUTLET STRUCTURE.

BASIN LINER SHALL CONSIST OF AT LEAST 10 MIL POLY LINER, COVERED WITH 6" OF CLEAN SAND AND GRAVEL BELOW THE PERMANENT POOL ELEVATION; AND 6" OF CLAYEY LOAM AND SEED ABOVE THE PERMANENT POOL ELEVATION.

1) THE BASIN LINER SHALL BE INSTALLED ON ALL AREAS WITHIN THE BASIN TO 2' ABOVE THE OUTLET STRUCTURE TOP OF GRATE.

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A. CONSTRUCTION OF COMMON BORROW MATERIAL MEETING M.D.O.T. SPECIFICATION
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WetPonds with UNDERDRAINED GRAVEL TRENCH OUTLET

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1 WET POND AND OUTLET STRUCTURE

(SCALE: 1"=2')

MEDOT Specifications for Underdrains (ME DOT #703.22)	
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1"	90-100
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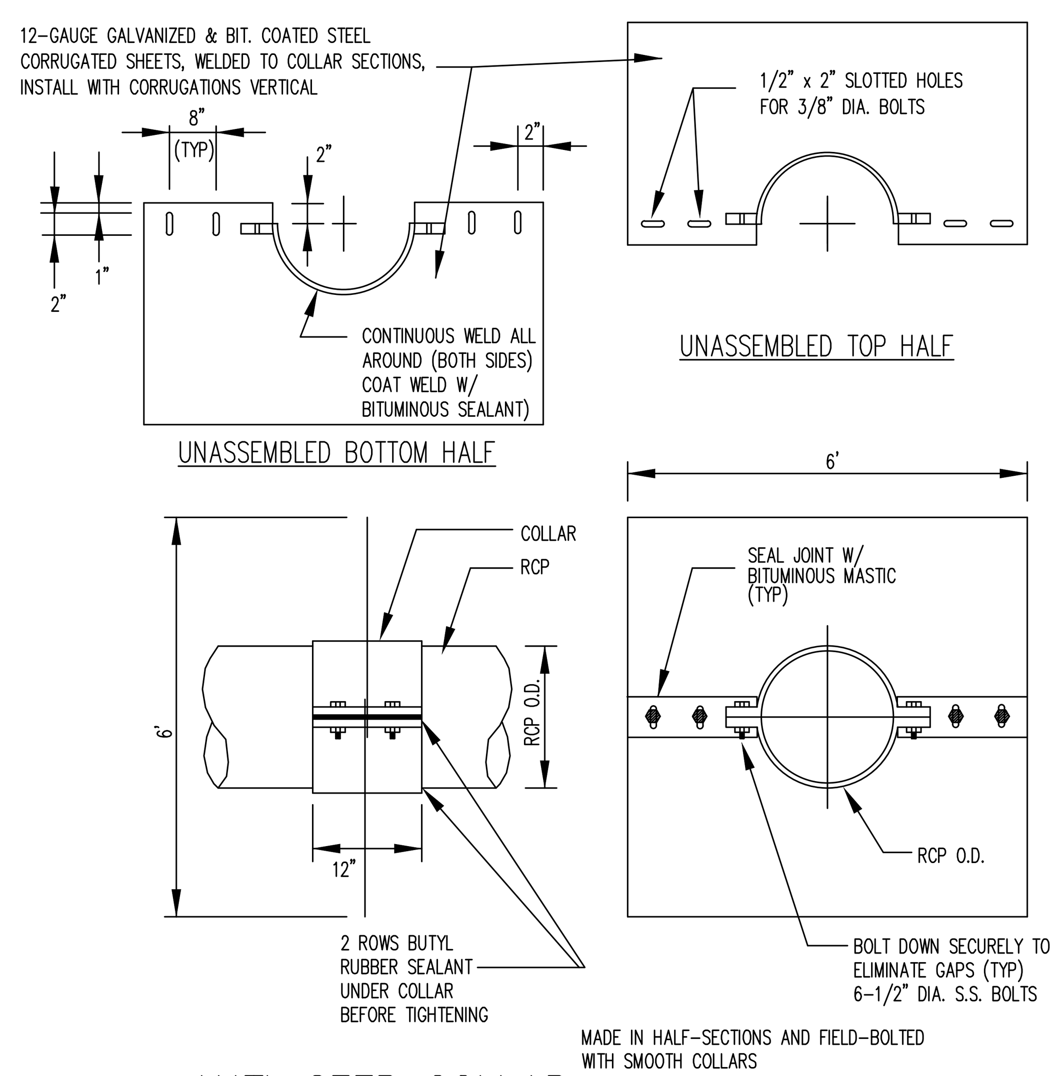
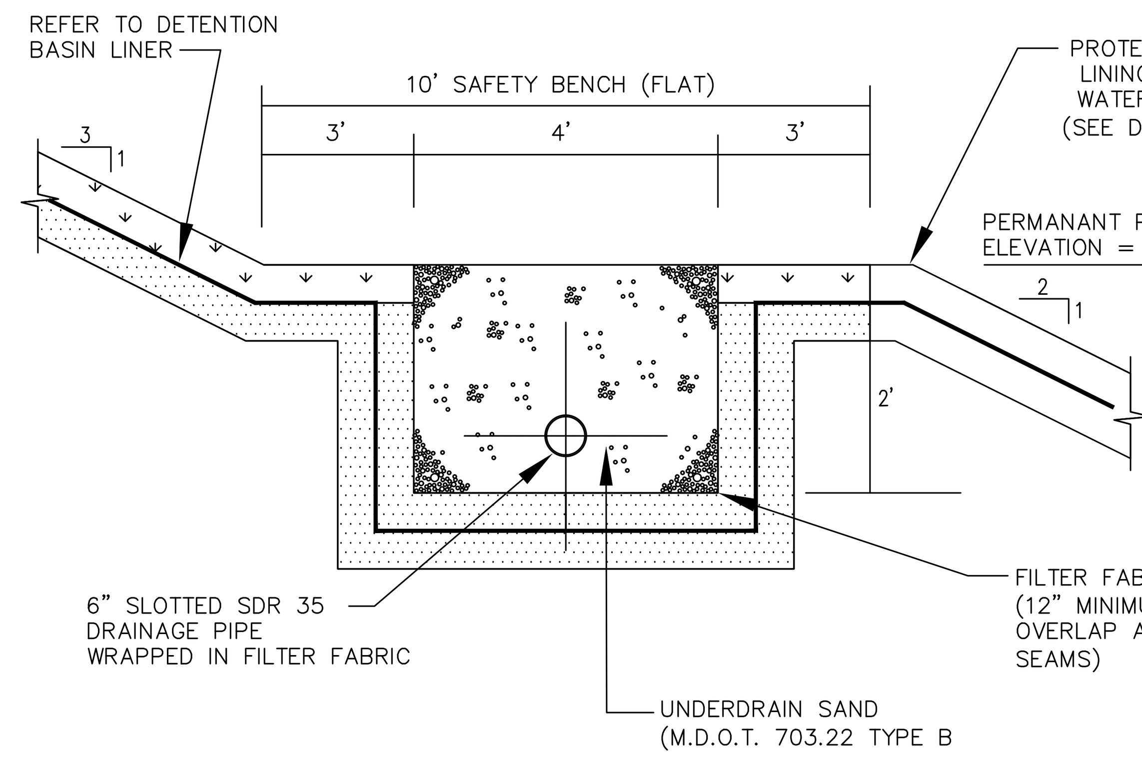
#20	15-80
#50	0-15
#200	0-5
Underdrain Type C	
1"	100
3/4"	90-100
3/8"	0-75
#4	0-25
#10	0-5



3 ANTI-SEEP COLLAR

NOT TO SCALE



NOTE:

FILTER FABRIC SHALL BE MIRAFI 140N OR APPROVED EQUAL.

6 GRAVEL UNDERDRAIN TRENCH DETAIL

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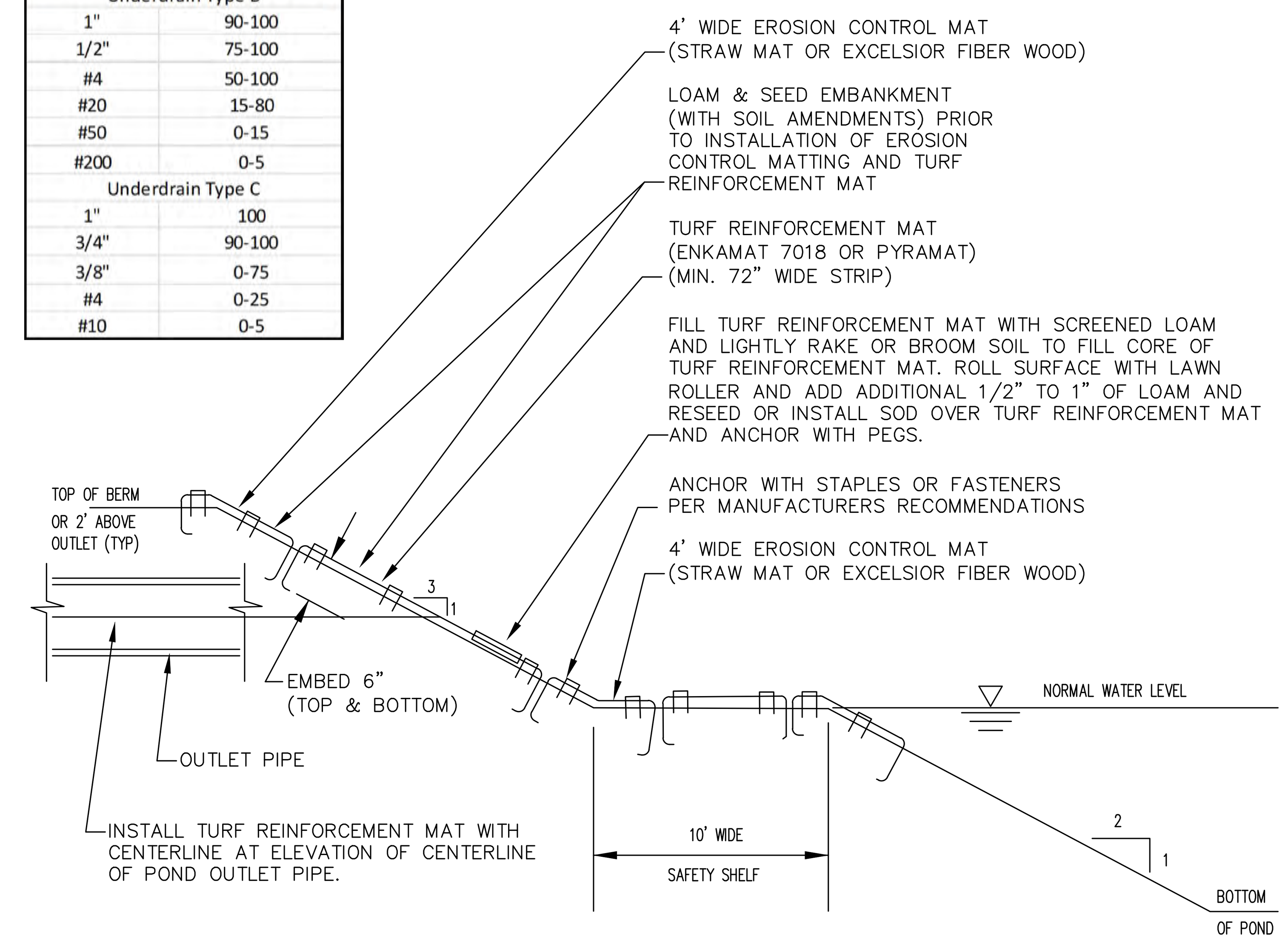
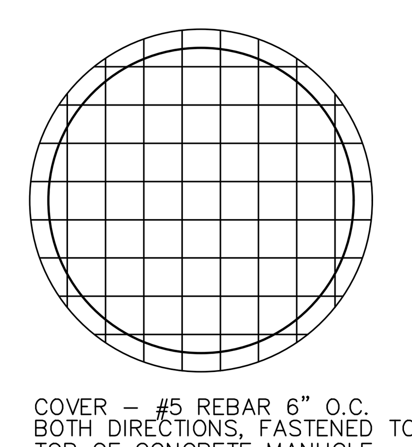


2 PROTECTIVE LINING AT WATERLINE

NOT TO SCALE



3 TRASH RACK / MANHOLE COVER

NOT TO SCALE

PROGRESS PLAN
NOT FOR CONSTRUCTION

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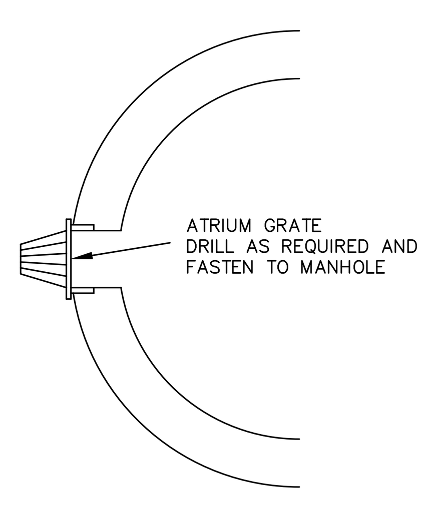
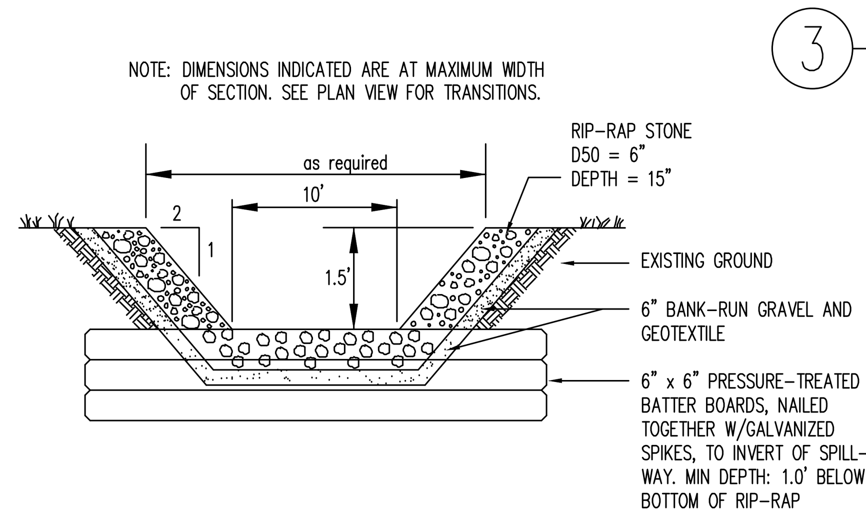


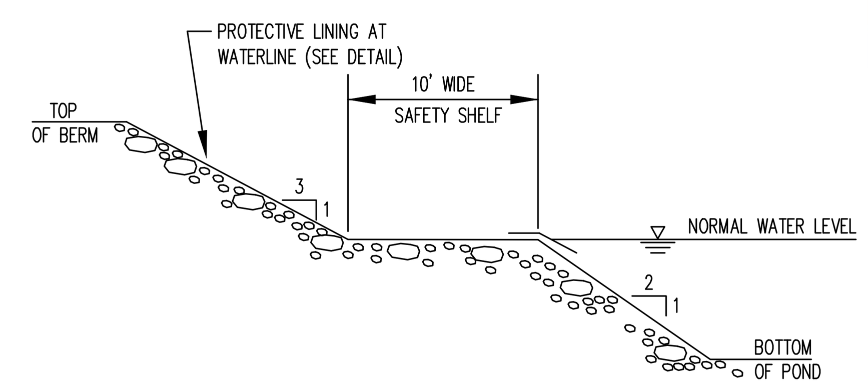
3 ATRIUM GRATE DETAIL

NOT TO SCALE



8 TYPICAL EMERGENCY SPILLWAY SECTION

NOT TO SCALE



4 TYPICAL POND GRADING

NOT TO SCALE

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
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4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

Periwinkle Drive Wet Pond Details

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE CHRISTOPHER S. BELANGER 9098 LICENSED PROFESSIONAL ENGINEER

7-31-2018

BELANGER ENGINEERING CONSULTING ENGINEERS
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Email: cbelanger@roadrunner.com
63 Second Avenue , Augusta, Maine 04330 Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C25
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

6.	7–31–2018	No changes this sheet, re–submit to Town	CSB
5.	7–16–2018	No changes this sheet	CSB
4.	5–4–2018	Respond to DEP Comments, re–submit to DEP	CSB
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Stormwater Buffer Location Plan

Oceanview at Cumberland
291Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330

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Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE: 1"=20'	SHEET:
DRN BY:	JOB #:	C26
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

8.	7–31–2018	No changes this sheet, re–submit to Town	CSB
7.	7–16–2018	No changes this sheet	CSB
6.	6–15–2018	move low point, move focal point re–submit to Maine DEP	CSB
5.	5–4–2018	Respond to DEP comments, re–submit to DEP	CSB
4.	4–5–2018	Submit revised details to Focalpoint	CSB
3.	3–1–2018	Respond to Town Memos, Re–submit to Town	CSB
2.	2–7–2018	Submit to Maine DEP	CSB
1.	1–31–2018	Respond to Town Memos, submit to Town and DEP	CSB

Site Development Plan
Focalpoint Sta 19+50 Right Side

Oceanview at Cumberland
291Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

PROGRESS PLAN
NOT FOR CONSTRUCTION
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STATE OF MAINE ★ CHRISTOPHER S. BELANGER 9098 ★ LICENSED PROFESSIONAL ENGINEER
7-31-2018

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Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE: 1"=10'	SHEET: C27
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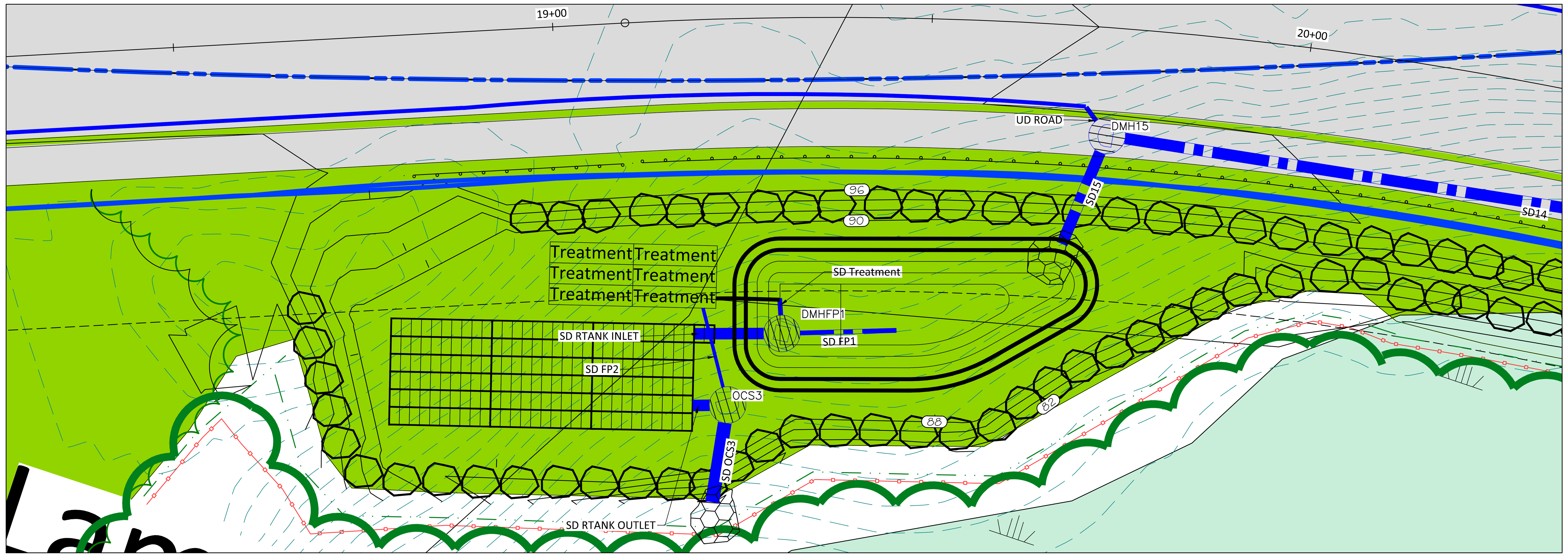
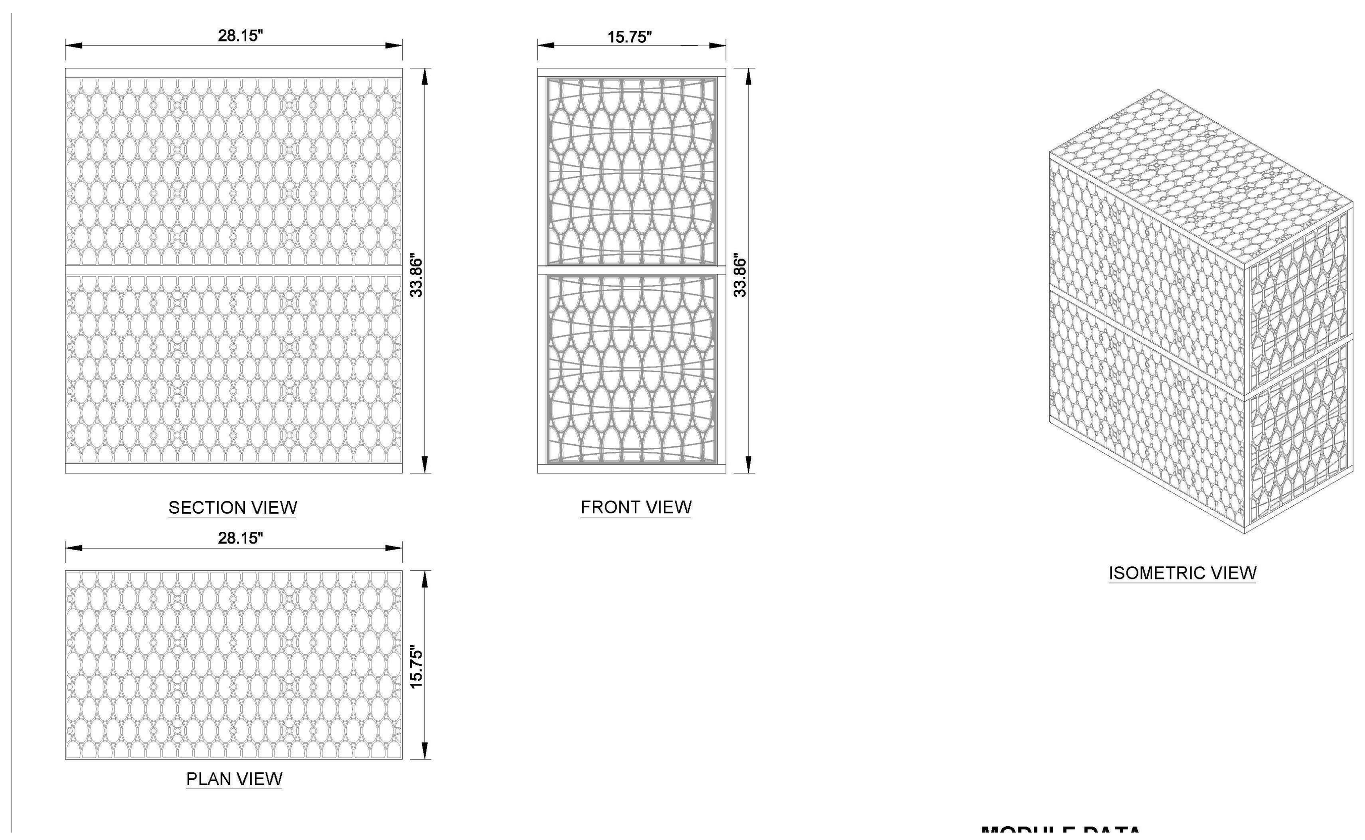


EXPANDED R-TANK SYSTEM LAYOUT (10 SCALE)

R-TANK SYSTEM DIMESIONAL DATA

R-TANK SYSTEM I.D.	FP-1	FP-2
R-TANK[HD] MODULE	DOUBLE	DOUBLE
# TANKS WIDE	6	
# TANKS LONG	30	
STONE PERIMETER WIDTH	2 FT	
SYSTEM WIDTH	14'	
SYSTEM LENGTH	40'	
R-TANK INVERT	82.5	
STONE BASE ELEV	82.0	
R-TANK TOP ELEV	84.0	
MIN COVER (20")	2'	
MAX COVER (7 FT)	2'	



MODULE DATA

GEOMETRY: LENGTH = 28.15 IN. (715 MM)
WIDTH = 15.75 IN. (400 MM)
HEIGHT = 33.86 IN. (860 MM)
TANK VOLUME = 8.69 CF
STORAGE VOLUME = 8.25 CF
VOID INTERNAL VOLUME: 95%
VOID SURFACE AREA: 90%

LOAD RATING: 33.4 PSI, (MODULE ONLY)
HS25, (WITH ACF COVER SYSTEM)

MATERIAL: 100% RECYCLED POLYPROPYLENE

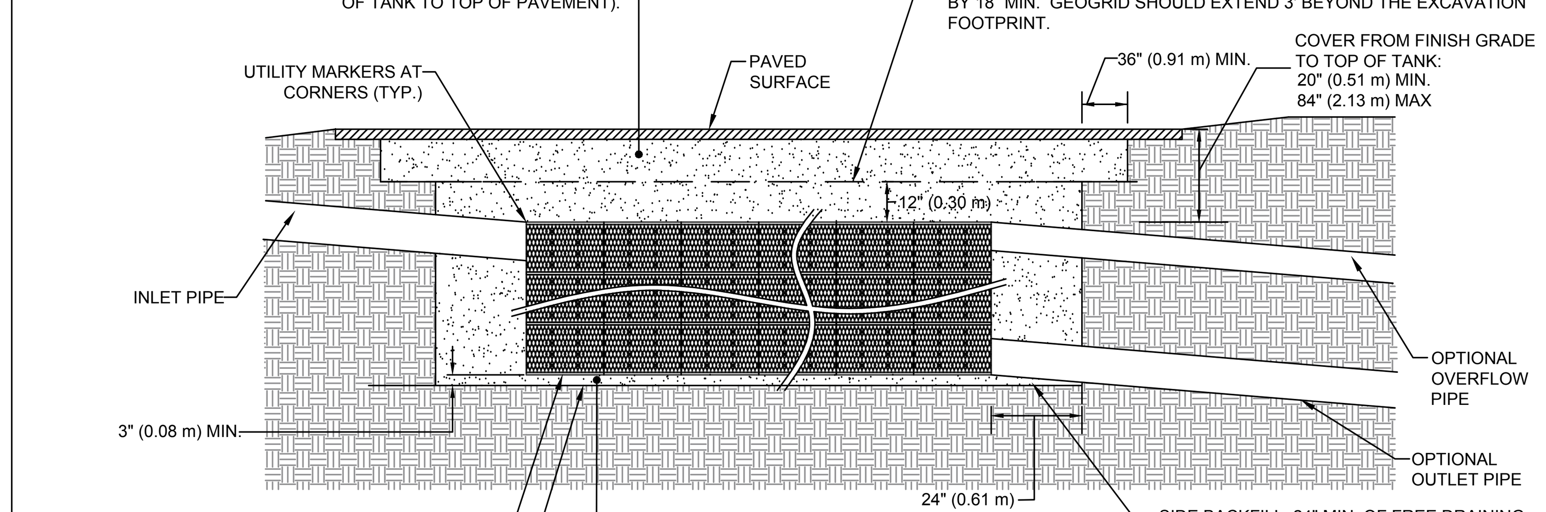
SMALL PLATES PER SEGMENT/TOTAL: 5/10

1 R-TANK[HD] DOUBLE - MODULE DETAIL

TOTAL COVER: 20" MINIMUM AND 84" MAXIMUM. FIRST 12" MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12" COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:

- FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK[HD] MODULE SHEET
- INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF H20 LOADING PER THE 1983, 13TH EDITION OF THE AMERICAN ASSOCIATION OF STATE, HIGHWAY AND TRAFFIC OFFICIALS (AASHTO) STANDARD SPECIFICATIONS
- PRE-TREATMENT STRUCTURES NOT SHOWN

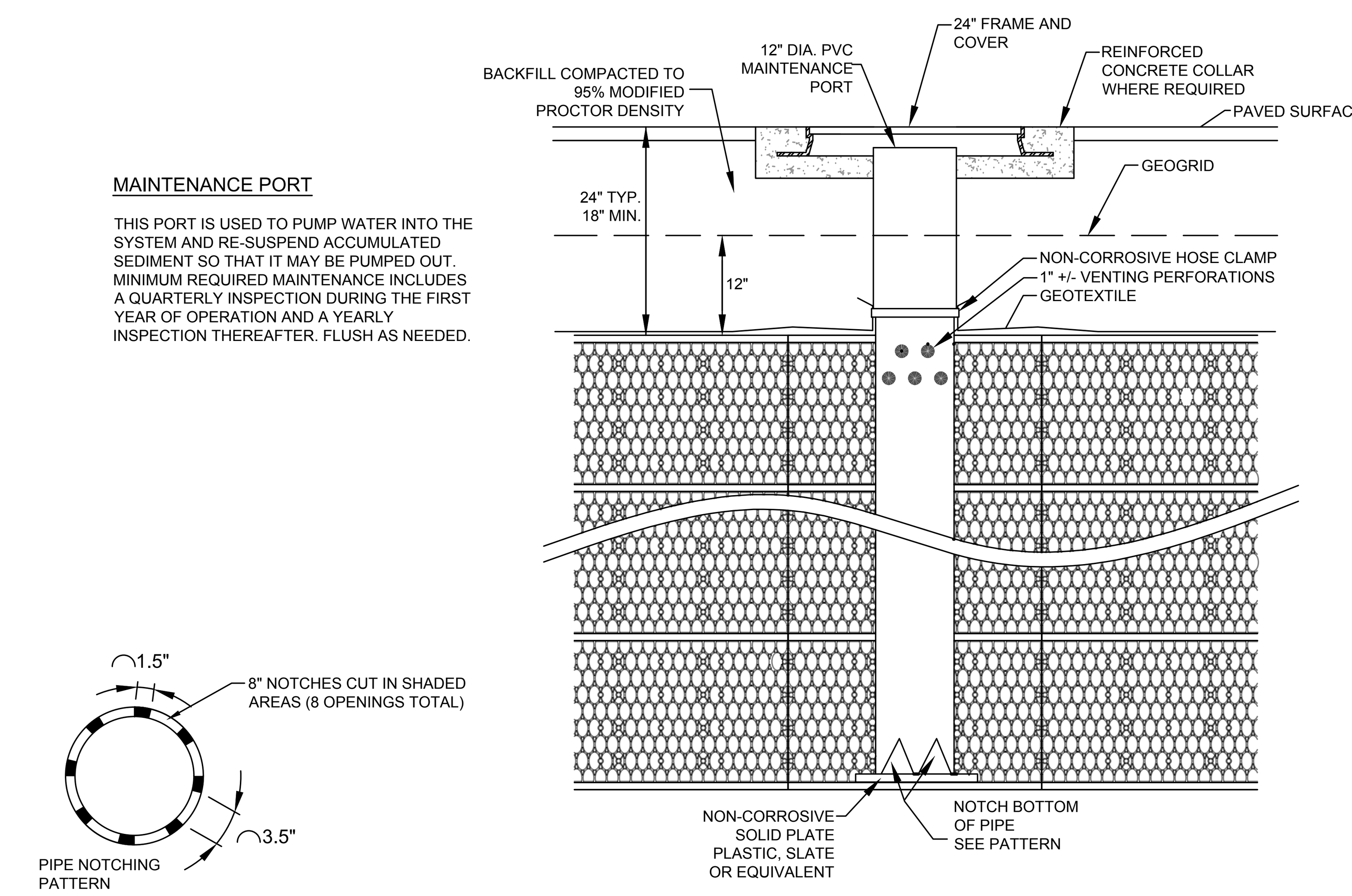


* FOR INFILTRATION APPLICATIONS, BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03B) TO PROVIDE A LEVEL BASE SURFACE. MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK[HD] FOOTPRINT. A BEARING CAPACITY OF 2,000 PSF MUST BE ACHIEVED PRIOR TO INSTALLING R-TANK[HD].

2 R-TANK[HD] - H-20 LOADS

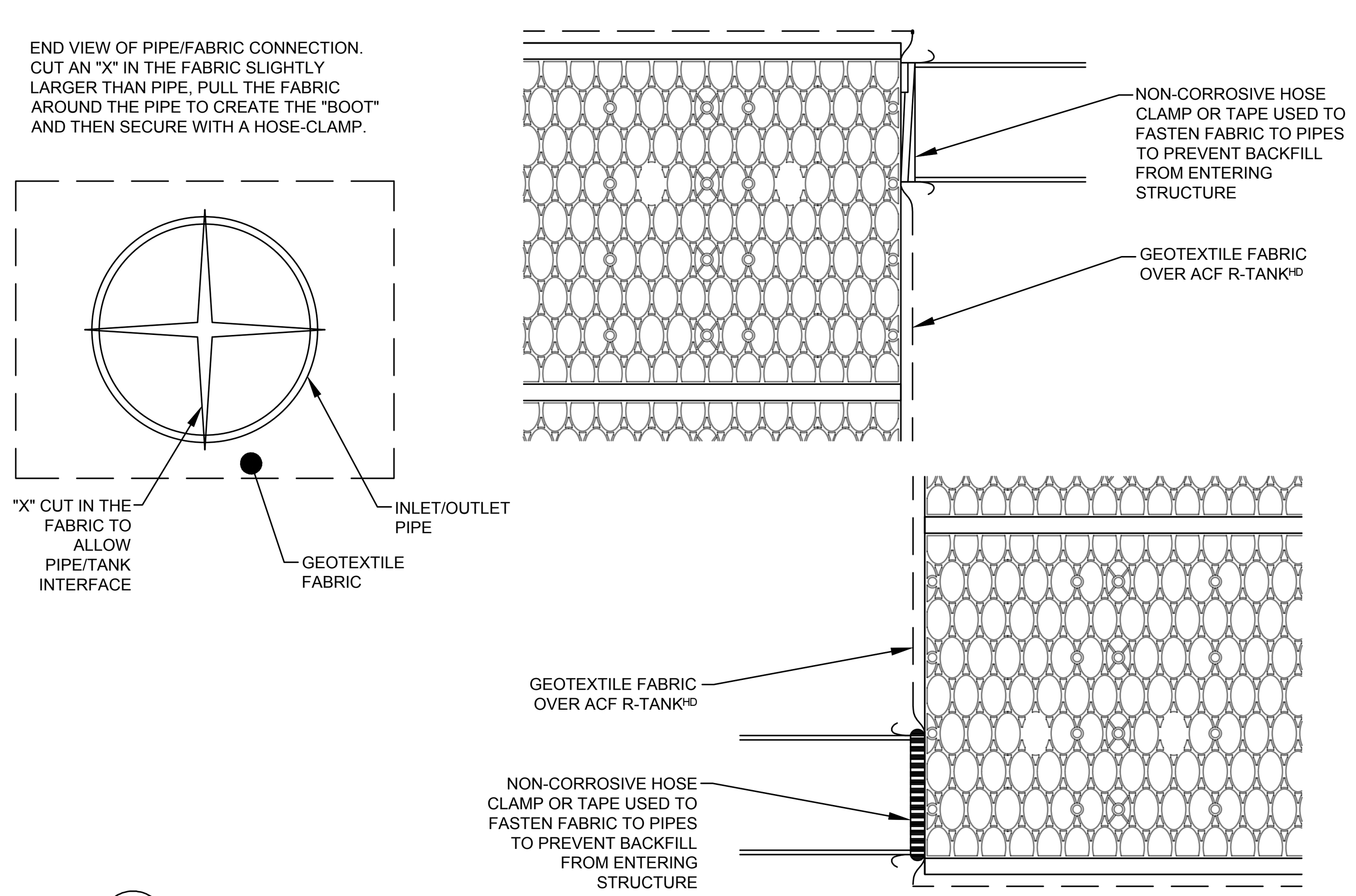
MAINTENANCE PORT

THIS PORT IS USED TO PUMP WATER INTO THE SYSTEM AND RE-SUSPEND ACCUMULATED SEDIMENT SO THAT IT MAY BE PUMPED OUT. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.

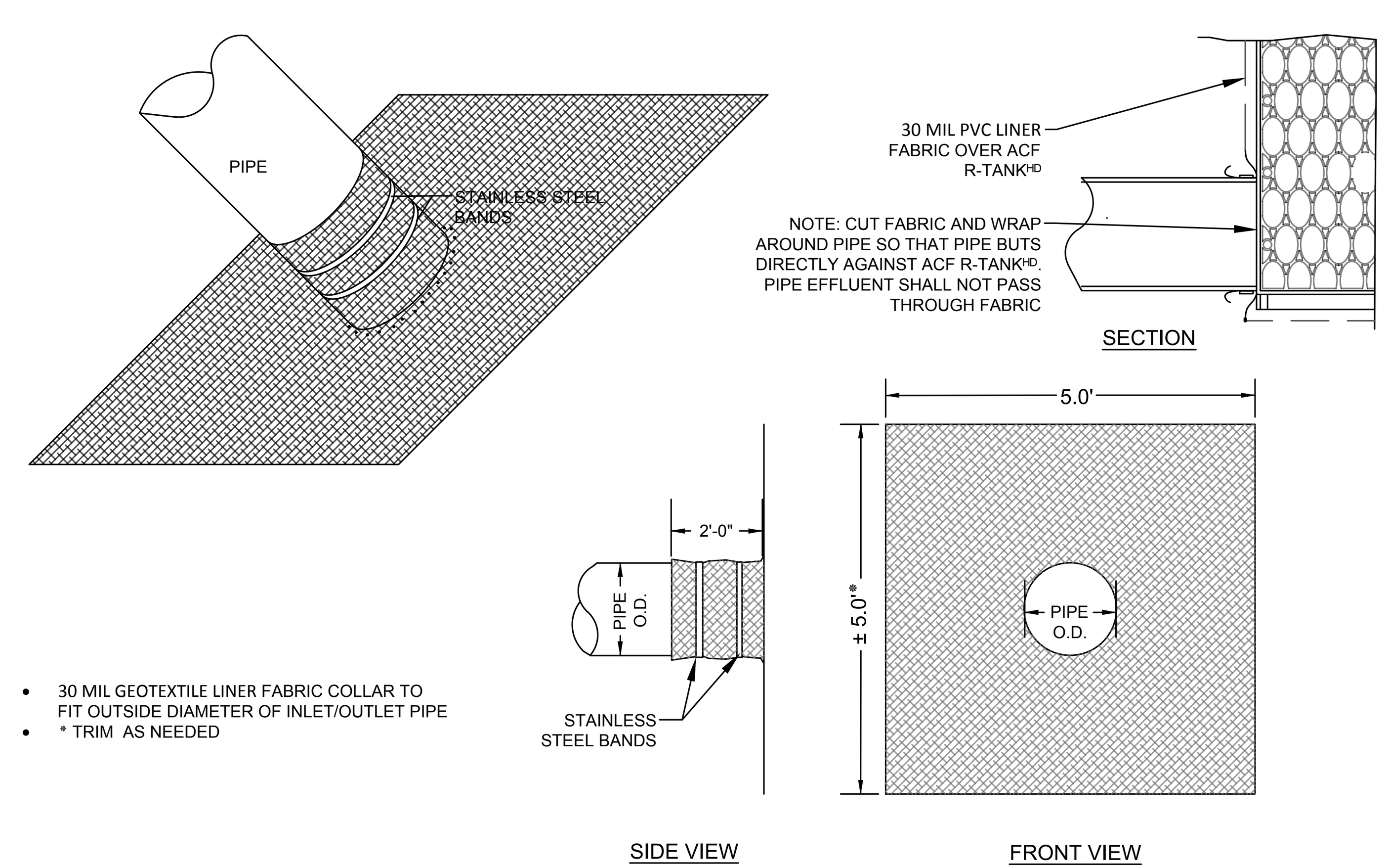


3 R-TANK[HD] TYPICAL MAINTENANCE PORT

END VIEW OF PIPE/FABRIC CONNECTION. CUT AN "X" IN THE FABRIC SLIGHTLY LARGER THAN PIPE. PULL THE FABRIC AROUND THE PIPE TO CREATE THE "BOOT" AND THEN SECURE WITH A HOSE-CLAMP.

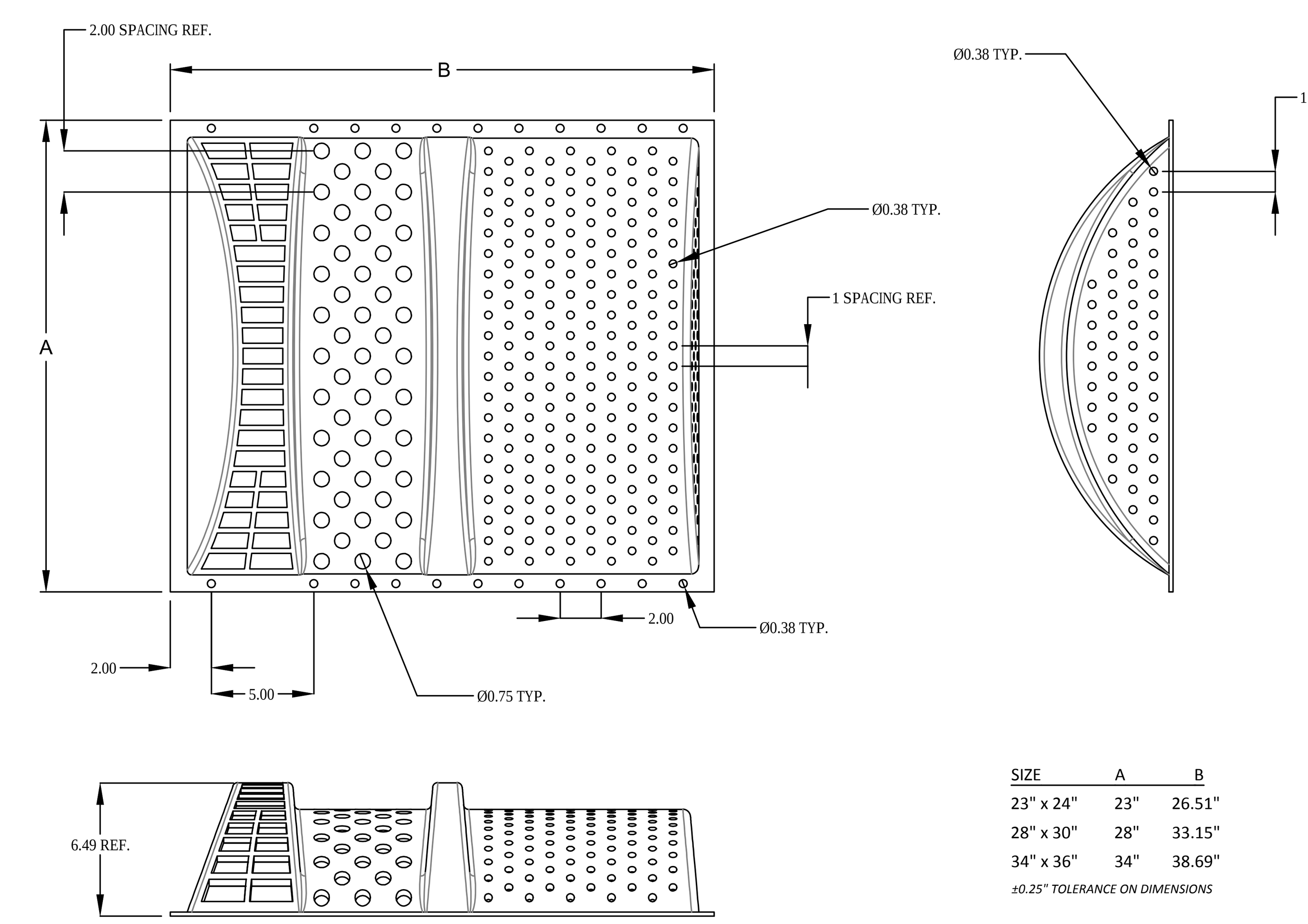


4 R-TANK[HD] TYPICAL TANK INLET/OUTLET DETAIL



- 30 MIL GEOTEXTILE LINER FABRIC COLLAR TO FIT OUTSIDE DIAMETER OF INLET/OUTLET PIPE
- * TRIM AS NEEDED

5 GEOTEXTILE PIPE BOOT FOR R-TANK[HD]



SIZE	A	B
23" x 24"	23"	26.51"
28" x 30"	28"	33.15"
34" x 36"	34"	38.69"

±0.25" TOLERANCE ON DIMENSIONS

6 TRASH GUARD PLUS DETAIL

DATE	REVISION
-	-

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
ACF ENVIRONMENTAL 1-800-448-3636
www.acfenvironmental.com

ACF ENVIRONMENTAL LET'S GET IT DONE

R-TANK[HD] DETAILS FOR EXPANDED FOCALPOINT SYSTEM UNDERDRAINS

PROJECT NAME

CITY, STATE

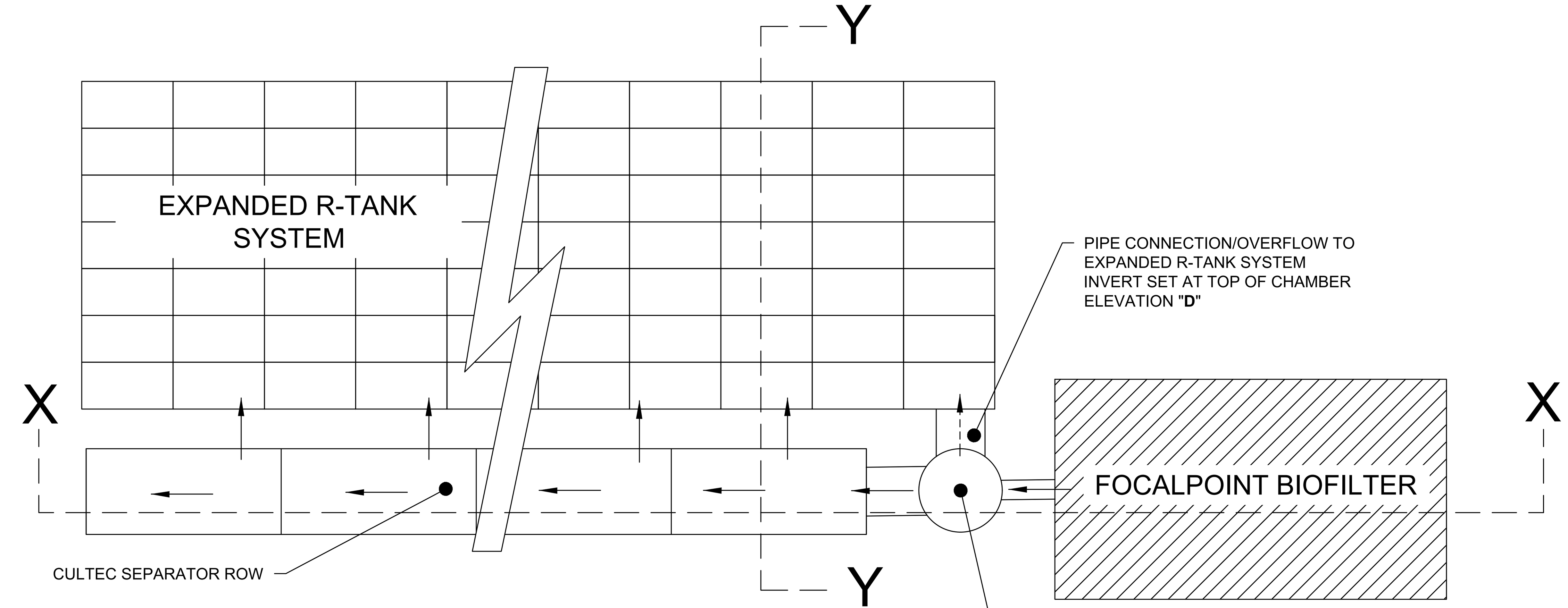
PROJECT NO. 109

DATE July 31, 2018

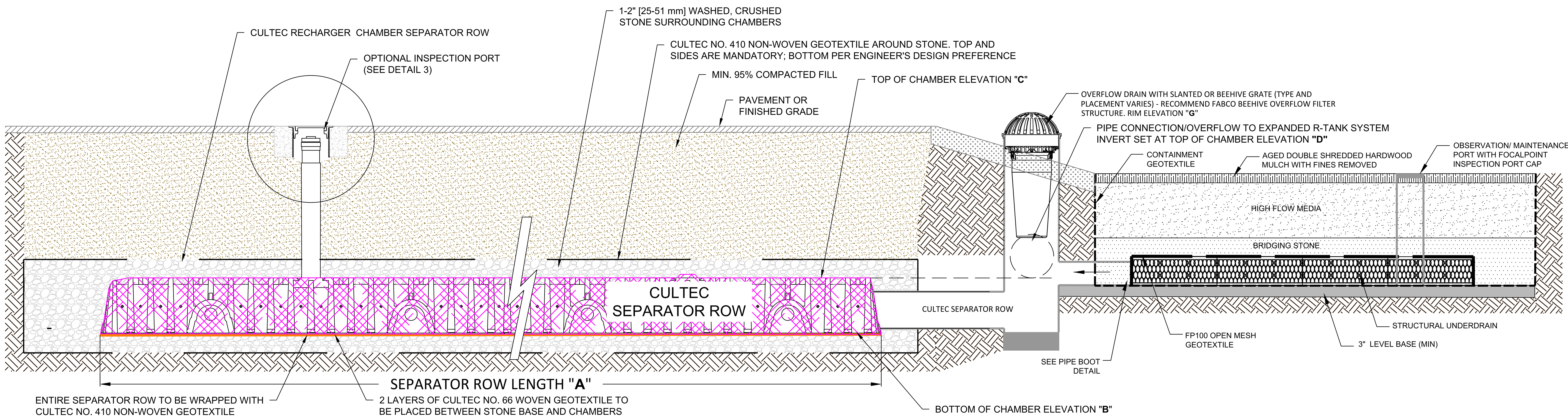
SHEET NO. C28

REV 3/18/16

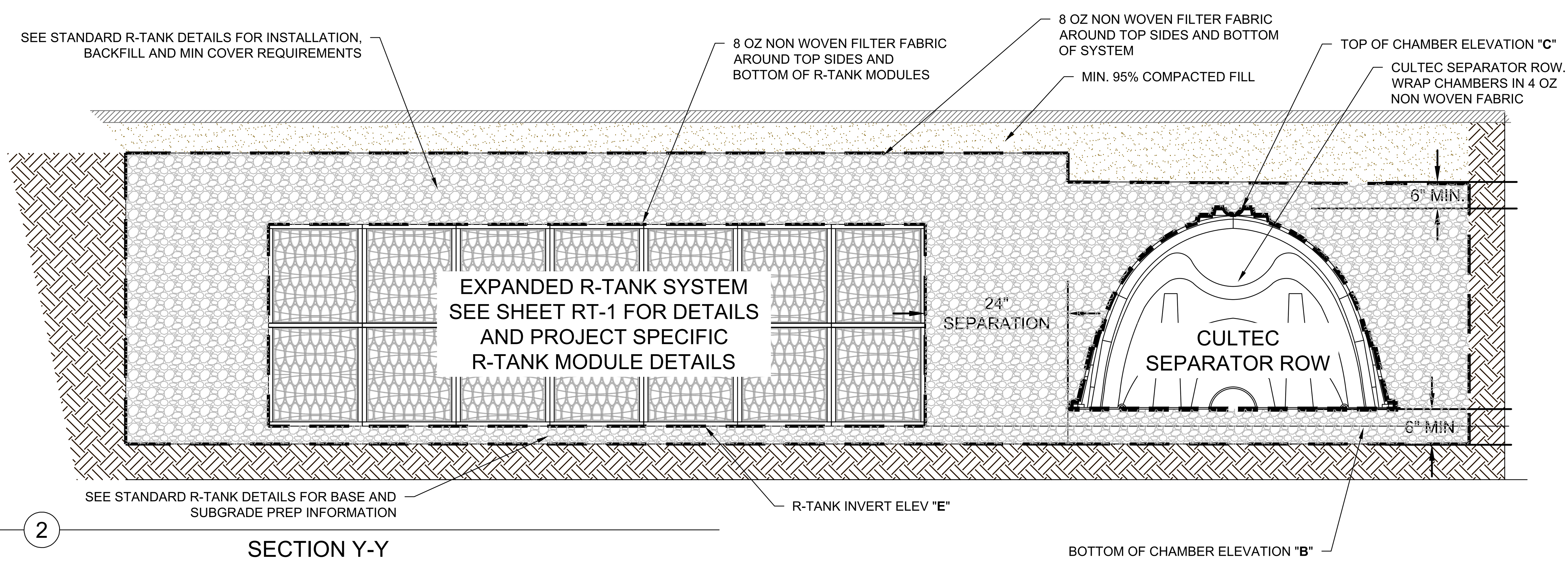
SEPARATOR ROW KEY DIMENSIONAL DATA				
FOCALPOINT I.D.		FP#1-Sta 21+50 Right		
	CULTEC CHAMBER	150XLHD		
	# CULTEC CHAMBERS	7		
A	SEPARATOR ROW LENGTH	77'		
B	BOTTOM OF CHAMBER ELEV	86.0		
C	TOP OF CHAMBER ELEV	87.5		
D	OVERFLOW PIPE TO R-TANK ELEV	87.5		
E	R-TANK INVERT	85.0 (verify)		
F	R-TANK MODULE	DOUBLE		
G	BEEHIVE OVERFLOW RIM	92.5		



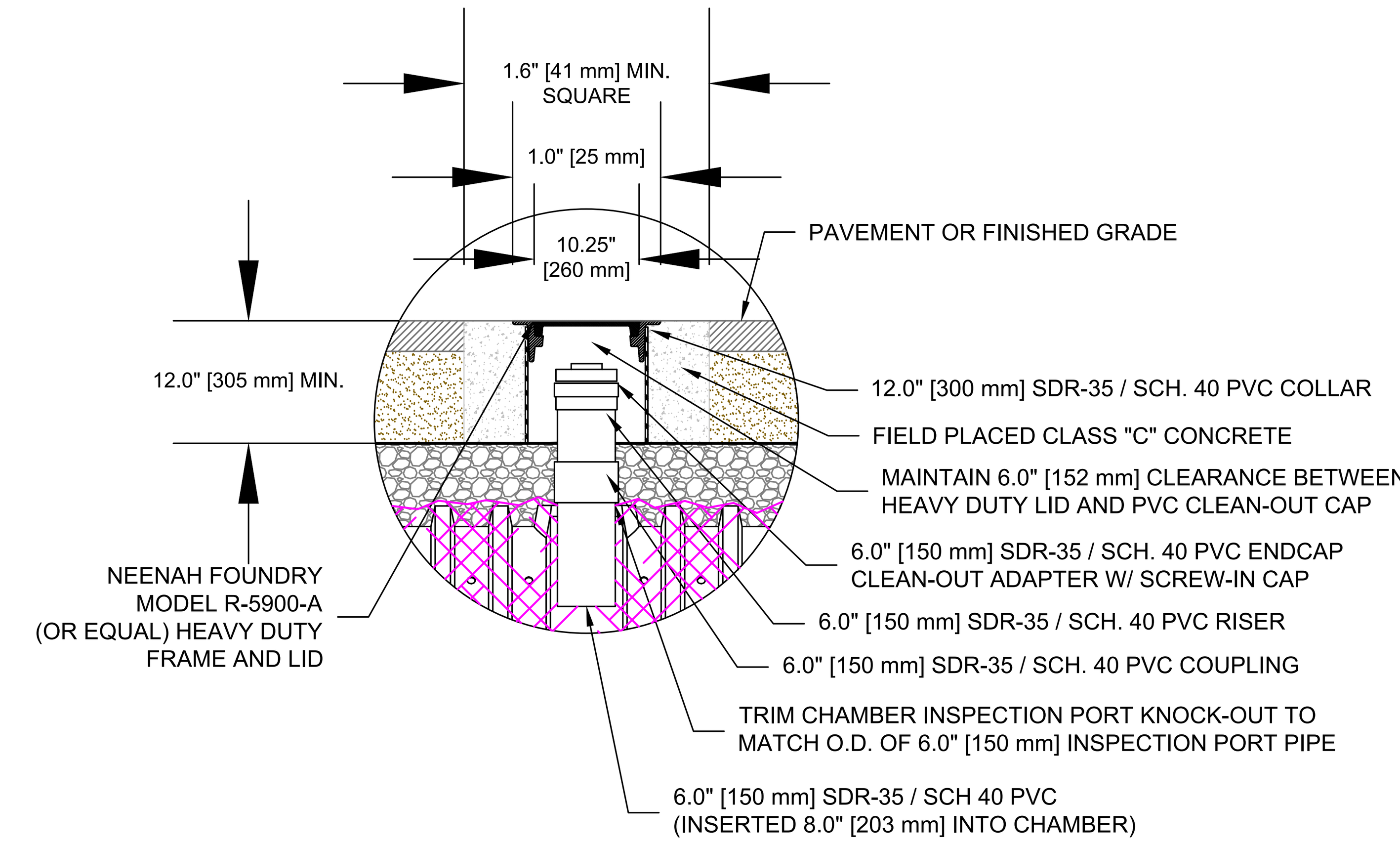
FLOW/COMPONENT SCHEMATIC



1 SECTION X-X (NTS)



2 SECTION Y-Y



3 CULTEC SEPARATOR ROW INSPECTION PORT DETAIL

REV 3/18/16

NOTE: ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

DATE	REVISION
-	-

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SEPARATOR ROW SYSTEM DETAILS

Oceanview @ Cumberland
291 Tuttle Road, Cumberland, Maine

PROJECT NO. 109

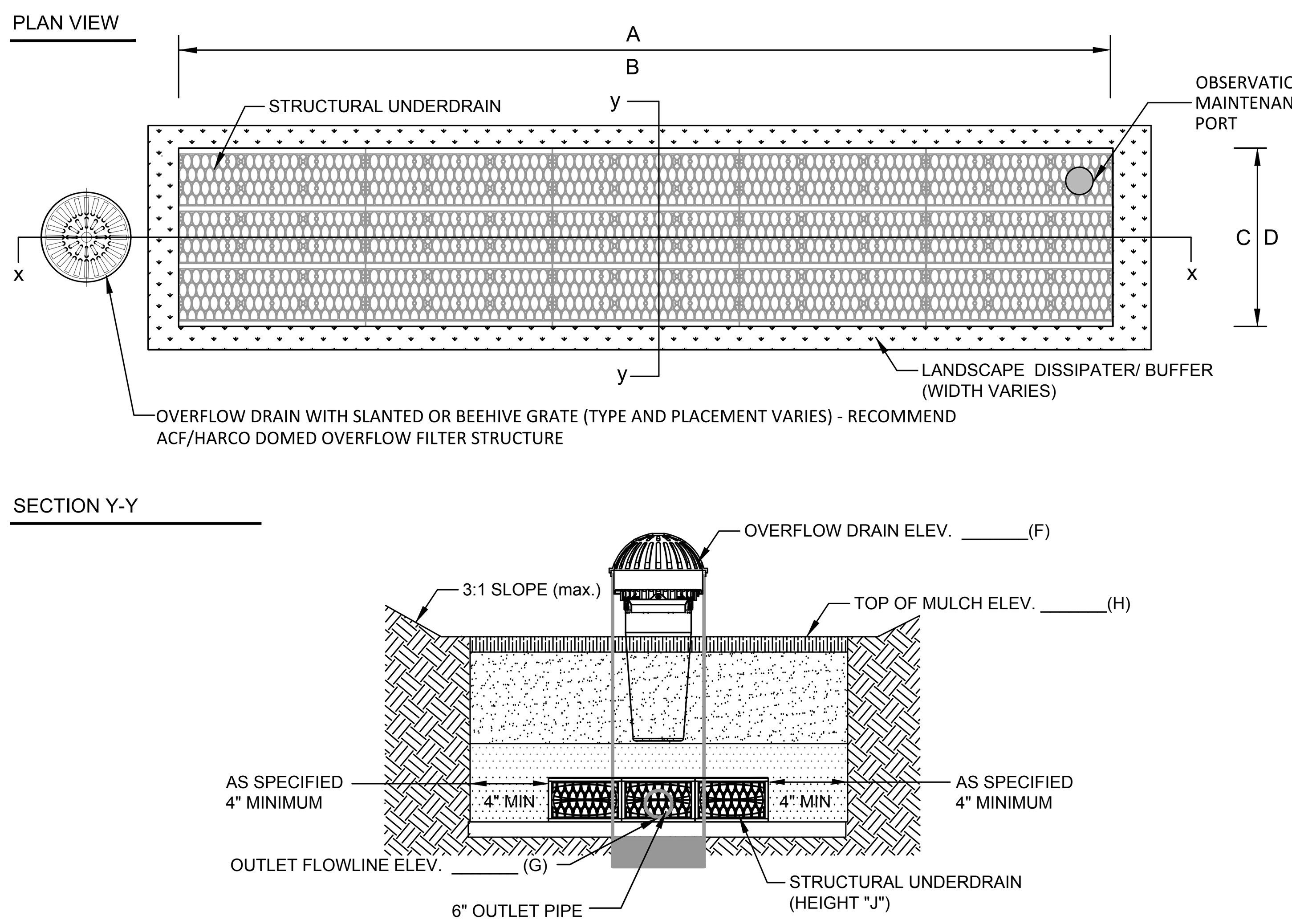
DATE July 31, 2018

SHEET NO.

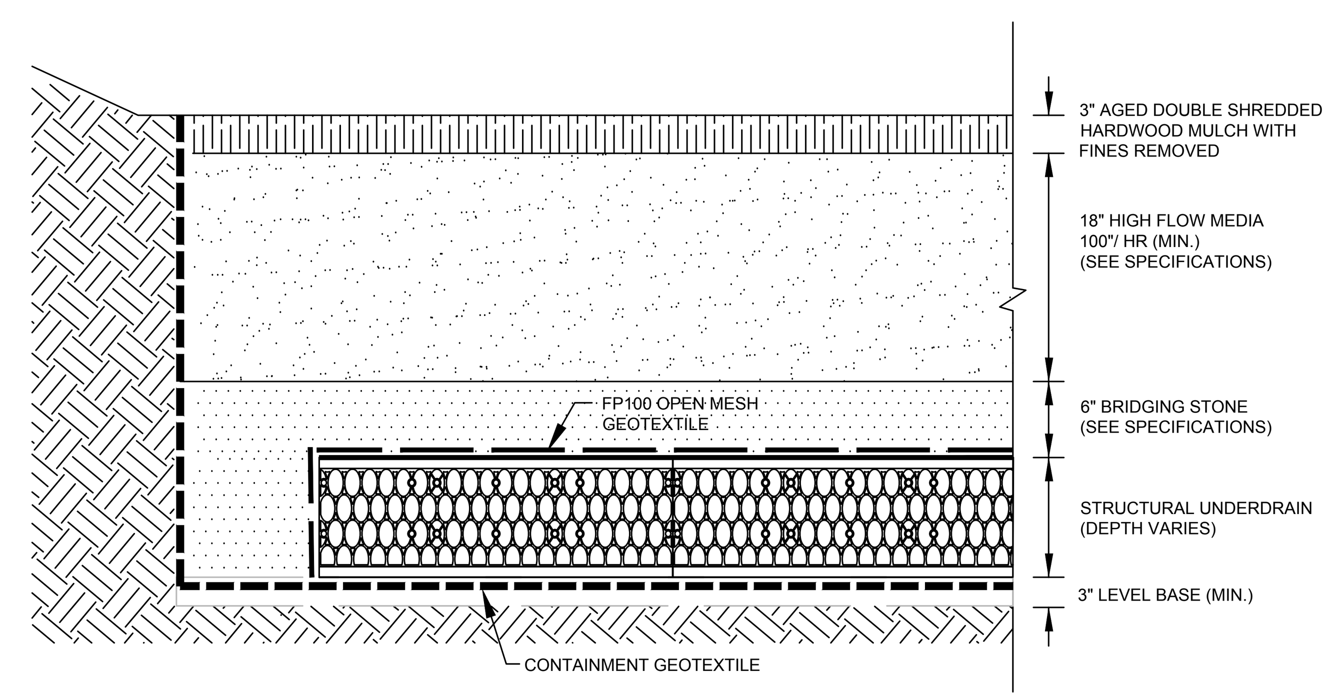
C29

FOCALPOINT KEY DIMENSIONAL DATA

FOCALPOINT I.D.		#1-Sta 21+50 Rt.						
A	FOCALPOINT LENGTH	9'						
B	# UNDERDRAIN LONG	9'						
C	FOCALPOINT WIDTH	8'						
D	# UNDERDRAIN WIDE	3'						
E	WATER QUALITY VOLUME	1350 c.f.						
F	OVERFLOW ELEVATION	88.0						
G	OUTLET FLOWLINE	84.0						
H	TOP OF MULCH	88.5						
J	UNDERDRAIN HEIGHT	MINI						



1 FOCALPOINT CONSTRUCTION GUIDE



FOCALPOINT HP PERFORMANCE SPECIFICATION:

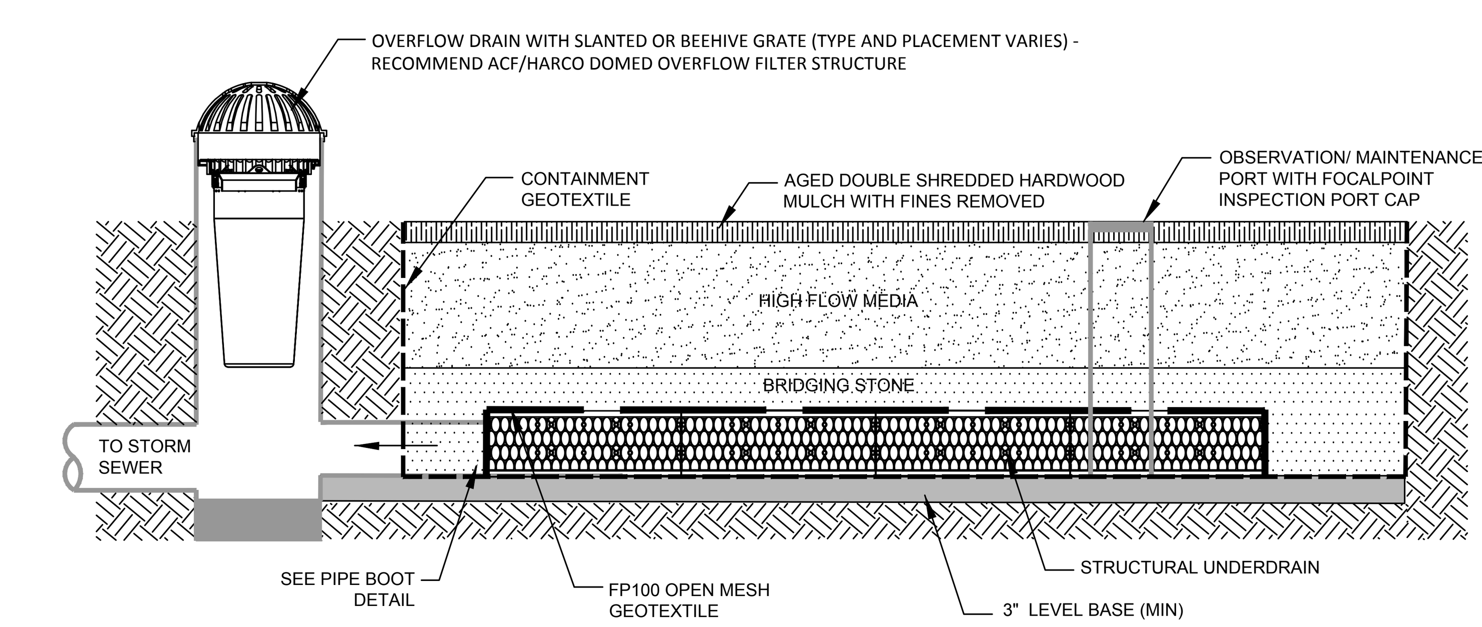
HIGH PERFORMANCE MEDIA

HIGH PERFORMANCE MEDIA MUST MEET A MINIMUM OF 100" PER HOUR INFILTRATION RATE.

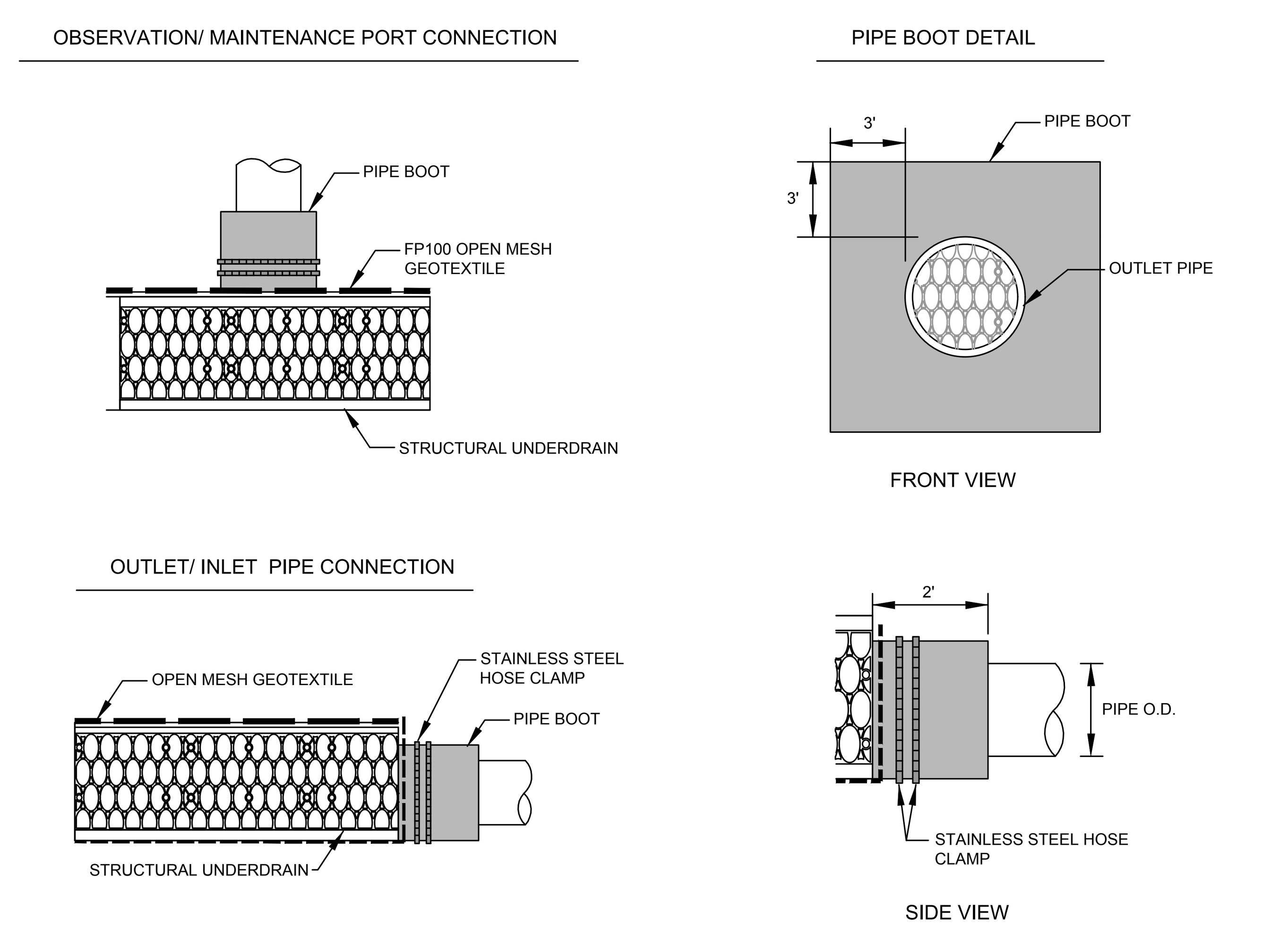
HIGH PERFORMANCE STRUCTURAL UNDERDRAIN

MUST HAVE A MINIMUM OF 19 SQUARE INCHES OF ORIFICE OPENING PER SQUARE FOOT.
MUST MEET H20 LOADING REQUIREMENTS.
MUST BE MODULAR IN NATURE AND ASSEMBLED ON SITE.
MUST HAVE MINIMUM 90% INTERIOR VOID SPACE.

2 FOCALPOINT DETAILED CROSS SECTION



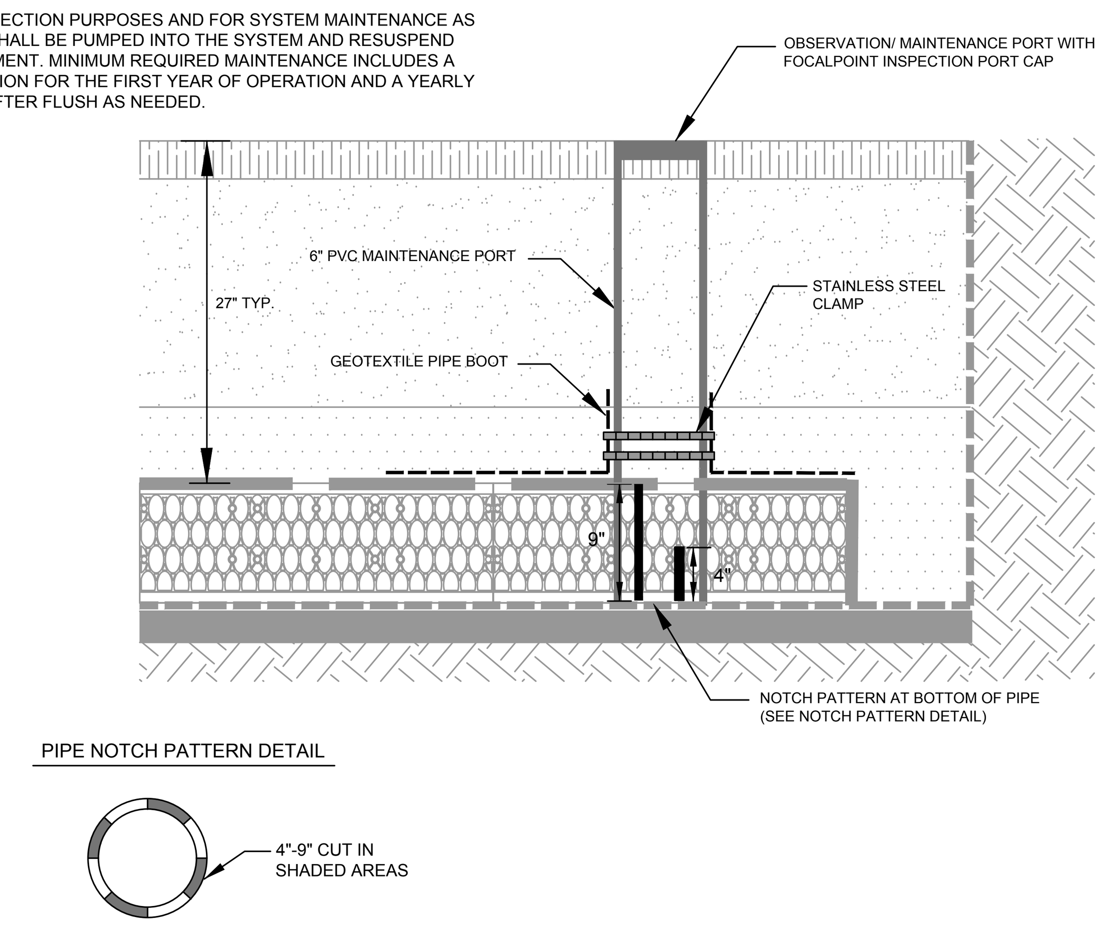
3 FOCALPOINT SECTION X-X



4 FOCALPOINT PIPE CONNECTION DETAIL

OBSERVATION/ MAINTENANCE PORT

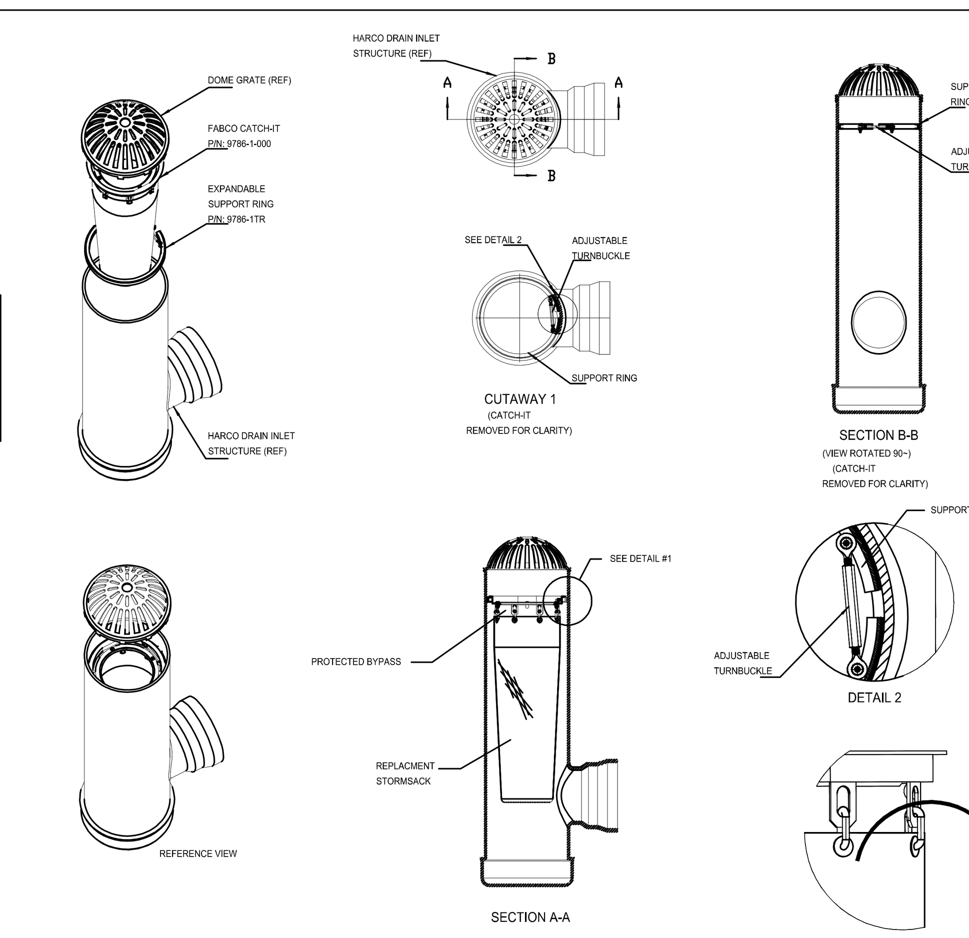
PORT USED FOR INSPECTION PURPOSES AND FOR SYSTEM MAINTENANCE AS REQUIRED. WATER SHALL BE PUMPED INTO THE SYSTEM AND RESUSPEND ACCUMULATED SEDIMENT. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION FOR THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER FLUSH AS NEEDED.



5 FOCALPOINT OBSERVATION PORT DETAIL

NOTES:
1. STORMSACK WEIGHT (EMPTY): 12 LB MAX
2. MATERIAL:
   A) SHROUD: HIGH DENSITY POLYETHYLENE (TYPICAL WALL THICKNESS .125")
   B) SUPPORT HUB: CRS, POWDER COATED
   C) STORMSACK: WOVEN POLYPROPYLENE GEOTEXTILE (GEOTEX 117F)
   D) HARDWARE: ALUMINUM POP-RIVETS
3. RECOMMENDED MINIMUM VAULT DEPTH: 2-IN BELOW CARTRIDGE
4. TYPICAL INSTALLATION: RAISE STORM GRATE, PUSH CATCH-IT SHROUD DOWN ON FRAME SUPPORT LEDGE UNTIL LOCKING-CLIPS CLICK IN PLACE, LOWER STORM GRATE.
5. USE ONLY WITH FABCO REPLACEABLE STORMSACK.

STRUCTURE DIAMETER (INCHES)	DEBRIS CAPACITY (CF)	FILTERED FLOWRATE (CFS)	BYPASS FLOWRATE (CFS)	TOTAL SYSTEM FLOWRATE (CFS)
12	0.77	2.2	1.2	3.4
18	1.65	2.5	1.0	3.5
24	3.60	4.9	2.4	7.3
30	6.20	4.9	2.4	7.3



6 ACF/HARCO DOMED OVERFLOW FILTER RISER

REV 3/18/16

NOTE: ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

DATE	REVISION
-	-

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www.acfenvironmental.com

ACF ENVIRONMENTAL
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FOCALPOINT SYSTEM DETAILS

Oceanview @ Cumberland

Tuttle Road, Cumberland, Maine

PROJECT NO.
109

DATE
July 31, 2018

SHEET NO.
C30

Legend for Soil Maps

1. Drainage Class

Excessively Well Drained	EWD
Well Drained	WD
Moderately Well Drained	MWD
Somewhat Poorly Drained	SPD
Poorly Drained	PD
Very Poorly Drained	VPD

2. Slope Designation

0-3%	A
3-8%	B
8-15%	C
15-25%	D
>25%	E

3. Note: High Intensity Soil Survey has been prepared by Mark Hampton Associates, Inc. in accordance with the standards adopted by the Maine Association of Professional Soil Scientists, and the Maine Board of Certification of Geologists and Soil Scientists.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

Prepared in association with:

LICHT ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
MARK J. HAMPTON #216
CERTIFIED SOIL SCIENTIST

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER

7-31-2018

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	No changes, re-submit to Town	CSB
2.	2.7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-submit to Town and DEP	CSB

Class B High Intensity Soil Survey

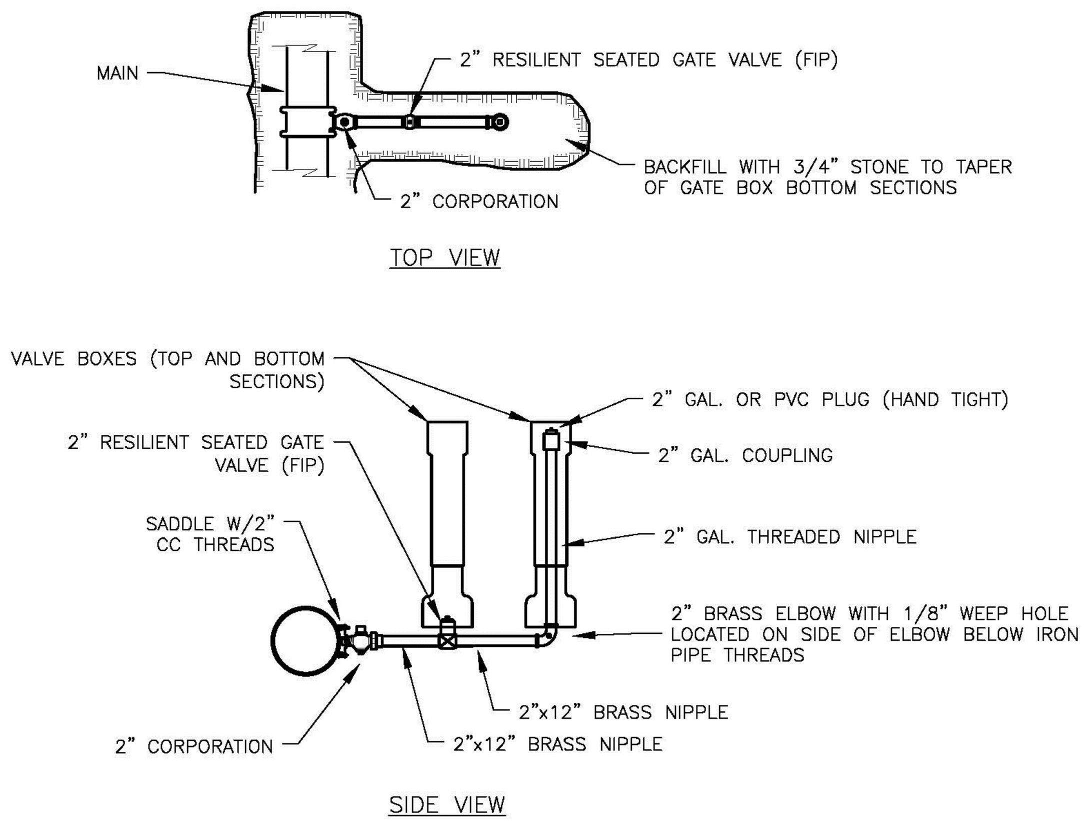
Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

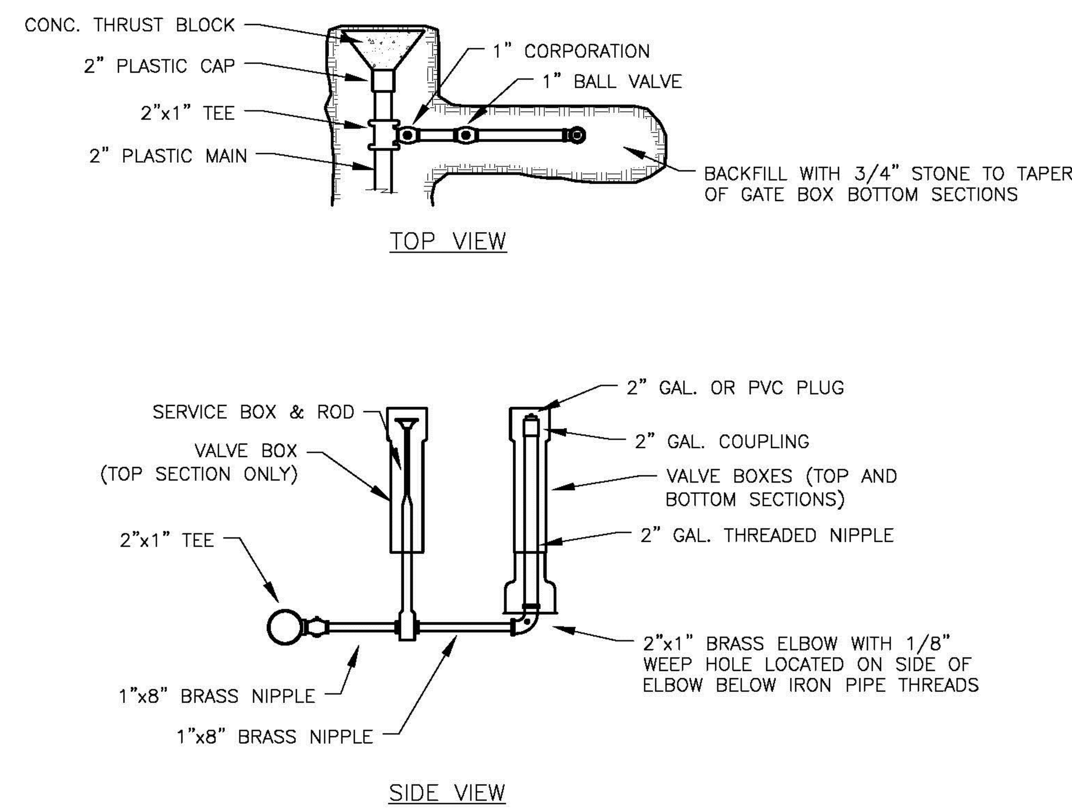
BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE: 1"=100'	SHEET: C32
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



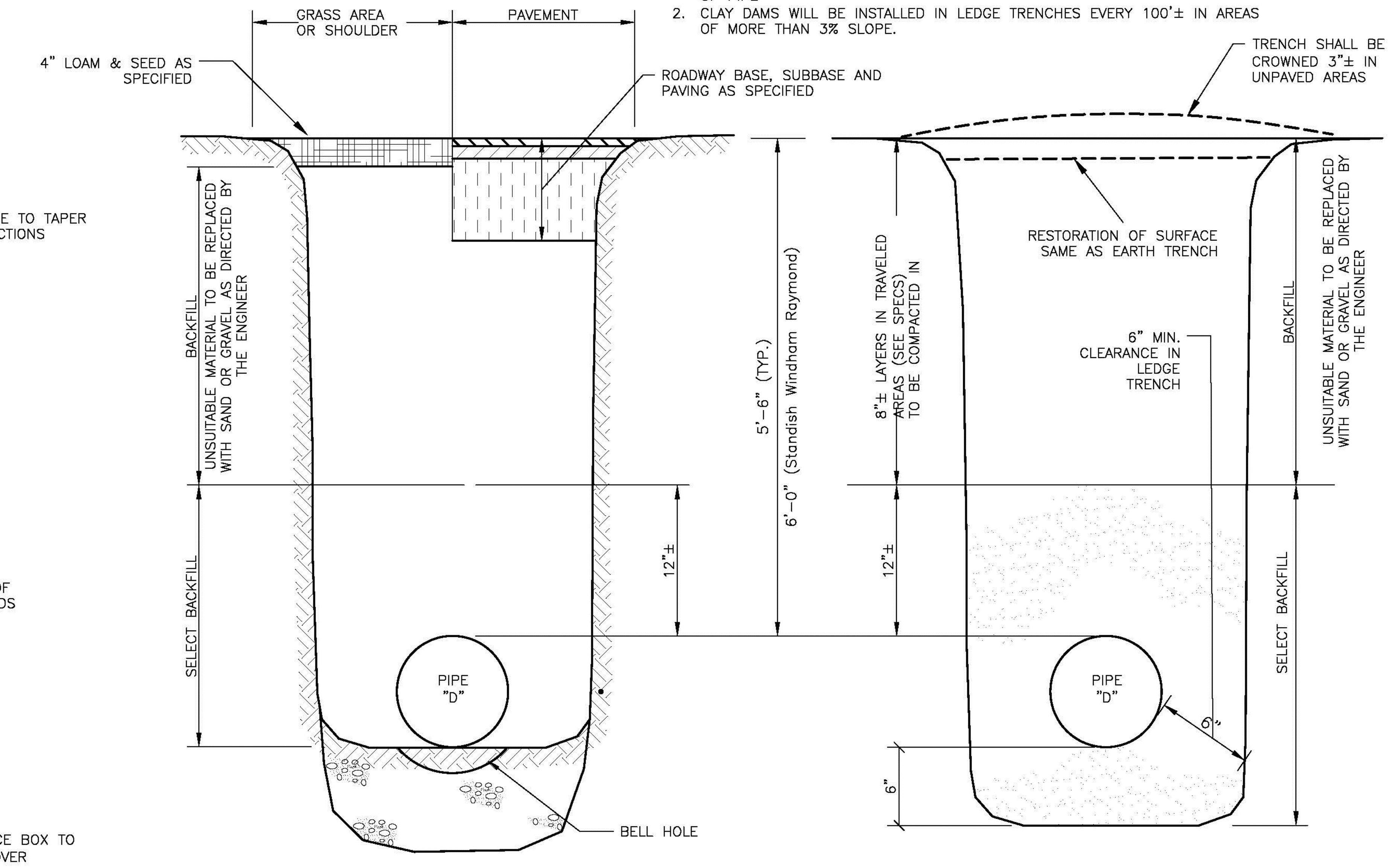
SIDE-ARM BLOW-OFF (4" & LARGER MAINS)



SIDE-ARM BLOW-OFF (2" MAIN)

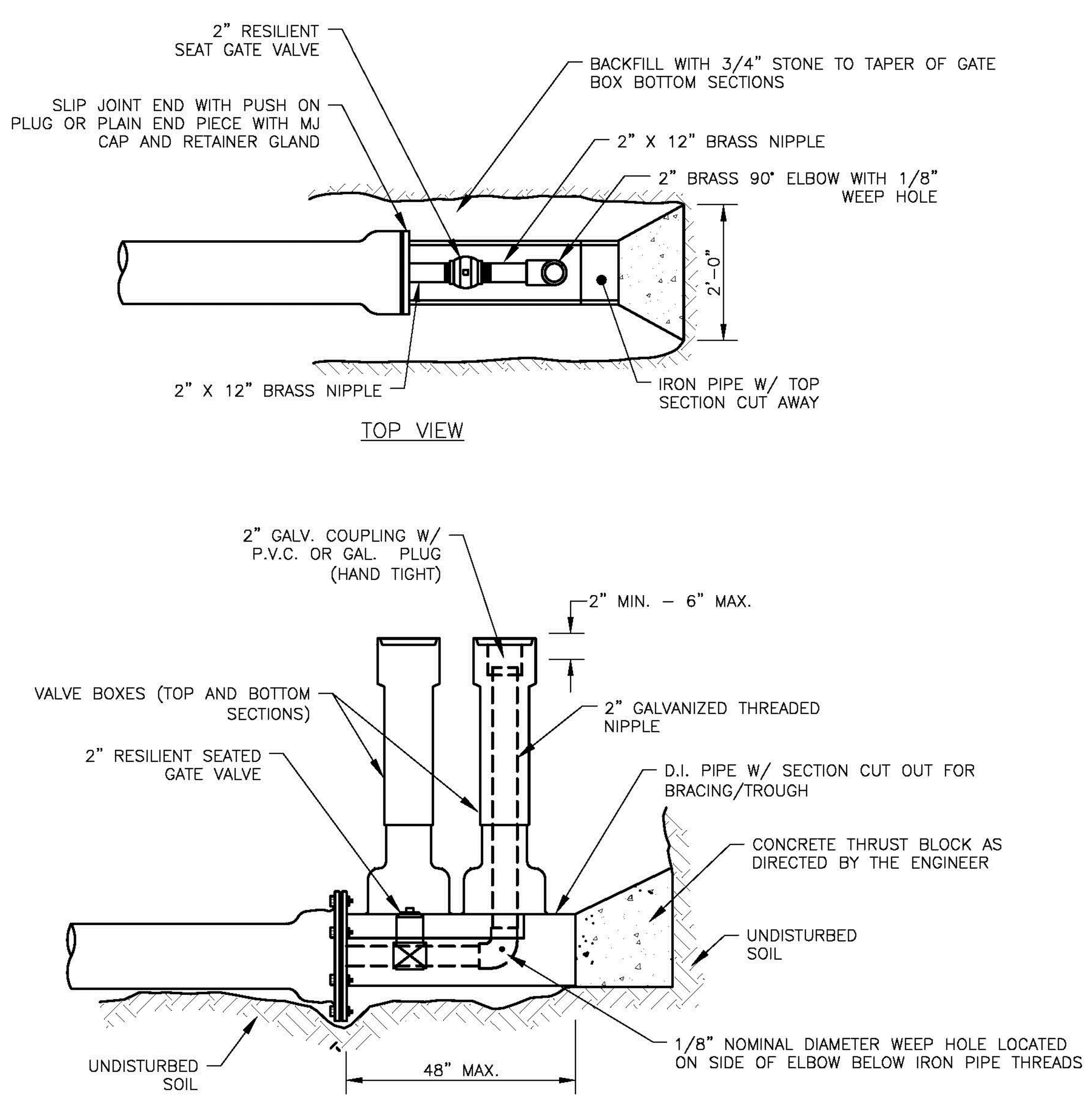
TRENCH NOTES

1. MAX PAY LIMITS SHALL BE 1.5 TIMES THE PIPE DIAMETER ON EACH SIDE OF PIPE
2. CLAY DAMS WILL BE INSTALLED IN LEDGE TRENCHES EVERY 100'± IN AREAS OF MORE THAN 3% SLOPE.

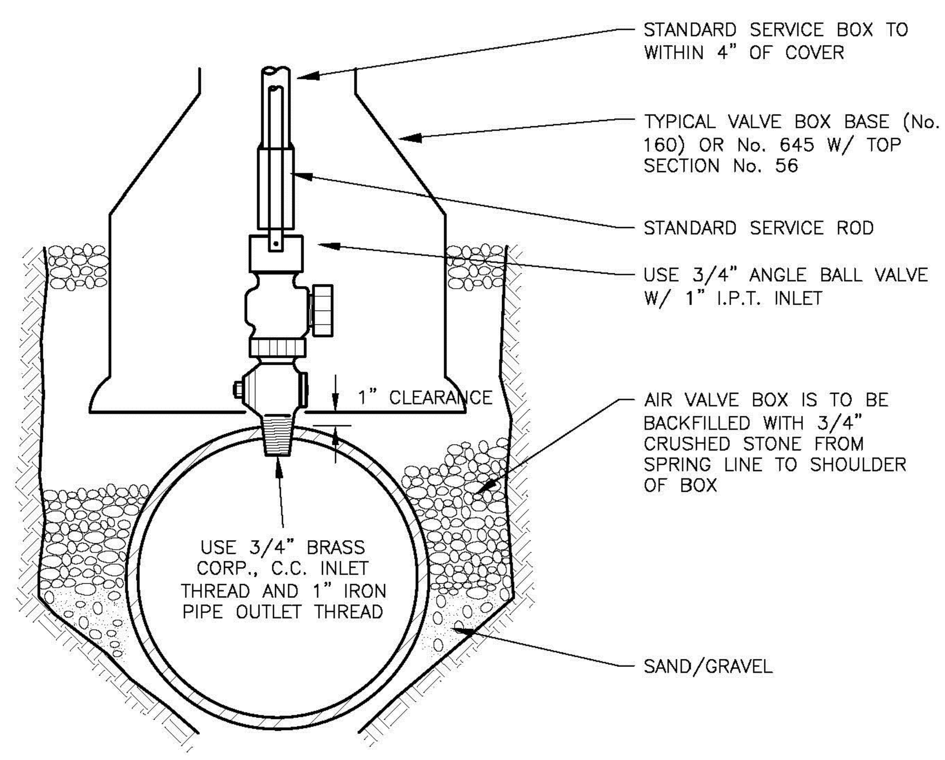


SECTION THRU EARTH TRENCH

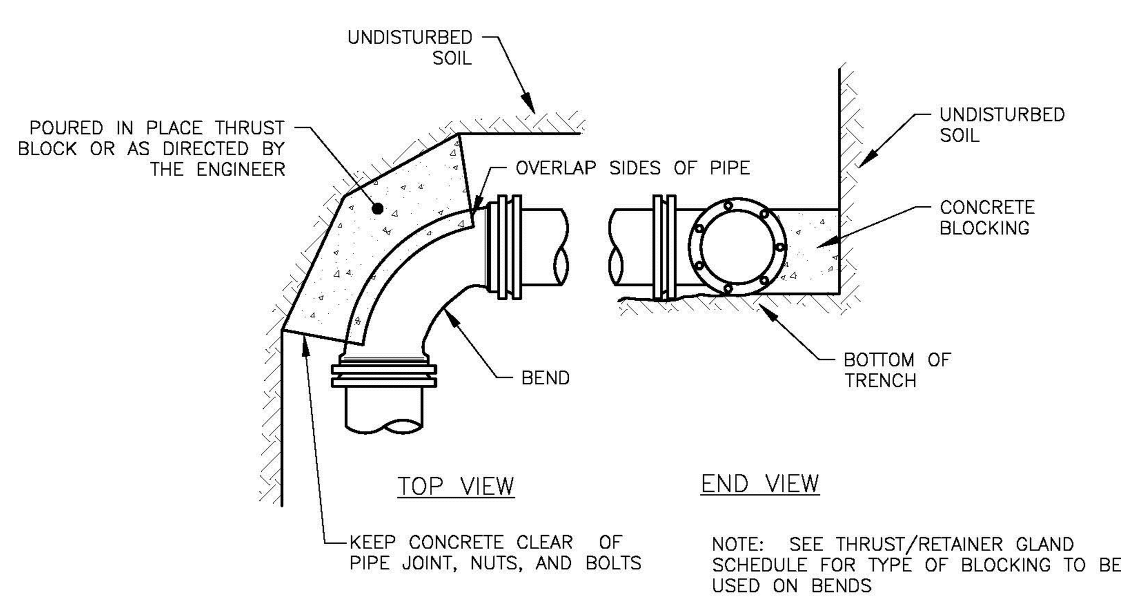
SECTION THRU LEDGE TRENCH



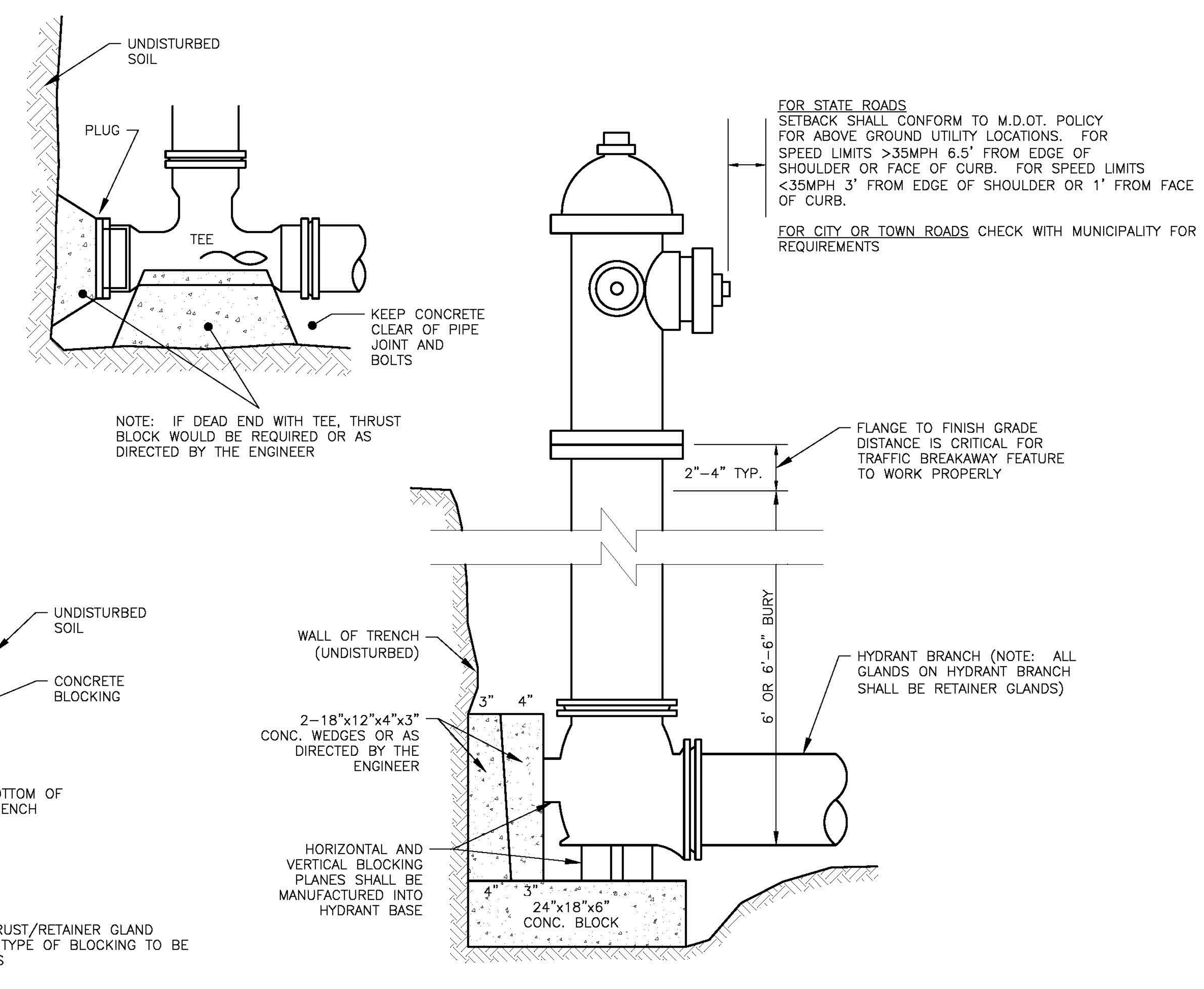
STANDARD 2" BLOW OFF



TYPICAL AIR VALVE (1")



STANDARD BEND BLOCKING



TYPICAL HYDRANT INSTALLATION DETAIL

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this sheet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

PORTLAND WATER DISCRICT
STANDARD DETAILS 1

Oceanview at Cumberland
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

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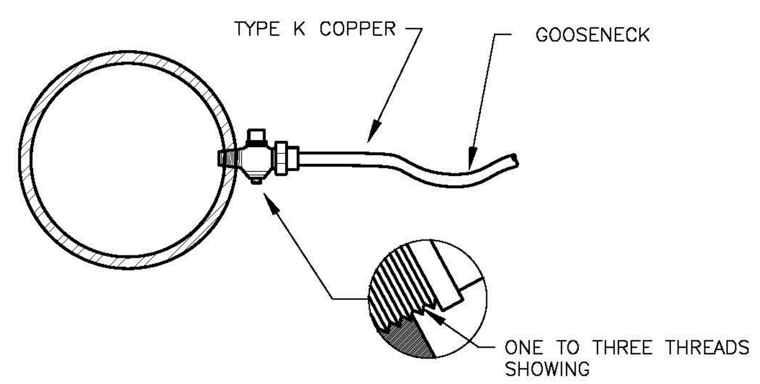
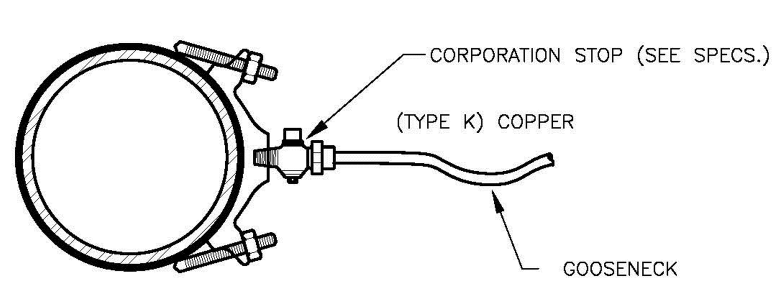
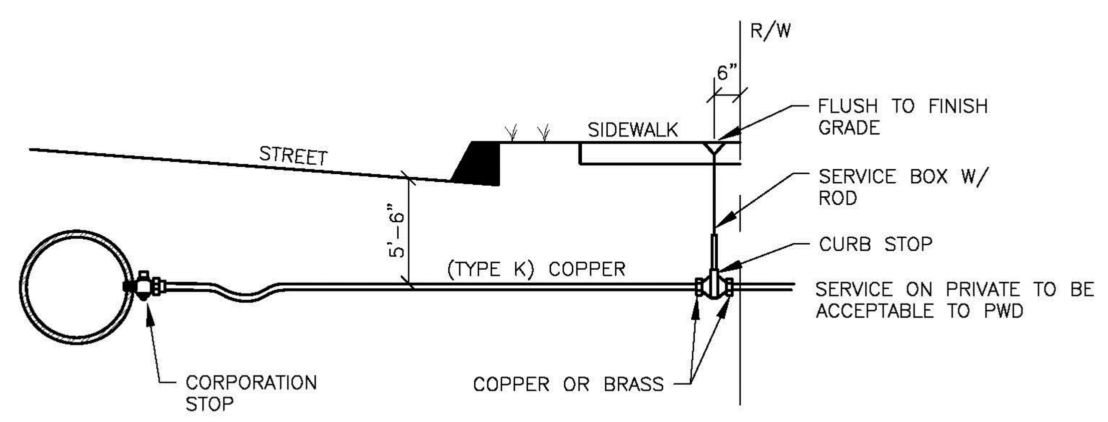
FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C33
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



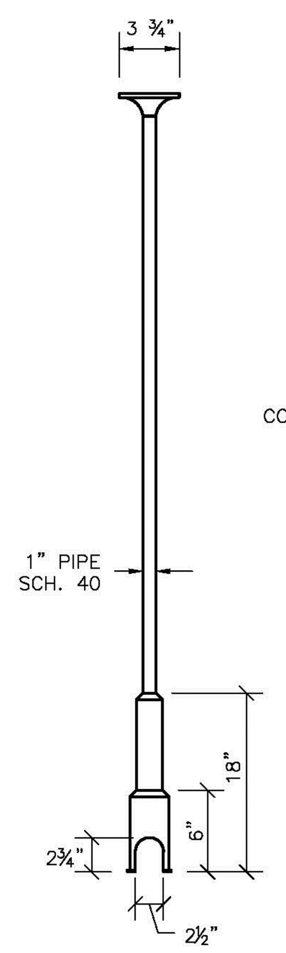
SERVICE TAP
(3/4" AND 1" C.C. THREAD)



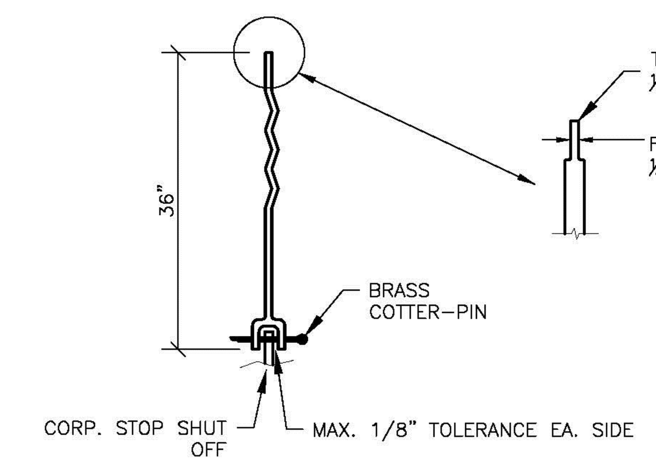
SERVICE SADDLE
(1-1/2" AND 2" C.C. THREAD)



TYPICAL SERVICE CONNECTION



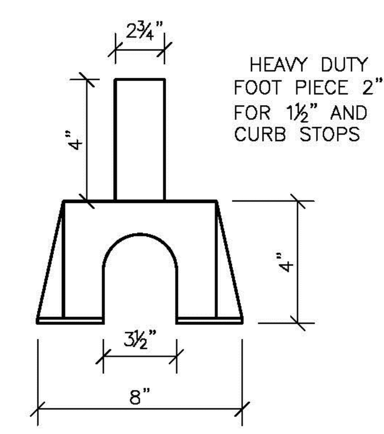
SERVICE BOX



SERVICE ROD

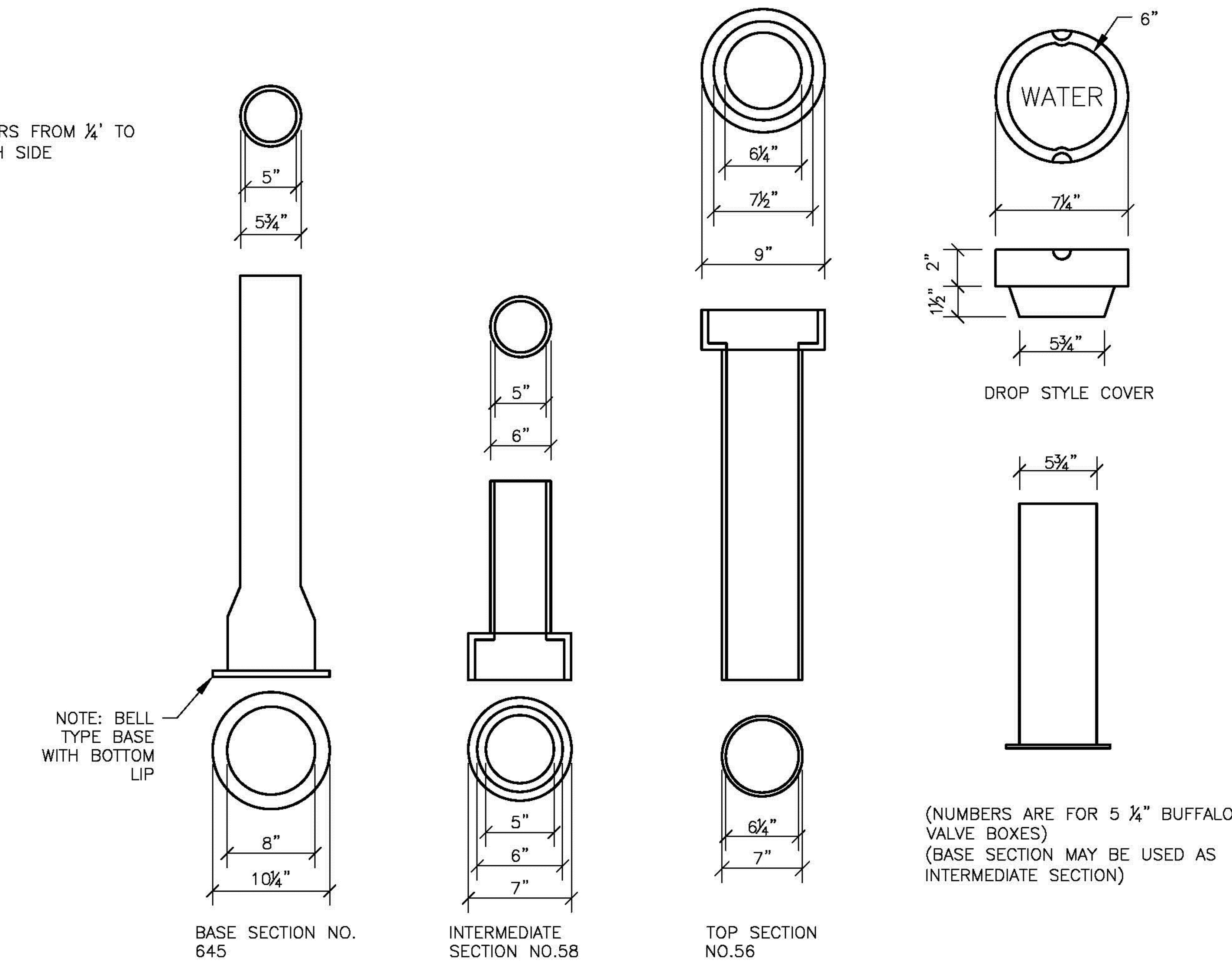
COVER

STANDARD FOOT PIECE 1" FOR ¾" AND CURB/STOPS



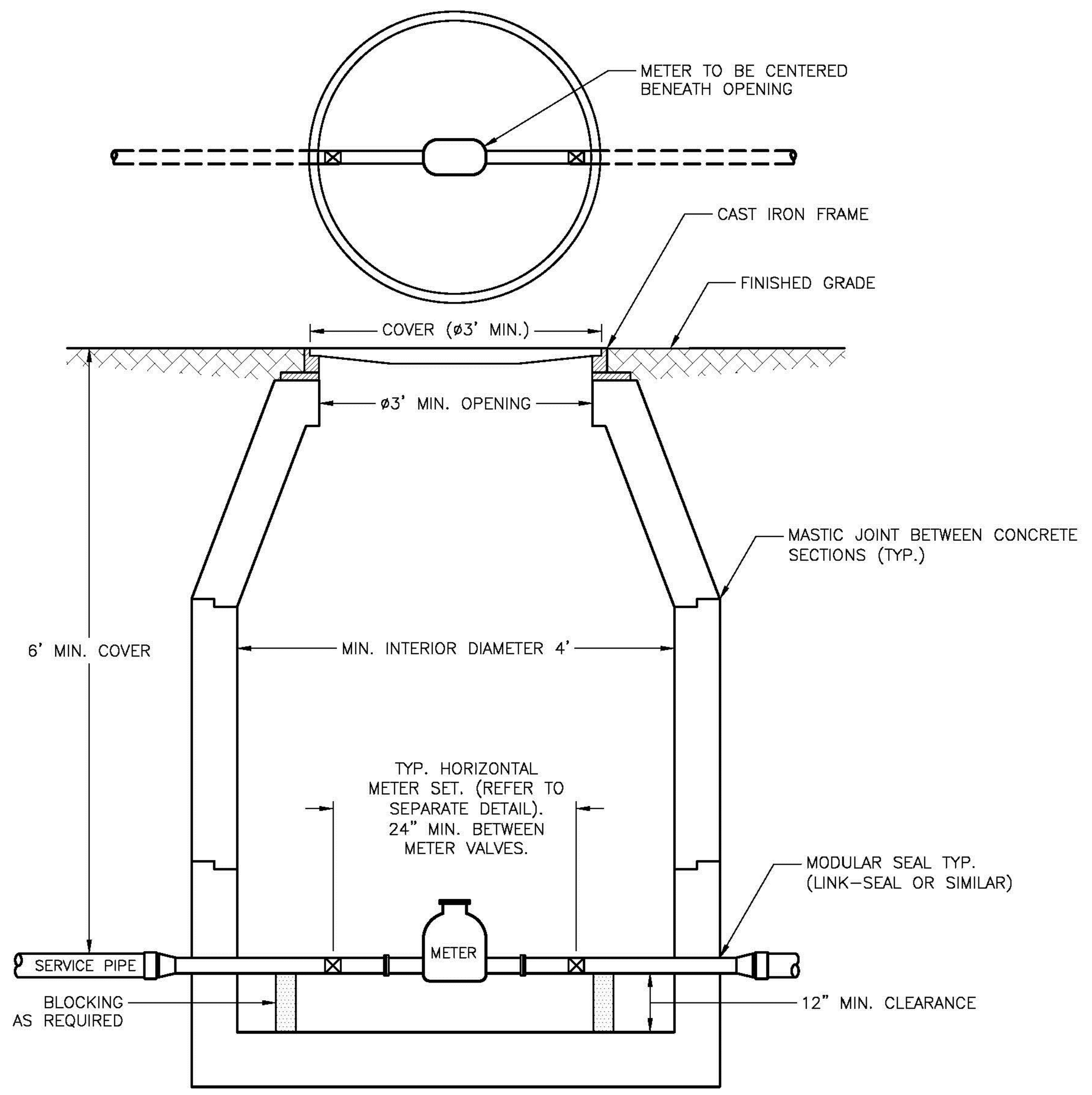
FOOT PIECE

NOTE: ANY EXTENSION OF SERVICE BOX REQUIRES:
1. 1" FEMALE IRON PIPE COUPLING
2. 1" THREADED PIPE (THIS IS TO BE A NON-WELDED, TWO PIECE ARRANGEMENT. SLIP ON ADAPTERS ARE NOT PERMISSIBLE.)



(NUMBERS ARE FOR 5 ¼" BUFFALO VALVE BOXES)
(BASE SECTION MAY BE USED AS INTERMEDIATE SECTION)

VALVE BOX & COVER



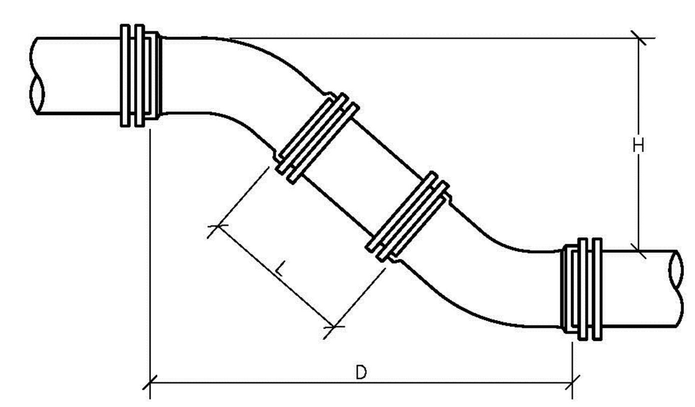
TYPICAL SMALL METER PIT
(⅝" TO 2" METER)

METER PIT AND COVER NOTES

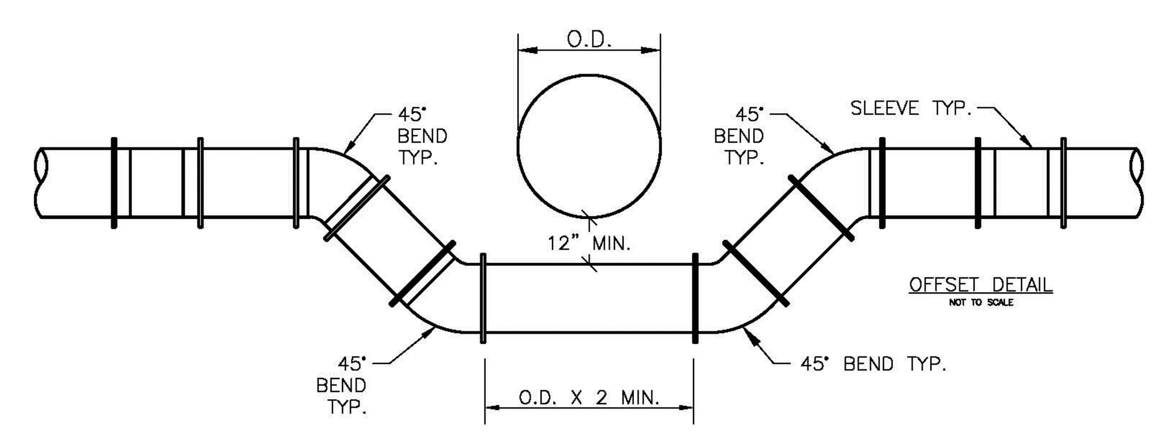
1. THE METER PIT SHALL BE SUPPLIED AND INSTALLED BY THE CUSTOMER AND LOCATED ON PRIVATE PROPERTY BETWEEN 10' AND 20' FROM THE PROPERTY LINE.
2. THE METER PIT SHALL BE MADE OF PRECAST CONCRETE OF SUFFICIENT SIZE TO PROVIDE 5.5' MINIMUM GROUND COVER FROM FINISHED GRADE TO THE TOP OF THE SERVICE PIPE. ANY SEAMS BETWEEN CONCRETE SECTIONS SHALL BE SEALED WITH MASTIC JOINT. ALL OPENINGS IN THE CONCRETE FOR SERVICE PIPING SHALL BE SEALED WITH A MODULAR SEAL (LINK-SEAL OR SIMILAR).
3. THE INTERIOR OF THE METER PIT SHALL BE A MINIMUM OF 4' IN DIAMETER, AND THE METER PIT OPENING SHALL BE A MINIMUM OF 30" IN DIAMETER WITH A CAST IRON FRAME. THE METER PIT COVER SHALL BE CAST IRON, 32" MINIMUM IN DIAMETER, AND BE EITHER PERMANENTLY LABELED "WATER" OR HAVE NO LABEL. ANY STEEL PLATE MATERIAL SHALL BE COATED WITH A RUST INHIBITOR PAINT.
4. WALL-MOUNTED LADDER RUNGS SHALL NOT BE INSTALLED WITHIN METER PIT.
5. ALL PIPING INSIDE AND EXTENDING THROUGH THE METER PIT SHALL BE MADE OF COPPER, WITH A MINIMUM OF 6" CLEARANCE FROM THE METER PIT FLOOR. BLOCKING SHALL BE INSTALLED AS REQUIRED TO SUPPORT THE PIPE.
6. CUSTOMER SHALL ENSURE THE METER PIT AND COVER ARE PROPERLY RATED FOR TRAFFIC FLOW, IF APPLICABLE.

METER NOTES

7. ONLY PWD PERSONNEL ARE AUTHORIZED TO INSTALL WATER METERS. PWD PERSONNEL ARE ADDITIONALLY AUTHORIZED TO OPERATE METER VALVES AS NEEDED FOR INSTALLATION AND MAINTENANCE.
8. PWD WILL SUPPLY THE WATER METER. ALL OTHER FITTINGS, INCLUDING A METER RESETTER FOR 1" OR SMALLER METERS, SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER.
9. FOR 1.5" AND 2" METERS, CUSTOMER SHALL INSTALL A FLANGED METER SPOOL PIECE, SUPPLIED BY PWD AT NO ADDITIONAL CHARGE, PRIOR TO METER SET. THE METER SPOOL WILL BE MADE AVAILABLE FOR CUSTOMER PICKUP AT PWD CUSTOMER SERVICE, 225 DOUGLASS STREET, PORTLAND DURING NORMAL BUSINESS HOURS.
10. CUSTOMER WILL INSTALL TWO BALL VALVES AT LEAST 24" APART FOR METER INSTALLATION, ALLOWING FOR THE WATER METER TO BE CENTERED UNDER THE METER PIT OPENING. THE BALL VALVES SHALL BE SOLDERED IN PLACE.
11. THE METER PIT MAY HOUSE UP TO TWO 5/8", 3/4" OR 1" METERS WITH PRIOR APPROVAL FROM PWD.



	6" PIPE		8" PIPE		12" PIPE	
H	D	L	D	L	D	L
12"	1' 6-1/2"	0' 10-1/2"	1' 7-1/2"	0' 9-1/2"	1' 11-1/2"	0' 5-1/2"
13"	1' 7-1/2"	0' 11-7/8"	1' 8-1/2"	0' 10-7/8"	2' 0-1/2"	0' 6-7/8"
14"	1' 8-1/2"	1' 1-5/16"	1' 9-1/2"	1' 0-5/16"	2' 1-1/2"	0' 8-5/16"
15"	1' 9-1/2"	1' 2-11/16"	1' 10-1/2"	1' 1-11/16"	2' 2-1/2"	0' 9-11/16"
16"	1' 10-1/2"	1' 4-1/8"	1' 11-1/2"	1' 3-1/8"	2' 3-1/2"	0' 11-1/8"
17"	1' 11-1/2"	1' 5-9/16"	2' 0-1/2"	1' 4-9/16"	2' 4-1/2"	1' 0-9/16"
18"	2' 0-1/2"	1' 6-15/16"	2' 1-1/2"	1' 5-15/16"	2' 5-1/2"	1' 1-15/16"
19"	2' 1-1/2"	1' 8-3/8"	2' 2-1/2"	1' 7-3/8"	2' 6-1/2"	1' 3-3/8"
20"	2' 2-1/2"	1' 9-13/16"	2' 3-1/2"	1' 8-13/16"	2' 7-1/2"	1' 4-13/16"
21"	2' 3-1/2"	1' 11-3/16"	2' 4-1/2"	1' 10-3/16"	2' 8-1/2"	1' 6-3/16"
22"	2' 4-1/2"	2' 0-5/8"	2' 5-1/2"	1' 11-5/8"	2' 9-1/2"	1' 7-5/8"
23"	2' 5-1/2"	2' 2"	2' 6-1/2"	2' 1"	2' 10-1/2"	1' 9"
24"	2' 6-1/2"	2' 3-7/16"	2' 7-1/2"	2' 2-7/16"	2' 11-1/2"	1' 10-7/16"
25"	2' 7-1/2"	2' 4-7/8"	2' 8-1/2"	2' 3-7/8"	3' 0-1/2"	1' 11-7/8"
26"	2' 8-1/2"	2' 6-1/4"	2' 9-1/2"	2' 5-1/4"	3' 1-1/2"	2' 1-1/4"
27"	2' 9-1/2"	2' 7-11/16"	2' 10-1/2"	2' 6-11/16"	3' 2-1/2"	2' 2-11/16"
28"	2' 10-1/2"	2' 9-1/8"	2' 11-1/2"	2' 8-1/8"	3' 3-1/2"	2' 4-1/8"
29"	2' 11-1/2"	2' 10-1/2"	3' 0-1/2"	2' 9-1/2"	3' 4-1/2"	2' 5-1/2"
30"	3' 0-1/2"	2' 11-15/16"	3' 1-1/2"	2' 10-15/16"	3' 5-1/2"	2' 6-15/16"
31"	3' 1-1/2"	3' 1-5/16"	3' 2-1/2"	3' 0-5/16"	3' 6-1/2"	2' 8-5/16"
32"	3' 2-1/2"	3' 2-3/4"	3' 3-1/2"	3' 1-3/4"	3' 7-1/2"	2' 9-3/4"
33"	3' 3-1/2"	3' 4-3/16"	3' 4-1/2"	3' 3-3/16"	3' 8-1/2"	2' 11-3/16"
34"	3' 4-1/2"	3' 5-9/16"	3' 5-1/2"	3' 4-9/16"	3' 9-1/2"	3' 0-9/16"
35"	3' 5-1/2"	3' 7"	3' 6-1/2"	3' 6"	3' 10-1/2"	3' 2"
36"	3' 6-1/2"	3' 8-7/16"	3' 7-1/2"	3' 7-7/16"	3' 11-1/2"	3' 3-7/16"
37"	3' 7-1/2"	3' 9-13/16"	3' 8-1/2"	3' 8-13/16"	4' 0-1/2"	3' 4-13/16"
38"	3' 8-1/2"	3' 11-1/4"	3' 9-1/2"	3' 10-1/4"	4' 1-1/2"	3' 6-1/4"
39"	3' 9-1/2"	4' 0-11/16"	3' 10-1/2"	3' 11-11/16"	4' 2-1/2"	3' 7-11/16"
40"	3' 10-1/2"	4' 2-1/16"	3' 11-1/2"	4' 1-1/16"	4' 3-1/2"	3' 9-1/16"
41"	3' 11-1/2"	4' 3-1/2"	4' 0-1/2"	4' 2-1/2"	4' 4-1/2"	3' 10-1/2"
42"	4' 0-1/2"	4' 4-7/8"	4' 1-1/2"	4' 3-7/8"	4' 5-1/2"	3' 11-7/8"
43"	4' 1-1/2"	4' 6-5/16"	4' 2-1/2"	4' 5-5/16"	4' 6-1/2"	4' 1-5/16"
44"	4' 2-1/2"	4' 7-3/4"	4' 3-1/2"	4' 6-3/4"	4' 7-1/2"	4' 2-3/4"
45"	4' 3-1/2"	4' 9-1/8"	4' 4-1/2"	4' 8-1/8"	4' 8-1/2"	4' 4-1/8"
46"	4' 4-1/2"	4' 10-9/16"	4' 5-1/2"	4' 9-9/16"	4' 9-1/2"	4' 5-9/16"
47"	4' 5-1/2"	4' 11-15/16"	4' 6-1/2"	4' 10-15/16"	4' 10-1/2"	4' 6-15/16"
48"	4' 6-1/2"	5' 1-3/8"	4' 7-1/2"	5' 0-3/8"	4' 11-1/2"	4' 8-3/8"
49"	4' 7-1/2"	5' 2-13/16"	4' 8-1/2"	5' 1-13/16"	5' 0-1/2"	4' 9-13/16"
50"	4' 8-1/2"	5' 4-3/16"	4' 9-1/2"	5' 3-3/16"	5' 1-1/2"	4' 11-3/16"
51"	4' 9-1/2"	5' 5-5/8"	4' 10-1/2"	5' 4-5/8"	5' 2-1/2"	5' 0-5/8"
52"	4' 10-1/2"	5' 7-1/16"	4' 11-1/2"	5' 6-1/16"	5' 3-1/2"	5' 2-1/16"
53"	4' 11-1/2"	5' 8-7/16"	5' 0-1/2"	5' 7-7/16"	5' 4-1/2"	5' 3-7/16"
54"	5' 0-1/2"	5' 9-7/8"	5' 1-1/2"	5' 8-7/8"	5' 5-1/2"	5' 4-7/8"
55"	5' 1-1/2"	5' 11-5/16"	5' 2-1/2"	5' 10-5/16"	5' 6-1/2"	5' 6-5/16"



NOTE: DIMENSIONS APPLICABLE FOR SIGMA COMPACT BENDS. FOR TYLER COMPACT BENDS, ADD 1/2" TO "D" DIMENSION AND SUBTRACT 1/2" FROM "L" DIMENSION. FOR OTHER FITTINGS REFER TO MANUFACTURER'S RECOMMENDATIONS.

TYPICAL MAIN OFFSET

6.	7-31-2018	No changes this sheet, re-submit to Town	CSB
5.	7-16-2018	No changes this seet	CSB
4.	5-4-2018	No changes this sheet	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Re-Submit to Town and Maine DEP	CSB

PORTLAND WATER DISCRICT
STANDARD DETAILS 2

Oceanview at Cumberland
277 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

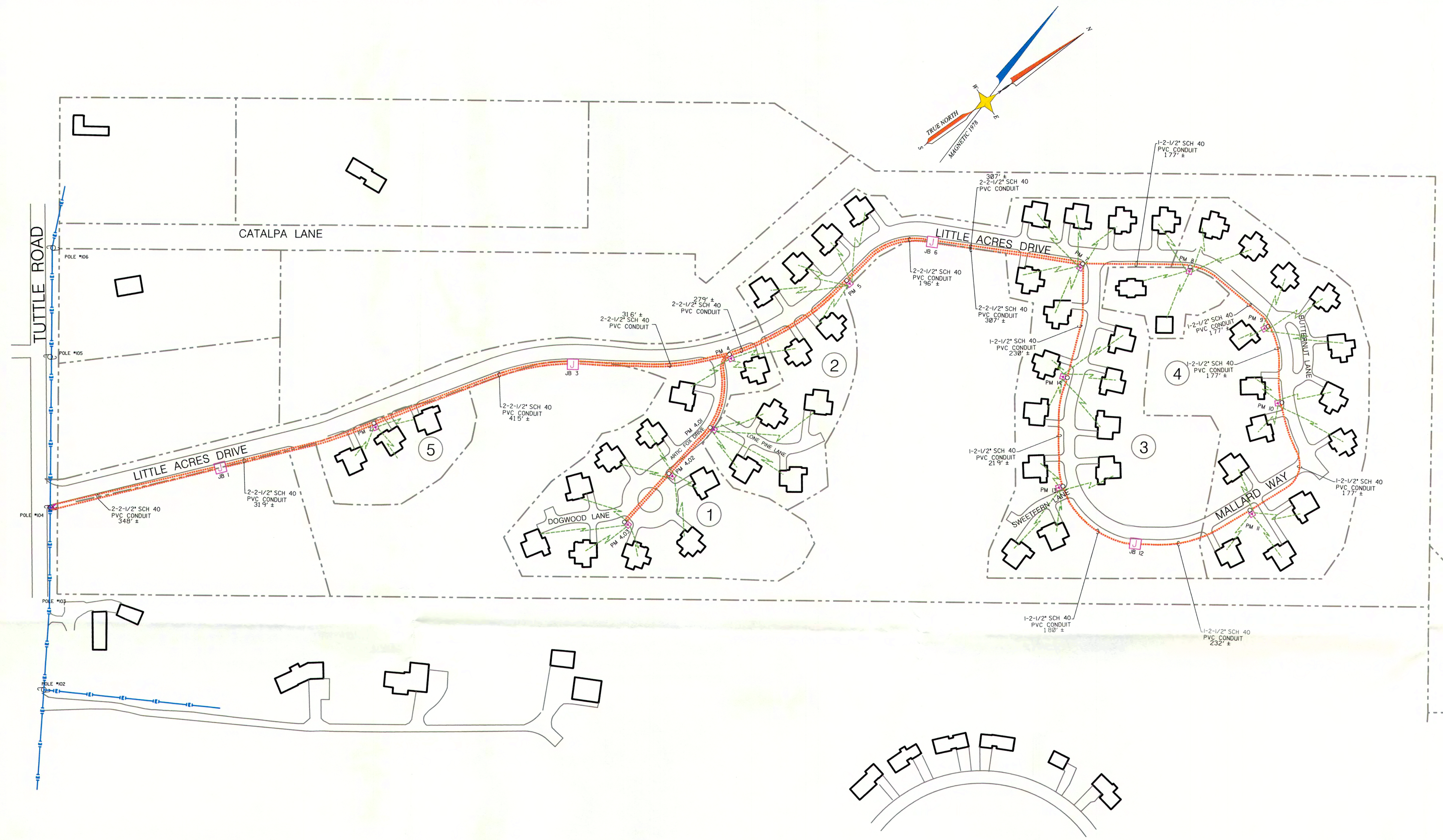
STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
7-31-2018

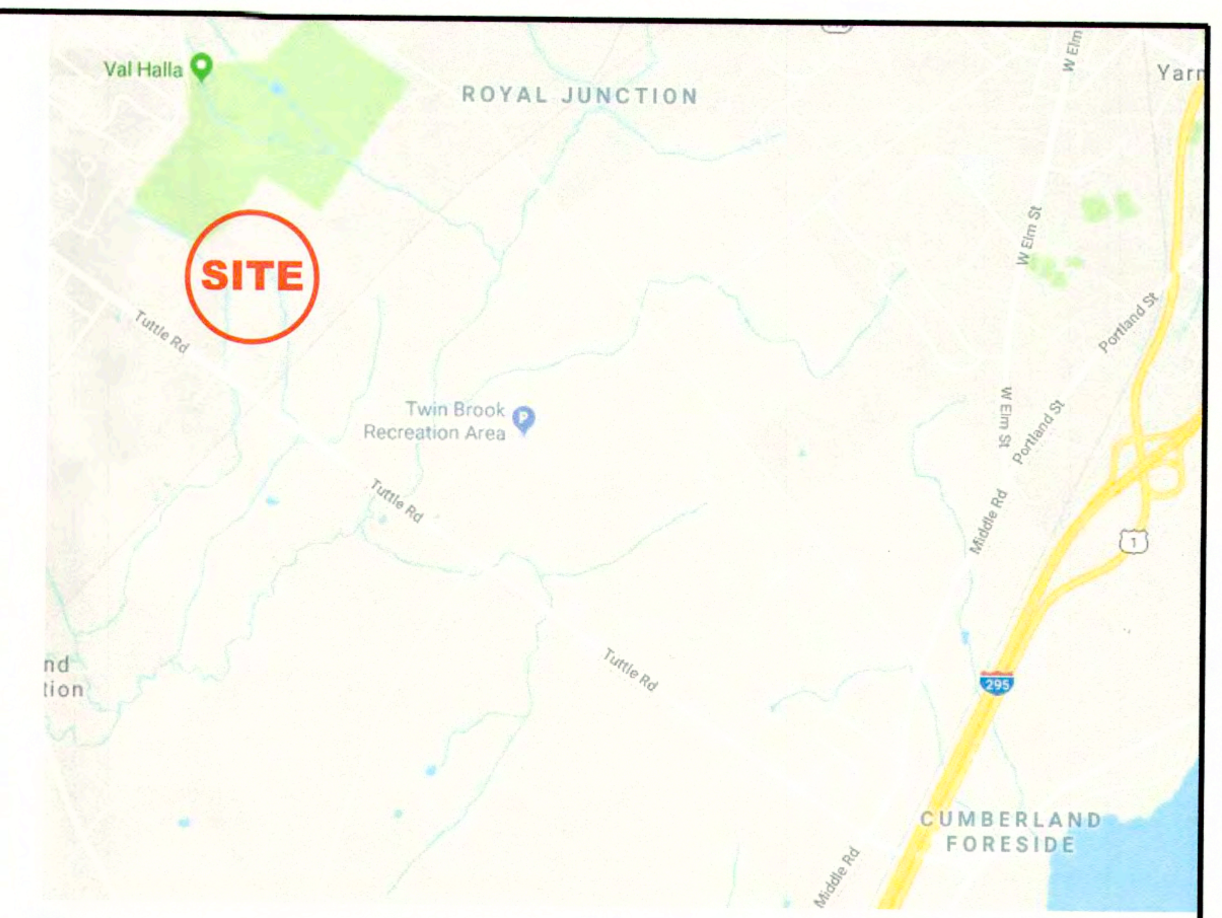
BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C34
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

This document and any attachments are considered:
BUSINESS CONFIDENTIAL
PROTECTED CRITICAL INFRASTRUCTURE INFORMATION





GPS COORDINATES DMS

//MAINE.MAPS.ARCGIS.COM

1. 43.796414 -70.240065
2. 43.79499 -70.237061
3. 43.790312 -70.245859
4. 43.788825 -70.242897

STANDARD NOTES:

1) Electrical installations to conform to Central Maine Power Company's Handbook of Requirements for Electric Service and Meter Installations.

2) Conduit is required under all roads, driveways, and paved areas for both primary and secondary cables.

3) At each transformer location a level 10-foot by 10-foot area will be provided as shown on Illustration #21 in the Handbook of Requirements. The elevation of this area shall be sufficiently high to always be above the highest expected water level and at or above the top of any nearby ditch slope. The transformer foundation shall be installed so the top of the foundation is 6 inches above this elevation. The transformer foundation shall be installed no more than 20 feet from a road surface.

4) Primary voltage cable to be Single Phase, #2 AL, 15kV, URD cables.

5) Feed Thru bushings, elbows and pad covers will be required for any location where a pad mount transformer is not initially installed. Transformer installations should be coordinated with the service center.

6) All construction to be in compliance with CMP's Construction Standards and the latest edition of the National Electrical Safety Code.

7) For added protection and ease of cable replacement, Central Maine Power strongly recommends that all underground cables be installed in conduit. However, conduit shall be installed extensively enough to provide a cable raceway under any existing or anticipated street, driveway or paved area.

8) Conduit shall be a minimum of 2½" Schedule 40 PVC or equivalent.

9) Padmount transformer locations shall be graded for proper drainage and maintained by the customer to be readily accessible by truck at all times without causing site damage.

10) See CMP's Handbook of Requirements, Section IX, Paragraphs 910, 911 and 912 for specifications on back-fill materials, depth, etc.

11) Primary cables to be extended as necessary to limit CMP owned secondary services to the maximum distance as shown in Illustration #31 of the Handbook of Requirements. 200 amp services are limited to a maximum of 220 feet with 4/0 AL conductors

12) Primary Riser - see Illustration #28 in the Handbook of Requirements.

13) Transformer Foundation - see Illustration #23 or 26 in the Handbook of Requirements.

14) For any buildable lot where the driveway has not been determined by rough grading or curb opening, conduit shall extend across the entire lot.

15) The Contractor is required to notify CMP by calling the Line Supervisor at telephone number 1-800-565-3181 (ask for Portland Line Supervision) at least 72 hours before trench excavation begins.

16) A maximum of 6 sets of secondary conductors may be connected to a single transformer.

17) All 90 degree bends shall be galvanized long sweep bends. Conduit bell ends required at splice boxes, transformer bases, and wsitch cabinets

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

J Junction Box, see Illustration #26 in Handbook of Requirements.
X Primary Riser
Transformer Foundation
Primary UG
Secondary UG

SAP#10300439641

Customer: SEACOAST MANAGEMENT COMPANY
20 BLUEBERRY LANE, FALMOUTH, MAINE

Site Plan Produced By: BELANGER ENGINEERING
Address / Phone / Email: CBELANGER@ROADRUNNER.COM
63 SECOND AVENUE, AUGUSTA, MAINE 04330
207-622-1462 CELL 207-242-5713

Sheet Title: OVERALL HASING PLAN
Revision #4 Date: 5-4-2018 Drawn By: CSB

NO.	REVISION	DATE	BY	CK	P.E. STAMPED BY	P.E. No.
		/ /				
		/ /				
		/ /				
		/ /				
		/ /				
		/ /				
0	INITIAL DRAWING RELEASE	6/09/18	E.N.W	MLR	MLR	13430

Professional Engineer Seal
6/6/2018
STATE OF MAINE
MARSHALL LINWOOD RIPLEY
13430
LICENSED
PROFESSIONAL ENGINEER

DESIGNED MLR/
DRAWN ENW
CHECKED MLR/
APPROVED MLR
REVIEWED MLR

OCEAN VIEW CUMBERLAND
OFF POLE #102 TUTTLE ROAD
CUMBERLAND, MAINE
UNDERGROUND ELECTRICAL LAYOUT

CENTRAL MAINE POWER COMPANY
DISTRIBUTION DEPARTMENT
CENTRAL MAINE POWER
SCALE 1" =100' DATE 06/09/2018

905-4938
REV. 0

FILE NAME: 905-4938.dgn

THIS DRAWING SHALL BE REVISED ON THE CADD SYSTEM ONLY

SITE FIXTURE SCHEDULE

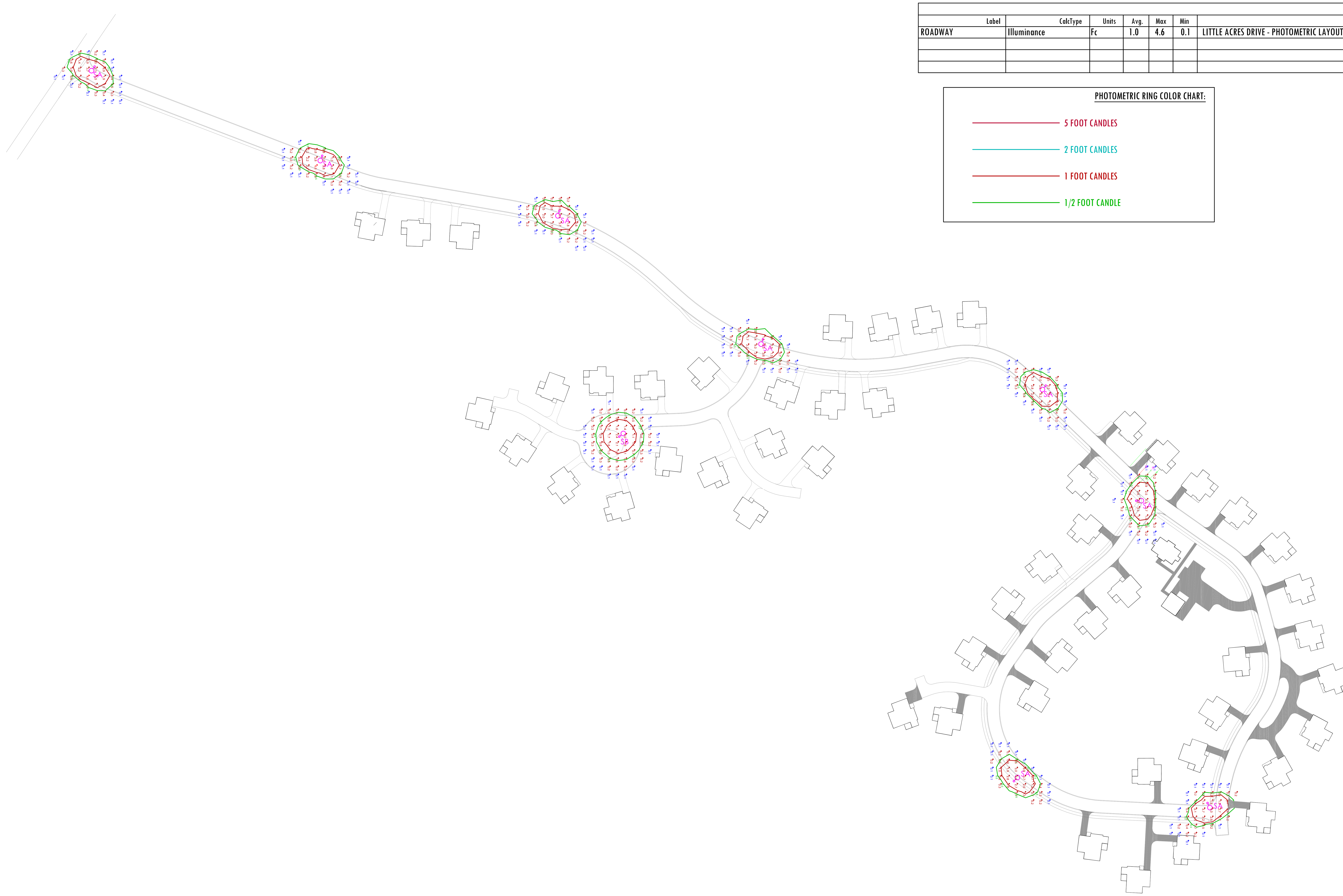
QUANTITY	TYPE	MANUFACTURER	CATALOG NUMBER	DESCRIPTION
8	SA	BEACON	URBCAP-26/36NB-80/4K/UNV/T3/PEC-208/GENI-XX/NRNW/BBT	ROADWAY LED FIXTURE W/ PHOTOCELL
1	SB	BEACON	URBCAP-26/36NB-80/4K/UNV/T5W/PEC-208/GENI-XX/NRNW/BBT	ROADWAY LED FIXTURE W/ PHOTOCELL
9			AA-41/S/4/B/P/BBT	DECORATIVE POLE MOUNT ARM
9			RSA-B-SHO-S-14-40-B-OT-BBT/DOMU-4-BBT	14' ROUND POLE W/ BASE COVER

NUMERIC SUMMARY

Label	CalcType	Units	Avg.	Max	Min	
ROADWAY	Illuminance	Fc	1.0	4.6	0.1	LITTLE ACRES DRIVE - PHOTOMETRIC LAYOUT

PHOTOMETRIC RING COLOR CHART:

- 5 FOOT CANDLES
- 2 FOOT CANDLES
- 1 FOOT CANDLES
- 1/2 FOOT CANDLE



Anthony Mancini, Inc.
179 SHERIDAN ST.
PORTLAND, ME 04101
P: (207)774-5829 F: (207)772-1686
E: info@mancinielectric.com
"We appreciate Your Business."

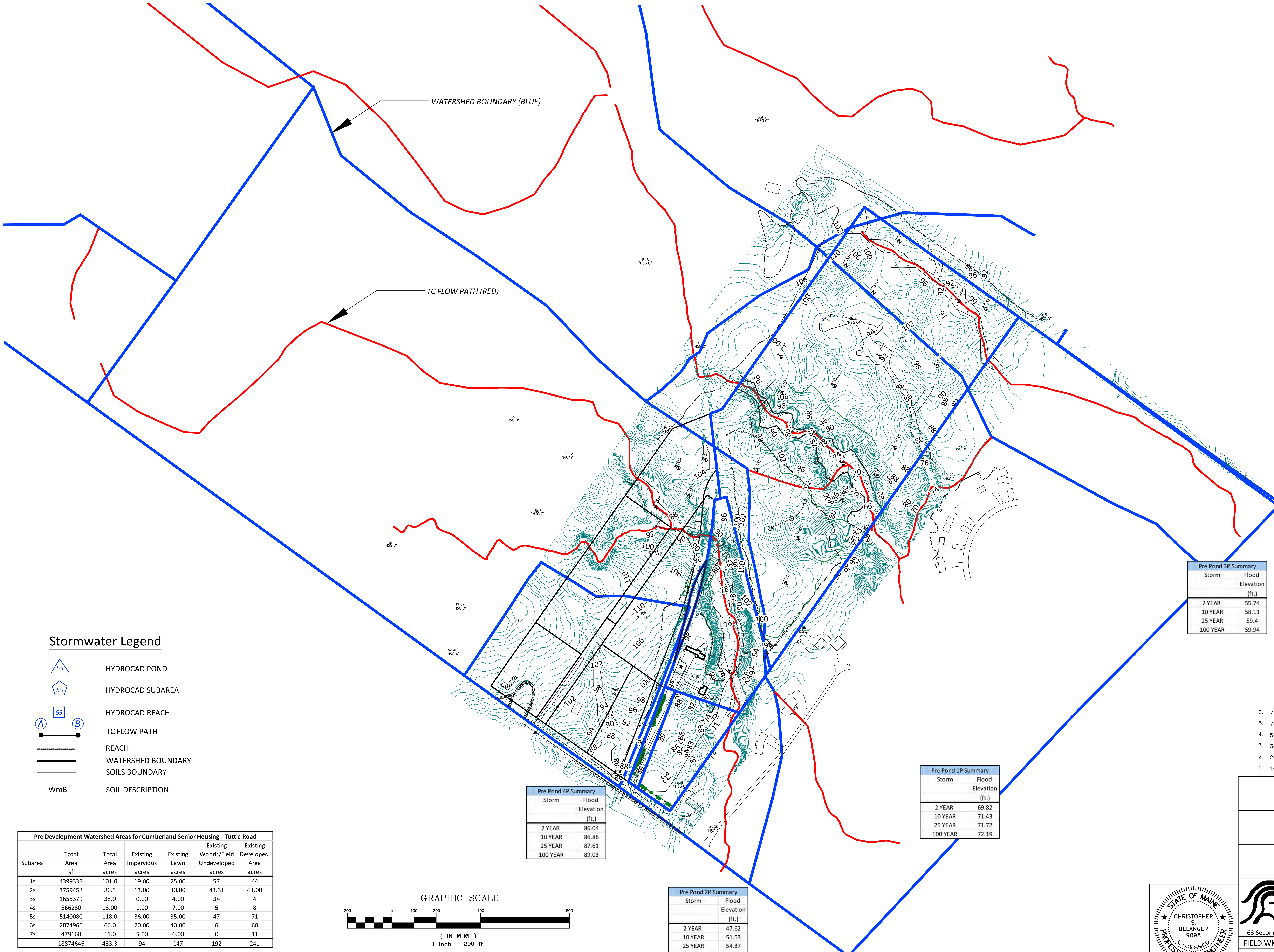
NO.	DATE	DESCRIPTION
A	03/02/2018	REVISED PLAN FROM BELANGER ENGINEERING

PROJECT NAME & ADDRESS:
Oceanview at Cumberland
291 Tuttle Road
Cumberland, Maine

SHEET NAME:
Site - Photometric Layout

Checked By: G.MANCINI
Drawn By: A.AMES
Date: 02.22.2018
Scale: 1' = 100'-0"

SHEET:
ES1



Stormwater Legend

5S	HYDROCAD POND
5S	HYDROCAD SUBAREA
5S	HYDROCAD REACH
A — B	TC FLOW PATH
	REACH
	WATERSHED BOUNDARY
	SOILS BOUNDARY
WmB	SOIL DESCRIPTION

Pre Development Watershed Areas for Cumberland Senior Housing - Tuttle Road						
Subarea	Total Area sf	Total Area acres	Existing Impervious acres	Existing Lawn acres	Existing Woods/Field Undeveloped acres	Existing Developed Area acres
1s	4399335	101.0	19.00	25.00	57	44
2s	3759452	86.3	13.00	30.00	43.31	43.00
3s	1655379	38.0	0.00	4.00	34	4
4s	566280	13.00	1.00	7.00	5	8
5s	5140080	118.0	36.00	35.00	47	71
6s	2874960	66.0	20.00	40.00	6	60
7s	479160	11.0	5.00	6.00	0	11
	18874646	433.3	94	147	192	241

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

Pre Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Pre Pond 2P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	47.62
10 YEAR	51.53
25 YEAR	54.37
100 YEAR	57.43

Pre Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	69.82
10 YEAR	71.43
25 YEAR	71.72
100 YEAR	72.19

Pre Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.74
10 YEAR	58.11
25 YEAR	59.4
100 YEAR	59.94

FLOODING STANDARD RESULTS POND 1P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	38.34	36.79	-4%
10 YEAR	96.83	90.79	-7%
25 YEAR	144.34	133.18	-8%
50 YEAR	189.15	172.9	-9%
100 YEAR	239.06	217.46	-10%

FLOODING STANDARD RESULTS POND 2P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	55.7	54.13	-3%
10 YEAR	89.77	88.87	-1%
25 YEAR	107.91	107.36	-1%
50 YEAR	141.82	140.94	-1%
100 YEAR	237.6	227.4	-4%

FLOODING STANDARD RESULTS POND 3P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	12.99	12.36	-5%
10 YEAR	26.68	25.72	-4%
25 YEAR	48.56	44.46	-9%
50 YEAR	70.97	66.91	-6%
100 YEAR	93.27	88.29	-6%

FLOODING STANDARD RESULTS POND 4P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	4.55	4.55	0%
10 YEAR	8.95	8.95	0%
25 YEAR	11.61	11.61	0%
50 YEAR	13.6	13.6	0%
100 YEAR	15.83	15.83	0%

FLOODING STANDARD RESULTS REACH 3R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	48.66	45.53	-7%
10 YEAR	103.64	95.15	-9%
25 YEAR	151.56	137.74	-10%
50 YEAR	196.96	177.94	-11%
100 YEAR	248.09	222.64	-11%

FLOODING STANDARD RESULTS REACH 6R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	94.2	86.15	-9%
10 YEAR	194.34	175.66	-11%
25 YEAR	265.34	236.28	-12%
50 YEAR	375.46	308.12	-22%
100 YEAR	493.76	408.14	-21%

FLOODING STANDARD RESULTS REACH 55R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	14.17	13.43	-6%
10 YEAR	35.23	33.41	-5%
25 YEAR	54.61	51.79	-5%
50 YEAR	73.49	69.7	-5%
100 YEAR	94.84	89.95	-5%

6.	7–31–2018	No changes this sheet, re–submit to Town	CSB
5.	7–16–2018	No changes this sheet	CSB
4.	5–4–2018	No changes this sheet	CSB
3.	3–1–2018	No Changes this sheet – Re–submit to Town	CSB
2.	2–7–2018	Submit to DEP	CSB
1.	1–31–2018	Respond to Town Memos, submit to Town and DEP	CSB

Pre Development Drainage Plan

Oceanview @ Cumberland
291 Tuttle Road, Cumberland, Maine

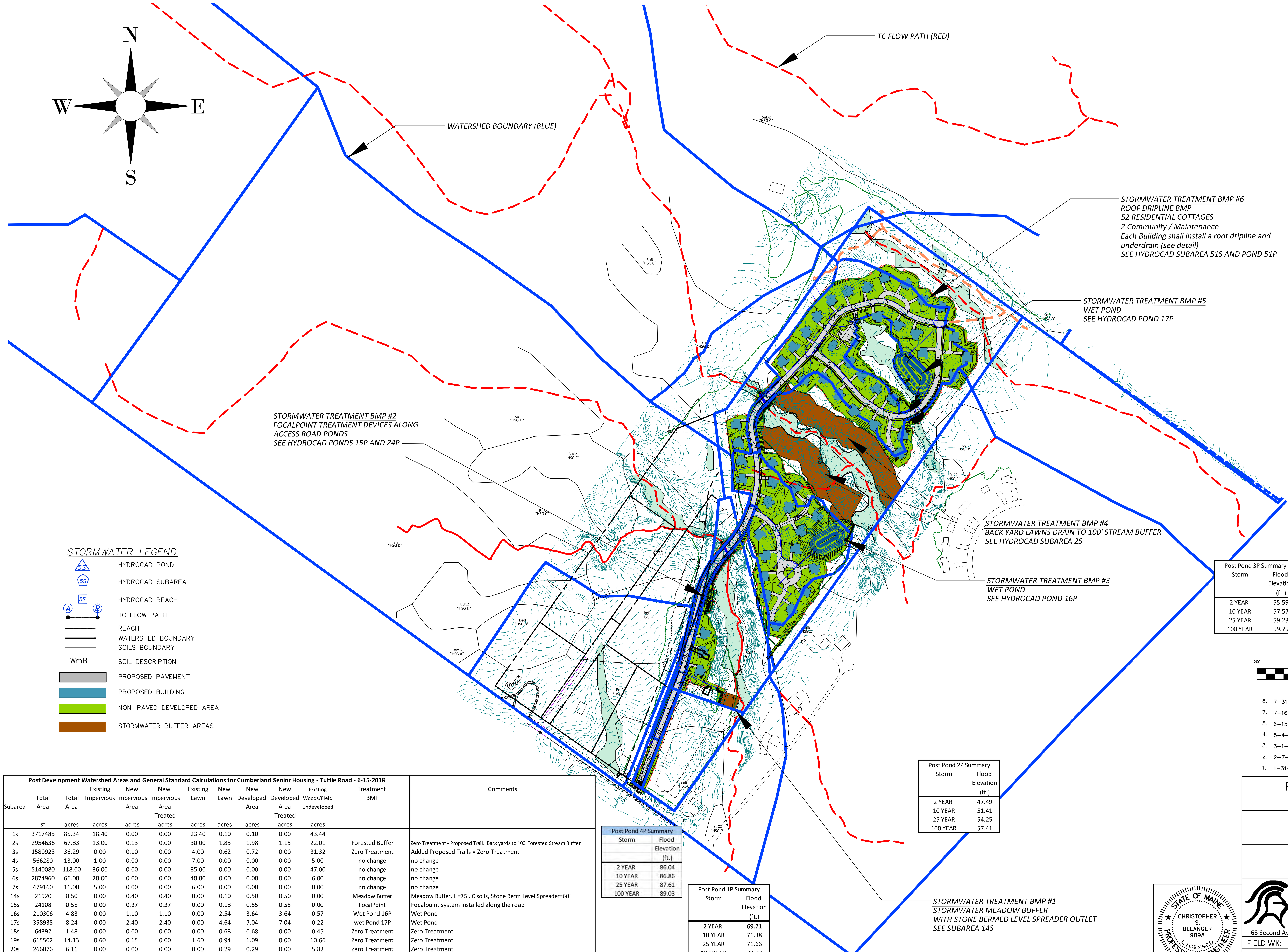
Oceanview @ Cumberland LLC
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE ★ CHRISTOPHER S. BELANGER 9098 ★ LICENSED PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE: 1"=200'	SHEET: Pre
DRN BY:	JOB #: 109	
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	



FLOODING STANDARD RESULTS POND 1P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	38.34	36.38	-5%
10 YEAR	96.83	90.39	-7%
25 YEAR	144.34	132.66	-9%
50 YEAR	189.15	171.99	-10%
100 YEAR	239.06	212.2	-13%

FLOODING STANDARD RESULTS POND 2P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	55.7	54.26	-3%
10 YEAR	89.77	88.9	-1%
25 YEAR	107.91	107.21	-1%
50 YEAR	141.82	138.46	-2%
100 YEAR	237.6	234.91	-1%

FLOODING STANDARD RESULTS POND 3P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	12.99	11.45	-13%
10 YEAR	26.68	24.24	-10%
25 YEAR	48.56	38.26	-27%
50 YEAR	70.97	58.08	-22%
100 YEAR	93.27	76.14	-22%

FLOODING STANDARD RESULTS POND 4P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	4.55	4.55	0%
10 YEAR	8.95	8.95	0%
25 YEAR	11.61	11.61	0%
50 YEAR	13.6	13.6	0%
100 YEAR	15.83	15.83	0%

FLOODING STANDARD RESULTS REACH 3R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	48.66	45.72	-6%
10 YEAR	103.64	95.42	-9%
25 YEAR	151.56	138.13	-10%
50 YEAR	196.96	177.46	-11%
100 YEAR	248.09	217.18	-14%

FLOODING STANDARD RESULTS REACH 6R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	94.2	87.71	-7%
10 YEAR	194.34	180.52	-8%
25 YEAR	265.34	250.59	-6%
50 YEAR	375.46	359.26	-5%
100 YEAR	493.76	466.77	-6%

FLOODING STANDARD RESULTS REACH 55R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	14.17	12.06	-17%
10 YEAR	35.23	29.2	-21%
25 YEAR	54.61	44.85	-22%
50 YEAR	73.49	60.06	-22%
100 YEAR	94.84	77.22	-23%

Post Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.59
10 YEAR	57.57
25 YEAR	59.23
100 YEAR	59.75

Post Pond 2P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	47.49
10 YEAR	51.41
25 YEAR	54.25
100 YEAR	57.41

Post Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Post Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	69.71
10 YEAR	71.38
25 YEAR	71.66
100 YEAR	72.07

Post Development Watershed Areas and General Standard Calculations for Cumberland Senior Housing - Tuttle Road - 6-15-2018

Subarea	Total Area sf	Total Area acres	Existing Impervious acres	New Impervious Area acres	New Impervious Area Treated acres	Existing Lawn acres	New Lawn acres	New Developed Area acres	New Developed Area Treated acres	Existing Woods/Field Undeveloped acres	Treatment BMP	Comments
1s	3717485	85.34	18.40	0.00	0.00	23.40	0.10	0.10	0.00	43.44		
2s	2954636	67.83	13.00	0.13	0.00	30.00	1.85	1.98	1.15	22.01	Forested Buffer	Zero Treatment - Proposed Trail. Back yards to 100' Forested Stream Buffer
3s	1580923	36.29	0.00	0.10	0.00	4.00	0.62	0.72	0.00	31.32	Zero Treatment	Added Proposed Trails = Zero Treatment
4s	566280	13.00	1.00	0.00	0.00	7.00	0.00	0.00	0.00	5.00	no change	no change
5s	5140080	118.00	36.00	0.00	0.00	35.00	0.00	0.00	0.00	47.00	no change	no change
6s	2874960	66.00	20.00	0.00	0.00	40.00	0.00	0.00	0.00	6.00	no change	no change
7s	479160	11.00	5.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	no change	no change
14s	21920	0.50	0.00	0.40	0.40	0.00	0.10	0.50	0.50	0.00	Meadow Buffer	Meadow Buffer, L =75', C soils, Stone Berm Level Spreader=60'
15s	24108	0.55	0.00	0.37	0.37	0.00	0.18	0.55	0.55	0.00	FocalPoint	Focalpoint system installed along the road
16s	210306	4.83	0.00	1.10	1.10	0.00	2.54	3.64	3.64	0.57	Wet Pond 16P	Wet Pond
17s	358935	8.24	0.00	2.40	2.40	0.00	4.64	7.04	7.04	0.22	wet Pond 17P	Wet Pond
18s	64392	1.48	0.00	0.00	0.00	0.00	0.68	0.68	0.00	0.45	Zero Treatment	Zero Treatment
19s	615502	14.13	0.60	0.15	0.00	1.60	0.94	1.09	0.00	10.66	Zero Treatment	Zero Treatment
20s	266076	6.11	0.00	0.00	0.00	0.00	0.29	0.29	0.00	5.82	Zero Treatment	Zero Treatment
51s	--	--	0.00	3.22	3.22	0.00	0.00	3.22	3.22	--	Roof Dripline BMP	54 Roof Areas draining to Roof Dripline BMP
	18874763	433.30	94.00	7.87	7.49	147.00	11.94	19.81	16.10	155		
				>95%	95%	✓		>80%	81%	✓		

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

8.	7-31-2018	No changes this sheet, re-submit to Town	CSB
7.	7-16-2018	No changes this sheet	CSB
5.	6-15-2018	Move Focal Point storage. Re-submit to Maine DEP	CSB
4.	5-4-2018	Respond to Ben Viola comments	CSB
3.	3-1-2018	Shift Road, Revise Buffer and BMP 1 Location	CSB
2.	2-7-2018	Response to Peer Review Comments, Re-submit to Town Submit to DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

Post Development Drainage Plan

Oceanview @ Cumberland
291 Tuttle Road, Cumberland, Maine

Oceanview @ Cumberland LLC
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER
7-31-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE: 1"=200'	SHEET:
DRN BY:	JOB #: 109	Post
CH'D BY:	SS:	
DATE: 7-31-2018	FILE:	

BELANGER ENGINEERING
CONSULTING ENGINEERS

Maine DEP SLODA
Permit Application
STORMWATER MANAGEMENT REPORT

Project: OceanView @ Cumberland Expansion Project
Tuttle Road, Cumberland, Maine

Prepared By:
Belanger Engineering
63 Second Avenue
Augusta, ME 04330
207-622-1462

Prepared For:
Seacoast Management Company
20 Blueberry Lane
Falmouth, Maine
207-233-4194 – Chris Wasileski

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER

Date: March 1, 2018

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Oceanview at Cumberland, Tuttle Road, Cumberland, Maine

Stormwater Narrative – March 1, 2018
Oceanview @ Cumberland Senior Housing Community
Tuttle Road, Cumberland, Maine

Belanger Engineering has evaluated the proposed stormwater impacts resulting from the creation of a new residential Senior Housing Community located off Tuttle Road in Cumberland. The property is shown on Town Tax Map R4 Lot 4E+5 and is approximately 36.83 acres in size.

This approval will focus on the proposed development expansions located on Lot 4C. In particular, the project creates 7.87 acres (was 8.04) of new impervious area and 19.81 acres (was 19.76) of new developed area. Approximately 3.15 acres (was 3.24) of road, 1.27 acres of driveway, and 3.22 acres of building roof will be created. We expect to construct 52 residential cottages and community facilities to support them. A community building and maintenance building is also planned to support the project. We have modeled 54 buildings in the enclosed calculations. We have also added 0.23 acres of impervious area into the calculations to include the proposed pedestrian trails.

Project Location: The project is located off Tuttle Road in Cumberland, Maine. The site is located across the street from the Cumberland Town Hall building.

DEP Jurisdiction: The proposed project includes the development of 19.81 acres of developed area and 7.87 acres of impervious area. The project does trigger the Site Law. The project is not within an urban impaired stream or a severely blooming lake. As a result, the Basic Standards, General Standards, and the Flooding Standard apply to this project. See Section 4A and 4B of the Chapter 500 Rules, pages 4&5.

Basic Standards

1. Erosion and sedimentation control plan – See Appendix A of Chapter 500 Rules
2. Inspection and Maintenance Plan – See Appendix A and B of Chapter 500 Rules
3. Housekeeping – See Appendix C of the Chapter 500 Rules

General Standards

1. Narrative
2. Drainage Plans
3. Calculations
4. Details, designs, and specifications for Underdrained vegetated filters, & Buffers.

Flooding Standards

1. Stormwater Management System must detain, retain, or result in infiltration of stormwater for the 2,10,25 storms such that the peak flows do not exceed “pre-development” conditions.

Surface water on or abutting the site: Runoff from the site drains southerly toward two separate un-named streams. The first stream crosses Tuttle Road via two 24” culverts. The second stream crosses Crossing Brook Road and the railroad line via a 24” culvert. Runoff continues to drain toward Mill Brook and the Piscataquis River.

Alterations to Land Cover: The drainage study is conducted on the sites 36.83 acres. The existing ground cover is 100% woods and meadow. The proposed ground cover will result in approximately: 18% impervious, 17% lawn, and 65% woods and meadow.

Downstream ponds and Lakes: Runoff from the site drains to Mill Brook and the Piscataquis River. Enclosed is a U.S.G.S. Map showing the site location.

Historic Flooding: The property is fairly uniform with mildly irregular topography and typical slopes between 2 % and 18 %. The stream area may have localized flooding but is located within ravine areas and outside development areas. There site is not located within any designated 100-year flood elevation zones. See enclosed Firm Maps.

Alterations to natural drainage ways: Natural drainage ways will not be altered as a result of the proposed development. Pipe Arch's and Culverts will be installed to maintain current drainage flow patterns.

Proposed BMP's: Steep slopes will be rip rapped. Silt fence is shown at the bottom of all fill slopes, hay bale barriers and stone check dams will be used in ditches and/or around catch basins. BMP's proposed for this project are shown and described on the enclosed plans.

Pre Development Watershed Areas for Cumberland Senior Housing - Tuttle Road						
					Existing	Existing
	Total	Total	Existing	Existing	Woods/Field	Developed
Subarea	Area	Area	Impervious	Lawn	Undeveloped	Area
	sf	acres	acres	acres	acres	acres
1s	4399335	101.0	19.00	25.00	57	44
2s	3759452	86.3	13.00	30.00	43.31	43.00
3s	1655379	38.0	0.00	4.00	34	4
4s	566280	13.00	1.00	7.00	5	8
5s	5140080	118.0	36.00	35.00	47	71
6s	2874960	66.0	20.00	40.00	6	60
7s	479160	11.0	5.00	6.00	0	11
	18874646	433.3	94	147	192	241

Proposed Conditions – Oceanview Cumberland Senior Housing Project

The project will be accessed from a 50' right way off Tuttle Road and will extend a new road to the project area. The main access road is approximately 2950' long, 22' wide, curbed, and a 5' sidewalk will be installed on the right side. The Arctic Fox Drive is 865' long and will be 22' wide and curbed. Mallard Way at the end is approximately 1013' long and will be 22' wide. The roads create 3.15 acres of impervious area and 6.52 acres of developed area.

The developer is proposing to construct 52 residential homes. We have assumed each house will have approximately 2700 s.f. (.06 ac.) of building footprint area including an optional garage. We have also assumed each driveway will be 24' by 40' (.02 acres) in area. This will accommodate a 2 bay garage option and four (4) vehicles. Impervious area per cottage is .08 acres each based on the above assumptions. We will also assume a small community building and amenities at 0.2 acres. The residential construction creates 4.49 acres of impervious area and 13.29 acres of developed area.

The project creates 7.87 acres of impervious area and 19.81 acres of developed area. This is the basis of the general standards calculations below.

OV Cumberland Road Impervious Area Summary - 3-1-2018								
Description	Road	Impervious Area		Lawn Area		Developed Area		Comments
	Length							
	feet	s.f.	acres	s.f.	acres			
Little Acres Drive	2953	79278	1.82	91543	2.10	170821	3.92	@22', curb, 5' sidewalk
Arctic Fox Drive	594	16711	0.38	12989	0.30	29700	0.68	@22', curb, no sidewalk, 30' sac
Arctic Fox Drive Spur 1	205	3712	0.09	3712	0.09	7424	0.17	18', no curb
Arctic Fox Drive Spur 2	150	3621	0.08	3621	0.08	7242	0.17	18', no curb
Mallard Way	1013	27314	0.63	28000	0.64	55314	1.27	@22', curb, 5' sidewalk
Mallard Way Spur	130	2777	0.06	2777	0.06	5554	0.13	18' no curb
Eyebrow Road 1	175	4013	0.09	4013	0.09	8026	0.18	20' no curb
Road Totals	5220	137426	3.15	146655	3.37	284081	6.52	

General Standard Narrative and Selected BMP's:

The developer will utilize the following BMP's for stormwater treatment and storage.

1. Wet Ponds (2) – Maine BMP's Chapter 4.
2. Roof Dripline BMP – Maine BMP's Chapter 7.5.
3. FocalPoint Proprietary Subsurface Treatment and Storage Systems.
4. Forested Buffers adjacent to development
5. Forested Buffers with Stone Bermed Level Lip Spreader

Wet Pond

Two (2) Wet Ponds will be developed to support the project. The pond has been sized to store 2.0" X the watersheds impervious area and 0.8"X the watersheds "disturbed" below the permanent pool. In addition, the Pond will store 1" X the watershed impervious area and 0.4" X the watershed disturbed area above the permanent pool and will discharge to a gravel filter drain to cool runoff and provide a slow release of runoff. An outlet control structure and spillway has been implemented in the ponds to provide emergency overflow as required. The outlet control structure will also be the gravel drain outlet. Runoff will discharge to the adjacent wetland.

Roof Dripline

Roof driplines with capture roof areas and drain them through foundation backfill and discharge to footing drains. The roof dripline will be 3' wide and 1.5' deep and will be installed in roof drainage areas. Once treated, 4" drain pipes will outlet into the street catch basins or can daylight in forested areas behind the buildings as conditions allow. The roof driplines will store 1" X roof areas utilizing 40% voids.

Focal Point Proprietary System

Along the main access road, the developer has secured a 50' access easement. We will utilize focalpoint which is an approved proprietary stormwater treatment system. We have followed the sizing guidelines from the manufacturer and the Departments approval letter dated February 2, 2017. Utilizing the Chapter 500 Design Worksheet / Checklist enclosed, we have sized each focal point system based on the drainage area being captured and treated. The following design elements are included with each location.

1. FocalPoint Bed Area (min. 174 square feet per acre of impervious area (e.g. 0.2 acres=35 s.f.)).
2. Verify a 0.95 inch Type III rainfall event is treated prior to activation of the overflow (typically 6-12"). We have provided 12" of storage in each treatment area.
3. Maintain a ratio of filter media (s.f.) to the temporary ponding volume (c.f.) at 1:5.
4. Subsurface Chamber Treatment row must be sized to treat the peak flow from a 1 year-24 hr storm event. The cultic 150XLHD requires (1 chamber per 0.185 cfs).

5. The subsurface storage basin will provide storage of 1" X Impervious Area and will control release over 24-48 hrs.
6. The design has been reviewed by the Manufacturer. The letter is attached.

Stormwater from one travel lane (11' wide) drains 500' along the gutter line before it outlets into a curb slot. Runoff passes through a grassed filter strip prior to entering the focalpoint filter system. This strip captures the majority of the coarse sediment and provides pre-treatment prior to draining into the focalpoint media. Runoff then drains from the focalpoint system to the subsurface treatment row sized for the 1 year peak flow. In this case the system treats 5500 s.f. (500'X11') of impervious area (0.12 acres). The minimum focalpoint bed area is calculated to be 21 s.f. (.06 X 174). We have provided a 3'X7' bed area (21' s.f.). The system was modeled with a 0.95 inch storm and stores the volume without breaching the overflow outlet as required. The ratio of surface area to temporary volume is approximately 1:5. The subsurface treatment row requires 2 units of cultic 150XLHD chambers by ACF environment. In addition, approximately 10 units are needed to provide 1" storage. In total 12 storage units will treat this portion of the road. The focalpoint systems are installed prior to each basin along the access road.

Forested Buffer

Portions of the back yard lawn areas that cannot be practically captured will drain toward the buffers located along the stream protection corridor. The back yards are largely pervious and will be graded to sheet flow into the undeveloped forested area below the back yard area. Note that buildings and pavement are being routed to other BMP devices and will not drain to the buffers. We have provided 100' buffers below the back yard lawn areas along the stream corridor as required by site law projects. We will utilize BMP 5.1 – Buffer Adjacent to Residential, Largely Pervious or Small Impervious Area Approximately 1.15 acres of lawn will be treated. Further, the fill slopes adjacent to the lawn areas will not be mowed and will be allowed to revert back to a natural meadow buffer condition. Approximately 0.6 acres will be converted back to meadow buffer. Approximately 0.54 acres of lawn will be treated by the buffers.

General Standard Calculations

Calculations: BMP's will be utilized to treat impervious and developed areas as far as practical. The project is required to effectively treat 95% of the impervious area and 80% disturbed area as described in the rules as far as practical. Certain areas cannot practically receive treatment. Where treatment of 95% of the impervious area is not practical, the department may allow treatment as low as 90% of the impervious area if the applicant is able to demonstrate that treatment of a greater depth of runoff than specified in the standards will result in at least an equivalent amount of overall treatment for the impervious area. As described in the calculation, the project captures 95% of the "new" projects impervious area and 81% of the projects overall developed areas. At 90-95%, DEP recommends 05" & 0.02" additional storage per % below 95%. The BMP's captures proposed areas to the extent practical. The treatment area summary and general standard calculations are attached.

The project as developed meets the General Standards as outlined in the Chapter 500 stormwater rules. The General Standard calculation is shown on the post development drainage plan and is included in this report.

<u>Arctic Fox Drive Wet Pond Design Criteria Pond 16P:</u>
A wet pond at Arctic Fox Drive will be constructed to support the project. Since this project will be required to meet the Flooding Standard per Town Ordinances and Site Law projects, the wet pond has been designed to store and hold 2.0” X the watershed impervious area and 0.8” of the watersheds non-impervious developed area below the permanent pool and an additional 1” over the watersheds impervious area and 0.4” X the watersheds non-impervious development area over the permanent pool that will drain through a gravel filter. An outlet structure with a 18” outlet pipe will control flow. The structure Rim is set at 81.0 with a 6” vertical orifice controlling flow into the Tuttle Road storm drain system. The permanent pool is elevation 77.0. The pond shape length to width ratio is 3:1. Approximately 1.1 acres of impervious area and 2.54 acres of lawn will be treated. A pond bench of 10’ is provided.

<u>Gravel Filter Drain Sizing:</u>
The gravel trench will be 4’ wide X 3’ deep. The underdrain piping shall be 6” slotted, rigid schedule 40 PVC or SDR 35 pipe. The trench shall be located in the pond bench. The trench length shall be 3’ of gravel trench per 1000 c.f. of channel protection volume (volume above permanent pool). The pond gravel outlet is set at 77.0 to provide 1.5’ of gravel drain storage above the permanent pool.

Oceanview at Cumberland							
Arctic Fox Drive Wet Pond Design Criteria - Hydrocad Pond 16P							
	acres	s.f.					
Impervious Area Draining to Pond	1.1	47916					
Lawn Area draining to Pond	2.54	110642					
Permanent Pool Elevation	77						
Treatment Volume	Above Pool	1" X Impervious Area + 0.4" X Lawn				7628	c.f.
	Below Pool	2" X Impervious Area + 0.8" X Lawn				11522	c.f.
Pond Storage Provided	Above Pool					12172	✓
	Below Pool					18632	✓
Mean Depth	Volume of Permanent Pool / Surface Area 1' below pool =					4.7	ft.
	Volume of Permanent Pool		18632	c.f.			
	Surface Area 1' below Pool		4000	s.f.			
Gravel Filter Drain Sizing	3' per 1000 c.f. of channel protection volume:				23		
	Channel Protection Volume		7628				

<u>Groundwater Impacts</u>

A soil borings / Test Pits was cored within the wet pond area. The borings and probe was completed Mark Hampton. Groundwater is expected to be near the existing ground surface. The pond will be lined with a 10 mil poly liner installed to prevent mixing of groundwater and pond water. The project will be served by public water and sewer utilities. Water will be routed through the outlet structure and discharged in the adjacent wetlands. The proposed pond will not significantly impact groundwater.

<u>Bedrock</u>

Ledge was observed within the boring areas. The bottom of pond is set at elevation 71.0. Vertical ledge or boulder walls may be excavated should ledge be encountered to provide the pond storage required.

Mallard Way Wet Pond Design Criteria:

A wet pond will be constructed off Mallard Way to support the project. Since this project will be required to meet the Flooding Standard per Town Ordinances and Site Law projects, the wet pond has been designed to store and hold 2.0” X the watershed impervious area and 0.8” of the watersheds non-impervious developed area below the permanent pool and an additional 1” over the watersheds impervious area and 0.4” X the watersheds non-impervious development area over the permanent pool that will drain through a gravel filter. An outlet structure with a 18” outlet pipe will control flow. The structure Rim is set at 90.5 with a 6” vertical orifice controlling flow into the Tuttle Road storm drain system. The permanent pool is elevation 88.0. The pond shape length to width ratio is 4:1. Approximately 2.4 acres of impervious area and 4.64 acres of lawn will be treated. A pond bench of 10’ is provided.

Gravel Filter Drain Sizing:

The gravel trench will be 4’ wide X 3’ deep. The underdrain piping shall be 6” slotted, rigid schedule 40 PVC or SDR 35 pipe. The trench shall be located in the pond bench. The trench length shall be 3’ of gravel trench per 1000 c.f. of channel protection volume (volume above permanent pool). The pond gravel outlet is set at 89.5 to provide 1.5’ of storage above the permanent pool.

Oceanview at Cumberland							
Mallard Way Wet Pond Design Criteria							
	acres	s.f.					
Impervious Area Draining to Pond	2.4	104544					
Lawn Area draining to Pond	4.64	202118					
Permanent Pool Elevation	88						
Treatment Volume	Above Pool	1" X Impervious Area + 0.4" X Lawn				15347	c.f.
	Below Pool	2" X Impervious Area + 0.8" X Lawn				23174	c.f.
Pond Storage Provided	Above Pool					19786	✓
	Below Pool					23438	✓
Mean Depth	Volume of Permanent Pool / Surface Area 1' below pool =					4.8	ft.
	Volume of Permanent Pool		23438	c.f.			
	Surface Area 1' below Pool		4879	s.f.			
Gravel Filter Drain Sizing	3' per 1000 c.f. of channel protection volume:				46		
	Channel Protection Volume		15347				

Groundwater Impacts

A soil borings / Test Pits was cored within the wet pond area. The borings and probe was completed Mark Hampton. The pond will be lined with a 10 mil poly liner installed to prevent mixing of groundwater and pond water. The project will be served by public water and sewer utilities. Water will be routed through the outlet structure and discharged in the adjacent wetlands. The proposed pond will not significantly impact groundwater.

Bedrock

Ledge was observed within the boring areas. The bottom of pond is set at elevation 81.0. Vertical ledge or boulder walls may be excavated should ledge be encountered to provide the pond storage required.

Post Area Summary and General Standard Calculation

Post Development Watershed Areas and General Standard Calculations for Cumberland Senior Housing - Tuttle Road - 3-1-2018											
Subarea	Total Area	Total Area	Existing Impervious	New Impervious Area	New Impervious Area Treated	Existing Lawn	New Lawn	New Developed Area	New Developed Area Treated	Existing Woods/Field Undeveloped	Treatment BMP
	sf	acres	acres	acres	acres	acres	acres	acres	acres	acres	
1s	3717485	85.34	18.40	0.00	0.00	23.40	0.10	0.10	0.00	43.44	
2s	2954636	67.83	13.00	0.13	0.00	30.00	1.85	1.98	1.15	22.01	Forested Buffer
3s	1580923	36.29	0.00	0.10	0.00	4.00	0.62	0.72	0.00	31.32	Zero Treatment
4s	566280	13.00	1.00	0.00	0.00	7.00	0.00	0.00	0.00	5.00	no change
5s	5140080	118.00	36.00	0.00	0.00	35.00	0.00	0.00	0.00	47.00	no change
6s	2874960	66.00	20.00	0.00	0.00	40.00	0.00	0.00	0.00	6.00	no change
7s	479160	11.00	5.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	no change
14s	21920	0.50	0.00	0.40	0.40	0.00	0.10	0.50	0.50	0.00	Forested Buffer
15s	24108	0.55	0.00	0.37	0.37	0.00	0.18	0.55	0.55	0.00	FocalPoint
16s	210306	4.83	0.00	1.10	1.10	0.00	2.54	3.64	3.64	0.57	Wet Pond 16P
17s	358935	8.24	0.00	2.40	2.40	0.00	4.64	7.04	7.04	0.22	wet Pond 17P
18s	64392	1.48	0.00	0.00	0.00	0.00	0.68	0.68	0.00	0.45	Zero Treatment
19s	615502	14.13	0.60	0.15	0.00	1.60	0.94	1.09	0.00	10.66	Zero Treatment
20s	266076	6.11	0.00	0.00	0.00	0.00	0.29	0.29	0.00	5.82	Zero Treatment
51s	--	--	0.00	3.22	3.22	0.00	0.00	3.22	3.22	--	Roof Dripline BMP
	18874763	433.30	94.00	7.87	7.49	147.00	11.94	19.81	16.10	155	
				>95%	95%	✓		>80%	81%	✓	

Flooding Standard

This drainage study will focus on the proposed impacts created by the Oceanview at Cumberland Senior Housing project. The model compares flooding standard results as they cross the project boundary. The intent is to meet the pre-development peak flows.

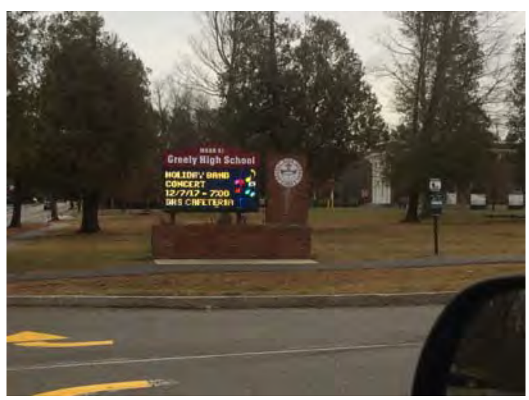
Watershed 1 has been estimated to be 101 acres and is adjacent to Tuttle Road and Main Street. The top end of the watershed is the Greely Middle School entrance. Ponds were observed on site. The Pond outlet at the Tuttle Road Middle School entrance is a 30” concrete culvert and drains toward a swale and ditch adjacent to Tuttle Road. Runoff travels through the residential neighborhood and crosses Meadow Way via 2 - 24” culverts. Runoff travels overland through woods and field until it drains to a stream above the Oceanview Cumberland Senior Housing site. Soils in the vicinity of the project site show the natural wooded areas to Scantic and Buxton soils which is a “D” soil. The fields are predominately Suffield which is a C soil condition. This stream drains through the development site and crosses Tuttle Road by one 30” and one 24” culvert. The site primary access road is located over an existing driveway serving the Allen property. The tracks and crossing have been removed. We will cross the stream and will install a new arch culvert at the crossing.

Pond at Greely Middle School


Watershed drains through Cumberland Common


Two culverts Crossing Tuttle Road 30” & 24” (below site) – Hydrocad Pond 1P

Watershed 2 is approximately 67 acres and is below the existing 48” culvert crossing the cart path at the Val Halla Golf Course. The 48” culvert controls the upper watershed subareas 5 and 6. This upper watershed area includes Greely High School, a residential neighborhood of approximately 150 homes, public Val Halla Golf Course, and undeveloped areas. Watershed 2 is the area being developed with the project.

Greely High School Drainage


Hemlock Drive Culvert crossing onto Val Halla properties



Two 30” Culverts draining to Val Halla Golf Course Below Hemlock Drive



48” culvert crossing Golf Cart Path and pond storage below outlet



Pond controls outlet of two (2) – 48” culverts – drains Hydrocad Subarea 5 and 6


Golf Cart Path crossing Controls flow out of pond – Oval 4'X3' and 30" overflow pipe Pond 5P


48" culvert crossing cart path inlet – Hydrocad Pond 6P


48" culvert crossing cart path outlet – Hydrocad Pond 6P


4'X6' Box Culvert under old Railroad Bed

These drainage areas are defined in our Stormwater Model as shown on the HydroCAD diagrams. Full-size drainage plans and stormwater calculations for the existing and developed site conditions are included with this report. Refer to the HydroCAD diagrams, calculations, report and drainage plans for modeling assumptions, subcatchments, flowpaths, drainage reaches, etc. Runoff calculations were performed for the 2-year, 10 year, and 25 year storm events in accordance with Cumberland Ordinances and DEP requirements. Results of the calculations are shown in the Summary Table for ease of comparison. In order to significantly reduce the volume of paper required to reproduce complete data and calculation reports for all design storms, partial HydroCAD reports were generated for the 2-10-25-year storm events (pre- & post-) for selected subcatchments.

Modeling assumptions: The flooding standard is required with this development because this is a Site Law Project. We have modeled the pond areas to demonstrate that the outlets have the required storage volume capacity and that they will pass the 25 year storm event without flooding the pond embankments. The "HydroCad" computer program was used to determine the peak storm water runoff for the pre- and post-development conditions. HydroCad is a storm water modeling system, which utilizes the TR-20 method developed by the Soil Conservation Service (SCS).

The design assumptions used for this project are:

Design storm: 24 hour, Type III rainfall distribution.
Rainfall: 24 hour precipitation values from U.S. Weather Bureau Technical Release No. 40:
2 year storm = 3.1 inches
10 year storm = 4.6 inches
25 year storm = 5.80 inches
50 year storm = 6.90 inches
100 year storm = 8.10 inches
500 year storm = 12.10 inches

Site specific parameters for the project are listed below:

Soils: Soils information to determine the hydrologic soil group for the site, are derived from the Soil Survey of Cumberland County by the United States Department of Agriculture Soil Conservation Service. The soils and hydrologic group are listed below:

Soil Classification	Hydrologic Group
BgB – Belgrade very fine Sandy Loam	HSG B
BuB – Lamoine silt loam	HSG C
BuC2 – Buxton Silt Loam	HSG D
DeB - Deerfield Loam Sand	HSG B
EmB – Elmwood Fine Sandy Loam	HSG C
Ls – Limerick – Saco silt loams	HSG C
Sn – Scantic Silt Loam	HSG D
SuC2 – Suffield Silt Loam	HSG C
SuD2 – Suffield Silt Loam	HSG C
SuE2 – Suffield Silt Loam	HSG C
WmB – Windsor Loamy Sand	HSG A
MeC – Melrose fine sandy loam	HSG C
Sz – Swanton fine sandy loam	HSG C/D

Ground Cover:

Pre-& Post Development: The watershed ground cover is modeled as woods, grass, meadow and impervious.

Cover Description	Curve Number:
Impervious	98
Woods	70
Lawn	74

PRE- & POST-DEVELOPMENT HYDROLOGIC RESULTS

At Allen Property Line

FLOODING STANDARD RESULTS REACH 3R			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	48.66	45.78	-6%
10 YEAR	103.64	95.56	-8%
25 YEAR	151.56	138.31	-10%
50 YEAR	196.96	177.65	-11%
100 YEAR	248.09	217.25	-14%

FLOODING STANDARD RESULTS POND 1P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	38.34	36.55	-5%
10 YEAR	96.83	90.56	-7%
25 YEAR	144.34	132.86	-9%
50 YEAR	189.15	172.21	-10%
100 YEAR	239.06	212.37	-13%

Pre Pond 1P Summary	
Storm	Flood
	Elevation
	(ft.)
2 YEAR	69.82
10 YEAR	71.43
25 YEAR	71.72
100 YEAR	72.19

Post Pond 1P Summary	
Storm	Flood
	Elevation
	(ft.)
2 YEAR	69.72
10 YEAR	71.38
25 YEAR	71.66
100 YEAR	72.07

Stream at Lower Property Line

FLOODING STANDARD RESULTS REACH 6R			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	94.2	87.63	-7%
10 YEAR	194.34	180.21	-8%
25 YEAR	265.34	250.22	-6%
50 YEAR	375.46	357.08	-5%
100 YEAR	493.76	462.13	-7%

FLOODING STANDARD RESULTS POND 2P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	55.7	54.15	-3%
10 YEAR	89.77	88.83	-1%
25 YEAR	107.91	107.16	-1%
50 YEAR	141.82	137.87	-3%
100 YEAR	237.6	234.77	-1%

Pre Pond 2P Summary	
Storm	Flood
	Elevation
	(ft.)
2 YEAR	47.62
10 YEAR	51.53
25 YEAR	54.37
100 YEAR	57.43

Post Pond 2P Summary	
Storm	Flood
	Elevation
	(ft.)
2 YEAR	47.48
10 YEAR	51.4
25 YEAR	54.24
100 YEAR	57.41

Forested Wetland below site

FLOODING STANDARD RESULTS REACH 55R			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	14.17	12.06	-17%
10 YEAR	35.23	29.2	-21%
25 YEAR	54.61	44.85	-22%
50 YEAR	73.49	60.06	-22%
100 YEAR	94.84	77.22	-23%

FLOODING STANDARD RESULTS POND 3P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	12.99	11.45	-13%
10 YEAR	26.68	24.24	-10%
25 YEAR	48.56	38.26	-27%
50 YEAR	70.97	58.08	-22%
100 YEAR	93.27	76.14	-22%

Pre Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.74
10 YEAR	58.11
25 YEAR	59.4
100 YEAR	59.94

Post Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.59
10 YEAR	57.57
25 YEAR	59.23
100 YEAR	59.75

15" Culvert at Tuttle Road

FLOODING STANDARD RESULTS POND 4P AT PROPERTY LINE			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	4.55	4.55	0%
10 YEAR	8.95	8.95	0%
25 YEAR	11.61	11.61	0%
50 YEAR	13.6	13.6	0%
100 YEAR	15.83	15.83	0%

Pre Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Post Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Conclusion:

The above analysis points are located where the project crosses the property line and points of interest along Crossing Brook Road and Tuttle Road. (See Ponds 1P and 2P above). Peak flows are being maintained for the 2, 10 and 25 year storms at the existing twin 30" culverts at Crossing Brook Road (Pond 2P) the two culverts at Tuttle Road (one 24" and one 30"). Peak flows are less than pre development flows at the (existing 15" culvert (Pond 4P) crossing Tuttle Road at the proposed entrance. Pond 3P is located toward the back and drains toward a culvert at the RR crossings. Peak flows are being maintained in all four locations below the site. The project will maintain the pre-development peak flow as required for the existing project. Reach 3R, 6R, and 55R model the stream and wetland as it crosses the property line. These locations also maintain the pre-development flows as required.

Two wet ponds are being constructed to provide water quality and quantity treatment. The proposed ponds have the capacity to control flow from the 100 year storm which exceeds the DEP Flooding Standards. Adjacent properties will not be flooded as a result of this project. The project does not significantly impact downstream structures or properties. We submit that the Flooding Standard has been met or exceeded with this development.

The proposed project captures 95% of the newly developed impervious area and 81% of the developed area as required to meet the General Standards. Two Wet Ponds will be constructed to provide impervious treatment and storage. Each cottage will provide roof driplines (BMP 7.6) to provide building roof treatment and storage. The access road will install focal point devices to provide treatment and storage along the road. Finally, back yard lawn areas, that cannot be practically captured, adjacent to the stream will be sent to the forested buffer for treatment. The General Standard will be met with the above BMP's installed.

The Basic Standards will be met with the proposed erosion control plans and stabilization details provided. No additional water quality or quantity measures are warranted for the OceanView @ Cumberland Cottage Expansion Project. We submit that the project meets the Basic, General, and the Flooding standard as outlined in the Maine DEP Chapter 500 Stormwater Rules. The proposal maintains these standards as required.

OceanView @ Cumberland Property Maintenance:

PART 1: RESPONSIBILITY FOR MAINTENANCE

OceanView @ Cumberland Retirement Community will be responsible for maintenance of the stormwater systems. Contact Chris Wasileski at Seacoast Management Company.

PART 2: INSPECTIONS – During Construction and Post Construction

- Detention Facilities: Two (2) Wet Ponds
  - Embankment inspection and maintenance
  - Spillway maintenance
  - Outlet Structure sump cleaning and maintenance
  - Sediment removal and disposal

- Detention Facilities: Focalpoint Devices and Detention Ponds
  - Debris removal from stone storage area (leaves, branches, trash, etc.)
  - Sediment removal and disposal

- Ditches, Swales, or other open stormwater channels
  - Embankment inspection and maintenance
  - Channel inspection
  - Sediment removal and disposal

- Culverts, catch basins, stormwater control structures
  - Embankment inspection and maintenance
  - Inlet and Outlet inspection
  - Debris removal and disposal

- Roof Dripline Filter BMP Maintenance
  - Sediment removal and disposal
  - Filter and Underdrain replacement
  - Debris removal and disposal
  - Stone Dripline Replacement
  - Foundation Sealant
  - Foundation Backfill

- Focalpoint filter media and underground pipe storage
  - Embankment inspection and maintenance
  - Channel inspection
  - Sediment removal and disposal
  - Pipe flushing and cleaning
  - Filter media replacement
  - Coarse sediment removal at focalpoint media inlet

The owners representative will inspect the detention ponds, roof driplines, swales, channels, stormwater structures, focalpoint devices to determine if the soil blockage or impaired capacity to pass flow exists. Inspections will be performed on a monthly basis from March to November, and quarterly during the remainder of the year. A record of inspections and maintenance or corrective measures shall be kept by the owner (see part 4).

PART 3: MAINTENANCE AND CLEANING

The owner will regularly inspect for sediment accumulation, obstructions, debris, and other potential causes for operational difficulty in the conveyance and detention system as described in Part 2. Immediate action shall be taken to remedy detrimental obstructions. This may include replacing the filter pond and roof driplines filter beds as necessary to allow infiltration and treatment to occur.

Cleaning out of catch basins, culvert cleaning, and other means necessary to ensure the stormwater system is maintained. Some additional measures (but not limited to) are shown below:

- Wet Pond maintenance – Arctic Fox Wet Pond and Mallard Way Wet Pond
  - Gravel Drain Inspection
  - Gravel Drain replacement
  - Outlet Structure sump cleaning and maintenance
  - Sediment removal and disposal
  - Mowing
  - Harvesting and Weeding

The owner will regularly inspect the wet pond after every major storm event in the first few months to ensure proper function. There after the pond should be inspected bi-annually to ensure that it is draining within 24 hours. Sediment shall be removed from the pond when sediment reduces the pond volume by 25%. The removed sediment shall be hauled off site and disposed of. Mowing of the pond area shall be limited to 2 times per year to maintain grass heights to less than 12”. Weeding and pruning of growth within the pond and pond back slopes will be completed as necessary. The pond outlet shall be inspected for erosion and make repairs as needed annually.

- Focalpoint filter Maintenance – two (2) locations Sta 21+50 right and left sides along Little Acres Drive:
  - Soil Filter Inspection
  - Soil Filter replacement
  - Outlet Structure sump cleaning and maintenance
  - Sediment removal and disposal
  - Mowing
  - Harvesting and Weeding

The owner will regularly inspect the soil filter after every major storm event in the first few months to ensure proper function. There after the filter should be inspected bi-annually to ensure that it is draining within 24 hours. 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. Sediment shall be removed from the filter bed annually. The bed shall be hand raked and re-seeded as necessary. The removed sediment shall be hauled off site and disposed of in a stabilized area. Mowing of the filter area shall be limited to 2 times per year to maintain grass heights to less than 12”. Weeding and pruning of growth within the filter zone will be completed as necessary.

- Stormwater Facilities: Catch basins, Wet Ponds, Culverts,

A mandatory scheduled maintenance will be performed every four weeks for a period of one hundred and twenty (120) days and will begin after satisfactory completion and acceptance of landscape construction. Ongoing maintenance will be required as necessary.

- Parking/Display Areas:

All sand, salt, etc. accumulated when sweeping the parking and display areas, shall be trucked off-site for disposal. The parking lot shall be swept annually in the spring.

PART 4: RECORD KEEPING

The owner will maintain inspection records, with recordings of condition of basins, and pipes and annotation of substantial precipitation events or mitigating circumstances in the intervening time for trending to develop the anticipated preventive maintenance schedule.

PART 5: MAINTENANCE CONTRACT

Should proprietary devices be utilized, a maintenance contract will be established with the manufacturer for regular maintenance and cleaning of the device. Focalpoint manufactures will be on site through the installation process. A maintenance contract will be maintained as necessary to ensure proper system performance of the focal point system. Other facilities included catch basins, culverts, wet ponds will also be maintained annually or as required by inspection. The intent being to maintain a working system.

PART 6: RE-CERTIFICATION

The owner shall submit a certification to Maine DEP within three months of the expiration of each five year interval from the date of issuance of the permit. The owner shall submit the maintenance log which identifies inspections completed, erosion problems found, when corrective action was taken, and who completed the work. The certification will include a statement indicating that the stormwater system is working and is being maintained in working condition in accordance with the permit requirements.

Maintenance Log Sheet

<u>OceanView @ Cumberland Retirement Community</u>

Name	Maintenance Task Completed	Date

Maine DEP Chapter 500 Appendix C. Housekeeping – Updated 2017

These performance standards apply to all projects.

1. Spill prevention. Controls must be used to prevent pollutants from construction and waste materials stored on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.

NOTE: Any spill or release of toxic or hazardous substances must be reported to the Department. For oil spills, call 1-800-482-0777 which is available 24 hours a day. For spills of toxic or hazardous material, call 1-800-452-4664 which is available 24 hours a day. For more information, visit the Department's website at http://www.maine.gov/dep/spills/emergspillresp/

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. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

See Appendix D for license by rule standards for infiltration of stormwater.

NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

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, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

NOTE: Dewatering a stream without a permit from the Department may violate state water quality standards and the Natural Resources Protection Act.

4. Debris and other materials. Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.

NOTE: 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. Excavation de-watering. Excavation 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 removed from the ponded area, either through gravity or pumping, 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.
NOTE: Dewatering controls are discussed in the "Maine Erosion and Sediment Control BMPs, Maine Department of Environmental Protection."

6. Authorized Non-stormwater discharges. Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:
(a) Discharges from firefighting activity;
(b) Fire hydrant flushings;
(c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);
(d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);
(e) Routine external building washdown, not including surface paint removal, that does not involve detergents;
(f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;
(g) Uncontaminated air conditioning or compressor condensate;
(h) Uncontaminated groundwater or spring water;
(i) Foundation or footer drain-water where flows are not contaminated;
(j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));
(k) Potable water sources including waterline flushings; and
(l) Landscape irrigation.

7. Unauthorized non-stormwater discharges. The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non_stormwater, other than those discharges in compliance with Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:
(a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;
(b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;
(c) Soaps, solvents, or detergents used in vehicle and equipment washing; and
(d) Toxic or hazardous substances from a spill or other release.
(8) Additional requirements. Additional requirements may be applied on a site-specific basis.

EROSION AND SEDIMENT CONTROL INSPECTION REPORT FOR CONSTRUCTION SITES AN ACRE OR GREATER

Inspection Date:		Project Type:	
Project Address / Location:	291 Tuttle Road	Inspection Duration:	
Map / Lot:	R4-4C	Inspector:	
Project in Shoreland Zone[1]:	☐ Y ☐ N	Inspector Qualifications:	Contractor MCGP Reporting
Property Owner:	Chris Wasileski	Owner Contact Info:	207-233-4194 chrisw@oceanviewrc.com
Excavation Contractor:	Storey Brothers	Contractor Contact Info:	207-829-4282 Robsto@maine.rr.com
DEP ESC-certified contractor?[1]	☐ Y ☐ N	Photos:	☐ Y ☐ N
Weather / Temp:		Date & inches last precip:	

CH500/MCGP CITATION		Inspection Criteria[2]	Inspection Result[3]				Observations / Corrective Actions Needed
		SECTION A. Erosion Control & Sediment Control Practices - Installed According to Approved Plan.					
APPENDIX A		***Measures must be taken "to prevent unreasonable erosion of soil or sediment beyond the project site or into a protected natural resource as defined by 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."***					
MCGP Part V	Record Retention	ESC plan & MCGP permit on site	N/A	M	P	F	
App A(1)	Pollution Prevention	Disturbed areas minimized	N/A	M	P	F	
		Natural buffers protected	N/A	M	P	F	
		Discharges not eroding	N/A	M	P	F	
App A(2)	Sediment Barriers	Properly installed and maintained;	N/A	M	P	F	
		Downgradient of disturbance(s)/stock piles	N/A	M	P	F	
		Adjacent to drainage channels	N/A	M	P	F	
		Perimeter controls prior to construction	N/A	M	P	F	
App A(3)	Temporary Stabilization	Areas unworked for >7days	N/A	M	P	F	
		Stabilized w/mulch or non-eroding cover	N/A	M	P	F	
		Stabilized w/in 48hrs of storm event along wetland or waterbody (w/in 75')	N/A	M	P	F	
		Accumulated sediments removed	N/A	M	P	F	
App A(5)	Permanent Stabilization	If final grade, permanently stabled <7days	N/A	M	P	F	*Comment should (1) identify which areas, so a copy of a site plan may be needed; and (2) type of permanent stabilization should be noted in each area*
	(a) Seeded Areas	Protected with mulch or erosion control blanket	N/A	M	P	F	
		Achieved 90% cover of disturbed area	N/A	M	P	F	
		No evidence of washing/rilling of topsoil	N/A	M	P	F	
	(b) Sodded Areas	Binding of sod roots to soil	N/A	M	P	F	
		No evidence of slumping of die off	N/A	M	P	F	
	(c) Perm't Mulch	Total coverage of exposed areas with approved mulch materials	N/A	M	P	F	
	(d) Riprap	Appropriate backing of a well-graded gravel or geo-textile	N/A	M	P	F	
		No evidence of soil movemement from behind rip-rap	N/A	M	P	F	
		Stone is appropriately sized to stay in place	N/A	M	P	F	
	(e) Ag Use	Land returned to Ag use	N/A	M	P	F	
	(f) Paved Areas	Placement of compacted subbase is complete	N/A	M	P	F	
	(g) Ditches, channels, swales	90% coverage of health veg.	N/A	M	P	F	
		Well graded rip-rap lining or other non-erosive lining	N/A	M	P	F	
		No evidence of undercutting of banks	N/A	M	P	F	
		No evidence of down-cutting of channel	N/A	M	P	F	
		No evidence of slumping of channel lining	N/A	M	P	F	
App A(6)	Winter Construction	Occurring Nov 1 - April 15	N/A	M	P	F	
	(a) Site	Hay mulch is applied at 2x standard application rate	N/A	M	P	F	

	Stabilization	Areas brought to final grade are stabilized each day		N/A		M		P		F
	(b) Sediment barriers	Areas W/I 75' of protected natural resource must be double row of barriers		N/A		M		P		F
	(c) Ditch	Stabilized with geotextile, gravel bed and stone lining		N/A		M		P		F
	(d) Slopes	Netting used to anchor mulch on 8% slopes unless;		N/A		M		P		F
		Erosion control blankets or erosion control mix is in place		N/A		M		P		F
App A(7)	Stormwater Channels	Stabilized for long-term erosion control		N/A		M		P		F
		Sized to handle runoff		N/A		M		P		F
		Constructed and completed w/in same day		N/A		M		P		F
		If delayed, diversion berms used		N/A		M		P		F
		Check dams installed appropriately		N/A		M		P		F
		Temporary lining installed/prevent scour		N/A		M		P		F
App A(8)	Roads - Gravel & Paved	Roads & parking drain to stable area		N/A		M		P		F
App A(9)	Culverts	No evidence of overtopping or flooding		N/A		M		P		F
		Culvert outlet has apron or plunge pools installed		N/A		M		P		F
		Culvert inlets protected with appropriate materials to prevent erosion		N/A		M		P		F
App A(10)	Parking Areas	Run-off is evenly distrubuted to buffers		N/A		M		P		F
		Catch basin(s) are capturing run-off without by-pass to other areas		N/A		M		P		F
App A(11)	Add'l Req'ts	Site specific additional measures needed		N/A		M		P		F
CH500/MCGP CITATION		**SECTION B. Inspection & Maintenance (I&M)**								
App B(1)	I&M									
	Sediment Barriers	Sediment barriers are functioning as installed. Excess sediment removed from behind		N/A		M		P		F
	Stormwater Channels, Swales & Ditches	Channel, banks and slopes free of erosion		N/A		M		P		F
		Check dams are functioning as required and being maintained		N/A		M		P		F
	Storage Area	Exposure to stormwater is minimzied in material storage areas		N/A		M		P		F
	Parking and Roads	Impervious areas are draining to stabilized buffer or conveyance		N/A		M		P		F
		Downslopes are free from erosion		N/A		M		P		F
	Culverts	Inlets and outlets are free from erosion		N/A		M		P		F
		Aprons and plunge pools are functioning as required and maintained		N/A		M		P		F
App B	Reports	Contractor ESC log up to date		N/A		M		P		F
		Name of inspector is documented		N/A		M		P		F
		Qualifications listed		N/A		M		P		F
		BMP corrective actions are documented		N/A		M		P		F
		Modifications or additional BMPs were completed w/I 7 days		N/A		M		P		F
CH500/MCGP CITATION		**SECTION C. Housekeeping**								
App C(1)	Spill Prevention	A spill prevention, containment and response plan is on site		N/A		M		P		F
		Controls are in place to prevent petroleum or other hazardous materials from discharging		N/A		M		P		F
				N/A		M		P		F

App C(2)	Ground water protection	No liquid petroleum or hazardous materials stored or handled that drains to an infiltration area.		N/A		M		P		F	
App C(3)	Fugitive sediment and dust	Tracking of mud/soil onto public roadway		N/A		M		P		F	
		Stabilized construction entrance		N/A		M		P		F	
		Non-oil dust control used		N/A		M		P		F	
		Weekly sweeping of roads		N/A		M		P		F	
App C(4)	Debris and other Materials	Litter, construction debris/chemicals protected from exposure to stormwater		N/A		M		P		F	
App C(5)	De-watering	Discharging to a wooded buffer, sediment bag, or specifically designated BMP		N/A		M		P		F	
		Discharge is prevented from flowing across disturbed areas		N/A		M		P		F	
App C(6)	Non-Stormwater Discharges	Pollution prevention measures are in place for allowable stormwater discharges		N/A		M		P		F	
App C(7)	Additional Requirement	Site specific requirements		N/A		M		P		F	

*1. Contractor **MUST BE** certified by DEP in ESC if working within 250' of a river, coastal or freshwater wetland; or 75' of stream.*

2. Refer to Maine Erosion & Sediment Control BMPs

*3. **N/A** = Not Applicable; **M** = Maintenance Needed; **P** = Pass; **F** = Fail*

4. Chapter 500 specific.

5. Chapter 500 specific, MCGP proposed changes to match

6. Permit language differs, MCGP proposed changes to match

Additional Comments (including any deviations from ESC plan, recommendations for improvements to contractor, and remedial actions needed):

Remedial Actions Needed? ☐ Y ☐ N

With 7 days/Prior to Next Precipitation. Date:

Contractor Signature

SEA COAST
MANAGEMENT COMPANY

June 10, 2015

Christopher Belanger, P.E.
Belanger Engineering
63 Second Avenue
Augusta, ME 04330

RE: Local and State Permitting Authorization
Town Hall Village, Highland Green and OceanView at Falmouth Communities
For Sea Coast Management Company

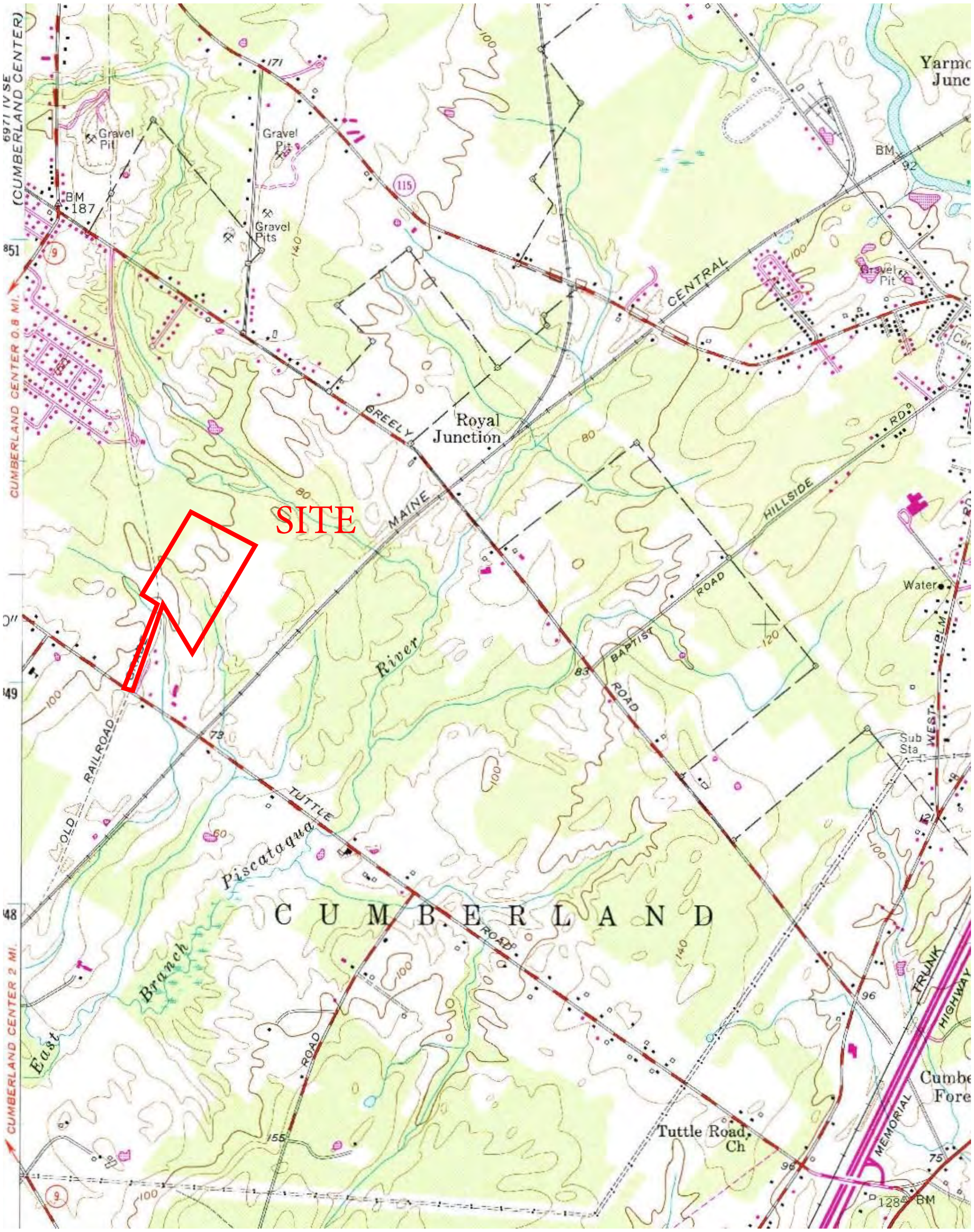
Dear Chris,

Please accept this letter as the full authorization for Belanger Engineering to act as agent for Sea Coast Management Company with regard to various land use permitting requirements for all of its communities including, but not limited to, Town Hall Village at the Highlands, Highland Green and OceanView at Falmouth. This authorization includes any and all submissions to DEP, DOT, EPA, ACOE and the Towns of Topsham and Falmouth.

Very Truly Yours,

Matthew D. Teare
Director of Development
Sea Coast Management Company

REFERENCE : USGS, Yarmouth, 7.5 Minute Series, 1957, 1977 Rev



- PREPARED FOR:

OCEANVIEW AT CUMBERLAND
TUTTLE ROAD
CUMBERLAND

- TITLE:

USGS Locus Map

LICHT
ENVIRONMENTAL DESIGN, LLC

- DATE: 12.2017
- SCALE: 1″=1000′
- JOB NO: 16.084

Exhibit 3

Soil Map—Cumberland County and Part of Oxford County, Maine

Map Scale: 1:8,540 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 100, 200, 400, 600

Feet: 0, 400, 800, 1600, 2400

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

EXHIBIT 6

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Survey Areas
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 12, 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—Jul 18, 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.

Map Unit Legend

Cumberland County and Part of Oxford County, Maine (ME005)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BgB	Belgrade very fine sandy loam, 0 to 8 percent slopes	4.4	3.4%
BuB	Lamoine silt loam, 3 to 8 percent slopes	59.1	45.8%
BuC2	Buxton silt loam, 8 to 15 percent slopes	2.9	2.2%
DeB	Deerfield loamy sand, 3 to 8 percent slopes	2.3	1.8%
EmB	Elmwood fine sandy loam, 0 to 8 percent slopes	12.4	9.6%
Ls	Limerick-Saco silt loams	1.5	1.2%
Sn	Scantic silt loam, 0 to 3 percent slopes	25.3	19.6%
SuC2	Suffield silt loam, 8 to 15 percent slopes, eroded	4.1	3.2%
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded	5.1	3.9%
SuE2	Suffield silt loam, 25 to 45 percent slopes, eroded	11.2	8.7%
WmB	Windsor loamy sand, 0 to 8 percent slopes	0.8	0.6%
Totals for Area of Interest		**129.0**	**100.0%**

M A R K   H A M P T O N   A S S O C I A T E S ,   I N C .

SOIL EVALUATION • WETLAND DELINEATIONS • SOIL SURVEYS • WETLAND PERMITTING

4674

Oceanview
Catalpa Lane
Oceanview at Cumberland, LLC
Cumberland, ME

Soil Narrative Report

DATE:	Soil Profiles observed on July 19, 2017
BASE MAP:	Base plan provided by Titcomb Associates scale 1 inch equals 100 feet and two foot contours.
GROUND CONTROL:	Soil survey boundaries located by Mark Hampton Associates, Inc. for Class B Soil Survey

Class B-High Intensity Soil Survey (Minimum Standards)

Mapping units of 1 acre or larger.
Scale of 1"= 100 feet or larger.
Up to 25% inclusions in mapping units of which no more than 15% may be dissimilar soils.
Ground Control – test pits located accurately under direction of registered land surveyor
Base Map –2 foot contour intervals

Provided:

Mapping units of 1/2 acre or larger
Base map scale of 1"= 100 feet.
Up to 25 percent inclusions in mapping units of which no more than 15 percent is dissimilar soils.
Baseline information and test pits located by Mark Hampton Associates, Inc.
Ground topographic survey with one foot contours and ground control provided.

P.O. BOX 1931 • PORTLAND, ME 04104-1931 • 207-756-2900 • mhampto1@maine.rr.com

The accompanying soil profile descriptions, soil map, and this soil narrative report were done in accordance with the standards adopted by the Maine Association of Professional Soil Scientists, and the Maine Board of Certification of Geologists and Soil Scientists.

____________________________C.S.S. #216, L.S.E. #263______________________

Mark J. Hampton Date

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Oceanview
Catalpa Lane
Oceanview at Cumberland, LLC
Cumberland, ME

Buxton
(Aquic Dystric Eutrochrepts)

SETTING

PARENT MATERIAL:	Derived from glaciomarine or glaciolaucustrine sediments
LANDFORM:	Coastal lowlands and river valleys
POSITION IN LANDSCAPE:	Intermediate positions on landform
SLOPE GRADIENT RANGES:	(B) 3-8%, (C) 8-15%, (D) 15-25%

COMPOSITION AND SOIL CHARACTERISTICS

DRAINAGE CLASS:	Moderately well drained with a perched watertable from 1.5 to 3.0 feet below the surface at some time from November to May or during periods of heavy precipitation.	
TYPICAL PROFILE:	Surface Layer:	Dark Brown, fine sandy loam 0-7"
	Subsurface Layer:	Olive brown, silt loam, 8-15"
	Subsoil Layer:	Olive gray silty clay loam, 15-32"
	Substratum:	Gray silty clay loam +32"
HYDROLOGIC GROUP:	Group C	
SURFACE RUNOFF:	Moderate to moderately slow	
PERMEABILITY:	Slow to very slow	
DEPTH TO BEDROCK:	Greater than 60 inches	
HAZARD TO FLOODING:	None	

INCLUSIONS
(Within Mapping Unit)

CONTRASTING: Scantic, Lamoine

USE AND MANAGEMENT

Development: The limiting factor for building site development is wetness due to the presence of a high watertable for a portion of the year. Proper foundation drainage or site modification is recommended.

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Oceanview at Cumberland, LLC
Cumberland, ME

Lamoine
(Aeric Haplaquepts)

SETTING

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LANDFORM:	Coastal lowlands and river valleys
POSITION IN LANDSCAPE:	Intermediate positions on landform
SLOPE GRADIENT RANGES:	(A) 0-3%, (C) 8-15%, (E) >25%

COMPOSITION AND SOIL CHARACTERISTICS

DRAINAGE CLASS:	Somewhat poorly drained with a perched watertable from 0.5 to 2.0 feet below the surface at some time from November to June or during periods of heavy precipitation.	
TYPICAL PROFILE:	Surface Layer:	Dark Brown, fine sandy loam 0-7"
	Subsurface Layer:	Lt. Olive brown silt loam, 7-14"
	Subsoil Layer:	Olive silty clay loam, 14-21"
	Substratum:	Olive, silty clay loam, 21-65"

HYDROLOGIC GROUP:	Group D
SURFACE RUNOFF:	Moderate to moderately slow
PERMEABILITY:	Slow to very slow
DEPTH TO BEDROCK:	Greater than 65 inches
HAZARD TO FLOODING:	None

INCLUSIONS
(Within Mapping Unit)

CONTRASTING:	Buxton, Scantic

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Catalpa Lane
Oceanview at Cumberland, LLC
Cumberland, ME

Scantic
(Aquic Haplorthod)

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LANDFORM:	Coastal lowlands and river valleys
POSITION IN LANDSCAPE:	Lower positions on landform
SLOPE GRADIENT RANGES:	(A) 0-3%, (B) 3-8%

COMPOSITION AND SOIL CHARACTERISTICS

DRAINAGE CLASS: Poorly drained with a perched watertable from 0.0 to 1.0 feet below the surface at some time from October to May or during periods of heavy precipitation.

TYPICAL PROFILE:	Surface Layer:	Dark grayish brown, silt loam 0-9"
	Subsurface Layer:	Olive gray silt loam, 9-16"
	Subsoil Layer:	Olive silty clay loam, 16-29"
	Substratum:	Olive gray clay loam, 29-65"

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(Within Mapping Unit)

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Mark J. Hampton Date

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HAZARD TO FLOODING:	None	

INCLUSIONS
(Within Mapping Unit)

CONTRASTING: Scantic, Lamoine

USE AND MANAGEMENT

Development: The limiting factor for building site development is wetness due to the presence of a high watertable for a portion of the year. Proper foundation drainage or site modification is recommended.

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HYDROLOGIC GROUP:	Group D
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DEPTH TO BEDROCK:	Greater than 65 inches
HAZARD TO FLOODING:	None

INCLUSIONS
(Within Mapping Unit)

CONTRASTING: Buxton, Scantic

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INCLUSIONS

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STA 21+50 LEFT
600' X 11' = 6600 SF = 0.15 AC.

FOCALPOINT

ENVIRONMENTAL
LET'S GET IT DONE

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM

MAINE – CHAPTER 500 DESIGN WORKSHEET/CHECKLIST

1. **FocalPoint Bed Area (min 174 square feet per acre of impervious area (e.g. 0.2 acres = 35 sf))**

- Tributary Impervious area = 0.15 ac.
- Min FocalPoint bed area req'd 0.15 X 174 = 26 sf.
- FocalPoint Bed Area provided * = 27 sf. → 3' X 9'

* see criteria 2. to determine if minimum size is appropriate.

2. **A 0.95 inch Type III 24hr rainfall event shall be modelled to demonstrate the entire storm volume is treated prior to activation of the overflow (typically set at 6-12" above the mulch)**

- Temporary storage depth provided = 12" inches (typ 6" to 12")
- Temporary storage volume provided at above depth = 96 cubic feet.
- Peak ponding depth from 0.95" 24hr storm event = 6" inches

3. **Ratio of the surface area of the filter media (sf) to the temporary ponding volume (cf) shall be no less that 1:5**

- Ratio of FocalPoint Bed Area : Temporary Storage Vol = _____ : _____

4. **Subsurface Chamber Treatment Row must be sized to treat the peak flow from a 1 yr-24hr storm event.**

- 1yr 24hr Peak Flowrate = 0.44 cfs
- Chamber model selected
  - Cultec 330 XLHD (1 chamber per 0.227 cfs) ☐
  - Cultec 150XLHD (1 chamber per 0.185 cfs) ☒
- Number of Chambers required = 2.4 ≈ $\boxed{3}$

5. **Controlled release of the Channel Protection over 24-48 hrs**

- Controlled release of the channel protection volume is being achieved by:
  - Expanded subsurface storage basin with OCS ☒
  - Surface detention basin with OCS ☐

6. **The Design shall be reviewed by the manufacturer's representative prior to submission and installation will be overseen by the manufacturer's representative.**

  - The Design has been reviewed by ACF Environmental ☒
  - Engineer will coordinate installation inspection with ACF ☒

Contact ACF Environmental at 1800 448 3636 with any questions
or contact Rob Woodman – Senior Stormwater Engineer at rwoodman@acfenv.com

STA 21+50 Right
600' x 16' = 9,600 SF
= 0.22 Ac.

FOCALPOINT

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM

MAINE – CHAPTER 500 DESIGN WORKSHEET/CHECKLIST

1. **FocalPoint Bed Area (min 174 square feet per acre of impervious area (e.g. 0.2 acres = 35 sf))**

- Tributary Impervious area = 0.22 ac.
- Min FocalPoint bed area req'd — 174 x 0.22 = 38 sf.
- FocalPoint Bed Area provided * = 39 sf. → 3' x 13'

* see criteria 2. to determine if minimum size is appropriate.

2. **A 0.95 inch Type III 24hr rainfall event shall be modelled to demonstrate the entire storm volume is treated prior to activation of the overflow (typically set at 6-12" above the mulch)**

- Temporary storage depth provided = 12" inches (typ 6" to 12")
- Temporary storage volume provided at above depth = 96 cubic feet.
- Peak ponding depth from 0.95" 24hr storm event = 11" inches

3. **Ratio of the surface area of the filter media (sf) to the temporary ponding volume (cf) shall be no less that 1:5**

- Ratio of FocalPoint Bed Area : Temporary Storage Vol = ______ : ______

4. **Subsurface Chamber Treatment Row must be sized to treat the peak flow from a 1 yr-24hr storm event.**

- 1yr 24hr Peak Flowrate = 0.63 cfs
- Chamber model selected
  - Cultec 330 XLHD (1 chamber per 0.227 cfs) ☐
  - Cultec 150XLHD (1 chamber per 0.185 cfs) ☒
- Number of Chambers required = 3.4 ≈ $\boxed{4}$

5. **Controlled release of the Channel Protection over 24-48 hrs**

- Controlled release of the channel protection volume is being achieved by:
  - Expanded subsurface storage basin with OCS ☒
  - Surface detention basin with OCS ☐

6. **The Design shall be reviewed by the manufacturer's representative prior to submission and installation will be overseen by the manufacturer's representative.**

- The Design has been reviewed by ACF Environmental ☒
- Engineer will coordinate installation inspection with ACF ☒

CULTEC Contactor® & Recharger® Chamber Specification Information

	Contactor® 100HD	Recharger® 150XLHD	Recharger® 280HD	Recharger® 330XLHD	Recharger® V8HD[1]
Length	8' 2.44 m	11' 3.35 m	8' 2.44 m	8.5' 2.59 m	8' 2.44 m
Installed Length	7.5' 2.29 m	10.25' 3.12 m	7' 2.13 m	7' 2.13 m	7.5' 2.29 m
Width	36" 914 mm	33" 838 mm	47" 1194 mm	52" 1321 mm	60" 1524 mm
Height	12.5" 318 mm	18.5" 470 mm	26.5" 673 mm	30.5" 775 mm	32" 813 mm
Bare Chamber Storage Capacity	14.00 ft^3 0.40 m^3	27.16 ft^3 0.77 m^3	42.55 ft^3 1.21 m^3	52.21 ft^3 1.48 m^3	65.09 ft^3 1.84 m^3
Min. Storage Capacity Surrounded in Stone	28.81 ft^3 0.82 m^3	50.17 ft^3 1.42 m^3	64.46 ft^3 1.83 m^3	79.26 ft^3 2.24 m^3	99.56 ft^3 2.82 m^3
Scan for Product Downloads and CAD details					

Based on installed length. Stone void is calculated at 40%. Includes 6" (152 mm) stone base, 6" (152 mm) stone above chamber crown and stone around units based on typical minimum center to center spacing.

[1] The Recharger V8HD information is based on the V8IHD Intermediate. See pages 12-13 for information on the V8SHD Starter and V8EHD End units.

Other CULTEC models are available if the above chambers do not meet your design parameters. Please contact our Technical Department for more information.

Shown L->R- Contactor 100HD, Recharger 150XLHD, Recharger 280HD, Recharger 330XLHD, and Recharger V8HD.

Minimum Fill Requirements

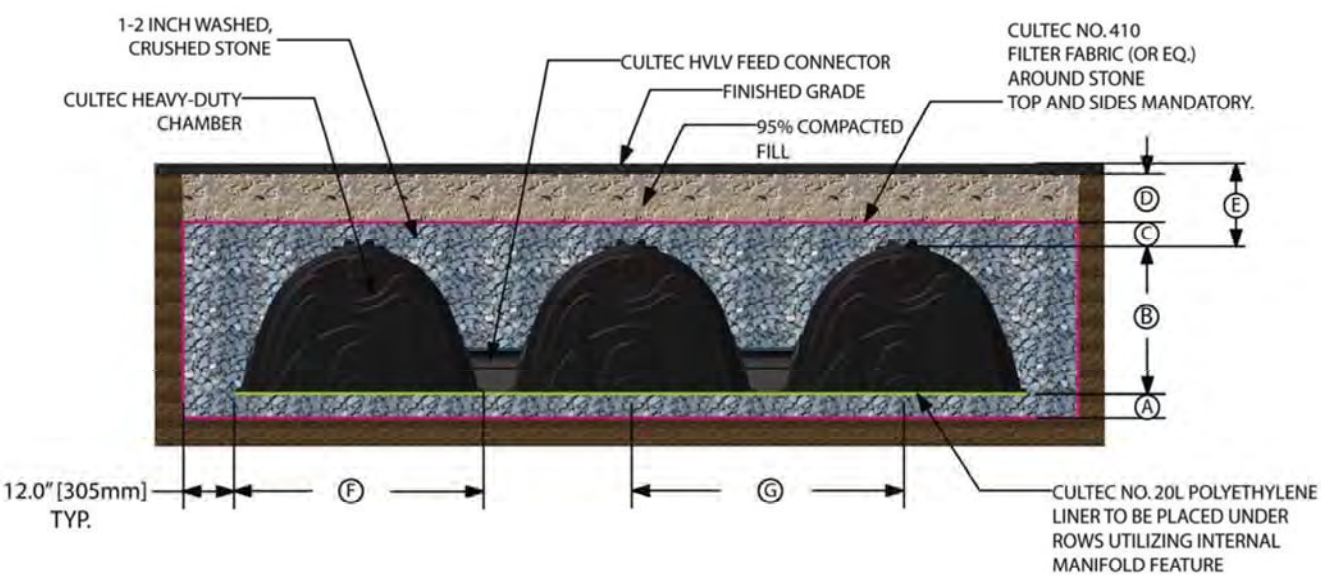
These requirements are for paved traffic applications only. If these models and design parameters do not meet your needs, please call CULTEC's Technical Department at 1-800-4-CULTEC, Ext. 2003 (1-800-428-5832, Ext. 2003) for further information and assistance.

Refer to CULTEC's most current installation instructions for further details including but not limited to acceptable fill materials and vehicle loads.

Table 1

	See Fig. 1	Contactor® 100HD	Recharger® 150XLHD	Recharger® 280HD	Recharger® 330XLHD	Recharger® V8HD
Typical Center to Center Spacing	G	3.33′ 1.02 m	3.25′ 0.99 m	4.33′ 1.32 m	4.83′ 1.47 m	5.5′ 1.68 m
Chamber width	F	36″ 914 mm	33″ 838 mm	47″ 1194 mm	52″ 1321 mm	60″ 1524 mm
Max. depth of cover allowed above crown of chamber	E	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m	12′ 3.66 m	8′ 2.44 m
Min. depth required of 95% Compacted Fill for Paved Traffic Application	D	8″ 203 mm	8″ 203 mm	8″ 203 mm	10″ 254 mm	12″ 305 mm
Min. depth of stone required above units for traffic applications	C	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm
Chamber height	B	12.5″ 318 mm	18.5″ 470 mm	26.5″ 673 mm	30.5″ 775 mm	32″ 813 mm
Min. depth of stone base	A	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm

Fig. 1

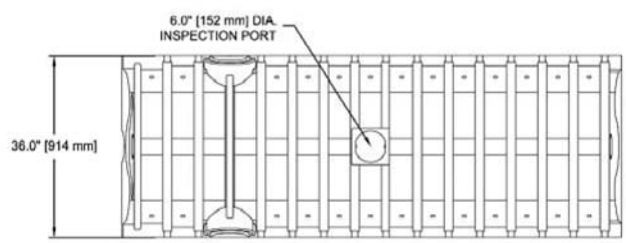


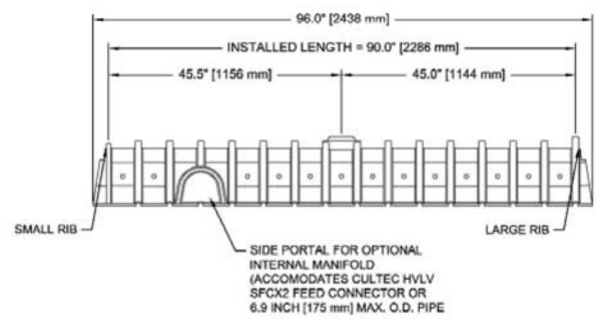
For more information, contact CULTEC at (203) 775-4416 or visit www.cultec.com.

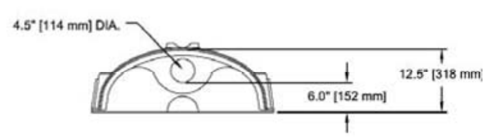
CULTEC Contactor® 100HD

The Contactor® 100HD is a 12.5" (318 mm) tall, low profile chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Contactor 100HD has the side portal internal manifold feature. The HVLV® SFCx2 Feed Connector is inserted into the side portal of the Contactor 100HD to create the internal manifold.

Size (L x W x H)	8' x 36" x 12.5" 2.44 m x 914 mm x 318 mm
Installed Length	7.5' 2.29 m
Length Adjustment per Run	0.5' 0.15 m
Chamber Storage	1.87 ft³/ft 0.17 m³/m 14.00 ft³/unit 0.40 m³/unit
Min. Installed Storage	3.84 ft³/ft 0.36 m³/m 28.81 ft³/unit 0.82 m³/unit
Min. Area Required	25 ft² 2.32 m²
Min. Center to Center Spacing	3.33' 1.02 m
Max. Allowable Cover	12' 3.66 m
Max. Inlet Opening in Endwall	10" 250 mm
Max. Allowable O.D. in Side Portal	6.9" 175 mm
Compatible Feed Connector	HVLV SFCx2 Feed Connector







	Stone Foundation Depth		
	6" 152 mm	12" 305 mm	18" 457 mm
Chamber and Stone Storage Per Chamber	28.81 ft³ 0.82 m³	33.81 ft³ 0.96 m³	38.81 ft³ 1.10 m³
Min. Effective Depth	2.04' 0.62 m	2.54' 0.77 m	3.04' 0.93 m
Stone Required Per Chamber	1.37 yd³ 1.05 m³	1.84 yd³ 1.40 m³	2.30 yd³ 1.76 m³

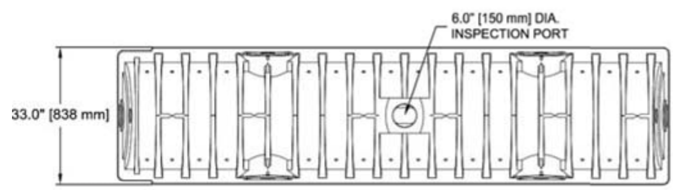
Scan for Contactor 100HD downloads

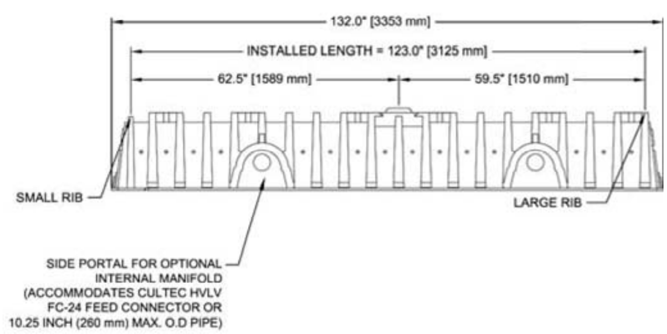
Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround.
Stone void calculated at 40%.

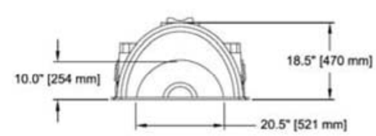
CULTEC Recharger® 150XLHD

The Recharger® 150XLHD is a 18.5" (470 mm) tall, lower profile chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Recharger® 150XLHD has the side portal internal manifold feature. HVLV® FC-24 Feed Connectors are inserted into the side portals to create the internal manifold.

Size (L x W x H)	11' x 33" x 18.5" 3.35 m x 838 mm x 470 mm
Installed Length	10.25' 3.12 m
Length Adjustment per Run	0.75' 0.23 m
Chamber Storage	2.65 ft^3/ft 0.25 m^3/m 27.16 ft^3/unit 0.77 m^3/unit
Min. Installed Storage	4.89 ft^3/ft 0.45 m^3/m 50.17 ft^3/unit 1.42 m^3/unit
Min. Area Required	33.31 ft^2 3.09 m^2
Min. Center to Center Spacing	3.25' 0.99 m
Max. Allowable Cover	12' 3.66 m
Max. Inlet Opening in Endwall	12" 300 mm
Max. Allowable O.D. in Side Portal	10.25" 260 mm
Compatible Feed Connector	HVLV FC-24 Feed Connector







	Stone Foundation Depth		
	6" 152 mm	12" 305 mm	18" 457 mm
Chamber and Stone Storage Per Chamber	50.17 ft^3 1.42 m^3	56.83 ft^3 1.61 m^3	63.49 ft^3 1.80 m^3
Min. Effective Depth	2.54' 0.77 m	3.04' 0.93 m	3.54' 1.08 m
Stone Required Per Chamber	2.13 yd^3 1.63 m^3	2.75 yd^3 2.10 m^3	3.36 yd^3 2.57 m^3

Scan for Recharger 150XLHD downloads

Calculations are based on installed chamber length.
Includes 6" (152 mm) stone above crown of chamber and typical stone surround.
Stone void calculated at 40%.

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

February 2, 2017

Stormwater Systems ACF-Convergent Water Technologies Alliance
23 Faith Drive
Gorham, ME 04038
ATTN: Robert Woodman and Scott Gorneau

Dear Mr. Woodman and Mr. Gorneau:

This letter replaces the May 16, 2016 approval from the Department of Environmental Protection (Department) that authorized the use of the FocalPoint system. The FocalPoint system (a high performance modular biofiltration system), when installed in series with a subsurface chamber-based treatment row, meets the requirements of the General Standards (Section 4.C.) of the Stormwater Management Rules (Chapter 500), provided that the system is filled with the FocalPoint engineered filter media; it is sized to meet the requirements of the General Standards (Section 4.B.); and it is installed, operated and maintained in accordance with the following provisions:

1. The FocalPoint system must be sized in accordance with the manufacturer's latest field test results with the goal of treating 90% of the annual runoff volume. To accomplish this, the system must be modelled in HydroCAD (or similar TR-55 modelling software) to demonstrate that the entire volume of a 0.95 inch Type III 24-hr storm is treated prior to activation of the bypass/overflow (typically set at 6" to 12" above the mulch surface). When sizing the FocalPoint system to meet Chapter 500, note that runoff from the entire contributing drainage area, including pervious areas, must be included in the modeled runoff values.

2. The surface area of the media within the FocalPoint must be a minimum of 174 square feet per 1 acre of impervious area treated (26 sq. ft. per 0.15 acres). The thickness of the media is to be no less than 1.5 ft. (18 inches) and the ratio of the surface area of the filter media bed in square feet to the ponding volume in cubic feet must be no less than 1 to 5.

3. The FocalPoint system consists of five components that include: 1) an open cell underdrain; 2) a wide aperture separation mesh wrap around the underdrain; 3) a layer of clean washed, 3/8" diameter bridging stone; 4) advanced high flow rate engineered media with an infiltration rate of 100 inches per hour; and 5) double shredded hardwood mulch. These components are built from the bottom up to create a mostly permeable profile that measures 3 feet from bottom of underdrain to top of mulch. The ponding

depth above the mulch surface is typically 6 to 12 inches and varies based on site conditions. An overflow outlet should be placed above the ponding depth.

4. The FocalPoint system requires the establishment of vegetation that is tolerant of wet and dry conditions. Plants that are not performing as desired should be replaced as needed. A list of appropriate plants for use in the FocalPoint system is provided at: http://www.acfenvironmental.com/products/stormwater-management/filtration/focal-point/.

5. The FocalPoint biofiltration system must be placed in-line with a subsurface chamber-based treatment row that is approved by the Department such that both the treated discharge and the bypass discharge from the FocalPoint system drain to the treatment row. The treatment row must be sized to treat the peak flow from a 1-year, 24-hour storm event. The treatment row structure must be continuous and without obstacle for cleaning, and must have access at both ends for the removal of accumulated sediment and debris. The treatment row must be underlain with a bottom surface consisting of 2 layers of woven geotextile (e.g., ACF S300) that extends 18 to 24 inches beyond all sides of the bottom of the structure.

6. Additional storage downstream of the FocalPoint and treatment row will be required to store at least the sum of 1.0 inch of runoff from the impervious areas and 0.4 inches of runoff from the lawn and landscaped areas that drain to the system unless attenuation of the channel protection volume is not required (i.e. direct discharge to a lake, tidal waters, or a major river). An external outlet control structure must control the flow out of a downstream storage system, sized for the entire channel protection volume, and drain in no less than 24 hours or more than 48 hours.

7. If required for flooding control, the storage system can be sized to provide for the storage and release of the peak flow with a regulated flow rate from 24-hour storms of the 2, 10, and 25-year frequencies such that the peak flows from the project site do not exceed the peak flow prior to undertaking the project.

8. The applicant must demonstrate that the design meets all the manufacturer's specifications and shall be reviewed by the manufacturer prior to submission to the Department for approval. Review and approval of the design by the manufacturer will be sufficient to demonstrate conformance with the manufacturer's specifications. The FocalPoint system must be installed by a manufacturer's certified installer or under the supervision of a manufacturer's representative.

9. Components of the system that are delivered in bulk (i.e., mulch, high flow media and clean washed bridging stone), should be contained in nylon super sacks to promote ease of storage and protection during on-site construction activities.

10. The FocalPoint and treatment row system should be inspected and maintained if necessary at least once every six months to maintain the established efficiency for pollutant removal. Prior to construction, a five-year binding inspection and maintenance contract must be provided prior to the Department for review and approval, and must be renewed before contract expiration. The contract will be with a professional with knowledge of erosion and stormwater control, including experience with the proposed system.

11. The overall stormwater management design must meet all Department criteria and sizing specifications and will be reviewed and approved by the Department prior to use.

12. This approval is conditional on full-scale, cold climate field testing results, performed in accordance with the Department's protocols, confirming that the pollutant removal efficiency and sizing of the FocalPoint system are appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if, with proper maintenance, pollutant removals do not satisfy the General Standard Best Management Practices.

Questions concerning this decision should be directed to David Waddell at (207) 215-6932 or Jeff Dennis at (207) 215-6376.

Sincerely,

Mark R Bergeron

Mark Bergeron, P.E.
Director
Bureau of Land Resources

cc: Don Witherill, Maine DEP

ACF Environmental
2831 Cardwell Rd
Richmond, VA 23234

Engineer of Record

January 10, 2018

SUBJECT: Plan Review and Construction Oversight Commitment

Dear Chris,

Thank you for forwarding the preliminary plans for the OceanView @ Cumberland Expansion project in Cumberland, ME to ACF environmental for review of the proposed FocalPoint biofiltration system.

Our team has reviewed the plans and take no exceptions to the location and application of the FocalPoint system for this project.

It appears that the system has been designed in accordance with the design criteria set forth by Maine DEP in the May 16, 2016 FocalPoint system approval letter and meets the system's specifications etc.

Upon completion of your detail sheet we would be happy to review that also.

With regard to the installation, ACF Environmental will host a preconstruction meeting with the site contractor and will be on-site during the entire installation to ensure that the installation is being conducted in accordance with our standard installation procedures.

ACF Environmental will also provide the first year's maintenance on the FocalPoint bed area.

Please review and contact me with any questions from your office.

We look forward to working with you on this project.

Sincerely,

W. Scott Gorneau, P.E.
National Manager – Stormwater Systems
ACF-Convergent Alliance

cc: Rob Woodman, P.E., Senior Stormwater Engineer, ACF Environmental

MARK HAMPTON ASSOCIATES, INC.

SOIL EVALUATION • WETLAND DELINEATIONS • SOIL SURVEYS • WETLAND PERMITTING

4674

January 4, 2018

Mr. Rick Licht
Licht Environmental Design LLC
35 Fran Circle
Gray, ME 04039

Re: Soil Evaluation, Proposed Stormwater Devices, Oceanview at Cumberland, Cumberland, ME

Dear Rick,

I completed a soil evaluation for the proposed stormwater treatment program for development activities for the proposed Oceanview at Cumberland project Cumberland, ME. The soil evaluation was conducted in accordance with the Maine Subsurface Wastewater Disposal Rules dated August 2015, as amended. I evaluated two backhoe excavated soil test pits in each of both stormwater treatment ponds. The soils found on the parcel are moderately well drained marine lacustrine soils. There is a seasonal high watertable at approximately 14 and 28 inches, respectively. There was no observed groundwater table in either of the soil test pits. The soil test pit log descriptions are attached.

If you have any questions or require additional information, please contact me.

Sincerely,

Mark J. Hampton L.S.E., C.S.S.
Licensed Site Evaluator #263
Certified Soil Scientist #216

P.O. BOX 1931 • PORTLAND, ME 04104-1931 • 207-756-2900 • mhampto1@maine.rr.com

Quality services that meet your deadline

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FORM F Rev. 07/11

SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name: Oceanview at Cumberland

Applicant Name: Seacoast Management Company

Project Location (municipality): Cumberland

Exploration Symbol # STW-1

☒ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

Pond 1 ____ " Depth of exploration or to refusal

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Redox Features
0	Fine sandy loam	Friable	Dark Brown	
10	fine sandy loam	Friable	Brown	
20–30	silty clay loam	Firm	olive gray	Common & Distinct
40–50	silty clay	Firm to very Firm	gray	
~~60~~ 180				

Soil Details by S.E.

Soil Classification: Profile	Condition	Slope: Percent	Limiting Factor: Depth	
8	D	6	14 "	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

S.S. Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic Soil Group: D

Exploration Symbol # STW-2

☒ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

Pond 2 ____ " Depth of exploration or to refusal

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Redox Features
0	fine sandy loam	Friable	Dark Brown	
10–20	fine sandy loam	Friable	Brown	
30	silty clay loam	Firm	Gray	Common Distinct
~~40~~ 96–50	fine sandy loam to silty clay	Firm	Gray	
~~60~~ 140				

Soil Details by S.E.

Soil Classification: Profile	Condition	Slope: Percent	Limiting Factor: Depth	
8	C	6	28 "	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

S.S. Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic Soil Group: D

Exploration Symbol # ____

☐ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

____ " Depth of exploration or to refusal

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Redox Features
0				
10				
20				
30				
40				
50				
60				

Soil Details by S.E.: Soil Classification ____ Profile ____ Condition; Slope ____ Percent; Limiting Factor ____ " Depth ☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

S.S. Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic ____ Soil Group

Exploration Symbol # ____

☐ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

____ " Depth of exploration or to refusal

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Redox Features
0				
10				
20				
30				
40				
50				
60				

Soil Details by S.E.: Soil Classification ____ Profile ____ Condition; Slope ____ Percent; Limiting Factor ____ " Depth ☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

S.S. Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic ____ Soil Group

INVESTIGATOR INFORMATION AND SIGNATURE

Signature: Marc J. Hampton

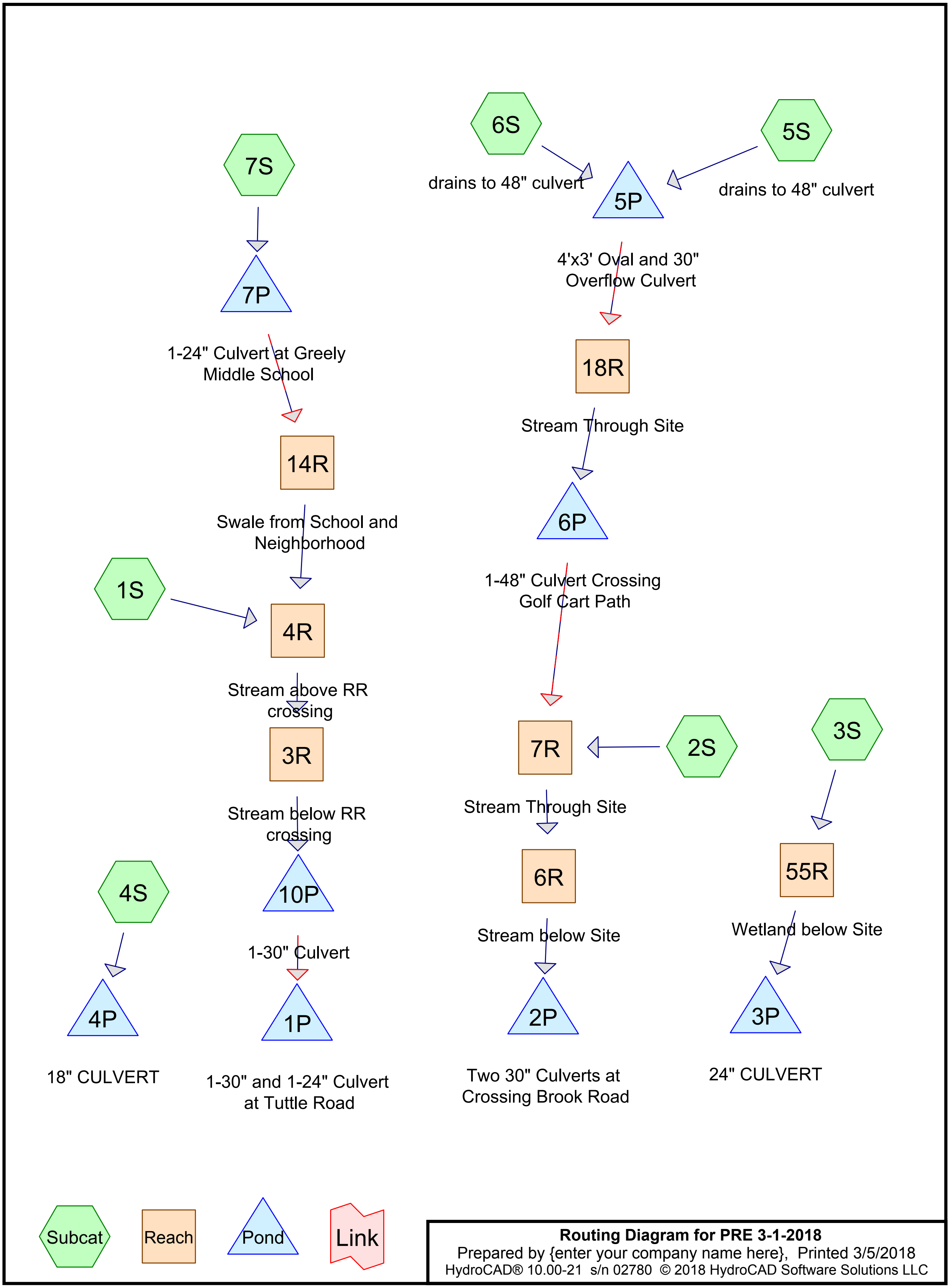
Date: 1/3/18

Name Printed: MARC J. Hampton

Cert/Lic/Reg. #: 263/216

Title: ☒ Licensed Site Evaluator ☒ Certified Soil Scientist ☐ Certified Geologist ☐ Professional Engineer

affix professional seal



Routing Diagram for PRE 3-1-2018
Prepared by {enter your company name here}, Printed 3/5/2018
HydroCAD® 10.00-21 s/n 02780 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
94.000	98	EXISTING IMPERVIOUS AREA (1S, 2S, 4S, 5S, 6S, 7S)
147.000	74	EXISTING LAWN C (1S, 2S, 3S, 4S, 5S, 6S, 7S)
192.310	70	WOODS / FIELD HSG C (1S, 2S, 3S, 4S, 5S, 6S)
433.310	**77**	**TOTAL AREA**

Summary for Subcatchment 1S:

Runoff = 48.56 cfs @ 12.85 hrs, Volume= 8.142 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	57.000	70	WOODS / FIELD HSG C
*	19.000	98	EXISTING IMPERVIOUS AREA
*	25.000	74	EXISTING LAWN C
	101.000	76	Weighted Average
	82.000		81.19% Pervious Area
	19.000		18.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 45.47 cfs @ 12.74 hrs, Volume= 6.986 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	43.310	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
	86.310	76	Weighted Average
	73.310		84.94% Pervious Area
	13.000		15.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 14.23 cfs @ 12.68 hrs, Volume= 2.156 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	34.000	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
	38.000	70	Weighted Average
	38.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
43.8	550	Total			

Summary for Subcatchment 4S:

Runoff = 5.49 cfs @ 12.86 hrs, Volume= 0.935 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 46.40 cfs @ 13.55 hrs, Volume= 11.467 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 54.10 cfs @ 12.54 hrs, Volume= 6.986 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 19.44 cfs @ 12.12 hrs, Volume= 1.427 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Reach 3R: Stream below RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 0.94" for 2 YEAR event
Inflow = 48.80 cfs @ 12.87 hrs, Volume= 8.797 af
Outflow = 48.66 cfs @ 12.95 hrs, Volume= 8.745 af, Atten= 0%, Lag= 4.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.23 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 2.61 fps, Avg. Travel Time= 5.5 min

Peak Storage= 8,009 cf @ 12.90 hrs
Average Depth at Peak Storage= 1.28'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 373.38 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 860.0' Slope= 0.0116 '/'
Inlet Invert= 82.00', Outlet Invert= 72.00'

Summary for Reach 4R: Stream above RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 0.94" for 2 YEAR event
Inflow = 48.88 cfs @ 12.85 hrs, Volume= 8.810 af
Outflow = 48.80 cfs @ 12.87 hrs, Volume= 8.797 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.97 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1,966 cf @ 12.86 hrs
Average Depth at Peak Storage= 1.34'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 346.26 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 84.00', Outlet Invert= 82.00'

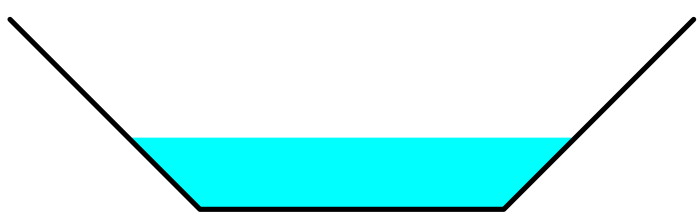
Summary for Reach 6R: Stream below Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 1.09" for 2 YEAR event
Inflow = 94.39 cfs @ 13.05 hrs, Volume= 24.448 af
Outflow = 94.20 cfs @ 13.10 hrs, Volume= 24.384 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.06 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.96 fps, Avg. Travel Time= 2.5 min

Peak Storage= 8,394 cf @ 13.07 hrs
Average Depth at Peak Storage= 1.89'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'



Summary for Reach 7R: Stream Through Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 1.09" for 2 YEAR event
Inflow = 94.57 cfs @ 12.98 hrs, Volume= 24.550 af
Outflow = 94.39 cfs @ 13.05 hrs, Volume= 24.448 af, Atten= 0%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.90 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 4.54 fps, Avg. Travel Time= 4.0 min

Peak Storage= 13,154 cf @ 13.01 hrs
Average Depth at Peak Storage= 1.29'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 0.85" for 2 YEAR event
Inflow = 1.21 cfs @ 14.58 hrs, Volume= 0.776 af
Outflow = 1.21 cfs @ 15.70 hrs, Volume= 0.668 af, Atten= 0%, Lag= 67.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.54 fps, Min. Travel Time= 36.4 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 47.8 min

Peak Storage= 2,643 cf @ 15.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'

Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 1.16" for 2 YEAR event
Inflow = 67.65 cfs @ 12.77 hrs, Volume= 17.762 af
Outflow = 66.47 cfs @ 12.89 hrs, Volume= 17.661 af, Atten= 2%, Lag= 7.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.18 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 3.42 fps, Avg. Travel Time= 5.8 min

Peak Storage= 12,911 cf @ 12.83 hrs
Average Depth at Peak Storage= 1.17'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site

Inflow Area = 38.000 ac, 0.00% Impervious, Inflow Depth > 0.68" for 2 YEAR event
Inflow = 14.23 cfs @ 12.68 hrs, Volume= 2.156 af
Outflow = 14.17 cfs @ 12.76 hrs, Volume= 2.143 af, Atten= 0%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.69 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 5.5 min

Peak Storage= 2,367 cf @ 12.71 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 0.92" for 2 YEAR event
Inflow = 38.99 cfs @ 13.29 hrs, Volume= 8.571 af
Outflow = 38.34 cfs @ 13.37 hrs, Volume= 8.561 af, Atten= 2%, Lag= 5.1 min
Primary = 38.34 cfs @ 13.37 hrs, Volume= 8.561 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 69.82' @ 13.37 hrs Surf.Area= 5,442 sf Storage= 8,451 cf

Plug-Flow detention time= 3.2 min calculated for 8.532 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (890.4 - 887.5)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=38.29 cfs @ 13.37 hrs HW=69.82' (Free Discharge)
1=Culvert (Inlet Controls 24.59 cfs @ 5.18 fps)
2=Culvert (Inlet Controls 13.70 cfs @ 4.36 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=68.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 1.08" for 2 YEAR event
Inflow = 94.20 cfs @ 13.10 hrs, Volume= 24.384 af
Outflow = 55.70 cfs @ 14.58 hrs, Volume= 22.669 af, Atten= 41%, Lag= 88.8 min
Primary = 55.70 cfs @ 14.58 hrs, Volume= 22.669 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 47.62' @ 14.58 hrs Surf.Area= 96,190 sf Storage= 282,628 cf

Plug-Flow detention time= 75.6 min calculated for 22.594 af (93% of inflow)
Center-of-Mass det. time= 56.5 min (947.0 - 890.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=55.70 cfs @ 14.58 hrs HW=47.62' (Free Discharge)
1=Culvert (Inlet Controls 36.38 cfs @ 7.41 fps)
2=Culvert (Inlet Controls 19.33 cfs @ 6.15 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3P: 24" CULVERT

Inflow Area =	38.000 ac,	0.00% Impervious, Inflow Depth > 0.68" for 2 YEAR event		
Inflow =	14.17 cfs @	12.76 hrs, Volume=	2.143 af	
Outflow =	12.99 cfs @	12.91 hrs, Volume=	2.117 af,	Atten= 8%, Lag= 9.3 min
Primary =	12.99 cfs @	12.91 hrs, Volume=	2.117 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 55.74' @ 12.91 hrs Surf.Area= 6,379 sf Storage= 7,586 cf

Plug-Flow detention time= 12.2 min calculated for 2.117 af (99% of inflow)

Center-of-Mass det. time= 8.2 min (871.4 - 863.2)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=12.97 cfs @ 12.91 hrs HW=55.73' (Free Discharge)
1=Culvert (Inlet Controls 12.97 cfs @ 4.48 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=54.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 0.86" for 2 YEAR event
Inflow = 5.49 cfs @ 12.86 hrs, Volume= 0.935 af
Outflow = 4.55 cfs @ 13.16 hrs, Volume= 0.910 af, Atten= 17%, Lag= 17.9 min
Primary = 4.55 cfs @ 13.16 hrs, Volume= 0.910 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 86.04' @ 13.16 hrs Surf.Area= 8,631 sf Storage= 6,225 cf

Plug-Flow detention time= 28.3 min calculated for 0.910 af (97% of inflow)
Center-of-Mass det. time= 19.6 min (879.1 - 859.5)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=4.54 cfs @ 13.16 hrs HW=86.04' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.54 cfs @ 3.47 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=85.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 1.20" for 2 YEAR event
Inflow = 69.48 cfs @ 12.62 hrs, Volume= 18.453 af
Outflow = 67.65 cfs @ 12.77 hrs, Volume= 17.762 af, Atten= 3%, Lag= 8.9 min
Primary = 38.36 cfs @ 12.77 hrs, Volume= 14.947 af
Secondary = 29.29 cfs @ 12.77 hrs, Volume= 2.815 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 137.32' @ 12.77 hrs Surf.Area= 17,956 sf Storage= 84,792 cf

Plug-Flow detention time= 32.4 min calculated for 17.762 af (96% of inflow)
Center-of-Mass det. time= 20.7 min (884.6 - 863.8)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=38.34 cfs @ 12.77 hrs HW=137.31' (Free Discharge)
├─**1=Culvert** (Barrel Controls 0.72 cfs @ 10.76 fps)
└─**2=Culvert** (Inlet Controls 37.62 cfs @ 7.66 fps)

Secondary OutFlow Max=28.51 cfs @ 12.77 hrs HW=137.31' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 28.51 cfs @ 1.51 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 1.15" for 2 YEAR event
Inflow = 66.47 cfs @ 12.89 hrs, Volume= 17.661 af
Outflow = 61.46 cfs @ 13.39 hrs, Volume= 17.564 af, Atten= 8%, Lag= 30.1 min
Primary = 61.46 cfs @ 13.39 hrs, Volume= 17.564 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 99.06' @ 13.39 hrs Surf.Area= 22,689 sf Storage= 35,702 cf

Plug-Flow detention time= 9.2 min calculated for 17.564 af (99% of inflow)
Center-of-Mass det. time= 7.5 min (897.8 - 890.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=61.45 cfs @ 13.39 hrs HW=99.06' (Free Discharge)
└─**1=Culvert** (Inlet Controls 61.45 cfs @ 5.96 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=96.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 1.56" for 2 YEAR event
Inflow = 19.44 cfs @ 12.12 hrs, Volume= 1.427 af
Outflow = 1.21 cfs @ 14.58 hrs, Volume= 0.776 af, Atten= 94%, Lag= 147.2 min
Primary = 1.21 cfs @ 14.58 hrs, Volume= 0.776 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.90' @ 14.58 hrs Surf.Area= 21,586 sf Storage= 38,151 cf

Plug-Flow detention time= 238.2 min calculated for 0.776 af (54% of inflow)
Center-of-Mass det. time= 158.6 min (952.3 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.21 cfs @ 14.58 hrs HW=121.90' (Free Discharge)
└─**1=Culvert** (Passes 1.21 cfs of 14.46 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.21 cfs @ 6.18 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 0.94" for 2 YEAR event
Inflow = 48.66 cfs @ 12.95 hrs, Volume= 8.745 af
Outflow = 38.99 cfs @ 13.29 hrs, Volume= 8.571 af, Atten= 20%, Lag= 20.3 min
Primary = 33.00 cfs @ 13.29 hrs, Volume= 8.374 af
Secondary = 6.00 cfs @ 13.29 hrs, Volume= 0.198 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.20' @ 13.29 hrs Surf.Area= 39,042 sf Storage= 54,494 cf

Plug-Flow detention time= 22.7 min calculated for 8.571 af (98% of inflow)
Center-of-Mass det. time= 16.4 min (887.5 - 871.1)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=32.99 cfs @ 13.29 hrs HW=71.20' (Free Discharge)
└**1=Culvert** (Inlet Controls 32.99 cfs @ 6.72 fps)

Secondary OutFlow Max=5.91 cfs @ 13.29 hrs HW=71.20' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 5.91 cfs @ 1.19 fps)

Summary for Subcatchment 1S:

Runoff = 103.11 cfs @ 12.82 hrs, Volume= 16.897 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	57.000	70	WOODS / FIELD HSG C
*	19.000	98	EXISTING IMPERVIOUS AREA
*	25.000	74	EXISTING LAWN C
	101.000	76	Weighted Average
	82.000		81.19% Pervious Area
	19.000		18.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 96.37 cfs @ 12.71 hrs, Volume= 14.488 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	43.310	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
	86.310	76	Weighted Average
	73.310		84.94% Pervious Area
	13.000		15.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 35.35 cfs @ 12.63 hrs, Volume= 4.992 af, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	34.000	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
	38.000	70	Weighted Average
	38.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
43.8	550	Total			

Summary for Subcatchment 4S:

Runoff = 12.23 cfs @ 12.83 hrs, Volume= 2.009 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 91.32 cfs @ 13.48 hrs, Volume= 22.409 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 103.57 cfs @ 12.52 hrs, Volume= 13.387 af, Depth> 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 34.68 cfs @ 12.12 hrs, Volume= 2.580 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Reach 3R: Stream below RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 1.92" for 10 YEAR event
Inflow = 103.92 cfs @ 12.83 hrs, Volume= 17.894 af
Outflow = 103.64 cfs @ 12.89 hrs, Volume= 17.823 af, Atten= 0%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.56 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 3.01 fps, Avg. Travel Time= 4.8 min

Peak Storage= 13,594 cf @ 12.86 hrs
Average Depth at Peak Storage= 1.98'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 373.38 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 860.0' Slope= 0.0116 '/'
Inlet Invert= 82.00', Outlet Invert= 72.00'

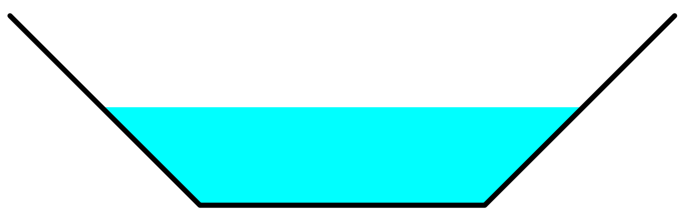
Summary for Reach 4R: Stream above RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 1.92" for 10 YEAR event
Inflow = 103.98 cfs @ 12.82 hrs, Volume= 17.912 af
Outflow = 103.92 cfs @ 12.83 hrs, Volume= 17.894 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.22 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.84 fps, Avg. Travel Time= 1.2 min

Peak Storage= 3,341 cf @ 12.82 hrs
Average Depth at Peak Storage= 2.07'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 346.26 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 84.00', Outlet Invert= 82.00'



Summary for Reach 6R: Stream below Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 2.18" for 10 YEAR event
Inflow = 194.64 cfs @ 12.87 hrs, Volume= 49.063 af
Outflow = 194.34 cfs @ 12.91 hrs, Volume= 48.974 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.27 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.41 fps, Avg. Travel Time= 2.2 min

Peak Storage= 13,965 cf @ 12.89 hrs
Average Depth at Peak Storage= 2.86'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 2.18" for 10 YEAR event
Inflow = 194.97 cfs @ 12.82 hrs, Volume= 49.203 af
Outflow = 194.64 cfs @ 12.87 hrs, Volume= 49.063 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.93 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 5.27 fps, Avg. Travel Time= 3.5 min

Peak Storage= 21,590 cf @ 12.84 hrs
Average Depth at Peak Storage= 1.97'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

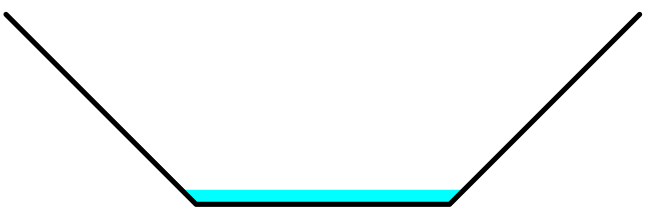
Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 1.26" for 10 YEAR event
Inflow = 1.70 cfs @ 15.15 hrs, Volume= 1.156 af
Outflow = 1.70 cfs @ 16.05 hrs, Volume= 1.014 af, Atten= 0%, Lag= 53.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.75 fps, Min. Travel Time= 32.1 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 44.3 min

Peak Storage= 3,268 cf @ 15.51 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'



Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 2.28" for 10 YEAR event
Inflow = 137.41 cfs @ 12.64 hrs, Volume= 35.006 af
Outflow = 137.06 cfs @ 12.71 hrs, Volume= 34.868 af, Atten= 0%, Lag= 4.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.79 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 3.99 fps, Avg. Travel Time= 5.0 min

Peak Storage= 21,119 cf @ 12.67 hrs
Average Depth at Peak Storage= 1.80'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site

Inflow Area = 38.000 ac, 0.00% Impervious, Inflow Depth > 1.58" for 10 YEAR event
Inflow = 35.35 cfs @ 12.63 hrs, Volume= 4.992 af
Outflow = 35.23 cfs @ 12.69 hrs, Volume= 4.973 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 4.4 min

Peak Storage= 4,298 cf @ 12.66 hrs
Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 1.88" for 10 YEAR event
Inflow = 96.89 cfs @ 13.07 hrs, Volume= 17.582 af
Outflow = 96.83 cfs @ 13.08 hrs, Volume= 17.553 af, Atten= 0%, Lag= 0.8 min
Primary = 59.10 cfs @ 13.08 hrs, Volume= 15.691 af
Secondary = 37.73 cfs @ 13.08 hrs, Volume= 1.863 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.43' @ 13.08 hrs Surf.Area= 7,170 sf Storage= 18,562 cf

Plug-Flow detention time= 3.5 min calculated for 17.553 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (870.4 - 867.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=59.09 cfs @ 13.08 hrs HW=71.43' (Free Discharge)
1=Culvert (Inlet Controls 38.67 cfs @ 7.88 fps)
2=Culvert (Inlet Controls 20.43 cfs @ 6.50 fps)

Secondary OutFlow Max=37.55 cfs @ 13.08 hrs HW=71.43' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 37.55 cfs @ 1.76 fps)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 2.17" for 10 YEAR event
Inflow = 194.34 cfs @ 12.91 hrs, Volume= 48.974 af
Outflow = 89.77 cfs @ 14.98 hrs, Volume= 45.181 af, Atten= 54%, Lag= 124.2 min
Primary = 89.77 cfs @ 14.98 hrs, Volume= 45.181 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 51.53' @ 14.98 hrs Surf.Area= 150,666 sf Storage= 747,506 cf

Plug-Flow detention time= 107.9 min calculated for 45.181 af (92% of inflow)
Center-of-Mass det. time= 86.2 min (959.0 - 872.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=89.77 cfs @ 14.98 hrs HW=51.53' (Free Discharge)
1=Culvert (Inlet Controls 59.24 cfs @ 12.07 fps)
2=Culvert (Inlet Controls 30.52 cfs @ 9.72 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3P: 24" CULVERT

Inflow Area =	38.000 ac,	0.00% Impervious, Inflow Depth > 1.57"	for 10 YEAR event
Inflow =	35.23 cfs @	12.69 hrs, Volume=	4.973 af
Outflow =	26.68 cfs @	12.99 hrs, Volume=	4.935 af, Atten= 24%, Lag= 18.0 min
Primary =	26.68 cfs @	12.99 hrs, Volume=	4.935 af
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 58.11' @ 12.99 hrs Surf.Area= 10,558 sf Storage= 27,489 cf

Plug-Flow detention time= 13.2 min calculated for 4.918 af (99% of inflow)

Center-of-Mass det. time= 10.5 min (854.3 - 843.8)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=26.68 cfs @ 12.99 hrs HW=58.11' (Free Discharge)
└─**1=Culvert** (Inlet Controls 26.68 cfs @ 8.49 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=54.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: 18" CULVERT

Inflow Area =	13.000 ac,	7.69% Impervious,	Inflow Depth > 1.85"	for 10 YEAR event
Inflow =	12.23 cfs @	12.83 hrs, Volume=	2.009 af	
Outflow =	8.95 cfs @	13.22 hrs, Volume=	1.973 af,	Atten= 27%, Lag= 23.6 min
Primary =	8.95 cfs @	13.22 hrs, Volume=	1.973 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 86.86' @ 13.22 hrs Surf.Area= 13,049 sf Storage= 15,074 cf

Plug-Flow detention time= 26.6 min calculated for 1.973 af (98% of inflow)
Center-of-Mass det. time= 20.5 min (864.1 - 843.6)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=8.95 cfs @ 13.22 hrs HW=86.86' (Free Discharge)
└─**1=Culvert** (Inlet Controls 8.95 cfs @ 5.06 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=85.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 2.33" for 10 YEAR event
Inflow = 137.73 cfs @ 12.61 hrs, Volume= 35.796 af
Outflow = 137.41 cfs @ 12.64 hrs, Volume= 35.006 af, Atten= 0%, Lag= 1.8 min
Primary = 40.18 cfs @ 12.64 hrs, Volume= 20.895 af
Secondary = 97.23 cfs @ 12.64 hrs, Volume= 14.111 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 137.72' @ 12.64 hrs Surf.Area= 19,152 sf Storage= 92,199 cf

Plug-Flow detention time= 22.3 min calculated for 34.889 af (97% of inflow)
Center-of-Mass det. time= 15.2 min (865.6 - 850.5)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=40.17 cfs @ 12.64 hrs HW=137.72' (Free Discharge)
1=Culvert (Barrel Controls 0.74 cfs @ 10.99 fps)
2=Culvert (Inlet Controls 39.44 cfs @ 8.03 fps)

Secondary OutFlow Max=96.98 cfs @ 12.64 hrs HW=137.72' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 96.98 cfs @ 2.26 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 2.27" for 10 YEAR event
Inflow = 137.06 cfs @ 12.71 hrs, Volume= 34.868 af
Outflow = 115.80 cfs @ 13.58 hrs, Volume= 34.715 af, Atten= 16%, Lag= 51.8 min
Primary = 115.80 cfs @ 13.58 hrs, Volume= 34.715 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 101.66' @ 13.58 hrs Surf.Area= 38,314 sf Storage= 117,247 cf

Plug-Flow detention time= 12.5 min calculated for 34.599 af (99% of inflow)
Center-of-Mass det. time= 11.1 min (881.4 - 870.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=115.79 cfs @ 13.58 hrs HW=101.66' (Free Discharge)
1=Culvert (Inlet Controls 115.79 cfs @ 9.21 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=96.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area =	11.000 ac,	45.45% Impervious,	Inflow Depth > 2.81"	for 10 YEAR event
Inflow =	34.68 cfs @	12.12 hrs,	Volume=	2.580 af
Outflow =	1.70 cfs @	15.15 hrs,	Volume=	1.156 af, Atten= 95%, Lag= 181.6 min
Primary =	1.70 cfs @	15.15 hrs,	Volume=	1.156 af
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 123.47' @ 15.15 hrs Surf.Area= 24,239 sf Storage= 74,205 cf

Plug-Flow detention time= 249.6 min calculated for 1.156 af (45% of inflow)
Center-of-Mass det. time= 162.9 min (942.8 - 780.0)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.70 cfs @ 15.15 hrs HW=123.47' (Free Discharge)
└─**1=Culvert** (Passes 1.70 cfs of 23.79 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.70 cfs @ 8.64 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area =	112.000 ac,	21.43% Impervious,	Inflow Depth > 1.91"	for 10 YEAR event
Inflow =	103.64 cfs @	12.89 hrs,	Volume=	17.823 af
Outflow =	96.89 cfs @	13.07 hrs,	Volume=	17.582 af, Atten= 7%, Lag= 10.4 min
Primary =	38.63 cfs @	13.07 hrs,	Volume=	13.364 af
Secondary =	58.26 cfs @	13.07 hrs,	Volume=	4.218 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.92' @ 13.07 hrs Surf.Area= 53,867 sf Storage= 88,051 cf

Plug-Flow detention time= 19.5 min calculated for 17.582 af (99% of inflow)
Center-of-Mass det. time= 15.0 min (867.4 - 852.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=38.62 cfs @ 13.07 hrs HW=71.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 38.62 cfs @ 7.87 fps)

Secondary OutFlow Max=58.10 cfs @ 13.07 hrs HW=71.92' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 58.10 cfs @ 2.53 fps)

Summary for Subcatchment 1S:

Runoff = 150.79 cfs @ 12.80 hrs, Volume= 24.710 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	57.000	70	WOODS / FIELD HSG C
*	19.000	98	EXISTING IMPERVIOUS AREA
*	25.000	74	EXISTING LAWN C
	101.000	76	Weighted Average
	82.000		81.19% Pervious Area
	19.000		18.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 140.81 cfs @ 12.69 hrs, Volume= 21.182 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	43.310	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
	86.310	76	Weighted Average
	73.310		84.94% Pervious Area
	13.000		15.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 54.85 cfs @ 12.62 hrs, Volume= 7.643 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	34.000	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
	38.000	70	Weighted Average
	38.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
43.8	550	Total			

Summary for Subcatchment 4S:

Runoff = 18.21 cfs @ 12.81 hrs, Volume= 2.982 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 129.65 cfs @ 13.46 hrs, Volume= 31.922 af, Depth> 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 145.08 cfs @ 12.51 hrs, Volume= 18.906 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 47.09 cfs @ 12.12 hrs, Volume= 3.550 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Reach 3R: Stream below RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 2.78" for 25 YEAR event
Inflow = 151.93 cfs @ 12.81 hrs, Volume= 25.940 af
Outflow = 151.56 cfs @ 12.87 hrs, Volume= 25.855 af, Atten= 0%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.32 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 3.26 fps, Avg. Travel Time= 4.4 min

Peak Storage= 17,836 cf @ 12.84 hrs
Average Depth at Peak Storage= 2.45'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 373.38 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 860.0' Slope= 0.0116 '/'
Inlet Invert= 82.00', Outlet Invert= 72.00'

Summary for Reach 4R: Stream above RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 2.78" for 25 YEAR event
Inflow = 151.98 cfs @ 12.80 hrs, Volume= 25.961 af
Outflow = 151.93 cfs @ 12.81 hrs, Volume= 25.940 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.93 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.07 fps, Avg. Travel Time= 1.1 min

Peak Storage= 4,386 cf @ 12.81 hrs
Average Depth at Peak Storage= 2.56'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 346.26 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 84.00', Outlet Invert= 82.00'

Summary for Reach 6R: Stream below Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 3.13" for 25 YEAR event
Inflow = 265.65 cfs @ 12.84 hrs, Volume= 70.607 af
Outflow = 265.34 cfs @ 12.87 hrs, Volume= 70.499 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.84 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 3.69 fps, Avg. Travel Time= 2.0 min

Peak Storage= 17,462 cf @ 12.85 hrs
Average Depth at Peak Storage= 3.40'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 3.14" for 25 YEAR event
Inflow = 266.10 cfs @ 12.78 hrs, Volume= 70.776 af
Outflow = 265.65 cfs @ 12.84 hrs, Volume= 70.607 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.90 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 5.72 fps, Avg. Travel Time= 3.2 min

Peak Storage= 26,847 cf @ 12.81 hrs
Average Depth at Peak Storage= 2.36'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 1.54" for 25 YEAR event
Inflow = 2.00 cfs @ 15.48 hrs, Volume= 1.411 af
Outflow = 2.00 cfs @ 16.31 hrs, Volume= 1.251 af, Atten= 0%, Lag= 49.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 30.3 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 42.6 min

Peak Storage= 3,624 cf @ 15.80 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'

Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 3.26" for 25 YEAR event
Inflow = 195.61 cfs @ 12.62 hrs, Volume= 49.959 af
Outflow = 195.00 cfs @ 12.69 hrs, Volume= 49.794 af, Atten= 0%, Lag= 4.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.68 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 4.33 fps, Avg. Travel Time= 4.6 min

Peak Storage= 26,999 cf @ 12.65 hrs
Average Depth at Peak Storage= 2.20'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site

Inflow Area = 38.000 ac, 0.00% Impervious, Inflow Depth > 2.41" for 25 YEAR event
Inflow = 54.85 cfs @ 12.62 hrs, Volume= 7.643 af
Outflow = 54.61 cfs @ 12.67 hrs, Volume= 7.620 af, Atten= 0%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.27 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.89 fps, Avg. Travel Time= 4.0 min

Peak Storage= 5,767 cf @ 12.64 hrs
Average Depth at Peak Storage= 1.37'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 2.74" for 25 YEAR event
Inflow = 144.41 cfs @ 13.02 hrs, Volume= 25.567 af
Outflow = 144.34 cfs @ 13.03 hrs, Volume= 25.526 af, Atten= 0%, Lag= 0.7 min
Primary = 62.21 cfs @ 13.03 hrs, Volume= 20.054 af
Secondary = 82.13 cfs @ 13.03 hrs, Volume= 5.471 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.72' @ 13.03 hrs Surf.Area= 7,497 sf Storage= 20,743 cf

Plug-Flow detention time= 3.3 min calculated for 25.526 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (859.4 - 856.7)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=62.20 cfs @ 13.03 hrs HW=71.72' (Free Discharge)
1=Culvert (Inlet Controls 40.76 cfs @ 8.30 fps)
2=Culvert (Inlet Controls 21.44 cfs @ 6.82 fps)

Secondary OutFlow Max=81.92 cfs @ 13.03 hrs HW=71.72' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 81.92 cfs @ 2.26 fps)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 3.13" for 25 YEAR event
Inflow = 265.34 cfs @ 12.87 hrs, Volume= 70.499 af
Outflow = 107.91 cfs @ 15.37 hrs, Volume= 60.494 af, Atten= 59%, Lag= 149.9 min
Primary = 107.91 cfs @ 15.37 hrs, Volume= 60.494 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 54.37' @ 15.37 hrs Surf.Area= 187,335 sf Storage= 1,227,360 cf

Plug-Flow detention time= 135.1 min calculated for 60.293 af (86% of inflow)
Center-of-Mass det. time= 98.8 min (963.6 - 864.7)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=107.91 cfs @ 15.37 hrs HW=54.37' (Free Discharge)
1=Culvert (Inlet Controls 71.36 cfs @ 14.54 fps)
2=Culvert (Inlet Controls 36.55 cfs @ 11.63 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3P: 24" CULVERT

Inflow Area = 38.000 ac, 0.00% Impervious, Inflow Depth > 2.41" for 25 YEAR event
Inflow = 54.61 cfs @ 12.67 hrs, Volume= 7.620 af
Outflow = 48.56 cfs @ 12.86 hrs, Volume= 7.573 af, Atten= 11%, Lag= 11.4 min
Primary = 31.72 cfs @ 12.86 hrs, Volume= 7.117 af
Secondary = 16.84 cfs @ 12.86 hrs, Volume= 0.456 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 59.40' @ 12.86 hrs Surf.Area= 16,981 sf Storage= 45,177 cf

Plug-Flow detention time= 14.6 min calculated for 7.548 af (99% of inflow)

Center-of-Mass det. time= 12.4 min (846.7 - 834.3)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=31.71 cfs @ 12.86 hrs HW=59.39' (Free Discharge)
└─**1=Culvert** (Inlet Controls 31.71 cfs @ 10.09 fps)

Secondary OutFlow Max=16.63 cfs @ 12.86 hrs HW=59.39' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 16.63 cfs @ 1.69 fps)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 2.75" for 25 YEAR event
Inflow = 18.21 cfs @ 12.81 hrs, Volume= 2.982 af
Outflow = 11.61 cfs @ 13.31 hrs, Volume= 2.938 af, Atten= 36%, Lag= 30.1 min
Primary = 11.61 cfs @ 13.31 hrs, Volume= 2.938 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.61' @ 13.31 hrs Surf.Area= 17,137 sf Storage= 26,474 cf

Plug-Flow detention time= 30.0 min calculated for 2.938 af (99% of inflow)
Center-of-Mass det. time= 24.9 min (860.1 - 835.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=11.61 cfs @ 13.31 hrs HW=87.61' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.61 cfs @ 6.57 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=85.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 3.31" for 25 YEAR event
Inflow = 195.88 cfs @ 12.60 hrs, Volume= 50.828 af
Outflow = 195.61 cfs @ 12.62 hrs, Volume= 49.959 af, Atten= 0%, Lag= 1.4 min
Primary = 41.35 cfs @ 12.62 hrs, Volume= 24.775 af
Secondary = 154.26 cfs @ 12.62 hrs, Volume= 25.185 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 137.98' @ 12.62 hrs Surf.Area= 19,954 sf Storage= 97,425 cf

Plug-Flow detention time= 18.5 min calculated for 49.959 af (98% of inflow)
Center-of-Mass det. time= 12.7 min (855.8 - 843.0)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=41.34 cfs @ 12.62 hrs HW=137.98' (Free Discharge)
1=Culvert (Barrel Controls 0.75 cfs @ 11.15 fps)
2=Culvert (Inlet Controls 40.59 cfs @ 8.27 fps)

Secondary OutFlow Max=153.85 cfs @ 12.62 hrs HW=137.98' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 153.85 cfs @ 2.61 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 3.25" for 25 YEAR event
Inflow = 195.00 cfs @ 12.69 hrs, Volume= 49.794 af
Outflow = 167.75 cfs @ 13.40 hrs, Volume= 49.594 af, Atten= 14%, Lag= 42.0 min
Primary = 143.09 cfs @ 13.40 hrs, Volume= 47.792 af
Secondary = 24.65 cfs @ 13.40 hrs, Volume= 1.802 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 103.59' @ 13.40 hrs Surf.Area= 50,620 sf Storage= 202,628 cf

Plug-Flow detention time= 15.7 min calculated for 49.429 af (99% of inflow)
Center-of-Mass det. time= 14.3 min (874.4 - 860.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=143.09 cfs @ 13.40 hrs HW=103.59' (Free Discharge)
1=Culvert (Inlet Controls 143.09 cfs @ 11.39 fps)

Secondary OutFlow Max=24.65 cfs @ 13.40 hrs HW=103.59' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 24.65 cfs @ 2.08 fps)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 3.87" for 25 YEAR event
Inflow = 47.09 cfs @ 12.12 hrs, Volume= 3.550 af
Outflow = 2.00 cfs @ 15.48 hrs, Volume= 1.411 af, Atten= 96%, Lag= 201.4 min
Primary = 2.00 cfs @ 15.48 hrs, Volume= 1.411 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 124.71' @ 15.48 hrs Surf.Area= 27,778 sf Storage= 105,955 cf

Plug-Flow detention time= 256.5 min calculated for 1.411 af (40% of inflow)
Center-of-Mass det. time= 162.0 min (934.4 - 772.4)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.00 cfs @ 15.48 hrs HW=124.71' (Free Discharge)
└**1=Culvert** (Passes 2.00 cfs of 29.13 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 2.00 cfs @ 10.17 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 2.77" for 25 YEAR event
Inflow = 151.56 cfs @ 12.87 hrs, Volume= 25.855 af
Outflow = 144.41 cfs @ 13.02 hrs, Volume= 25.567 af, Atten= 5%, Lag= 8.8 min
Primary = 41.57 cfs @ 13.02 hrs, Volume= 16.793 af
Secondary = 102.84 cfs @ 13.02 hrs, Volume= 8.774 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 72.34' @ 13.02 hrs Surf.Area= 56,811 sf Storage= 111,654 cf

Plug-Flow detention time= 17.9 min calculated for 25.482 af (99% of inflow)
Center-of-Mass det. time= 14.1 min (856.7 - 842.6)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=41.56 cfs @ 13.02 hrs HW=72.34' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 41.56 cfs @ 8.47 fps)

Secondary OutFlow Max=102.61 cfs @ 13.02 hrs HW=72.34' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 102.61 cfs @ 3.06 fps)

Summary for Subcatchment 1S:

Runoff = 246.43 cfs @ 12.78 hrs, Volume= 40.761 af, Depth> 4.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	57.000	70	WOODS / FIELD HSG C
*	19.000	98	EXISTING IMPERVIOUS AREA
*	25.000	74	EXISTING LAWN C
	101.000	76	Weighted Average
	82.000		81.19% Pervious Area
	19.000		18.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 229.83 cfs @ 12.68 hrs, Volume= 34.931 af, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	43.310	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
	86.310	76	Weighted Average
	73.310		84.94% Pervious Area
	13.000		15.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 95.27 cfs @ 12.61 hrs, Volume= 13.270 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	34.000	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
	38.000	70	Weighted Average
	38.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
43.8	550	Total			

Summary for Subcatchment 4S:

Runoff = 30.35 cfs @ 12.78 hrs, Volume= 5.001 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 205.17 cfs @ 13.43 hrs, Volume= 51.121 af, Depth> 5.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 226.05 cfs @ 12.51 hrs, Volume= 29.982 af, Depth> 5.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 70.86 cfs @ 12.12 hrs, Volume= 5.462 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Reach 3R: Stream below RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 4.60" for 100 YEAR event
Inflow = 248.09 cfs @ 12.80 hrs, Volume= 42.902 af
Outflow = 247.50 cfs @ 12.85 hrs, Volume= 42.796 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.37 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 3.76 fps, Avg. Travel Time= 3.8 min

Peak Storage= 25,467 cf @ 12.82 hrs
Average Depth at Peak Storage= 3.21'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 373.38 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 860.0' Slope= 0.0116 '/'
Inlet Invert= 82.00', Outlet Invert= 72.00'

Summary for Reach 4R: Stream above RR crossing

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 4.60" for 100 YEAR event
Inflow = 248.20 cfs @ 12.78 hrs, Volume= 42.928 af
Outflow = 248.09 cfs @ 12.80 hrs, Volume= 42.902 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.93 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.55 fps, Avg. Travel Time= 0.9 min

Peak Storage= 6,264 cf @ 12.79 hrs
Average Depth at Peak Storage= 3.35'
Bank-Full Depth= 4.00' Flow Area= 40.0 sf, Capacity= 346.26 cfs

6.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 14.00'
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 84.00', Outlet Invert= 82.00'

Summary for Reach 6R: Stream below Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 5.07" for 100 YEAR event
Inflow = 494.85 cfs @ 12.85 hrs, Volume= 114.172 af
Outflow = 493.76 cfs @ 12.88 hrs, Volume= 114.029 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.10 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 4.06 fps, Avg. Travel Time= 1.8 min

Peak Storage= 27,466 cf @ 12.86 hrs
Average Depth at Peak Storage= 4.78'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 5.08" for 100 YEAR event
Inflow = 496.11 cfs @ 12.81 hrs, Volume= 114.395 af
Outflow = 494.85 cfs @ 12.85 hrs, Volume= 114.172 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.03 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 6.35 fps, Avg. Travel Time= 2.9 min

Peak Storage= 41,837 cf @ 12.83 hrs
Average Depth at Peak Storage= 3.35'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 2.53" for 100 YEAR event
Inflow = 5.29 cfs @ 13.59 hrs, Volume= 2.323 af
Outflow = 5.15 cfs @ 14.25 hrs, Volume= 2.167 af, Atten= 3%, Lag= 40.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.59 fps, Min. Travel Time= 21.7 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 36.7 min

Peak Storage= 6,698 cf @ 13.89 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'

Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 5.22" for 100 YEAR event
Inflow = 310.32 cfs @ 12.61 hrs, Volume= 79.993 af
Outflow = 309.46 cfs @ 12.67 hrs, Volume= 79.772 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.93 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 4.83 fps, Avg. Travel Time= 4.1 min

Peak Storage= 37,431 cf @ 12.64 hrs
Average Depth at Peak Storage= 2.87'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

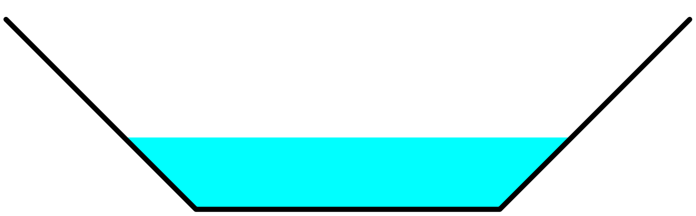
Summary for Reach 55R: Wetland below Site

Inflow Area = 38.000 ac, 0.00% Impervious, Inflow Depth > 4.19" for 100 YEAR event
Inflow = 95.27 cfs @ 12.61 hrs, Volume= 13.270 af
Outflow = 94.84 cfs @ 12.65 hrs, Volume= 13.239 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.08 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.16 fps, Avg. Travel Time= 3.5 min

Peak Storage= 8,420 cf @ 12.62 hrs
Average Depth at Peak Storage= 1.89'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'



Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 4.55" for 100 YEAR event
Inflow = 239.14 cfs @ 12.97 hrs, Volume= 42.426 af
Outflow = 239.06 cfs @ 12.98 hrs, Volume= 42.364 af, Atten= 0%, Lag= 0.6 min
Primary = 66.82 cfs @ 12.98 hrs, Volume= 27.779 af
Secondary = 172.24 cfs @ 12.98 hrs, Volume= 14.586 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 72.19' @ 12.98 hrs Surf.Area= 8,201 sf Storage= 24,403 cf

Plug-Flow detention time= 2.9 min calculated for 42.364 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (845.4 - 843.1)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=66.80 cfs @ 12.98 hrs HW=72.19' (Free Discharge)
1=Culvert (Inlet Controls 43.85 cfs @ 8.93 fps)
2=Culvert (Inlet Controls 22.95 cfs @ 7.30 fps)

Secondary OutFlow Max=171.91 cfs @ 12.98 hrs HW=72.19' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 171.91 cfs @ 2.88 fps)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 270.310 ac, 25.53% Impervious, Inflow Depth > 5.06" for 100 YEAR event
Inflow = 493.76 cfs @ 12.88 hrs, Volume= 114.029 af
Outflow = 237.60 cfs @ 14.35 hrs, Volume= 93.222 af, Atten= 52%, Lag= 88.1 min
Primary = 124.60 cfs @ 14.35 hrs, Volume= 76.641 af
Secondary = 113.00 cfs @ 14.35 hrs, Volume= 16.581 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 57.43' @ 14.35 hrs Surf.Area= 241,475 sf Storage= 1,890,336 cf

Plug-Flow detention time= 133.0 min calculated for 92.912 af (81% of inflow)
Center-of-Mass det. time= 88.6 min (939.0 - 850.4)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=124.60 cfs @ 14.35 hrs HW=57.43' (Free Discharge)
1=Culvert (Inlet Controls 82.49 cfs @ 16.81 fps)
2=Culvert (Inlet Controls 42.11 cfs @ 13.40 fps)

Secondary OutFlow Max=112.99 cfs @ 14.35 hrs HW=57.43' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 112.99 cfs @ 3.16 fps)

Summary for Pond 3P: 24" CULVERT

Inflow Area = 38.000 ac, 0.00% Impervious, Inflow Depth > 4.18" for 100 YEAR event
Inflow = 94.84 cfs @ 12.65 hrs, Volume= 13.239 af
Outflow = 93.27 cfs @ 12.72 hrs, Volume= 13.176 af, Atten= 2%, Lag= 4.1 min
Primary = 33.61 cfs @ 12.72 hrs, Volume= 10.216 af
Secondary = 59.66 cfs @ 12.72 hrs, Volume= 2.961 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 59.94' @ 12.72 hrs Surf.Area= 19,682 sf Storage= 55,082 cf

Plug-Flow detention time= 12.8 min calculated for 13.176 af (100% of inflow)

Center-of-Mass det. time= 11.1 min (832.9 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=33.60 cfs @ 12.72 hrs HW=59.93' (Free Discharge)
└─**1=Culvert** (Inlet Controls 33.60 cfs @ 10.70 fps)

Secondary OutFlow Max=59.41 cfs @ 12.72 hrs HW=59.93' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 59.41 cfs @ 2.54 fps)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 4.62" for 100 YEAR event
Inflow = 30.35 cfs @ 12.78 hrs, Volume= 5.001 af
Outflow = 15.83 cfs @ 13.43 hrs, Volume= 4.943 af, Atten= 48%, Lag= 39.0 min
Primary = 15.41 cfs @ 13.43 hrs, Volume= 4.937 af
Secondary = 0.43 cfs @ 13.43 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 89.03' @ 13.43 hrs Surf.Area= 24,770 sf Storage= 56,147 cf

Plug-Flow detention time= 40.7 min calculated for 4.943 af (99% of inflow)
Center-of-Mass det. time= 36.5 min (860.4 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=15.40 cfs @ 13.43 hrs HW=89.03' (Free Discharge)
└─**1=Culvert** (Inlet Controls 15.40 cfs @ 8.72 fps)

Secondary OutFlow Max=0.31 cfs @ 13.43 hrs HW=89.03' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.45 fps)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area =	184.000 ac, 30.43% Impervious, Inflow Depth > 5.29"	for 100 YEAR event	
Inflow =	310.62 cfs @ 12.59 hrs, Volume=	81.103 af	
Outflow =	310.32 cfs @ 12.61 hrs, Volume=	79.993 af,	Atten= 0%, Lag= 1.3 min
Primary =	43.18 cfs @ 12.61 hrs, Volume=	30.794 af	
Secondary =	267.14 cfs @ 12.61 hrs, Volume=	49.198 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 138.42' @ 12.61 hrs Surf.Area= 21,043 sf Storage= 106,292 cf

Plug-Flow detention time= 14.3 min calculated for 79.727 af (98% of inflow)
Center-of-Mass det. time= 9.6 min (842.4 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=43.17 cfs @ 12.61 hrs HW=138.42' (Free Discharge)
1=Culvert (Barrel Controls 0.77 cfs @ 11.39 fps)
2=Culvert (Inlet Controls 42.41 cfs @ 8.64 fps)

Secondary OutFlow Max=266.71 cfs @ 12.61 hrs HW=138.42' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 266.71 cfs @ 3.14 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 5.20" for 100 YEAR event
Inflow = 309.46 cfs @ 12.67 hrs, Volume= 79.772 af
Outflow = 285.90 cfs @ 12.94 hrs, Volume= 79.464 af, Atten= 8%, Lag= 16.1 min
Primary = 157.89 cfs @ 12.94 hrs, Volume= 64.473 af
Secondary = 128.01 cfs @ 12.94 hrs, Volume= 14.991 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 104.81' @ 12.94 hrs Surf.Area= 58,728 sf Storage= 269,120 cf

Plug-Flow detention time= 15.3 min calculated for 79.200 af (99% of inflow)
Center-of-Mass det. time= 13.9 min (860.1 - 846.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=157.88 cfs @ 12.94 hrs HW=104.81' (Free Discharge)
1=Culvert (Inlet Controls 157.88 cfs @ 12.56 fps)

Secondary OutFlow Max=127.90 cfs @ 12.94 hrs HW=104.81' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 127.90 cfs @ 3.54 fps)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 5.96" for 100 YEAR event
Inflow = 70.86 cfs @ 12.12 hrs, Volume= 5.462 af
Outflow = 5.29 cfs @ 13.59 hrs, Volume= 2.323 af, Atten= 93%, Lag= 88.0 min
Primary = 5.29 cfs @ 13.59 hrs, Volume= 2.323 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 126.27' @ 13.59 hrs Surf.Area= 33,165 sf Storage= 153,967 cf

Plug-Flow detention time= 234.9 min calculated for 2.323 af (43% of inflow)
Center-of-Mass det. time= 139.3 min (901.6 - 762.3)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.27 cfs @ 13.59 hrs HW=126.27' (Free Discharge)
└─**1=Culvert** (Passes 5.27 cfs of 34.74 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 2.32 cfs @ 11.82 fps)
  └─**4=Orifice/Grate** (Weir Controls 2.95 cfs @ 1.71 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area = 112.000 ac, 21.43% Impervious, Inflow Depth > 4.59" for 100 YEAR event
Inflow = 247.50 cfs @ 12.85 hrs, Volume= 42.796 af
Outflow = 239.14 cfs @ 12.97 hrs, Volume= 42.426 af, Atten= 3%, Lag= 7.3 min
Primary = 46.08 cfs @ 12.97 hrs, Volume= 22.662 af
Secondary = 193.06 cfs @ 12.97 hrs, Volume= 19.764 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 73.05' @ 12.97 hrs Surf.Area= 59,545 sf Storage= 152,766 cf

Plug-Flow detention time= 16.0 min calculated for 42.426 af (99% of inflow)
Center-of-Mass det. time= 13.0 min (843.1 - 830.1)

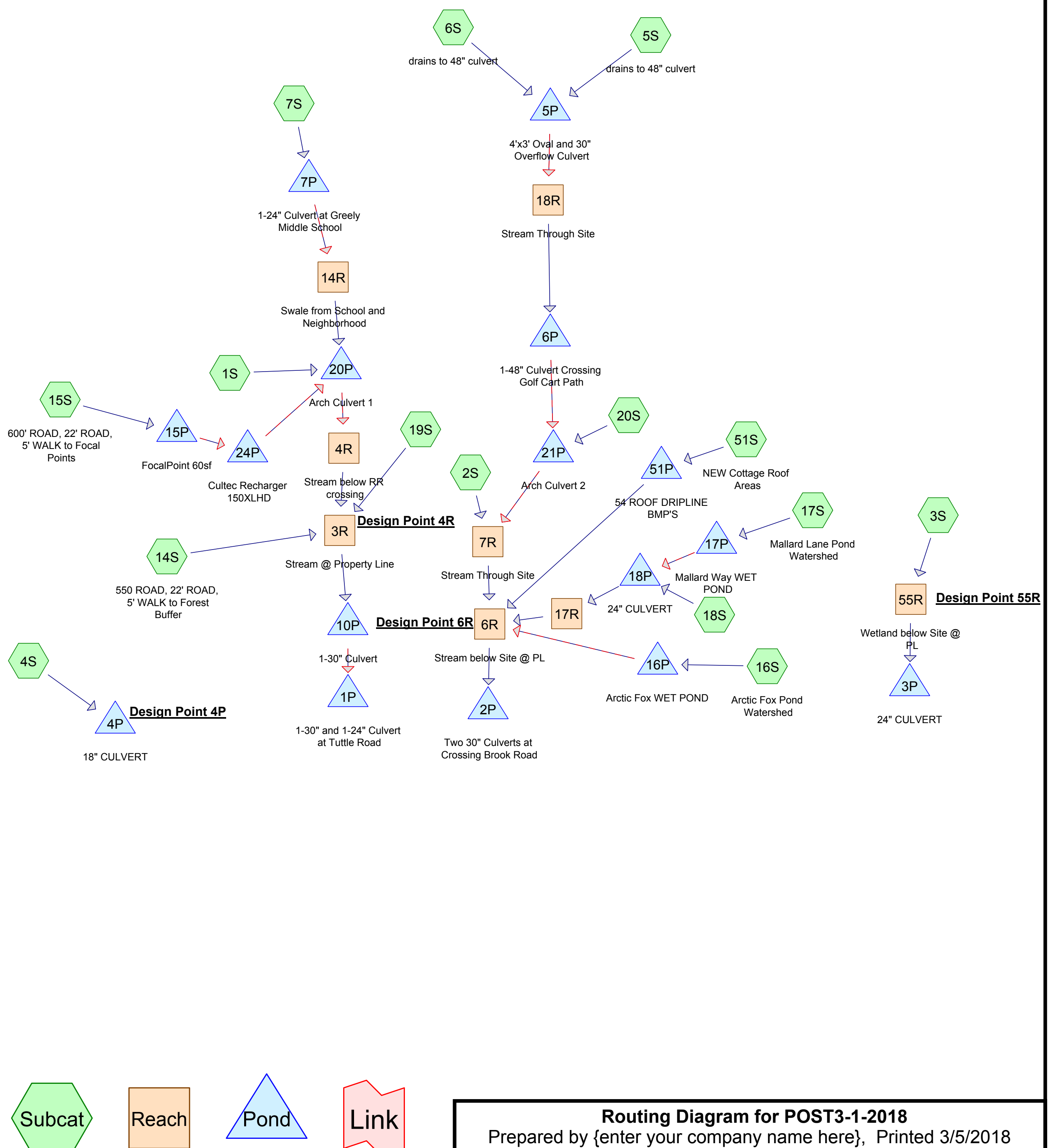
Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=46.06 cfs @ 12.97 hrs HW=73.05' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 46.06 cfs @ 9.38 fps)

Secondary OutFlow Max=192.71 cfs @ 12.97 hrs HW=73.05' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 192.71 cfs @ 3.76 fps)



Routing Diagram for POST3-1-2018
Prepared by {enter your company name here}, Printed 3/5/2018
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.220	98	52 Cottage Roofs + Community Buildings (51S)
94.000	98	EXISTING IMPERVIOUS AREA (1S, 2S, 4S, 5S, 6S, 7S, 19S)
147.000	74	EXISTING LAWN C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 19S)
0.410	70	NEW FILL SLOPE (3S)
4.420	98	NEW IMPERVIOUS PAVED AREA (14S, 15S, 16S, 17S, 19S)
11.530	74	NEW LAWN C (1S, 2S, 3S, 14S, 15S, 16S, 17S, 18S, 19S, 20S)
0.100	98	NEW Trails (3S)
0.130	98	New Trails (2S)
172.490	70	WOODS / FIELD HSG C (1S, 2S, 3S, 4S, 5S, 6S, 16S, 17S, 18S, 19S, 20S)
433.300	**78**	**TOTAL AREA**

Summary for Subcatchment 1S:

Runoff = 43.61 cfs @ 12.84 hrs, Volume= 7.268 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	43.440	70	WOODS / FIELD HSG C
*	18.400	98	EXISTING IMPERVIOUS AREA
*	23.400	74	EXISTING LAWN C
*	0.100	74	NEW LAWN C
	85.340	77	Weighted Average
	66.940		78.44% Pervious Area
	18.400		21.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 37.50 cfs @ 12.73 hrs, Volume= 5.728 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	22.010	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
*	1.850	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51S)
*	0.130	98	New Trails
	66.990	77	Weighted Average
	53.860		80.40% Pervious Area
	13.130		19.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 12.08 cfs @ 12.91 hrs, Volume= 2.160 af, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	31.320	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
*	0.210	74	NEW LAWN C
*	0.410	70	NEW FILL SLOPE
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
*	0.100	98	NEW Trails
	36.040	71	Weighted Average
	35.940		99.72% Pervious Area
	0.100		0.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
16.5	75	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.3	625	Total			

Summary for Subcatchment 4S:

Runoff = 5.49 cfs @ 12.86 hrs, Volume= 0.935 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
*	0.000	98	NEW IMPERVIOUS PAVED AREA
*	0.000	74	NEW LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 46.40 cfs @ 13.55 hrs, Volume= 11.467 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 54.10 cfs @ 12.54 hrs, Volume= 6.986 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 19.44 cfs @ 12.12 hrs, Volume= 1.427 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Subcatchment 14S: 550 ROAD, 22' ROAD, 5' WALK to Forest Buffer

Runoff = 0.91 cfs @ 12.26 hrs, Volume= 0.092 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.400	98	NEW IMPERVIOUS PAVED AREA
*	0.100	74	NEW LAWN C
	0.500	93	Weighted Average
	0.100		20.00% Pervious Area
	0.400		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
18.3	75	0.0700	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.7	336	Total			

Summary for Subcatchment 15S: 600' ROAD, 22' ROAD, 5' WALK to Focal Points

Runoff = 1.45 cfs @ 12.02 hrs, Volume= 0.090 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.370	98	NEW IMPERVIOUS PAVED AREA
*	0.180	74	NEW LAWN C
	0.550	90	Weighted Average
	0.180		32.73% Pervious Area
	0.370		67.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
1.4	261	Total			

Summary for Subcatchment 16S: Arctic Fox Pond Watershed

Runoff = 2.55 cfs @ 12.83 hrs, Volume= 0.420 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.570	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	1.100	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	2.540	74	NEW LAWN C
	4.210	80	Weighted Average
	3.110		73.87% Pervious Area
	1.100		26.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 17S: Mallard Lane Pond Watershed

Runoff = 4.88 cfs @ 12.82 hrs, Volume= 0.801 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.220	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	2.400	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	4.640	74	NEW LAWN C
	7.260	82	Weighted Average
	4.860		66.94% Pervious Area
	2.400		33.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 18S:

Runoff = 0.46 cfs @ 12.76 hrs, Volume= 0.072 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	0.450	70	WOODS / FIELD HSG C
*	0.680	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
	1.130	72	Weighted Average
	1.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 19S:

Runoff = 11.45 cfs @ 12.15 hrs, Volume= 0.913 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	10.660	70	WOODS / FIELD HSG C
*	0.600	98	EXISTING IMPERVIOUS AREA
*	1.600	74	EXISTING LAWN C
*	0.940	74	NEW LAWN C
*	0.150	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	13.950	72	Weighted Average
	13.200		94.62% Pervious Area
	0.750		5.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.7	300	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
9.2	400	Total			

Summary for Subcatchment 20S:

Runoff = 2.55 cfs @ 12.56 hrs, Volume= 0.348 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	5.820	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	0.290	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	6.110	70	Weighted Average
	6.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.7	200	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
35.5	300	Total			

Summary for Subcatchment 51S: NEW Cottage Roof Areas

Runoff = 7.24 cfs @ 12.21 hrs, Volume= 0.719 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

	Area (ac)	CN	Description
*	3.220	98	52 Cottage Roofs + Community Buildings
	3.220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.4000	3.25		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
2.5	25	0.0400	0.17		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.10"
13.1	75	0.1600	0.10		**Sheet Flow, CD** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.7	120	Total			

Summary for Reach 3R: Stream @ Property Line

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 0.97" for 2 YEAR event
Inflow = 46.00 cfs @ 12.95 hrs, Volume= 8.962 af
Outflow = 45.72 cfs @ 13.07 hrs, Volume= 8.881 af, Atten= 1%, Lag= 6.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.48 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 11.0 min

Peak Storage= 11,308 cf @ 13.00 hrs
Average Depth at Peak Storage= 1.01'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 287.21 cfs

12.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 77.00', Outlet Invert= 72.00'

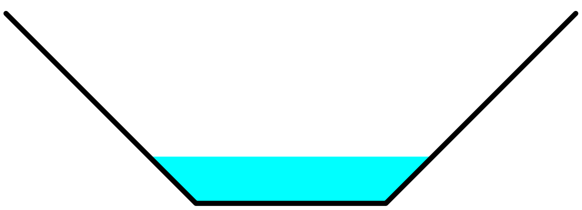
Summary for Reach 4R: Stream below RR crossing

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 0.99" for 2 YEAR event
Inflow = 44.17 cfs @ 12.86 hrs, Volume= 8.018 af
Outflow = 43.95 cfs @ 12.96 hrs, Volume= 7.957 af, Atten= 1%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 8.4 min

Peak Storage= 9,488 cf @ 12.90 hrs
Average Depth at Peak Storage= 1.48'
Bank-Full Depth= 6.00' Flow Area= 72.0 sf, Capacity= 582.42 cfs

6.00' x 6.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 82.00', Outlet Invert= 77.00'



Summary for Reach 6R: Stream below Site @ PL

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 1.05" for 2 YEAR event
Inflow = 87.77 cfs @ 13.11 hrs, Volume= 23.928 af
Outflow = 87.63 cfs @ 13.16 hrs, Volume= 23.862 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.94 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 3.01 fps, Avg. Travel Time= 2.5 min

Peak Storage= 7,980 cf @ 13.13 hrs
Average Depth at Peak Storage= 1.81'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 257.100 ac, 26.89% Impervious, Inflow Depth > 1.10" for 2 YEAR event
Inflow = 87.49 cfs @ 13.04 hrs, Volume= 23.560 af
Outflow = 87.35 cfs @ 13.11 hrs, Volume= 23.460 af, Atten= 0%, Lag= 4.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.70 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 4.57 fps, Avg. Travel Time= 4.0 min

Peak Storage= 12,483 cf @ 13.07 hrs
Average Depth at Peak Storage= 1.23'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 0.85" for 2 YEAR event
Inflow = 1.21 cfs @ 14.58 hrs, Volume= 0.776 af
Outflow = 1.21 cfs @ 15.70 hrs, Volume= 0.668 af, Atten= 0%, Lag= 67.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.54 fps, Min. Travel Time= 36.4 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 47.8 min

Peak Storage= 2,643 cf @ 15.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'

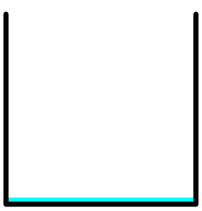
Summary for Reach 17R:

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 0.55" for 2 YEAR event
Inflow = 0.74 cfs @ 15.44 hrs, Volume= 0.387 af
Outflow = 0.74 cfs @ 15.56 hrs, Volume= 0.380 af, Atten= 0%, Lag= 7.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.41 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 2.11 fps, Avg. Travel Time= 5.5 min

Peak Storage= 214 cf @ 15.48 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 3.00' Flow Area= 9.0 sf, Capacity= 102.76 cfs

3.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Length= 700.0' Slope= 0.0286 '/'
Inlet Invert= 81.00', Outlet Invert= 61.00'



Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 1.16" for 2 YEAR event
Inflow = 67.65 cfs @ 12.77 hrs, Volume= 17.762 af
Outflow = 66.47 cfs @ 12.89 hrs, Volume= 17.661 af, Atten= 2%, Lag= 7.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.18 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 3.42 fps, Avg. Travel Time= 5.8 min

Peak Storage= 12,911 cf @ 12.83 hrs
Average Depth at Peak Storage= 1.17'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site @ PL

Inflow Area = 36.040 ac, 0.28% Impervious, Inflow Depth > 0.72" for 2 YEAR event
Inflow = 12.08 cfs @ 12.91 hrs, Volume= 2.160 af
Outflow = 12.06 cfs @ 12.99 hrs, Volume= 2.146 af, Atten= 0%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 5.5 min

Peak Storage= 2,134 cf @ 12.94 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 0.94" for 2 YEAR event
Inflow = 36.86 cfs @ 13.41 hrs, Volume= 8.705 af
Outflow = 36.38 cfs @ 13.49 hrs, Volume= 8.694 af, Atten= 1%, Lag= 4.7 min
Primary = 36.38 cfs @ 13.49 hrs, Volume= 8.694 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 69.71' @ 13.49 hrs Surf.Area= 5,347 sf Storage= 7,866 cf

Plug-Flow detention time= 3.2 min calculated for 8.694 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (891.6 - 888.8)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=36.37 cfs @ 13.49 hrs HW=69.71' (Free Discharge)
1=Culvert (Inlet Controls 23.23 cfs @ 5.06 fps)
2=Culvert (Inlet Controls 13.13 cfs @ 4.18 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=68.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 1.05" for 2 YEAR event
Inflow = 87.63 cfs @ 13.16 hrs, Volume= 23.862 af
Outflow = 54.15 cfs @ 14.65 hrs, Volume= 22.111 af, Atten= 38%, Lag= 89.3 min
Primary = 54.15 cfs @ 14.65 hrs, Volume= 22.111 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 47.48' @ 14.65 hrs Surf.Area= 94,846 sf Storage= 269,789 cf

Plug-Flow detention time= 74.8 min calculated for 22.038 af (92% of inflow)
Center-of-Mass det. time= 55.0 min (950.6 - 895.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=54.15 cfs @ 14.65 hrs HW=47.48' (Free Discharge)
—**1=Culvert** (Inlet Controls 35.33 cfs @ 7.20 fps)
—**2=Culvert** (Inlet Controls 18.82 cfs @ 5.99 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.00' (Free Discharge)
—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: 24" CULVERT

Inflow Area = 36.040 ac, 0.28% Impervious, Inflow Depth > 0.71" for 2 YEAR event
Inflow = 12.06 cfs @ 12.99 hrs, Volume= 2.146 af
Outflow = 11.45 cfs @ 13.14 hrs, Volume= 2.121 af, Atten= 5%, Lag= 9.2 min
Primary = 11.45 cfs @ 13.14 hrs, Volume= 2.121 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 55.59' @ 13.14 hrs Surf.Area= 6,030 sf Storage= 6,651 cf

Plug-Flow detention time= 12.1 min calculated for 2.121 af (99% of inflow)
Center-of-Mass det. time= 8.3 min (881.3 - 873.0)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=11.44 cfs @ 13.14 hrs HW=55.58' (Free Discharge)
└─**1=Culvert** (Inlet Controls 11.44 cfs @ 4.29 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=54.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 0.86" for 2 YEAR event
Inflow = 5.49 cfs @ 12.86 hrs, Volume= 0.935 af
Outflow = 4.55 cfs @ 13.16 hrs, Volume= 0.910 af, Atten= 17%, Lag= 17.9 min
Primary = 4.55 cfs @ 13.16 hrs, Volume= 0.910 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 86.04' @ 13.16 hrs Surf.Area= 8,631 sf Storage= 6,225 cf

Plug-Flow detention time= 28.3 min calculated for 0.910 af (97% of inflow)
Center-of-Mass det. time= 19.6 min (879.1 - 859.5)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=4.54 cfs @ 13.16 hrs HW=86.04' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.54 cfs @ 3.47 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=85.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 1.20" for 2 YEAR event
Inflow = 69.48 cfs @ 12.62 hrs, Volume= 18.453 af
Outflow = 67.65 cfs @ 12.77 hrs, Volume= 17.762 af, Atten= 3%, Lag= 8.9 min
Primary = 38.36 cfs @ 12.77 hrs, Volume= 14.947 af
Secondary = 29.29 cfs @ 12.77 hrs, Volume= 2.815 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 137.32' @ 12.77 hrs Surf.Area= 17,956 sf Storage= 84,792 cf

Plug-Flow detention time= 32.4 min calculated for 17.762 af (96% of inflow)
Center-of-Mass det. time= 20.7 min (884.6 - 863.8)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=38.34 cfs @ 12.77 hrs HW=137.31' (Free Discharge)
—**1=Culvert** (Barrel Controls 0.72 cfs @ 10.76 fps)
—**2=Culvert** (Inlet Controls 37.62 cfs @ 7.66 fps)

Secondary OutFlow Max=28.51 cfs @ 12.77 hrs HW=137.31' (Free Discharge)
—**3=Broad-Crested Rectangular Weir** (Weir Controls 28.51 cfs @ 1.51 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area =	184.000 ac,	30.43% Impervious,	Inflow Depth > 1.15"	for 2 YEAR event
Inflow =	66.47 cfs @	12.89 hrs, Volume=	17.661 af	
Outflow =	61.46 cfs @	13.39 hrs, Volume=	17.564 af,	Atten= 8%, Lag= 30.1 min
Primary =	61.46 cfs @	13.39 hrs, Volume=	17.564 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 99.06' @ 13.39 hrs Surf.Area= 22,689 sf Storage= 35,702 cf

Plug-Flow detention time= 9.2 min calculated for 17.564 af (99% of inflow)
Center-of-Mass det. time= 7.5 min (897.8 - 890.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=61.45 cfs @ 13.39 hrs HW=99.06' (Free Discharge)
—**1=Culvert** (Inlet Controls 61.45 cfs @ 5.96 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=96.00' (Free Discharge)
—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 1.56" for 2 YEAR event
Inflow = 19.44 cfs @ 12.12 hrs, Volume= 1.427 af
Outflow = 1.21 cfs @ 14.58 hrs, Volume= 0.776 af, Atten= 94%, Lag= 147.2 min
Primary = 1.21 cfs @ 14.58 hrs, Volume= 0.776 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.90' @ 14.58 hrs Surf.Area= 21,586 sf Storage= 38,151 cf

Plug-Flow detention time= 238.2 min calculated for 0.776 af (54% of inflow)
Center-of-Mass det. time= 158.6 min (952.3 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.21 cfs @ 14.58 hrs HW=121.90' (Free Discharge)
└─**1=Culvert** (Passes 1.21 cfs of 14.46 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.21 cfs @ 6.18 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 0.96" for 2 YEAR event
Inflow = 45.72 cfs @ 13.07 hrs, Volume= 8.881 af
Outflow = 36.86 cfs @ 13.41 hrs, Volume= 8.705 af, Atten= 19%, Lag= 20.9 min
Primary = 32.64 cfs @ 13.41 hrs, Volume= 8.577 af
Secondary = 4.22 cfs @ 13.41 hrs, Volume= 0.128 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.16' @ 13.41 hrs Surf.Area= 38,177 sf Storage= 52,867 cf

Plug-Flow detention time= 22.6 min calculated for 8.705 af (98% of inflow)
Center-of-Mass det. time= 16.4 min (888.8 - 872.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=32.63 cfs @ 13.41 hrs HW=71.16' (Free Discharge)
└**1=Culvert** (Inlet Controls 32.63 cfs @ 6.65 fps)

Secondary OutFlow Max=4.13 cfs @ 13.41 hrs HW=71.16' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 4.13 cfs @ 1.06 fps)

Summary for Pond 15P: FocalPoint 60sf

Inflow Area = 0.550 ac, 67.27% Impervious, Inflow Depth > 1.95" for 2 YEAR event
Inflow = 1.45 cfs @ 12.02 hrs, Volume= 0.090 af
Outflow = 1.44 cfs @ 12.03 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.4 min
Primary = 0.14 cfs @ 11.55 hrs, Volume= 0.058 af
Secondary = 1.31 cfs @ 12.03 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.69' @ 12.03 hrs Surf.Area= 60 sf Storage= 112 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.2 min (774.2 - 771.9)

Volume	Invert	Avail.Storage	Storage Description
#1	97.75'	27 cf	**3.00'W x 20.00'L x 2.25'H FocalPoint** 135 cf Overall x 20.0% Voids
#2	100.00'	133 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) -Impervious
		160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	60	0	0
100.50	157	54	54
101.00	157	79	133

Device	Routing	Invert	Outlet Devices
#1	Primary	97.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	100.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 11.55 hrs HW=97.97' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=1.24 cfs @ 12.03 hrs HW=100.69' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 1.24 cfs @ 1.41 fps)

Summary for Pond 16P: Arctic Fox WET POND

Inflow Area = 4.210 ac, 26.13% Impervious, Inflow Depth > 1.20" for 2 YEAR event
Inflow = 2.55 cfs @ 12.83 hrs, Volume= 0.420 af
Outflow = 0.24 cfs @ 17.25 hrs, Volume= 0.089 af, Atten= 91%, Lag= 265.5 min
Primary = 0.24 cfs @ 17.25 hrs, Volume= 0.089 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 77.00' Surf.Area= 4,505 sf Storage= 18,632 cf
Peak Elev= 78.80' @ 17.25 hrs Surf.Area= 9,245 sf Storage= 33,441 cf (14,810 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 204.2 min (1,049.8 - 845.6)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	82,315 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	1,852	0	0
72.00	2,232	2,042	2,042
73.00	2,636	2,434	4,476
74.00	3,065	2,851	7,327
75.00	3,520	3,293	10,619
76.00	4,000	3,760	14,379
77.00	4,505	4,253	18,632
77.10	7,408	596	19,227
78.00	8,400	7,114	26,341
79.00	9,450	8,925	35,266
80.00	10,557	10,004	45,269
81.00	11,720	11,139	56,408
82.00	12,940	12,330	68,738
83.00	14,215	13,578	82,315

Device	Routing	Invert	Outlet Devices
#1	Primary	74.00'	**18.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 74.00' / 70.00' S= 0.0690 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	78.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	81.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	81.50'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.24 cfs @ 17.25 hrs HW=78.80' (Free Discharge)
└─**1=Culvert** (Passes 0.24 cfs of 17.13 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 1.88 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=77.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 17P: Mallard Way WET POND

Inflow Area = 7.260 ac, 33.06% Impervious, Inflow Depth > 1.32" for 2 YEAR event
Inflow = 4.88 cfs @ 12.82 hrs, Volume= 0.801 af
Outflow = 0.66 cfs @ 15.80 hrs, Volume= 0.320 af, Atten= 86%, Lag= 178.7 min
Primary = 0.66 cfs @ 15.80 hrs, Volume= 0.320 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 88.00' Surf.Area= 5,558 sf Storage= 23,438 cf
Peak Elev= 90.24' @ 15.80 hrs Surf.Area= 12,217 sf Storage= 47,283 cf (23,845 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 159.6 min (1,000.4 - 840.8)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	70,904 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	1,346	0	0
82.00	1,867	1,607	1,607
83.00	2,419	2,143	3,750
84.00	2,996	2,708	6,457
85.00	3,599	3,298	9,755
86.00	4,226	3,913	13,667
87.00	4,879	4,553	18,220
88.00	5,558	5,219	23,438
88.10	9,325	744	24,182
89.00	10,578	8,956	33,139
90.00	11,887	11,233	44,371
91.00	13,252	12,570	56,941
92.00	14,675	13,964	70,904

Device	Routing	Invert	Outlet Devices
#1	Primary	86.00'	**18.0" Round Culvert** L= 31.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 86.00' / 85.50' S= 0.0161 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	89.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	90.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	91.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.66 cfs @ 15.80 hrs HW=90.24' (Free Discharge)
└─**1=Culvert** (Passes 0.66 cfs of 15.90 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.66 cfs @ 3.38 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=88.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 18P: 24" CULVERT

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 0.56" for 2 YEAR event
Inflow = 0.74 cfs @ 15.36 hrs, Volume= 0.393 af
Outflow = 0.74 cfs @ 15.44 hrs, Volume= 0.387 af, Atten= 0%, Lag= 4.6 min
Primary = 0.74 cfs @ 15.44 hrs, Volume= 0.387 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 85.35' @ 15.44 hrs Surf.Area= 1,040 sf Storage= 319 cf

Plug-Flow detention time= 7.7 min calculated for 0.386 af (98% of inflow)
Center-of-Mass det. time= 4.3 min (978.5 - 974.1)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	15,869 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	788	0	0
86.00	1,512	1,150	1,150
87.00	3,898	2,705	3,855
88.00	5,621	4,760	8,615
89.00	8,888	7,255	15,869

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.74 cfs @ 15.44 hrs HW=85.35' (Free Discharge)
└—**1=Culvert** (Inlet Controls 0.74 cfs @ 2.01 fps)

Summary for Pond 20P: Arch Culvert 1

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 0.99" for 2 YEAR event
Inflow = 44.21 cfs @ 12.85 hrs, Volume= 8.024 af
Outflow = 44.17 cfs @ 12.86 hrs, Volume= 8.018 af, Atten= 0%, Lag= 0.7 min
Primary = 44.17 cfs @ 12.86 hrs, Volume= 8.018 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 83.92' @ 12.86 hrs Surf.Area= 1,574 sf Storage= 1,818 cf

Plug-Flow detention time= 0.8 min calculated for 7.992 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (864.2 - 863.7)

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	85,094 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.00	320	0	0
86.00	2,932	6,504	6,504
87.00	7,643	5,288	11,792
88.00	11,989	9,816	21,608
89.00	18,865	15,427	37,035
90.00	23,627	21,246	58,281
91.00	30,000	26,814	85,094

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**88.0" W x 54.0" H, R=45.0"/126.0" Pipe Arch RCP_Arch 88x54** L= 70.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 82.00' / 81.50' S= 0.0071 '/' Cc= 0.900

			n= 0.022 Earth, clean & straight, Flow Area= 25.69 sf
#2	Secondary	90.00'	**25.0' long x 25.0' 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=44.13 cfs @ 12.86 hrs HW=83.92' (Free Discharge)
└─**1=RCP_Arch 88x54** (Barrel Controls 44.13 cfs @ 5.05 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=82.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 21P: Arch Culvert 2

Inflow Area =	190.110 ac, 29.46% Impervious, Inflow Depth > 1.13"	for 2 YEAR event	
Inflow =	62.31 cfs @ 13.35 hrs, Volume=	17.912 af	
Outflow =	62.30 cfs @ 13.39 hrs, Volume=	17.832 af,	Atten= 0%, Lag= 2.4 min
Primary =	62.30 cfs @ 13.39 hrs, Volume=	17.832 af	
Secondary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 93.98' @ 13.39 hrs Surf.Area= 6,980 sf Storage= 11,863 cf

Plug-Flow detention time= 4.1 min calculated for 17.832 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (899.7 - 896.9)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	200,953 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	5,000	0	0
93.00	6,000	5,500	5,500
94.00	7,000	6,500	12,000
95.00	8,390	7,695	19,695
96.00	12,267	10,329	30,024
97.00	23,771	18,019	48,043
98.00	31,886	27,829	75,871
99.00	67,139	49,513	125,384
100.00	84,000	75,570	200,953

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**122.0" W x 77.3" H, R=62.0"/218.0" Pipe Arch RCP_Arch 122x78**
			L= 70.0' RCP, end-section conforming to fill, Ke= 0.500
			Inlet / Outlet Invert= 92.00' / 91.50' S= 0.0071 '/' Cc= 0.900
			n= 0.022 Earth, clean & straight, Flow Area= 51.67 sf
#2	Secondary	99.00'	**25.0' long x 25.0' 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=62.28 cfs @ 13.39 hrs HW=93.98' (Free Discharge)
└─**1=RCP_Arch 122x78** (Barrel Controls 62.28 cfs @ 5.19 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 24P: Cultec Recharger 150XLHD

Inflow Area = 0.550 ac, 67.27% Impervious, Inflow Depth > 1.95" for 2 YEAR event
Inflow = 1.44 cfs @ 12.03 hrs, Volume= 0.090 af
Outflow = 0.31 cfs @ 12.43 hrs, Volume= 0.089 af, Atten= 79%, Lag= 24.0 min
Primary = 0.31 cfs @ 12.43 hrs, Volume= 0.089 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 95.81' @ 12.43 hrs Surf.Area= 0.025 ac Storage= 0.028 af

Plug-Flow detention time= 43.6 min calculated for 0.089 af (99% of inflow)
Center-of-Mass det. time= 39.0 min (813.2 - 774.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.00'	0.018 af	**14.50'W x 74.50'L x 2.54'H Field A** 0.063 af Overall - 0.018 af Embedded = 0.045 af x 40.0% Voids
#2A	94.50'	0.018 af	**Cultec R-150XLHD** x 28 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
#3	96.50'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**
		0.037 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	94.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	96.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	96.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.31 cfs @ 12.43 hrs HW=95.81' (Free Discharge)
└─**1=Culvert** (Passes 0.31 cfs of 8.77 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.25 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=94.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 51P: 54 ROOF DRIPLINE BMP'S

Inflow Area = 3.220 ac,100.00% Impervious, Inflow Depth > 2.68" for 2 YEAR event
Inflow = 7.24 cfs @ 12.21 hrs, Volume= 0.719 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.09' @ 20.00 hrs Surf.Area= 867,510 sf Storage= 31,305 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	13,187 cf	**3.00'W x 105.00'L x 2.00'H Prismatoid** x 54 34,020 cf Overall - 1,051 cf Embedded = 32,969 cf x 40.0% Voids
#2	100.00'	1,051 cf	**6.0" Round Pipe Storage** x 51 Inside #1 L= 105.0' S= 0.0050 '/'
		14,239 cf	x 51.00 = 726,182 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.50'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 51.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=100.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment 1S:

Runoff = 90.59 cfs @ 12.81 hrs, Volume= 14.836 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	43.440	70	WOODS / FIELD HSG C
*	18.400	98	EXISTING IMPERVIOUS AREA
*	23.400	74	EXISTING LAWN C
*	0.100	74	NEW LAWN C
	85.340	77	Weighted Average
	66.940		78.44% Pervious Area
	18.400		21.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 77.76 cfs @ 12.71 hrs, Volume= 11.685 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	22.010	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
*	1.850	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51S)
*	0.130	98	New Trails
	66.990	77	Weighted Average
	53.860		80.40% Pervious Area
	13.130		19.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 29.25 cfs @ 12.85 hrs, Volume= 4.910 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	31.320	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
*	0.210	74	NEW LAWN C
*	0.410	70	NEW FILL SLOPE
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
*	0.100	98	NEW Trails
	36.040	71	Weighted Average
	35.940		99.72% Pervious Area
	0.100		0.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
16.5	75	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.3	625	Total			

Summary for Subcatchment 4S:

Runoff = 12.23 cfs @ 12.83 hrs, Volume= 2.009 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
*	0.000	98	NEW IMPERVIOUS PAVED AREA
*	0.000	74	NEW LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 91.32 cfs @ 13.48 hrs, Volume= 22.409 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 103.57 cfs @ 12.52 hrs, Volume= 13.387 af, Depth> 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 34.68 cfs @ 12.12 hrs, Volume= 2.580 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Subcatchment 14S: 550 ROAD, 22' ROAD, 5' WALK to Forest Buffer

Runoff = 1.44 cfs @ 12.26 hrs, Volume= 0.149 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.400	98	NEW IMPERVIOUS PAVED AREA
*	0.100	74	NEW LAWN C
	0.500	93	Weighted Average
	0.100		20.00% Pervious Area
	0.400		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
18.3	75	0.0700	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.7	336	Total			

Summary for Subcatchment 15S: 600' ROAD, 22' ROAD, 5' WALK to Focal Points

Runoff = 2.39 cfs @ 12.02 hrs, Volume= 0.151 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.370	98	NEW IMPERVIOUS PAVED AREA
*	0.180	74	NEW LAWN C
	0.550	90	Weighted Average
	0.180		32.73% Pervious Area
	0.370		67.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
1.4	261	Total			

Summary for Subcatchment 16S: Arctic Fox Pond Watershed

Runoff = 4.99 cfs @ 12.80 hrs, Volume= 0.818 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.570	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	1.100	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	2.540	74	NEW LAWN C
	4.210	80	Weighted Average
	3.110		73.87% Pervious Area
	1.100		26.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 17S: Mallard Lane Pond Watershed

Runoff = 9.21 cfs @ 12.79 hrs, Volume= 1.513 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.220	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	2.400	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	4.640	74	NEW LAWN C
	7.260	82	Weighted Average
	4.860		66.94% Pervious Area
	2.400		33.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 18S:

Runoff = 1.07 cfs @ 12.72 hrs, Volume= 0.161 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	0.450	70	WOODS / FIELD HSG C
*	0.680	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
	1.130	72	Weighted Average
	1.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 19S:

Runoff = 26.82 cfs @ 12.14 hrs, Volume= 2.027 af, Depth> 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	10.660	70	WOODS / FIELD HSG C
*	0.600	98	EXISTING IMPERVIOUS AREA
*	1.600	74	EXISTING LAWN C
*	0.940	74	NEW LAWN C
*	0.150	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	13.950	72	Weighted Average
	13.200		94.62% Pervious Area
	0.750		5.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.7	300	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
9.2	400	Total			

Summary for Subcatchment 20S:

Runoff = 6.33 cfs @ 12.52 hrs, Volume= 0.806 af, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	5.820	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	0.290	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	6.110	70	Weighted Average
	6.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.7	200	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
35.5	300	Total			

Summary for Subcatchment 51S: NEW Cottage Roof Areas

Runoff = 10.82 cfs @ 12.21 hrs, Volume= 1.087 af, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.60"

	Area (ac)	CN	Description
*	3.220	98	52 Cottage Roofs + Community Buildings
	3.220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.4000	3.25		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
2.5	25	0.0400	0.17		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.10"
13.1	75	0.1600	0.10		**Sheet Flow, CD** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.7	120	Total			

Summary for Reach 3R: Stream @ Property Line

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 1.95" for 10 YEAR event
Inflow = 95.74 cfs @ 12.90 hrs, Volume= 18.084 af
Outflow = 95.42 cfs @ 12.99 hrs, Volume= 17.974 af, Atten= 0%, Lag= 5.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.49 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 8.4 min

Peak Storage= 18,298 cf @ 12.94 hrs
Average Depth at Peak Storage= 1.57'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 287.21 cfs

12.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 77.00', Outlet Invert= 72.00'

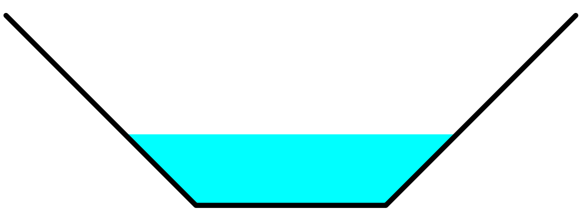
Summary for Reach 4R: Stream below RR crossing

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 1.98" for 10 YEAR event
Inflow = 91.80 cfs @ 12.83 hrs, Volume= 15.992 af
Outflow = 91.53 cfs @ 12.91 hrs, Volume= 15.908 af, Atten= 0%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.95 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 7.1 min

Peak Storage= 15,917 cf @ 12.86 hrs
Average Depth at Peak Storage= 2.24'
Bank-Full Depth= 6.00' Flow Area= 72.0 sf, Capacity= 582.42 cfs

6.00' x 6.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 82.00', Outlet Invert= 77.00'



Summary for Reach 6R: Stream below Site @ PL

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 2.13" for 10 YEAR event
Inflow = 180.46 cfs @ 12.90 hrs, Volume= 48.484 af
Outflow = 180.21 cfs @ 12.94 hrs, Volume= 48.392 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.13 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.48 fps, Avg. Travel Time= 2.2 min

Peak Storage= 13,236 cf @ 12.91 hrs
Average Depth at Peak Storage= 2.74'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 257.100 ac, 26.89% Impervious, Inflow Depth > 2.20" for 10 YEAR event
Inflow = 179.35 cfs @ 12.84 hrs, Volume= 47.101 af
Outflow = 178.99 cfs @ 12.89 hrs, Volume= 46.963 af, Atten= 0%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.67 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 5.31 fps, Avg. Travel Time= 3.5 min

Peak Storage= 20,372 cf @ 12.86 hrs
Average Depth at Peak Storage= 1.88'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

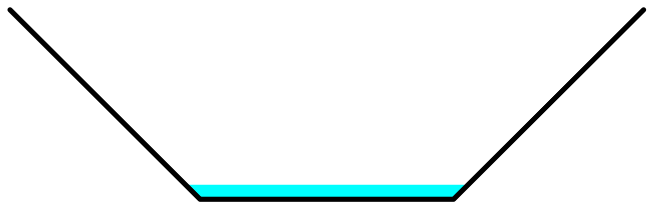
Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 1.26" for 10 YEAR event
Inflow = 1.70 cfs @ 15.15 hrs, Volume= 1.156 af
Outflow = 1.70 cfs @ 16.05 hrs, Volume= 1.014 af, Atten= 0%, Lag= 53.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.75 fps, Min. Travel Time= 32.1 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 44.3 min

Peak Storage= 3,268 cf @ 15.51 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'



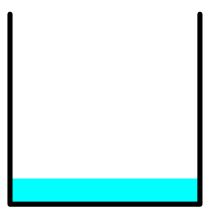
Summary for Reach 17R:

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 1.58" for 10 YEAR event
Inflow = 6.44 cfs @ 13.33 hrs, Volume= 1.102 af
Outflow = 6.41 cfs @ 13.40 hrs, Volume= 1.094 af, Atten= 0%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.32 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 4.3 min

Peak Storage= 846 cf @ 13.36 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 3.00' Flow Area= 9.0 sf, Capacity= 102.76 cfs

3.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Length= 700.0' Slope= 0.0286 '/'
Inlet Invert= 81.00', Outlet Invert= 61.00'



Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 2.28" for 10 YEAR event
Inflow = 137.41 cfs @ 12.64 hrs, Volume= 35.006 af
Outflow = 137.06 cfs @ 12.71 hrs, Volume= 34.868 af, Atten= 0%, Lag= 4.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.79 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 3.99 fps, Avg. Travel Time= 5.0 min

Peak Storage= 21,119 cf @ 12.67 hrs
Average Depth at Peak Storage= 1.80'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site @ PL

Inflow Area = 36.040 ac, 0.28% Impervious, Inflow Depth > 1.63" for 10 YEAR event
Inflow = 29.25 cfs @ 12.85 hrs, Volume= 4.910 af
Outflow = 29.20 cfs @ 12.91 hrs, Volume= 4.890 af, Atten= 0%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.47 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 4.5 min

Peak Storage= 3,793 cf @ 12.87 hrs
Average Depth at Peak Storage= 0.94'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 1.91" for 10 YEAR event
Inflow = 90.43 cfs @ 13.15 hrs, Volume= 17.733 af
Outflow = 90.39 cfs @ 13.16 hrs, Volume= 17.704 af, Atten= 0%, Lag= 0.9 min
Primary = 58.61 cfs @ 13.16 hrs, Volume= 16.092 af
Secondary = 31.78 cfs @ 13.16 hrs, Volume= 1.612 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.38' @ 13.16 hrs Surf.Area= 7,119 sf Storage= 18,233 cf

Plug-Flow detention time= 3.6 min calculated for 17.704 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (870.8 - 867.7)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=58.60 cfs @ 13.16 hrs HW=71.38' (Free Discharge)
1=Culvert (Inlet Controls 38.33 cfs @ 7.81 fps)
2=Culvert (Inlet Controls 20.27 cfs @ 6.45 fps)

Secondary OutFlow Max=31.64 cfs @ 13.16 hrs HW=71.38' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 31.64 cfs @ 1.66 fps)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 2.13" for 10 YEAR event
Inflow = 180.21 cfs @ 12.94 hrs, Volume= 48.392 af
Outflow = 88.83 cfs @ 15.03 hrs, Volume= 44.518 af, Atten= 51%, Lag= 125.9 min
Primary = 88.83 cfs @ 15.03 hrs, Volume= 44.518 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 51.40' @ 15.03 hrs Surf.Area= 148,024 sf Storage= 727,780 cf

Plug-Flow detention time= 106.3 min calculated for 44.370 af (92% of inflow)
Center-of-Mass det. time= 84.2 min (961.5 - 877.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=88.83 cfs @ 15.03 hrs HW=51.40' (Free Discharge)
1=Culvert (Inlet Controls 58.62 cfs @ 11.94 fps)
2=Culvert (Inlet Controls 30.21 cfs @ 9.62 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3P: 24" CULVERT

Inflow Area = 36.040 ac, 0.28% Impervious, Inflow Depth > 1.63" for 10 YEAR event
Inflow = 29.20 cfs @ 12.91 hrs, Volume= 4.890 af
Outflow = 24.24 cfs @ 13.21 hrs, Volume= 4.852 af, Atten= 17%, Lag= 18.2 min
Primary = 24.24 cfs @ 13.21 hrs, Volume= 4.852 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 57.57' @ 13.21 hrs Surf.Area= 9,350 sf Storage= 22,161 cf

Plug-Flow detention time= 12.5 min calculated for 4.852 af (99% of inflow)
Center-of-Mass det. time= 9.9 min (864.4 - 854.6)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=24.23 cfs @ 13.21 hrs HW=57.57' (Free Discharge)
└─**1=Culvert** (Inlet Controls 24.23 cfs @ 7.71 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=54.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 1.85" for 10 YEAR event
Inflow = 12.23 cfs @ 12.83 hrs, Volume= 2.009 af
Outflow = 8.95 cfs @ 13.22 hrs, Volume= 1.973 af, Atten= 27%, Lag= 23.6 min
Primary = 8.95 cfs @ 13.22 hrs, Volume= 1.973 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 86.86' @ 13.22 hrs Surf.Area= 13,049 sf Storage= 15,074 cf

Plug-Flow detention time= 26.6 min calculated for 1.973 af (98% of inflow)
Center-of-Mass det. time= 20.5 min (864.1 - 843.6)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=8.95 cfs @ 13.22 hrs HW=86.86' (Free Discharge)
└─**1=Culvert** (Inlet Controls 8.95 cfs @ 5.06 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=85.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 2.33" for 10 YEAR event
Inflow = 137.73 cfs @ 12.61 hrs, Volume= 35.796 af
Outflow = 137.41 cfs @ 12.64 hrs, Volume= 35.006 af, Atten= 0%, Lag= 1.8 min
Primary = 40.18 cfs @ 12.64 hrs, Volume= 20.895 af
Secondary = 97.23 cfs @ 12.64 hrs, Volume= 14.111 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 137.72' @ 12.64 hrs Surf.Area= 19,152 sf Storage= 92,199 cf

Plug-Flow detention time= 22.3 min calculated for 34.889 af (97% of inflow)
Center-of-Mass det. time= 15.2 min (865.6 - 850.5)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=40.17 cfs @ 12.64 hrs HW=137.72' (Free Discharge)
├─**1=Culvert** (Barrel Controls 0.74 cfs @ 10.99 fps)
└─**2=Culvert** (Inlet Controls 39.44 cfs @ 8.03 fps)

Secondary OutFlow Max=96.98 cfs @ 12.64 hrs HW=137.72' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 96.98 cfs @ 2.26 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 2.27" for 10 YEAR event
Inflow = 137.06 cfs @ 12.71 hrs, Volume= 34.868 af
Outflow = 115.80 cfs @ 13.58 hrs, Volume= 34.715 af, Atten= 16%, Lag= 51.8 min
Primary = 115.80 cfs @ 13.58 hrs, Volume= 34.715 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 101.66' @ 13.58 hrs Surf.Area= 38,314 sf Storage= 117,247 cf

Plug-Flow detention time= 12.5 min calculated for 34.599 af (99% of inflow)
Center-of-Mass det. time= 11.1 min (881.4 - 870.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=115.79 cfs @ 13.58 hrs HW=101.66' (Free Discharge)
└─**1=Culvert** (Inlet Controls 115.79 cfs @ 9.21 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=96.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

```
Inflow Area =     11.000 ac, 45.45% Impervious, Inflow Depth >  2.81"   for 10 YEAR event
Inflow      =     34.68 cfs @  12.12 hrs, Volume=       2.580 af
Outflow     =      1.70 cfs @  15.15 hrs, Volume=       1.156 af, Atten= 95%, Lag= 181.6 min
Primary     =      1.70 cfs @  15.15 hrs, Volume=       1.156 af
Secondary =        0.00 cfs @   5.00 hrs, Volume=       0.000 af
```

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 123.47' @ 15.15 hrs Surf.Area= 24,239 sf Storage= 74,205 cf

Plug-Flow detention time= 249.6 min calculated for 1.156 af (45% of inflow)
Center-of-Mass det. time= 162.9 min (942.8 - 780.0)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.70 cfs @ 15.15 hrs HW=123.47' (Free Discharge)
└─**1=Culvert** (Passes 1.70 cfs of 23.79 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.70 cfs @ 8.64 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

```
Inflow Area =    111.340 ac, 22.38% Impervious, Inflow Depth >  1.94"   for 10 YEAR event
Inflow      =     95.42 cfs @  12.99 hrs, Volume=      17.974 af
Outflow     =     90.43 cfs @  13.15 hrs, Volume=      17.733 af, Atten= 5%, Lag= 9.4 min
Primary     =     38.16 cfs @  13.15 hrs, Volume=      13.705 af
Secondary =       52.27 cfs @  13.15 hrs, Volume=       4.028 af
```

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.86' @ 13.15 hrs Surf.Area= 52,533 sf Storage= 84,592 cf

Plug-Flow detention time= 19.8 min calculated for 17.674 af (98% of inflow)
Center-of-Mass det. time= 15.3 min (867.7 - 852.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=38.16 cfs @ 13.15 hrs HW=71.86' (Free Discharge)
└─**1=Culvert** (Inlet Controls 38.16 cfs @ 7.77 fps)

Secondary OutFlow Max=52.24 cfs @ 13.15 hrs HW=71.86' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 52.24 cfs @ 2.44 fps)

Summary for Pond 15P: FocalPoint 60sf

Inflow Area = 0.550 ac, 67.27% Impervious, Inflow Depth > 3.30" for 10 YEAR event
Inflow = 2.39 cfs @ 12.02 hrs, Volume= 0.151 af
Outflow = 2.38 cfs @ 12.03 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.4 min
Primary = 0.14 cfs @ 11.10 hrs, Volume= 0.084 af
Secondary = 2.24 cfs @ 12.03 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.78' @ 12.03 hrs Surf.Area= 60 sf Storage= 125 cf

Plug-Flow detention time= 2.4 min calculated for 0.151 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (761.9 - 759.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.75'	27 cf	**3.00'W x 20.00'L x 2.25'H FocalPoint** 135 cf Overall x 20.0% Voids
#2	100.00'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	60	0	0
100.50	157	54	54
101.00	157	79	133

Device	Routing	Invert	Outlet Devices
#1	Primary	97.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	100.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 11.10 hrs HW=97.90' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=2.14 cfs @ 12.03 hrs HW=100.77' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 2.14 cfs @ 1.69 fps)

Summary for Pond 16P: Arctic Fox WET POND

Inflow Area = 4.210 ac, 26.13% Impervious, Inflow Depth > 2.33" for 10 YEAR event
Inflow = 4.99 cfs @ 12.80 hrs, Volume= 0.818 af
Outflow = 0.87 cfs @ 14.84 hrs, Volume= 0.426 af, Atten= 83%, Lag= 122.2 min
Primary = 0.87 cfs @ 14.84 hrs, Volume= 0.426 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 77.00' Surf.Area= 4,505 sf Storage= 18,632 cf
Peak Elev= 79.60' @ 14.84 hrs Surf.Area= 10,110 sf Storage= 41,095 cf (22,463 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 149.0 min (980.4 - 831.5)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	82,315 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	1,852	0	0
72.00	2,232	2,042	2,042
73.00	2,636	2,434	4,476
74.00	3,065	2,851	7,327
75.00	3,520	3,293	10,619
76.00	4,000	3,760	14,379
77.00	4,505	4,253	18,632
77.10	7,408	596	19,227
78.00	8,400	7,114	26,341
79.00	9,450	8,925	35,266
80.00	10,557	10,004	45,269
81.00	11,720	11,139	56,408
82.00	12,940	12,330	68,738
83.00	14,215	13,578	82,315

Device	Routing	Invert	Outlet Devices
#1	Primary	74.00'	**18.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 74.00' / 70.00' S= 0.0690 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	78.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	81.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	81.50'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.87 cfs @ 14.84 hrs HW=79.60' (Free Discharge)
1=Culvert (Passes 0.87 cfs of 18.73 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.87 cfs @ 4.43 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=77.00' (Free Discharge)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 17P: Mallard Way WET POND

Inflow Area = 7.260 ac, 33.06% Impervious, Inflow Depth > 2.50" for 10 YEAR event
Inflow = 9.21 cfs @ 12.79 hrs, Volume= 1.513 af
Outflow = 5.98 cfs @ 13.28 hrs, Volume= 0.948 af, Atten= 35%, Lag= 29.3 min
Primary = 5.98 cfs @ 13.28 hrs, Volume= 0.948 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 88.00' Surf.Area= 5,558 sf Storage= 23,438 cf
Peak Elev= 90.74' @ 13.28 hrs Surf.Area= 12,902 sf Storage= 53,590 cf (30,152 cf above start)

Plug-Flow detention time= 303.7 min calculated for 0.410 af (27% of inflow)
Center-of-Mass det. time= 82.8 min (909.8 - 827.1)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	70,904 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	1,346	0	0
82.00	1,867	1,607	1,607
83.00	2,419	2,143	3,750
84.00	2,996	2,708	6,457
85.00	3,599	3,298	9,755
86.00	4,226	3,913	13,667
87.00	4,879	4,553	18,220
88.00	5,558	5,219	23,438
88.10	9,325	744	24,182
89.00	10,578	8,956	33,139
90.00	11,887	11,233	44,371
91.00	13,252	12,570	56,941
92.00	14,675	13,964	70,904

Device	Routing	Invert	Outlet Devices
#1	Primary	86.00'	**18.0" Round Culvert** L= 31.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 86.00' / 85.50' S= 0.0161 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	89.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	90.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	91.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.87 cfs @ 13.28 hrs HW=90.74' (Free Discharge)
└─**1=Culvert** (Passes 5.87 cfs of 17.00 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.80 fps)
  └─**3=Orifice/Grate** (Weir Controls 4.93 cfs @ 1.61 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=88.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 18P: 24" CULVERT

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 1.59" for 10 YEAR event
Inflow = 6.58 cfs @ 13.27 hrs, Volume= 1.109 af
Outflow = 6.44 cfs @ 13.33 hrs, Volume= 1.102 af, Atten= 2%, Lag= 4.0 min
Primary = 6.44 cfs @ 13.33 hrs, Volume= 1.102 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 86.14' @ 13.33 hrs Surf.Area= 1,850 sf Storage= 1,388 cf

Plug-Flow detention time= 5.0 min calculated for 1.102 af (99% of inflow)
Center-of-Mass det. time= 3.1 min (902.9 - 899.8)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	15,869 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	788	0	0
86.00	1,512	1,150	1,150
87.00	3,898	2,705	3,855
88.00	5,621	4,760	8,615
89.00	8,888	7,255	15,869

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=6.42 cfs @ 13.33 hrs HW=86.14' (Free Discharge)
└─**1=Culvert** (Barrel Controls 6.42 cfs @ 5.01 fps)

Summary for Pond 20P: Arch Culvert 1

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 1.98" for 10 YEAR event
Inflow = 91.80 cfs @ 12.81 hrs, Volume= 16.001 af
Outflow = 91.80 cfs @ 12.83 hrs, Volume= 15.992 af, Atten= 0%, Lag= 0.6 min
Primary = 91.80 cfs @ 12.83 hrs, Volume= 15.992 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 85.05' @ 12.83 hrs Surf.Area= 2,314 sf Storage= 4,023 cf

Plug-Flow detention time= 0.8 min calculated for 15.939 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (846.7 - 846.1)

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	85,094 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.00	320	0	0
86.00	2,932	6,504	6,504
87.00	7,643	5,288	11,792
88.00	11,989	9,816	21,608
89.00	18,865	15,427	37,035
90.00	23,627	21,246	58,281
91.00	30,000	26,814	85,094

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**88.0" W x 54.0" H, R=45.0"/126.0" Pipe Arch RCP_Arch 88x54** L= 70.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 82.00' / 81.50' S= 0.0071 '/' Cc= 0.900

			n= 0.022 Earth, clean & straight, Flow Area= 25.69 sf
#2	Secondary	90.00'	**25.0' long x 25.0' 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=91.68 cfs @ 12.83 hrs HW=85.05' (Free Discharge)
└─**1=RCP_Arch 88x54** (Barrel Controls 91.68 cfs @ 6.19 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=82.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 21P: Arch Culvert 2

Inflow Area = 190.110 ac, 29.46% Impervious, Inflow Depth > 2.24" for 10 YEAR event
Inflow = 117.28 cfs @ 13.54 hrs, Volume= 35.520 af
Outflow = 117.26 cfs @ 13.58 hrs, Volume= 35.416 af, Atten= 0%, Lag= 2.0 min
Primary = 117.26 cfs @ 13.58 hrs, Volume= 35.416 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 94.90' @ 13.58 hrs Surf.Area= 8,247 sf Storage= 18,840 cf

Plug-Flow detention time= 3.3 min calculated for 35.416 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (882.7 - 880.3)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	200,953 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	5,000	0	0
93.00	6,000	5,500	5,500
94.00	7,000	6,500	12,000
95.00	8,390	7,695	19,695
96.00	12,267	10,329	30,024
97.00	23,771	18,019	48,043
98.00	31,886	27,829	75,871
99.00	67,139	49,513	125,384
100.00	84,000	75,570	200,953

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**122.0" W x 77.3" H, R=62.0"/218.0" Pipe Arch RCP_Arch 122x78**
			L= 70.0' RCP, end-section conforming to fill, Ke= 0.500
			Inlet / Outlet Invert= 92.00' / 91.50' S= 0.0071 '/' Cc= 0.900
			n= 0.022 Earth, clean & straight, Flow Area= 51.67 sf
#2	Secondary	99.00'	**25.0' long x 25.0' 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=117.25 cfs @ 13.58 hrs HW=94.90' (Free Discharge)
└─**1=RCP_Arch 122x78** (Barrel Controls 117.25 cfs @ 6.18 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 24P: Cultec Recharger 150XLHD

Inflow Area =	0.550 ac,	67.27% Impervious, Inflow Depth >	3.30"	for 10 YEAR event
Inflow =	2.38 cfs @	12.03 hrs, Volume=	0.151 af	
Outflow =	2.93 cfs @	12.10 hrs, Volume=	0.150 af,	Atten= 0%, Lag= 4.3 min
Primary =	1.86 cfs @	12.10 hrs, Volume=	0.142 af	
Secondary =	1.08 cfs @	12.10 hrs, Volume=	0.008 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 96.71' @ 12.10 hrs Surf.Area= 0.025 ac Storage= 0.036 af

Plug-Flow detention time= 41.2 min calculated for 0.150 af (99% of inflow)
Center-of-Mass det. time= 37.5 min (799.3 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.00'	0.018 af	**14.50'W x 74.50'L x 2.54'H Field A** 0.063 af Overall - 0.018 af Embedded = 0.045 af x 40.0% Voids
#2A	94.50'	0.018 af	**Cultec R-150XLHD** x 28 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
#3	96.50'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**
		0.037 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	94.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	96.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	96.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.84 cfs @ 12.10 hrs HW=96.71' (Free Discharge)
└─**1=Culvert** (Passes 1.84 cfs of 11.91 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.38 cfs @ 7.74 fps)
  └─**3=Orifice/Grate** (Weir Controls 1.46 cfs @ 1.49 fps)

Secondary OutFlow Max=1.07 cfs @ 12.10 hrs HW=96.71' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.07 cfs @ 1.28 fps)

Summary for Pond 51P: 54 ROOF DRIPLINE BMP'S

Inflow Area = 3.220 ac,100.00% Impervious, Inflow Depth > 4.05" for 10 YEAR event
Inflow = 10.82 cfs @ 12.21 hrs, Volume= 1.087 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.13' @ 20.00 hrs Surf.Area= 867,510 sf Storage= 47,341 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	13,187 cf	**3.00'W x 105.00'L x 2.00'H Prismatoid** x 54 34,020 cf Overall - 1,051 cf Embedded = 32,969 cf x 40.0% Voids
#2	100.00'	1,051 cf	**6.0" Round Pipe Storage** x 51 Inside #1 L= 105.0' S= 0.0050 '/'
		14,239 cf	x 51.00 = 726,182 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.50'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 51.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=100.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment 1S:

Runoff = 131.34 cfs @ 12.79 hrs, Volume= 21.542 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	43.440	70	WOODS / FIELD HSG C
*	18.400	98	EXISTING IMPERVIOUS AREA
*	23.400	74	EXISTING LAWN C
*	0.100	74	NEW LAWN C
	85.340	77	Weighted Average
	66.940		78.44% Pervious Area
	18.400		21.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 112.64 cfs @ 12.69 hrs, Volume= 16.962 af, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	22.010	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
*	1.850	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51S)
*	0.130	98	New Trails
	66.990	77	Weighted Average
	53.860		80.40% Pervious Area
	13.130		19.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 45.00 cfs @ 12.82 hrs, Volume= 7.460 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	31.320	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
*	0.210	74	NEW LAWN C
*	0.410	70	NEW FILL SLOPE
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
*	0.100	98	NEW Trails
	36.040	71	Weighted Average
	35.940		99.72% Pervious Area
	0.100		0.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
16.5	75	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.3	625	Total			

Summary for Subcatchment 4S:

Runoff = 18.21 cfs @ 12.81 hrs, Volume= 2.982 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
*	0.000	98	NEW IMPERVIOUS PAVED AREA
*	0.000	74	NEW LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 129.65 cfs @ 13.46 hrs, Volume= 31.922 af, Depth> 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 145.08 cfs @ 12.51 hrs, Volume= 18.906 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 47.09 cfs @ 12.12 hrs, Volume= 3.550 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Subcatchment 14S: 550 ROAD, 22' ROAD, 5' WALK to Forest Buffer

Runoff = 1.86 cfs @ 12.26 hrs, Volume= 0.196 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.400	98	NEW IMPERVIOUS PAVED AREA
*	0.100	74	NEW LAWN C
	0.500	93	Weighted Average
	0.100		20.00% Pervious Area
	0.400		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
18.3	75	0.0700	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.7	336	Total			

Summary for Subcatchment 15S: 600' ROAD, 22' ROAD, 5' WALK to Focal Points

Runoff = 3.14 cfs @ 12.02 hrs, Volume= 0.202 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.370	98	NEW IMPERVIOUS PAVED AREA
*	0.180	74	NEW LAWN C
	0.550	90	Weighted Average
	0.180		32.73% Pervious Area
	0.370		67.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
1.4	261	Total			

Summary for Subcatchment 16S: Arctic Fox Pond Watershed

Runoff = 7.06 cfs @ 12.78 hrs, Volume= 1.163 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.570	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	1.100	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	2.540	74	NEW LAWN C
	4.210	80	Weighted Average
	3.110		73.87% Pervious Area
	1.100		26.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 17S: Mallard Lane Pond Watershed

Runoff = 12.83 cfs @ 12.78 hrs, Volume= 2.124 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.220	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	2.400	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	4.640	74	NEW LAWN C
	7.260	82	Weighted Average
	4.860		66.94% Pervious Area
	2.400		33.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 18S:

Runoff = 1.62 cfs @ 12.71 hrs, Volume= 0.243 af, Depth> 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	0.450	70	WOODS / FIELD HSG C
*	0.680	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
	1.130	72	Weighted Average
	1.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 19S:

Runoff = 40.63 cfs @ 12.14 hrs, Volume= 3.049 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	10.660	70	WOODS / FIELD HSG C
*	0.600	98	EXISTING IMPERVIOUS AREA
*	1.600	74	EXISTING LAWN C
*	0.940	74	NEW LAWN C
*	0.150	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	13.950	72	Weighted Average
	13.200		94.62% Pervious Area
	0.750		5.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.7	300	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
9.2	400	Total			

Summary for Subcatchment 20S:

Runoff = 9.81 cfs @ 12.51 hrs, Volume= 1.233 af, Depth> 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	5.820	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	0.290	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	6.110	70	Weighted Average
	6.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.7	200	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
35.5	300	Total			

Summary for Subcatchment 51S: NEW Cottage Roof Areas

Runoff = 13.68 cfs @ 12.21 hrs, Volume= 1.381 af, Depth> 5.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.80"

	Area (ac)	CN	Description
*	3.220	98	52 Cottage Roofs + Community Buildings
	3.220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.4000	3.25		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
2.5	25	0.0400	0.17		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.10"
13.1	75	0.1600	0.10		**Sheet Flow, CD** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.7	120	Total			

Summary for Reach 3R: Stream @ Property Line

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 2.82" for 25 YEAR event
Inflow = 138.49 cfs @ 12.88 hrs, Volume= 26.128 af
Outflow = 138.13 cfs @ 12.96 hrs, Volume= 25.998 af, Atten= 0%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.07 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 7.3 min

Peak Storage= 23,439 cf @ 12.92 hrs
Average Depth at Peak Storage= 1.95'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 287.21 cfs

12.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 77.00', Outlet Invert= 72.00'

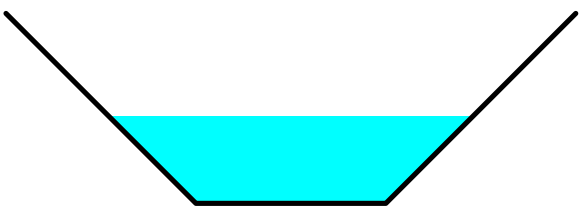
Summary for Reach 4R: Stream below RR crossing

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 2.85" for 25 YEAR event
Inflow = 132.89 cfs @ 12.82 hrs, Volume= 22.983 af
Outflow = 132.44 cfs @ 12.89 hrs, Volume= 22.883 af, Atten= 0%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.49 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 2.30 fps, Avg. Travel Time= 6.2 min

Peak Storage= 20,778 cf @ 12.85 hrs
Average Depth at Peak Storage= 2.76'
Bank-Full Depth= 6.00' Flow Area= 72.0 sf, Capacity= 582.42 cfs

6.00' x 6.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 82.00', Outlet Invert= 77.00'



Summary for Reach 6R: Stream below Site @ PL

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 3.07" for 25 YEAR event
Inflow = 250.46 cfs @ 12.91 hrs, Volume= 69.911 af
Outflow = 250.22 cfs @ 12.96 hrs, Volume= 69.799 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.73 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 3.75 fps, Avg. Travel Time= 2.0 min

Peak Storage= 16,730 cf @ 12.93 hrs
Average Depth at Peak Storage= 3.29'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 257.100 ac, 26.89% Impervious, Inflow Depth > 3.16" for 25 YEAR event
Inflow = 243.08 cfs @ 12.80 hrs, Volume= 67.667 af
Outflow = 242.73 cfs @ 12.85 hrs, Volume= 67.501 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.61 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 5.75 fps, Avg. Travel Time= 3.2 min

Peak Storage= 25,194 cf @ 12.82 hrs
Average Depth at Peak Storage= 2.24'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 1.54" for 25 YEAR event
Inflow = 2.00 cfs @ 15.48 hrs, Volume= 1.411 af
Outflow = 2.00 cfs @ 16.31 hrs, Volume= 1.251 af, Atten= 0%, Lag= 49.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 30.3 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 42.6 min

Peak Storage= 3,624 cf @ 15.80 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'

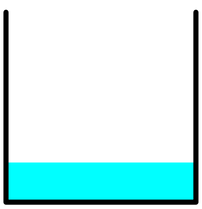
Summary for Reach 17R:

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 2.52" for 25 YEAR event
Inflow = 12.30 cfs @ 13.09 hrs, Volume= 1.764 af
Outflow = 12.26 cfs @ 13.14 hrs, Volume= 1.757 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.60 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 2.89 fps, Avg. Travel Time= 4.0 min

Peak Storage= 1,304 cf @ 13.11 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 3.00' Flow Area= 9.0 sf, Capacity= 102.76 cfs

3.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Length= 700.0' Slope= 0.0286 '/'
Inlet Invert= 81.00', Outlet Invert= 61.00'



Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 3.26" for 25 YEAR event
Inflow = 195.61 cfs @ 12.62 hrs, Volume= 49.959 af
Outflow = 195.00 cfs @ 12.69 hrs, Volume= 49.794 af, Atten= 0%, Lag= 4.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.68 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 4.33 fps, Avg. Travel Time= 4.6 min

Peak Storage= 26,999 cf @ 12.65 hrs
Average Depth at Peak Storage= 2.20'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site @ PL

Inflow Area =	36.040 ac,	0.28% Impervious,	Inflow Depth > 2.48"	for 25 YEAR event
Inflow =	45.00 cfs @	12.82 hrs, Volume=	7.460 af	
Outflow =	44.85 cfs @	12.89 hrs, Volume=	7.436 af,	Atten= 0%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.01 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.86 fps, Avg. Travel Time= 4.0 min

Peak Storage= 5,048 cf @ 12.85 hrs
Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area =	111.340 ac,	22.38% Impervious,	Inflow Depth > 2.77"	for 25 YEAR event
Inflow =	132.69 cfs @	13.10 hrs, Volume=	25.710 af	
Outflow =	132.66 cfs @	13.11 hrs, Volume=	25.668 af,	Atten= 0%, Lag= 0.7 min
Primary =	61.50 cfs @	13.11 hrs, Volume=	20.586 af	
Secondary =	71.16 cfs @	13.11 hrs, Volume=	5.083 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 71.66' @ 13.11 hrs Surf.Area= 7,421 sf Storage= 20,226 cf

Plug-Flow detention time= 3.3 min calculated for 25.668 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (859.2 - 856.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=61.49 cfs @ 13.11 hrs HW=71.65' (Free Discharge)
1=Culvert (Inlet Controls 40.28 cfs @ 8.21 fps)
2=Culvert (Inlet Controls 21.21 cfs @ 6.75 fps)

Secondary OutFlow Max=71.03 cfs @ 13.11 hrs HW=71.65' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 71.03 cfs @ 2.17 fps)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 3.07" for 25 YEAR event
Inflow = 250.22 cfs @ 12.96 hrs, Volume= 69.799 af
Outflow = 107.16 cfs @ 15.42 hrs, Volume= 59.718 af, Atten= 57%, Lag= 147.8 min
Primary = 107.16 cfs @ 15.42 hrs, Volume= 59.718 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 54.24' @ 15.42 hrs Surf.Area= 184,784 sf Storage= 1,203,628 cf

Plug-Flow detention time= 133.7 min calculated for 59.718 af (86% of inflow)
Center-of-Mass det. time= 96.8 min (965.7 - 868.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=107.16 cfs @ 15.42 hrs HW=54.24' (Free Discharge)
1=Culvert (Inlet Controls 70.86 cfs @ 14.44 fps)
2=Culvert (Inlet Controls 36.30 cfs @ 11.55 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 3P: 24" CULVERT

Inflow Area = 36.040 ac, 0.28% Impervious, Inflow Depth > 2.48" for 25 YEAR event
Inflow = 44.85 cfs @ 12.89 hrs, Volume= 7.436 af
Outflow = 38.26 cfs @ 13.17 hrs, Volume= 7.390 af, Atten= 15%, Lag= 16.9 min
Primary = 31.09 cfs @ 13.17 hrs, Volume= 7.225 af
Secondary = 7.16 cfs @ 13.17 hrs, Volume= 0.165 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 59.23' @ 13.17 hrs Surf.Area= 16,126 sf Storage= 42,346 cf

Plug-Flow detention time= 15.0 min calculated for 7.390 af (99% of inflow)
Center-of-Mass det. time= 12.8 min (858.2 - 845.4)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=31.08 cfs @ 13.17 hrs HW=59.22' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 31.08 cfs @ 9.89 fps)

Secondary OutFlow Max=7.02 cfs @ 13.17 hrs HW=59.22' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 7.02 cfs @ 1.26 fps)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 2.75" for 25 YEAR event
Inflow = 18.21 cfs @ 12.81 hrs, Volume= 2.982 af
Outflow = 11.61 cfs @ 13.31 hrs, Volume= 2.938 af, Atten= 36%, Lag= 30.1 min
Primary = 11.61 cfs @ 13.31 hrs, Volume= 2.938 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.61' @ 13.31 hrs Surf.Area= 17,137 sf Storage= 26,474 cf

Plug-Flow detention time= 30.0 min calculated for 2.938 af (99% of inflow)
Center-of-Mass det. time= 24.9 min (860.1 - 835.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=11.61 cfs @ 13.31 hrs HW=87.61' (Free Discharge)
└—**1=Culvert** (Inlet Controls 11.61 cfs @ 6.57 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=85.00' (Free Discharge)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area =	184.000 ac, 30.43% Impervious, Inflow Depth > 3.31" for 25 YEAR event			
Inflow =	195.88 cfs @	12.60 hrs, Volume=	50.828 af	
Outflow =	195.61 cfs @	12.62 hrs, Volume=	49.959 af,	Atten= 0%, Lag= 1.4 min
Primary =	41.35 cfs @	12.62 hrs, Volume=	24.775 af	
Secondary =	154.26 cfs @	12.62 hrs, Volume=	25.185 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 137.98' @ 12.62 hrs Surf.Area= 19,954 sf Storage= 97,425 cf

Plug-Flow detention time= 18.5 min calculated for 49.959 af (98% of inflow)
Center-of-Mass det. time= 12.7 min (855.8 - 843.0)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=41.34 cfs @ 12.62 hrs HW=137.98' (Free Discharge)
1=Culvert (Barrel Controls 0.75 cfs @ 11.15 fps)
2=Culvert (Inlet Controls 40.59 cfs @ 8.27 fps)

Secondary OutFlow Max=153.85 cfs @ 12.62 hrs HW=137.98' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 153.85 cfs @ 2.61 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 3.25" for 25 YEAR event
Inflow = 195.00 cfs @ 12.69 hrs, Volume= 49.794 af
Outflow = 167.75 cfs @ 13.40 hrs, Volume= 49.594 af, Atten= 14%, Lag= 42.0 min
Primary = 143.09 cfs @ 13.40 hrs, Volume= 47.792 af
Secondary = 24.65 cfs @ 13.40 hrs, Volume= 1.802 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 103.59' @ 13.40 hrs Surf.Area= 50,620 sf Storage= 202,628 cf

Plug-Flow detention time= 15.7 min calculated for 49.429 af (99% of inflow)
Center-of-Mass det. time= 14.3 min (874.4 - 860.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=143.09 cfs @ 13.40 hrs HW=103.59' (Free Discharge)
1=Culvert (Inlet Controls 143.09 cfs @ 11.39 fps)

Secondary OutFlow Max=24.65 cfs @ 13.40 hrs HW=103.59' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 24.65 cfs @ 2.08 fps)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 3.87" for 25 YEAR event
Inflow = 47.09 cfs @ 12.12 hrs, Volume= 3.550 af
Outflow = 2.00 cfs @ 15.48 hrs, Volume= 1.411 af, Atten= 96%, Lag= 201.4 min
Primary = 2.00 cfs @ 15.48 hrs, Volume= 1.411 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 124.71' @ 15.48 hrs Surf.Area= 27,778 sf Storage= 105,955 cf

Plug-Flow detention time= 256.5 min calculated for 1.411 af (40% of inflow)
Center-of-Mass det. time= 162.0 min (934.4 - 772.4)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.00 cfs @ 15.48 hrs HW=124.71' (Free Discharge)
└─**1=Culvert** (Passes 2.00 cfs of 29.13 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 2.00 cfs @ 10.17 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 2.80" for 25 YEAR event
Inflow = 138.13 cfs @ 12.96 hrs, Volume= 25.998 af
Outflow = 132.69 cfs @ 13.10 hrs, Volume= 25.710 af, Atten= 4%, Lag= 8.1 min
Primary = 40.91 cfs @ 13.10 hrs, Volume= 17.100 af
Secondary = 91.79 cfs @ 13.10 hrs, Volume= 8.610 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 72.25' @ 13.10 hrs Surf.Area= 56,431 sf Storage= 106,101 cf

Plug-Flow detention time= 18.1 min calculated for 25.710 af (99% of inflow)
Center-of-Mass det. time= 14.3 min (856.4 - 842.1)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=40.91 cfs @ 13.10 hrs HW=72.25' (Free Discharge)
└─**1=Culvert** (Inlet Controls 40.91 cfs @ 8.33 fps)

Secondary OutFlow Max=91.76 cfs @ 13.10 hrs HW=72.25' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 91.76 cfs @ 2.95 fps)

Summary for Pond 15P: FocalPoint 60sf

Inflow Area = 0.550 ac, 67.27% Impervious, Inflow Depth > 4.40" for 25 YEAR event
Inflow = 3.14 cfs @ 12.02 hrs, Volume= 0.202 af
Outflow = 3.12 cfs @ 12.03 hrs, Volume= 0.202 af, Atten= 1%, Lag= 0.4 min
Primary = 0.14 cfs @ 10.50 hrs, Volume= 0.102 af
Secondary = 2.98 cfs @ 12.03 hrs, Volume= 0.100 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.83' @ 12.03 hrs Surf.Area= 60 sf Storage= 134 cf

Plug-Flow detention time= 2.6 min calculated for 0.201 af (100% of inflow)
Center-of-Mass det. time= 2.6 min (755.9 - 753.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.75'	27 cf	**3.00'W x 20.00'L x 2.25'H FocalPoint** 135 cf Overall x 20.0% Voids
#2	100.00'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	60	0	0
100.50	157	54	54
101.00	157	79	133

Device	Routing	Invert	Outlet Devices
#1	Primary	97.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	100.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 10.50 hrs HW=97.89' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=2.84 cfs @ 12.03 hrs HW=100.82' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 2.84 cfs @ 1.86 fps)

Summary for Pond 16P: Arctic Fox WET POND

Inflow Area = 4.210 ac, 26.13% Impervious, Inflow Depth > 3.32" for 25 YEAR event
Inflow = 7.06 cfs @ 12.78 hrs, Volume= 1.163 af
Outflow = 1.23 cfs @ 14.72 hrs, Volume= 0.654 af, Atten= 83%, Lag= 116.0 min
Primary = 1.23 cfs @ 14.72 hrs, Volume= 0.654 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 77.00' Surf.Area= 4,505 sf Storage= 18,632 cf
Peak Elev= 80.45' @ 14.72 hrs Surf.Area= 11,085 sf Storage= 50,184 cf (31,552 cf above start)

Plug-Flow detention time= 416.3 min calculated for 0.225 af (19% of inflow)
Center-of-Mass det. time= 153.5 min (977.2 - 823.7)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	82,315 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	1,852	0	0
72.00	2,232	2,042	2,042
73.00	2,636	2,434	4,476
74.00	3,065	2,851	7,327
75.00	3,520	3,293	10,619
76.00	4,000	3,760	14,379
77.00	4,505	4,253	18,632
77.10	7,408	596	19,227
78.00	8,400	7,114	26,341
79.00	9,450	8,925	35,266
80.00	10,557	10,004	45,269
81.00	11,720	11,139	56,408
82.00	12,940	12,330	68,738
83.00	14,215	13,578	82,315

Device	Routing	Invert	Outlet Devices
#1	Primary	74.00'	**18.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 74.00' / 70.00' S= 0.0690 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	78.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	81.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	81.50'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.23 cfs @ 14.72 hrs HW=80.45' (Free Discharge)
1=Culvert (Passes 1.23 cfs of 20.32 cfs potential flow)
2=Orifice/Grate (Orifice Controls 1.23 cfs @ 6.29 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=77.00' (Free Discharge)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 17P: Mallard Way WET POND

Inflow Area = 7.260 ac, 33.06% Impervious, Inflow Depth > 3.51" for 25 YEAR event
Inflow = 12.83 cfs @ 12.78 hrs, Volume= 2.124 af
Outflow = 11.51 cfs @ 13.01 hrs, Volume= 1.529 af, Atten= 10%, Lag= 13.9 min
Primary = 11.51 cfs @ 13.01 hrs, Volume= 1.529 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 88.00' Surf.Area= 5,558 sf Storage= 23,438 cf
Peak Elev= 90.90' @ 13.01 hrs Surf.Area= 13,119 sf Storage= 55,655 cf (32,217 cf above start)

Plug-Flow detention time= 192.7 min calculated for 0.988 af (46% of inflow)
Center-of-Mass det. time= 56.8 min (876.3 - 819.5)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	70,904 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	1,346	0	0
82.00	1,867	1,607	1,607
83.00	2,419	2,143	3,750
84.00	2,996	2,708	6,457
85.00	3,599	3,298	9,755
86.00	4,226	3,913	13,667
87.00	4,879	4,553	18,220
88.00	5,558	5,219	23,438
88.10	9,325	744	24,182
89.00	10,578	8,956	33,139
90.00	11,887	11,233	44,371
91.00	13,252	12,570	56,941
92.00	14,675	13,964	70,904

Device	Routing	Invert	Outlet Devices
#1	Primary	86.00'	**18.0" Round Culvert** L= 31.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 86.00' / 85.50' S= 0.0161 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	89.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	90.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	91.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=11.49 cfs @ 13.01 hrs HW=90.90' (Free Discharge)
└─**1=Culvert** (Passes 11.49 cfs of 17.34 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.01 cfs @ 5.17 fps)
  └─**3=Orifice/Grate** (Weir Controls 10.47 cfs @ 2.07 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=88.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 18P: 24" CULVERT

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 2.53" for 25 YEAR event
Inflow = 12.79 cfs @ 12.99 hrs, Volume= 1.772 af
Outflow = 12.30 cfs @ 13.09 hrs, Volume= 1.764 af, Atten= 4%, Lag= 5.8 min
Primary = 12.30 cfs @ 13.09 hrs, Volume= 1.764 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 86.74' @ 13.09 hrs Surf.Area= 3,272 sf Storage= 2,915 cf

Plug-Flow detention time= 4.5 min calculated for 1.758 af (99% of inflow)
Center-of-Mass det. time= 3.1 min (873.3 - 870.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	15,869 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	788	0	0
86.00	1,512	1,150	1,150
87.00	3,898	2,705	3,855
88.00	5,621	4,760	8,615
89.00	8,888	7,255	15,869

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=12.29 cfs @ 13.09 hrs HW=86.74' (Free Discharge)
└─**1=Culvert** (Barrel Controls 12.29 cfs @ 5.67 fps)

Summary for Pond 20P: Arch Culvert 1

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 2.85" for 25 YEAR event
Inflow = 132.88 cfs @ 12.80 hrs, Volume= 22.993 af
Outflow = 132.89 cfs @ 12.82 hrs, Volume= 22.983 af, Atten= 0%, Lag= 1.1 min
Primary = 132.89 cfs @ 12.82 hrs, Volume= 22.983 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 85.98' @ 12.82 hrs Surf.Area= 2,917 sf Storage= 6,437 cf

Plug-Flow detention time= 0.8 min calculated for 22.906 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (837.3 - 836.7)

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	85,094 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.00	320	0	0
86.00	2,932	6,504	6,504
87.00	7,643	5,288	11,792
88.00	11,989	9,816	21,608
89.00	18,865	15,427	37,035
90.00	23,627	21,246	58,281
91.00	30,000	26,814	85,094

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**88.0" W x 54.0" H, R=45.0"/126.0" Pipe Arch RCP_Arch 88x54** L= 70.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 82.00' / 81.50' S= 0.0071 '/' Cc= 0.900

			n= 0.022 Earth, clean & straight, Flow Area= 25.69 sf
#2	Secondary	90.00'	**25.0' long x 25.0' 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=132.70 cfs @ 12.82 hrs HW=85.97' (Free Discharge)
└─**1=RCP_Arch 88x54** (Barrel Controls 132.70 cfs @ 6.88 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=82.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 21P: Arch Culvert 2

Inflow Area = 190.110 ac, 29.46% Impervious, Inflow Depth > 3.21" for 25 YEAR event
Inflow = 170.34 cfs @ 13.37 hrs, Volume= 50.827 af
Outflow = 170.22 cfs @ 13.42 hrs, Volume= 50.705 af, Atten= 0%, Lag= 2.9 min
Primary = 170.22 cfs @ 13.42 hrs, Volume= 50.705 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 95.68' @ 13.42 hrs Surf.Area= 11,009 sf Storage= 26,246 cf

Plug-Flow detention time= 3.1 min calculated for 50.705 af (100% of inflow)
Center-of-Mass det. time= 2.3 min (875.5 - 873.2)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	200,953 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	5,000	0	0
93.00	6,000	5,500	5,500
94.00	7,000	6,500	12,000
95.00	8,390	7,695	19,695
96.00	12,267	10,329	30,024
97.00	23,771	18,019	48,043
98.00	31,886	27,829	75,871
99.00	67,139	49,513	125,384
100.00	84,000	75,570	200,953

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**122.0" W x 77.3" H, R=62.0"/218.0" Pipe Arch RCP_Arch 122x78**
			L= 70.0' RCP, end-section conforming to fill, Ke= 0.500
			Inlet / Outlet Invert= 92.00' / 91.50' S= 0.0071 '/' Cc= 0.900
			n= 0.022 Earth, clean & straight, Flow Area= 51.67 sf
#2	Secondary	99.00'	**25.0' long x 25.0' 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=170.18 cfs @ 13.42 hrs HW=95.67' (Free Discharge)
↑—**1=RCP_Arch 122x78** (Barrel Controls 170.18 cfs @ 6.85 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 24P: Cultec Recharger 150XLHD

Inflow Area =	0.550 ac, 67.27% Impervious, Inflow Depth > 4.40" for 25 YEAR event			
Inflow =	3.12 cfs @	12.03 hrs, Volume=	0.202 af	
Outflow =	4.18 cfs @	12.05 hrs, Volume=	0.200 af,	Atten= 0%, Lag= 1.1 min
Primary =	2.57 cfs @	12.05 hrs, Volume=	0.182 af	
Secondary =	1.61 cfs @	12.05 hrs, Volume=	0.018 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 96.77' @ 12.04 hrs Surf.Area= 0.025 ac Storage= 0.036 af

Plug-Flow detention time= 37.3 min calculated for 0.200 af (99% of inflow)
Center-of-Mass det. time= 34.0 min (789.9 - 755.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.00'	0.018 af	**14.50'W x 74.50'L x 2.54'H Field A** 0.063 af Overall - 0.018 af Embedded = 0.045 af x 40.0% Voids
#2A	94.50'	0.018 af	**Cultec R-150XLHD** x 28 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
#3	96.50'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**
		0.037 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.00' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	94.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	96.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	96.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.41 cfs @ 12.05 hrs HW=96.76' (Free Discharge)
↑—**1=Culvert** (Passes 2.41 cfs of 12.06 cfs potential flow)
  ↑—**2=Orifice/Grate** (Orifice Controls 0.38 cfs @ 7.81 fps)
  └—**3=Orifice/Grate** (Weir Controls 2.03 cfs @ 1.66 fps)

Secondary OutFlow Max=1.50 cfs @ 12.05 hrs HW=96.76' (Free Discharge)
↑—**4=Broad-Crested Rectangular Weir** (Weir Controls 1.50 cfs @ 1.44 fps)

Summary for Pond 51P: 54 ROOF DRIPLINE BMP'S

Inflow Area = 3.220 ac,100.00% Impervious, Inflow Depth > 5.15" for 25 YEAR event
Inflow = 13.68 cfs @ 12.21 hrs, Volume= 1.381 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.17' @ 20.00 hrs Surf.Area= 867,510 sf Storage= 60,115 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	13,187 cf	**3.00'W x 105.00'L x 2.00'H Prismatoid** x 54 34,020 cf Overall - 1,051 cf Embedded = 32,969 cf x 40.0% Voids
#2	100.00'	1,051 cf	**6.0" Round Pipe Storage** x 51 Inside #1 L= 105.0' S= 0.0050 '/'
		14,239 cf	x 51.00 = 726,182 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.50'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 51.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=100.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment 1S:

Runoff = 212.84 cfs @ 12.77 hrs, Volume= 35.251 af, Depth> 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	43.440	70	WOODS / FIELD HSG C
*	18.400	98	EXISTING IMPERVIOUS AREA
*	23.400	74	EXISTING LAWN C
*	0.100	74	NEW LAWN C
	85.340	77	Weighted Average
	66.940		78.44% Pervious Area
	18.400		21.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 2S:

Runoff = 182.12 cfs @ 12.68 hrs, Volume= 27.748 af, Depth> 4.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	22.010	70	WOODS / FIELD HSG C
*	13.000	98	EXISTING IMPERVIOUS AREA
*	30.000	74	EXISTING LAWN C
*	1.850	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51S)
*	0.130	98	New Trails
	66.990	77	Weighted Average
	53.860		80.40% Pervious Area
	13.130		19.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 3S:

Runoff = 77.47 cfs @ 12.81 hrs, Volume= 12.844 af, Depth> 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	31.320	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	4.000	74	EXISTING LAWN C
*	0.210	74	NEW LAWN C
*	0.410	70	NEW FILL SLOPE
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
*	0.100	98	NEW Trails
	36.040	71	Weighted Average
	35.940		99.72% Pervious Area
	0.100		0.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.0	450	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
16.5	75	0.0900	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.3	625	Total			

Summary for Subcatchment 4S:

Runoff = 30.35 cfs @ 12.78 hrs, Volume= 5.001 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	5.000	70	WOODS / FIELD HSG C
*	1.000	98	EXISTING IMPERVIOUS AREA
*	7.000	74	EXISTING LAWN C
*	0.000	98	NEW IMPERVIOUS PAVED AREA
*	0.000	74	NEW LAWN C
	13.000	74	Weighted Average
	12.000		92.31% Pervious Area
	1.000		7.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 5S: drains to 48" culvert

Runoff = 205.17 cfs @ 13.43 hrs, Volume= 51.121 af, Depth> 5.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	47.000	70	WOODS / FIELD HSG C
*	36.000	98	EXISTING IMPERVIOUS AREA
*	35.000	74	EXISTING LAWN C
	118.000	80	Weighted Average
	82.000		69.49% Pervious Area
	36.000		30.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.0	100	0.0200	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
60.0	900	0.0100	0.25		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
14.8	2,671	0.0400	3.00		**Shallow Concentrated Flow, CD** Grassed Waterway Kv= 15.0 fps
112.8	3,671	Total			

Summary for Subcatchment 6S: drains to 48" culvert

Runoff = 226.05 cfs @ 12.51 hrs, Volume= 29.982 af, Depth> 5.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	6.000	70	WOODS / FIELD HSG C
*	20.000	98	EXISTING IMPERVIOUS AREA
*	40.000	74	EXISTING LAWN C
	66.000	81	Weighted Average
	46.000		69.70% Pervious Area
	20.000		30.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.0	900	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
3.7	2,500	0.0400	11.41	182.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=2.00' Z= 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
37.5	3,500	Total			

Summary for Subcatchment 7S:

Runoff = 70.86 cfs @ 12.12 hrs, Volume= 5.462 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.000	70	WOODS / FIELD HSG C
*	5.000	98	EXISTING IMPERVIOUS AREA
*	6.000	74	EXISTING LAWN C
	11.000	85	Weighted Average
	6.000		54.55% Pervious Area
	5.000		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.1	200	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
8.6	300	Total			

Summary for Subcatchment 14S: 550 ROAD, 22' ROAD, 5' WALK to Forest Buffer

Runoff = 2.66 cfs @ 12.26 hrs, Volume= 0.284 af, Depth> 6.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.400	98	NEW IMPERVIOUS PAVED AREA
*	0.100	74	NEW LAWN C
	0.500	93	Weighted Average
	0.100		20.00% Pervious Area
	0.400		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
18.3	75	0.0700	0.07		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
19.7	336	Total			

Summary for Subcatchment 15S: 600' ROAD, 22' ROAD, 5' WALK to Focal Points

Runoff = 4.55 cfs @ 12.02 hrs, Volume= 0.299 af, Depth> 6.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.370	98	NEW IMPERVIOUS PAVED AREA
*	0.180	74	NEW LAWN C
	0.550	90	Weighted Average
	0.180		32.73% Pervious Area
	0.370		67.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0300	1.02		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
1.2	250	0.0300	3.52		**Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps
1.4	261	Total			

Summary for Subcatchment 16S: Arctic Fox Pond Watershed

Runoff = 11.13 cfs @ 12.77 hrs, Volume= 1.859 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.570	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	1.100	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	2.540	74	NEW LAWN C
	4.210	80	Weighted Average
	3.110		73.87% Pervious Area
	1.100		26.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 17S: Mallard Lane Pond Watershed

Runoff = 19.89 cfs @ 12.77 hrs, Volume= 3.346 af, Depth> 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.220	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	2.400	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
*	4.640	74	NEW LAWN C
	7.260	82	Weighted Average
	4.860		66.94% Pervious Area
	2.400		33.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
30.0	900	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
58.8	1,000	Total			

Summary for Subcatchment 18S:

Runoff = 2.75 cfs @ 12.69 hrs, Volume= 0.415 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	0.450	70	WOODS / FIELD HSG C
*	0.680	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (see 51s)
	1.130	72	Weighted Average
	1.130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
21.7	650	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
50.5	750	Total			

Summary for Subcatchment 19S:

Runoff = 68.81 cfs @ 12.13 hrs, Volume= 5.192 af, Depth> 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	10.660	70	WOODS / FIELD HSG C
*	0.600	98	EXISTING IMPERVIOUS AREA
*	1.600	74	EXISTING LAWN C
*	0.940	74	NEW LAWN C
*	0.150	98	NEW IMPERVIOUS PAVED AREA
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	13.950	72	Weighted Average
	13.200		94.62% Pervious Area
	0.750		5.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.10"
1.7	300	0.0400	3.00		**Shallow Concentrated Flow, BC** Grassed Waterway Kv= 15.0 fps
9.2	400	Total			

Summary for Subcatchment 20S:

Runoff = 17.02 cfs @ 12.50 hrs, Volume= 2.140 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	5.820	70	WOODS / FIELD HSG C
*	0.000	98	EXISTING IMPERVIOUS AREA
*	0.000	74	EXISTING LAWN C
*	0.290	74	NEW LAWN C
*	0.000	98	NEW IMPERVIOUS BUILDING AREA (See 51s)
	6.110	70	Weighted Average
	6.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	100	0.0400	0.06		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.10"
6.7	200	0.0400	0.50		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
35.5	300	Total			

Summary for Subcatchment 51S: NEW Cottage Roof Areas

Runoff = 19.15 cfs @ 12.21 hrs, Volume= 1.941 af, Depth> 7.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.10"

	Area (ac)	CN	Description
*	3.220	98	52 Cottage Roofs + Community Buildings
	3.220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.4000	3.25		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.10"
2.5	25	0.0400	0.17		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.10"
13.1	75	0.1600	0.10		**Sheet Flow, CD** Woods: Dense underbrush n= 0.800 P2= 3.10"
15.7	120	Total			

Summary for Reach 3R: Stream @ Property Line

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 4.64" for 100 YEAR event
Inflow = 217.93 cfs @ 12.95 hrs, Volume= 43.053 af
Outflow = 217.18 cfs @ 13.02 hrs, Volume= 42.893 af, Atten= 0%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.86 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 2.44 fps, Avg. Travel Time= 5.9 min

Peak Storage= 31,916 cf @ 12.98 hrs
Average Depth at Peak Storage= 2.55'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 287.21 cfs

12.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 77.00', Outlet Invert= 72.00'

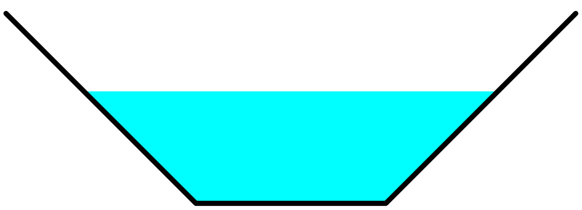
Summary for Reach 4R: Stream below RR crossing

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 4.67" for 100 YEAR event
Inflow = 209.77 cfs @ 12.89 hrs, Volume= 37.702 af
Outflow = 209.03 cfs @ 12.96 hrs, Volume= 37.577 af, Atten= 0%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.21 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 2.77 fps, Avg. Travel Time= 5.2 min

Peak Storage= 28,997 cf @ 12.92 hrs
Average Depth at Peak Storage= 3.54'
Bank-Full Depth= 6.00' Flow Area= 72.0 sf, Capacity= 582.42 cfs

6.00' x 6.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 860.0' Slope= 0.0058 '/'
Inlet Invert= 82.00', Outlet Invert= 77.00'



Summary for Reach 6R: Stream below Site @ PL

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 4.98" for 100 YEAR event
Inflow = 462.85 cfs @ 12.91 hrs, Volume= 113.295 af
Outflow = 462.13 cfs @ 12.94 hrs, Volume= 113.148 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.96 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 4.13 fps, Avg. Travel Time= 1.8 min

Peak Storage= 26,152 cf @ 12.92 hrs
Average Depth at Peak Storage= 4.61'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 538.97 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 61.00', Outlet Invert= 58.00'

Summary for Reach 7R: Stream Through Site

Inflow Area = 257.100 ac, 26.89% Impervious, Inflow Depth > 5.10" for 100 YEAR event
Inflow = 443.48 cfs @ 12.86 hrs, Volume= 109.195 af
Outflow = 442.48 cfs @ 12.91 hrs, Volume= 108.975 af, Atten= 0%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.62 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 6.37 fps, Avg. Travel Time= 2.9 min

Peak Storage= 38,590 cf @ 12.88 hrs
Average Depth at Peak Storage= 3.15'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 683.45 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,100.0' Slope= 0.0245 '/'
Inlet Invert= 88.00', Outlet Invert= 61.00'

Summary for Reach 14R: Swale from School and Neighborhood

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 2.53" for 100 YEAR event
Inflow = 5.29 cfs @ 13.59 hrs, Volume= 2.323 af
Outflow = 5.15 cfs @ 14.25 hrs, Volume= 2.167 af, Atten= 3%, Lag= 40.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.59 fps, Min. Travel Time= 21.7 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 36.7 min

Peak Storage= 6,698 cf @ 13.89 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 3.00' Flow Area= 21.0 sf, Capacity= 147.12 cfs

4.00' x 3.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 3,366.0' Slope= 0.0100 '/'
Inlet Invert= 117.66', Outlet Invert= 84.00'

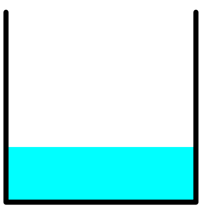
Summary for Reach 17R:

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 4.48" for 100 YEAR event
Inflow = 20.11 cfs @ 13.06 hrs, Volume= 3.131 af
Outflow = 20.09 cfs @ 13.10 hrs, Volume= 3.123 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.68 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 3.18 fps, Avg. Travel Time= 3.7 min

Peak Storage= 1,832 cf @ 13.08 hrs
Average Depth at Peak Storage= 0.87'
Bank-Full Depth= 3.00' Flow Area= 9.0 sf, Capacity= 102.76 cfs

3.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Length= 700.0' Slope= 0.0286 '/'
Inlet Invert= 81.00', Outlet Invert= 61.00'



Summary for Reach 18R: Stream Through Site

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 5.22" for 100 YEAR event
Inflow = 310.32 cfs @ 12.61 hrs, Volume= 79.993 af
Outflow = 309.46 cfs @ 12.67 hrs, Volume= 79.772 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.93 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 4.83 fps, Avg. Travel Time= 4.1 min

Peak Storage= 37,431 cf @ 12.64 hrs
Average Depth at Peak Storage= 2.87'
Bank-Full Depth= 4.00' Flow Area= 48.0 sf, Capacity= 563.18 cfs

8.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 16.00'
Length= 1,200.0' Slope= 0.0167 '/'
Inlet Invert= 125.00', Outlet Invert= 105.00'

Summary for Reach 55R: Wetland below Site @ PL

Inflow Area =	36.040 ac,	0.28% Impervious,	Inflow Depth > 4.28"	for 100 YEAR event	
Inflow =	77.47 cfs @	12.81 hrs,	Volume=	12.844 af	
Outflow =	77.22 cfs @	12.86 hrs,	Volume=	12.813 af,	Atten= 0%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.77 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 3.5 min

Peak Storage= 7,300 cf @ 12.83 hrs
Average Depth at Peak Storage= 1.68'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 540.76 cfs

8.00' x 5.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 1.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0067 '/'
Inlet Invert= 63.02', Outlet Invert= 60.00'

Summary for Pond 1P: 1-30" and 1-24" Culvert at Tuttle Road

Inflow Area =	111.340 ac,	22.38% Impervious,	Inflow Depth > 4.58"	for 100 YEAR event	
Inflow =	212.26 cfs @	13.12 hrs,	Volume=	42.524 af	
Outflow =	212.20 cfs @	13.13 hrs,	Volume=	42.462 af,	Atten= 0%, Lag= 0.6 min
Primary =	65.67 cfs @	13.13 hrs,	Volume=	28.273 af	
Secondary =	146.54 cfs @	13.13 hrs,	Volume=	14.190 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 72.07' @ 13.13 hrs Surf.Area= 7,952 sf Storage= 23,430 cf

Plug-Flow detention time= 2.9 min calculated for 42.462 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (844.8 - 842.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	31,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	3,850	0	0
70.00	5,600	9,450	9,450
72.00	7,800	13,400	22,850
73.00	9,865	8,833	31,683

Device	Routing	Invert	Outlet Devices
#1	Primary	67.50'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	67.50'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.50' / 66.50' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	71.00'	**50.0' 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

Primary OutFlow Max=65.66 cfs @ 13.13 hrs HW=72.07' (Free Discharge)
1=Culvert (Inlet Controls 43.08 cfs @ 8.78 fps)
2=Culvert (Inlet Controls 22.57 cfs @ 7.19 fps)

Secondary OutFlow Max=146.32 cfs @ 13.13 hrs HW=72.07' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 146.32 cfs @ 2.73 fps)

Summary for Pond 2P: Two 30" Culverts at Crossing Brook Road

Inflow Area = 272.920 ac, 27.79% Impervious, Inflow Depth > 4.98" for 100 YEAR event
Inflow = 462.13 cfs @ 12.94 hrs, Volume= 113.148 af
Outflow = 234.77 cfs @ 14.42 hrs, Volume= 91.982 af, Atten= 49%, Lag= 89.0 min
Primary = 124.48 cfs @ 14.42 hrs, Volume= 76.018 af
Secondary = 110.29 cfs @ 14.42 hrs, Volume= 15.963 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 57.41' @ 14.42 hrs Surf.Area= 241,122 sf Storage= 1,884,664 cf

Plug-Flow detention time= 133.1 min calculated for 91.676 af (81% of inflow)
Center-of-Mass det. time= 88.0 min (942.1 - 854.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,030,000 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	60,000	0	0
46.00	80,000	140,000	140,000
48.00	100,000	180,000	320,000
50.00	120,000	220,000	540,000
52.00	160,000	280,000	820,000
54.00	180,000	340,000	1,160,000
56.00	220,000	400,000	1,560,000
58.00	250,000	470,000	2,030,000

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**30.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	44.00'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.00' / 42.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Secondary	56.00'	**25.0' long x 25.0' 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=124.48 cfs @ 14.42 hrs HW=57.41' (Free Discharge)
1=Culvert (Inlet Controls 82.41 cfs @ 16.79 fps)
2=Culvert (Inlet Controls 42.07 cfs @ 13.39 fps)

Secondary OutFlow Max=110.18 cfs @ 14.42 hrs HW=57.41' (Free Discharge)
3=Broad-Crested Rectangular Weir (Weir Controls 110.18 cfs @ 3.13 fps)

Summary for Pond 3P: 24" CULVERT

Inflow Area = 36.040 ac, 0.28% Impervious, Inflow Depth > 4.27" for 100 YEAR event
Inflow = 77.22 cfs @ 12.86 hrs, Volume= 12.813 af
Outflow = 76.14 cfs @ 12.94 hrs, Volume= 12.751 af, Atten= 1%, Lag= 4.6 min
Primary = 32.97 cfs @ 12.94 hrs, Volume= 10.338 af
Secondary = 43.17 cfs @ 12.94 hrs, Volume= 2.413 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 59.75' @ 12.94 hrs Surf.Area= 18,753 sf Storage= 51,510 cf

Plug-Flow detention time= 13.6 min calculated for 12.709 af (99% of inflow)
Center-of-Mass det. time= 11.8 min (845.1 - 833.3)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	56,342 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	2,362	0	0
56.00	6,990	9,352	9,352
58.00	10,000	16,990	26,342
60.00	20,000	30,000	56,342

Device	Routing	Invert	Outlet Devices
#1	Primary	54.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 54.00' / 53.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	59.00'	**25.0' long x 25.0' 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=32.97 cfs @ 12.94 hrs HW=59.75' (Free Discharge)
1=Culvert (Inlet Controls 32.97 cfs @ 10.49 fps)

Secondary OutFlow Max=43.07 cfs @ 12.94 hrs HW=59.75' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 43.07 cfs @ 2.30 fps)

Summary for Pond 4P: 18" CULVERT

Inflow Area = 13.000 ac, 7.69% Impervious, Inflow Depth > 4.62" for 100 YEAR event
Inflow = 30.35 cfs @ 12.78 hrs, Volume= 5.001 af
Outflow = 15.83 cfs @ 13.43 hrs, Volume= 4.943 af, Atten= 48%, Lag= 39.0 min
Primary = 15.41 cfs @ 13.43 hrs, Volume= 4.937 af
Secondary = 0.43 cfs @ 13.43 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 89.03' @ 13.43 hrs Surf.Area= 24,770 sf Storage= 56,147 cf

Plug-Flow detention time= 40.7 min calculated for 4.943 af (99% of inflow)
Center-of-Mass det. time= 36.5 min (860.4 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	82,755 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	3,343	0	0
86.00	8,410	5,877	5,877
88.00	19,234	27,644	33,521
90.00	30,000	49,234	82,755

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**18.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Secondary	89.00'	**25.0' long x 25.0' 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=15.40 cfs @ 13.43 hrs HW=89.03' (Free Discharge)
└─**1=Culvert** (Inlet Controls 15.40 cfs @ 8.72 fps)

Secondary OutFlow Max=0.31 cfs @ 13.43 hrs HW=89.03' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.45 fps)

Summary for Pond 5P: 4'x3' Oval and 30" Overflow Culvert

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 5.29" for 100 YEAR event
Inflow = 310.62 cfs @ 12.59 hrs, Volume= 81.103 af
Outflow = 310.32 cfs @ 12.61 hrs, Volume= 79.993 af, Atten= 0%, Lag= 1.3 min
Primary = 43.18 cfs @ 12.61 hrs, Volume= 30.794 af
Secondary = 267.14 cfs @ 12.61 hrs, Volume= 49.198 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 138.42' @ 12.61 hrs Surf.Area= 21,043 sf Storage= 106,292 cf

Plug-Flow detention time= 14.3 min calculated for 79.727 af (98% of inflow)
Center-of-Mass det. time= 9.6 min (842.4 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	129.00'	142,735 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
129.00	4,441	0	0
130.00	6,196	5,319	5,319
132.00	8,225	14,421	19,740
134.00	10,880	19,105	38,845
136.00	14,005	24,885	63,730
138.00	20,000	34,005	97,735
140.00	25,000	45,000	142,735

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**4.0" W x 3.0" H, R=3.0" Elliptical Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.07 sf
#2	Primary	132.00'	**30.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 128.00' S= 0.0800 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 4.91 sf
#3	Secondary	137.00'	**60.0' long x 30.0' 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=43.17 cfs @ 12.61 hrs HW=138.42' (Free Discharge)
├─**1=Culvert** (Barrel Controls 0.77 cfs @ 11.39 fps)
└─**2=Culvert** (Inlet Controls 42.41 cfs @ 8.64 fps)

Secondary OutFlow Max=266.71 cfs @ 12.61 hrs HW=138.42' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 266.71 cfs @ 3.14 fps)

Summary for Pond 6P: 1-48" Culvert Crossing Golf Cart Path

Inflow Area = 184.000 ac, 30.43% Impervious, Inflow Depth > 5.20" for 100 YEAR event
Inflow = 309.46 cfs @ 12.67 hrs, Volume= 79.772 af
Outflow = 285.90 cfs @ 12.94 hrs, Volume= 79.464 af, Atten= 8%, Lag= 16.1 min
Primary = 157.89 cfs @ 12.94 hrs, Volume= 64.473 af
Secondary = 128.01 cfs @ 12.94 hrs, Volume= 14.991 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 104.81' @ 12.94 hrs Surf.Area= 58,728 sf Storage= 269,120 cf

Plug-Flow detention time= 15.3 min calculated for 79.200 af (99% of inflow)
Center-of-Mass det. time= 13.9 min (860.1 - 846.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	280,448 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,580	0	0
98.00	14,434	16,014	16,014
100.00	30,000	44,434	60,448
102.00	40,000	70,000	130,448
105.00	60,000	150,000	280,448

Device	Routing	Invert	Outlet Devices
#1	Primary	96.00'	**48.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.00' / 95.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Secondary	103.00'	**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=157.88 cfs @ 12.94 hrs HW=104.81' (Free Discharge)
└─**1=Culvert** (Inlet Controls 157.88 cfs @ 12.56 fps)

Secondary OutFlow Max=127.90 cfs @ 12.94 hrs HW=104.81' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 127.90 cfs @ 3.54 fps)

Summary for Pond 7P: 1-24" Culvert at Greely Middle School

Inflow Area = 11.000 ac, 45.45% Impervious, Inflow Depth > 5.96" for 100 YEAR event
Inflow = 70.86 cfs @ 12.12 hrs, Volume= 5.462 af
Outflow = 5.29 cfs @ 13.59 hrs, Volume= 2.323 af, Atten= 93%, Lag= 88.0 min
Primary = 5.29 cfs @ 13.59 hrs, Volume= 2.323 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 126.27' @ 13.59 hrs Surf.Area= 33,165 sf Storage= 153,967 cf

Plug-Flow detention time= 234.9 min calculated for 2.323 af (43% of inflow)
Center-of-Mass det. time= 139.3 min (901.6 - 762.3)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	214,248 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.00	18,593	0	0
122.00	21,745	40,338	40,338
124.00	25,131	46,876	87,214
126.00	32,605	57,736	144,950
128.00	36,693	69,298	214,248

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Secondary	127.00'	**25.0' long x 25.0' 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
#3	Device 1	120.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	126.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.27 cfs @ 13.59 hrs HW=126.27' (Free Discharge)
1=Culvert (Passes 5.27 cfs of 34.74 cfs potential flow)
3=Orifice/Grate (Orifice Controls 2.32 cfs @ 11.82 fps)
4=Orifice/Grate (Weir Controls 2.95 cfs @ 1.71 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=120.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 10P: 1-30" Culvert

Inflow Area = 111.340 ac, 22.38% Impervious, Inflow Depth > 4.62" for 100 YEAR event
Inflow = 217.18 cfs @ 13.02 hrs, Volume= 42.893 af
Outflow = 212.26 cfs @ 13.12 hrs, Volume= 42.524 af, Atten= 2%, Lag= 6.2 min
Primary = 44.93 cfs @ 13.12 hrs, Volume= 22.888 af
Secondary = 167.33 cfs @ 13.12 hrs, Volume= 19.636 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 72.86' @ 13.12 hrs Surf.Area= 58,824 sf Storage= 141,729 cf

Plug-Flow detention time= 16.2 min calculated for 42.524 af (99% of inflow)
Center-of-Mass det. time= 13.1 min (842.4 - 829.3)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	211,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	8,000	0	0
70.00	14,434	22,434	22,434
72.00	55,480	69,914	92,348
74.00	63,220	118,700	211,048

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**30.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.00' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	71.00'	**25.0' long x 25.0' 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=44.92 cfs @ 13.12 hrs HW=72.86' (Free Discharge)
└─**1=Culvert** (Inlet Controls 44.92 cfs @ 9.15 fps)

Secondary OutFlow Max=167.12 cfs @ 13.12 hrs HW=72.86' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 167.12 cfs @ 3.59 fps)

Summary for Pond 15P: FocalPoint 60sf

Inflow Area =	0.550 ac, 67.27% Impervious, Inflow Depth > 6.52" for 100 YEAR event		
Inflow =	4.55 cfs @ 12.02 hrs,	Volume=	0.299 af
Outflow =	4.52 cfs @ 12.03 hrs,	Volume=	0.299 af, Atten= 1%, Lag= 0.3 min
Primary =	0.14 cfs @ 9.45 hrs,	Volume=	0.126 af
Secondary =	4.38 cfs @ 12.03 hrs,	Volume=	0.173 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.93' @ 12.03 hrs Surf.Area= 60 sf Storage= 149 cf

Plug-Flow detention time= 2.6 min calculated for 0.299 af (100% of inflow)
Center-of-Mass det. time= 2.6 min (748.6 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	97.75'	27 cf	**3.00'W x 20.00'L x 2.25'H FocalPoint** 135 cf Overall x 20.0% Voids
#2	100.00'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	60	0	0
100.50	157	54	54
101.00	157	79	133

Device	Routing	Invert	Outlet Devices
#1	Primary	97.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	100.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 9.45 hrs HW=97.91' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=4.19 cfs @ 12.03 hrs HW=100.92' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 4.19 cfs @ 2.12 fps)

Summary for Pond 16P: Arctic Fox WET POND

Inflow Area = 4.210 ac, 26.13% Impervious, Inflow Depth > 5.30" for 100 YEAR event
Inflow = 11.13 cfs @ 12.77 hrs, Volume= 1.859 af
Outflow = 6.50 cfs @ 13.33 hrs, Volume= 1.197 af, Atten= 42%, Lag= 33.8 min
Primary = 6.50 cfs @ 13.33 hrs, Volume= 1.197 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 77.00' Surf.Area= 4,505 sf Storage= 18,632 cf
Peak Elev= 81.24' @ 13.33 hrs Surf.Area= 12,016 sf Storage= 59,284 cf (40,653 cf above start)

Plug-Flow detention time= 275.3 min calculated for 0.766 af (41% of inflow)
Center-of-Mass det. time= 113.6 min (926.6 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	82,315 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	1,852	0	0
72.00	2,232	2,042	2,042
73.00	2,636	2,434	4,476
74.00	3,065	2,851	7,327
75.00	3,520	3,293	10,619
76.00	4,000	3,760	14,379
77.00	4,505	4,253	18,632
77.10	7,408	596	19,227
78.00	8,400	7,114	26,341
79.00	9,450	8,925	35,266
80.00	10,557	10,004	45,269
81.00	11,720	11,139	56,408
82.00	12,940	12,330	68,738
83.00	14,215	13,578	82,315

Device	Routing	Invert	Outlet Devices
#1	Primary	74.00'	**18.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 74.00' / 70.00' S= 0.0690 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	78.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	81.00'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	81.50'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.38 cfs @ 13.33 hrs HW=81.24' (Free Discharge)
1=Culvert (Passes 6.38 cfs of 21.68 cfs potential flow)
2=Orifice/Grate (Orifice Controls 1.49 cfs @ 7.60 fps)
3=Orifice/Grate (Weir Controls 4.89 cfs @ 1.61 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=77.00' (Free Discharge)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 17P: Mallard Way WET POND

Inflow Area = 7.260 ac, 33.06% Impervious, Inflow Depth > 5.53" for 100 YEAR event
Inflow = 19.89 cfs @ 12.77 hrs, Volume= 3.346 af
Outflow = 18.97 cfs @ 12.91 hrs, Volume= 2.725 af, Atten= 5%, Lag= 8.7 min
Primary = 17.80 cfs @ 12.91 hrs, Volume= 2.689 af
Secondary = 1.17 cfs @ 12.91 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 88.00' Surf.Area= 5,558 sf Storage= 23,438 cf
Peak Elev= 91.13' @ 12.91 hrs Surf.Area= 13,435 sf Storage= 58,656 cf (35,218 cf above start)

Plug-Flow detention time= 131.6 min calculated for 2.179 af (65% of inflow)
Center-of-Mass det. time= 41.5 min (850.5 - 809.0)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	70,904 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	1,346	0	0
82.00	1,867	1,607	1,607
83.00	2,419	2,143	3,750
84.00	2,996	2,708	6,457
85.00	3,599	3,298	9,755
86.00	4,226	3,913	13,667
87.00	4,879	4,553	18,220
88.00	5,558	5,219	23,438
88.10	9,325	744	24,182
89.00	10,578	8,956	33,139
90.00	11,887	11,233	44,371
91.00	13,252	12,570	56,941
92.00	14,675	13,964	70,904

Device	Routing	Invert	Outlet Devices
#1	Primary	86.00'	**18.0" Round Culvert** L= 31.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 86.00' / 85.50' S= 0.0161 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	89.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	90.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	91.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=17.80 cfs @ 12.91 hrs HW=91.13' (Free Discharge)
└─**1=Culvert** (Inlet Controls 17.80 cfs @ 10.07 fps)
  ├─**2=Orifice/Grate** (Passes < 1.11 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 20.44 cfs potential flow)

Secondary OutFlow Max=1.14 cfs @ 12.91 hrs HW=91.13' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.14 cfs @ 0.89 fps)

Summary for Pond 18P: 24" CULVERT

Inflow Area = 8.390 ac, 28.61% Impervious, Inflow Depth > 4.49" for 100 YEAR event
Inflow = 21.43 cfs @ 12.87 hrs, Volume= 3.139 af
Outflow = 20.11 cfs @ 13.06 hrs, Volume= 3.131 af, Atten= 6%, Lag= 11.5 min
Primary = 20.11 cfs @ 13.06 hrs, Volume= 3.131 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.77' @ 13.06 hrs Surf.Area= 5,221 sf Storage= 7,357 cf

Plug-Flow detention time= 4.9 min calculated for 3.121 af (99% of inflow)
Center-of-Mass det. time= 4.0 min (850.5 - 846.6)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	15,869 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	788	0	0
86.00	1,512	1,150	1,150
87.00	3,898	2,705	3,855
88.00	5,621	4,760	8,615
89.00	8,888	7,255	15,869

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**24.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=20.10 cfs @ 13.06 hrs HW=87.77' (Free Discharge)
└—**1=Culvert** (Inlet Controls 20.10 cfs @ 6.40 fps)

Summary for Pond 20P: Arch Culvert 1

Inflow Area = 96.890 ac, 24.53% Impervious, Inflow Depth > 4.67" for 100 YEAR event
Inflow = 214.82 cfs @ 12.78 hrs, Volume= 37.715 af
Outflow = 209.77 cfs @ 12.89 hrs, Volume= 37.702 af, Atten= 2%, Lag= 6.6 min
Primary = 209.77 cfs @ 12.89 hrs, Volume= 37.702 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 88.24' @ 12.89 hrs Surf.Area= 13,654 sf Storage= 24,713 cf

Plug-Flow detention time= 1.0 min calculated for 37.702 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (825.6 - 824.7)

Volume	Invert	Avail.Storage	Storage Description
#1	82.00'	85,094 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.00	320	0	0
86.00	2,932	6,504	6,504
87.00	7,643	5,288	11,792
88.00	11,989	9,816	21,608
89.00	18,865	15,427	37,035
90.00	23,627	21,246	58,281
91.00	30,000	26,814	85,094

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**88.0" W x 54.0" H, R=45.0"/126.0" Pipe Arch RCP_Arch 88x54** L= 70.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 82.00' / 81.50' S= 0.0071 '/' Cc= 0.900

			n= 0.022 Earth, clean & straight, Flow Area= 25.69 sf
#2	Secondary	90.00'	**25.0' long x 25.0' 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=209.49 cfs @ 12.89 hrs HW=88.24' (Free Discharge)
└─**1=RCP_Arch 88x54** (Barrel Controls 209.49 cfs @ 8.16 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=82.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 21P: Arch Culvert 2

Inflow Area = 190.110 ac, 29.46% Impervious, Inflow Depth > 5.15" for 100 YEAR event
Inflow = 295.09 cfs @ 12.92 hrs, Volume= 81.604 af
Outflow = 290.85 cfs @ 13.04 hrs, Volume= 81.447 af, Atten= 1%, Lag= 7.4 min
Primary = 290.85 cfs @ 13.04 hrs, Volume= 81.447 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.31' @ 13.04 hrs Surf.Area= 26,283 sf Storage= 55,790 cf

Plug-Flow detention time= 3.1 min calculated for 81.176 af (99% of inflow)
Center-of-Mass det. time= 2.4 min (861.2 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	200,953 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	5,000	0	0
93.00	6,000	5,500	5,500
94.00	7,000	6,500	12,000
95.00	8,390	7,695	19,695
96.00	12,267	10,329	30,024
97.00	23,771	18,019	48,043
98.00	31,886	27,829	75,871
99.00	67,139	49,513	125,384
100.00	84,000	75,570	200,953

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**122.0" W x 77.3" H, R=62.0"/218.0" Pipe Arch RCP_Arch 122x78**
			L= 70.0' RCP, end-section conforming to fill, Ke= 0.500
			Inlet / Outlet Invert= 92.00' / 91.50' S= 0.0071 '/' Cc= 0.900
			n= 0.022 Earth, clean & straight, Flow Area= 51.67 sf
#2	Secondary	99.00'	**25.0' long x 25.0' 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=290.75 cfs @ 13.04 hrs HW=97.31' (Free Discharge)
└─**1=RCP_Arch 122x78** (Barrel Controls 290.75 cfs @ 8.00 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 24P: Cultec Recharger 150XLHD

Inflow Area =	0.550 ac,	67.27% Impervious, Inflow Depth >	6.52"	for 100 YEAR event
Inflow =	4.52 cfs @	12.03 hrs, Volume=	0.299 af	
Outflow =	4.98 cfs @	12.01 hrs, Volume=	0.297 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.02 cfs @	12.01 hrs, Volume=	0.256 af	
Secondary =	1.96 cfs @	12.01 hrs, Volume=	0.041 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 96.81' @ 12.01 hrs Surf.Area= 0.025 ac Storage= 0.036 af

Plug-Flow detention time= 33.8 min calculated for 0.297 af (99% of inflow)
Center-of-Mass det. time= 30.9 min (779.5 - 748.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	94.00'	0.018 af	**14.50'W x 74.50'L x 2.54'H Field A**
			0.063 af Overall - 0.018 af Embedded = 0.045 af x 40.0% Voids
#2A	94.50'	0.018 af	**Cultec R-150XLHD** x 28 Inside #1
			Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
			Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
			Row Length Adjustment= +0.75' x 2.65 sf x 4 rows
#3	96.50'	0.001 af	**4.00'D x 4.00'H Vertical Cone/Cylinder**
		0.037 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**18.0" Round Culvert**
			L= 30.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 94.00' / 93.00' S= 0.0333 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	94.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	96.50'	**18.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Secondary	96.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.83 cfs @ 12.01 hrs HW=96.79' (Free Discharge)
└─**1=Culvert** (Passes 2.83 cfs of 12.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.39 cfs @ 7.86 fps)
  └─**3=Orifice/Grate** (Weir Controls 2.44 cfs @ 1.77 fps)

Secondary OutFlow Max=1.81 cfs @ 12.01 hrs HW=96.79' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.81 cfs @ 1.55 fps)

Summary for Pond 51P: 54 ROOF DRIPLINE BMP'S

Inflow Area = 3.220 ac,100.00% Impervious, Inflow Depth > 7.23" for 100 YEAR event
Inflow = 19.15 cfs @ 12.21 hrs, Volume= 1.941 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

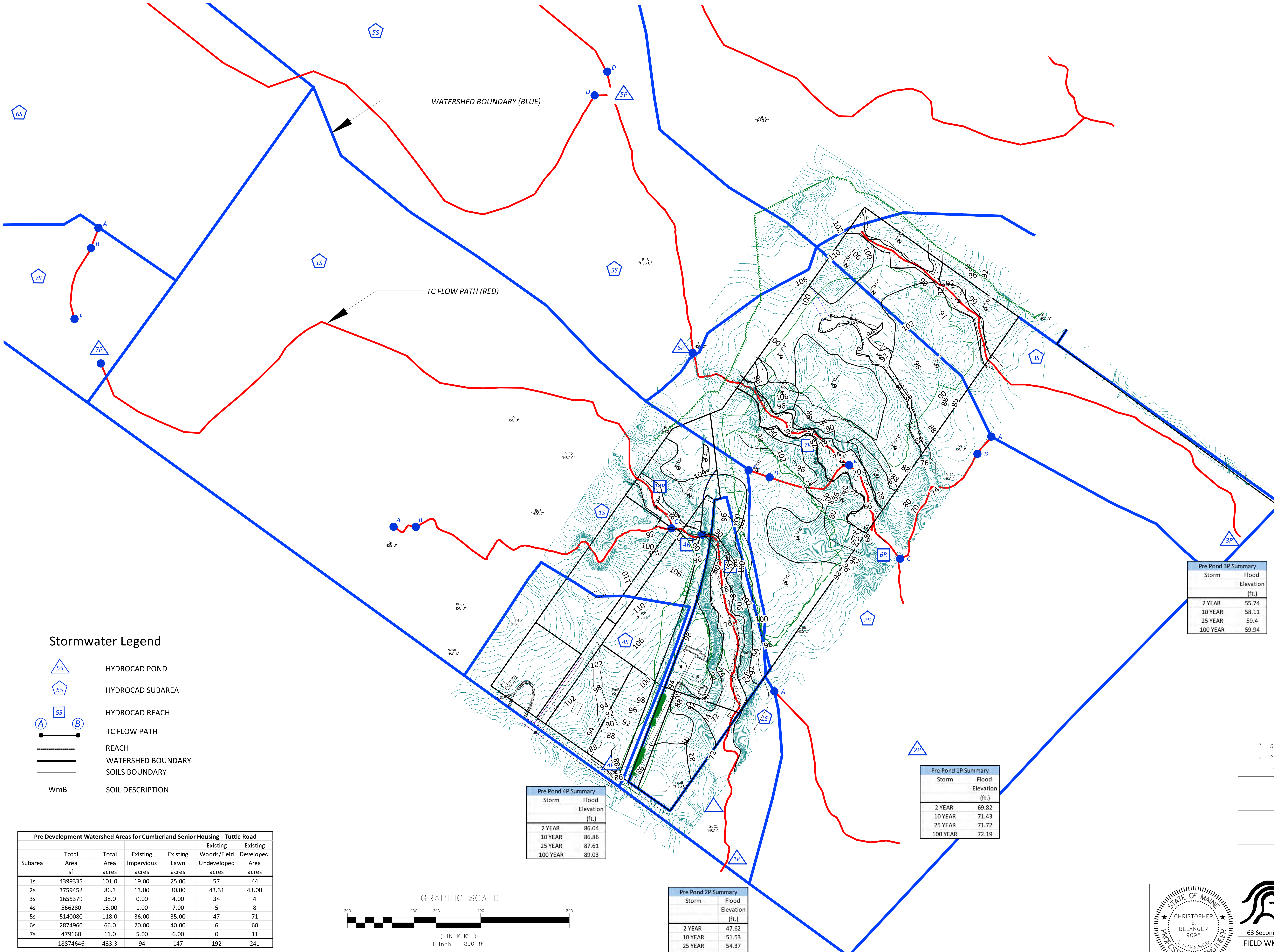
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.24' @ 20.00 hrs Surf.Area= 867,510 sf Storage= 84,525 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	13,187 cf	**3.00'W x 105.00'L x 2.00'H Prismatoid** x 54 34,020 cf Overall - 1,051 cf Embedded = 32,969 cf x 40.0% Voids
#2	100.00'	1,051 cf	**6.0" Round Pipe Storage** x 51 Inside #1 L= 105.0' S= 0.0050 '/'
		14,239 cf	x 51.00 = 726,182 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.50'	**100.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 51.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=100.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



FLOODING STANDARD RESULTS POND 1P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	38.34	36.79	-4%
10 YEAR	96.83	90.79	-7%
25 YEAR	144.34	133.18	-8%
50 YEAR	189.15	172.9	-9%
100 YEAR	239.06	217.46	-10%

FLOODING STANDARD RESULTS POND 2P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	55.7	54.13	-3%
10 YEAR	89.77	88.87	-1%
25 YEAR	107.91	107.36	-1%
50 YEAR	141.82	140.94	-1%
100 YEAR	237.6	227.4	-4%

FLOODING STANDARD RESULTS POND 3P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	12.99	12.36	-5%
10 YEAR	26.68	25.72	-4%
25 YEAR	48.56	44.46	-9%
50 YEAR	70.97	66.91	-6%
100 YEAR	93.27	88.29	-6%

FLOODING STANDARD RESULTS POND 4P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	4.55	4.55	0%
10 YEAR	8.95	8.95	0%
25 YEAR	11.61	11.61	0%
50 YEAR	13.6	13.6	0%
100 YEAR	15.83	15.83	0%

FLOODING STANDARD RESULTS REACH 3R			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	48.66	45.53	-7%
10 YEAR	103.64	95.15	-9%
25 YEAR	151.56	137.74	-10%
50 YEAR	196.96	177.94	-11%
100 YEAR	248.09	222.64	-11%

FLOODING STANDARD RESULTS REACH 6R			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	94.2	86.15	-9%
10 YEAR	194.34	175.66	-11%
25 YEAR	265.34	236.28	-12%
50 YEAR	375.46	308.12	-22%
100 YEAR	493.76	408.14	-21%

FLOODING STANDARD RESULTS REACH 55R			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	%
2 YEAR	14.17	13.43	-6%
10 YEAR	35.23	33.41	-5%
25 YEAR	54.61	51.79	-5%
50 YEAR	73.49	69.7	-5%
100 YEAR	94.84	89.95	-5%

Pre Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.74
10 YEAR	58.11
25 YEAR	59.4
100 YEAR	59.94

Pre Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Pre Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	69.82
10 YEAR	71.43
25 YEAR	71.72
100 YEAR	72.19

Pre Pond 2P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	47.62
10 YEAR	51.53
25 YEAR	54.37
100 YEAR	57.43

Pre Development Watershed Areas for Cumberland Senior Housing - Tuttle Road						
Subarea	Total Area sf	Total Area acres	Existing Impervious acres	Existing Lawn acres	Existing Woods/Field Undeveloped acres	Existing Developed Area acres
1s	4399335	101.0	19.00	25.00	57	44
2s	3759452	86.3	13.00	30.00	43.31	43.00
3s	1655379	38.0	0.00	4.00	34	4
4s	566280	13.00	1.00	7.00	5	8
5s	5140080	118.0	36.00	35.00	47	71
6s	2874960	66.0	20.00	40.00	6	60
7s	479160	11.0	5.00	6.00	0	11
	18874646	433.3	94	147	192	241

3. 3-1-2018 No Changes this sheet – Re-submit to Town CSB
2. 2-7-2018 Submit to DEP CSB
1. 1-31-2018 Respond to Town Memos, submit to Town and DEP CSB

Pre Development Drainage Plan

Oceanview @ Cumberland
291 Tuttle Road, Cumberland, Maine

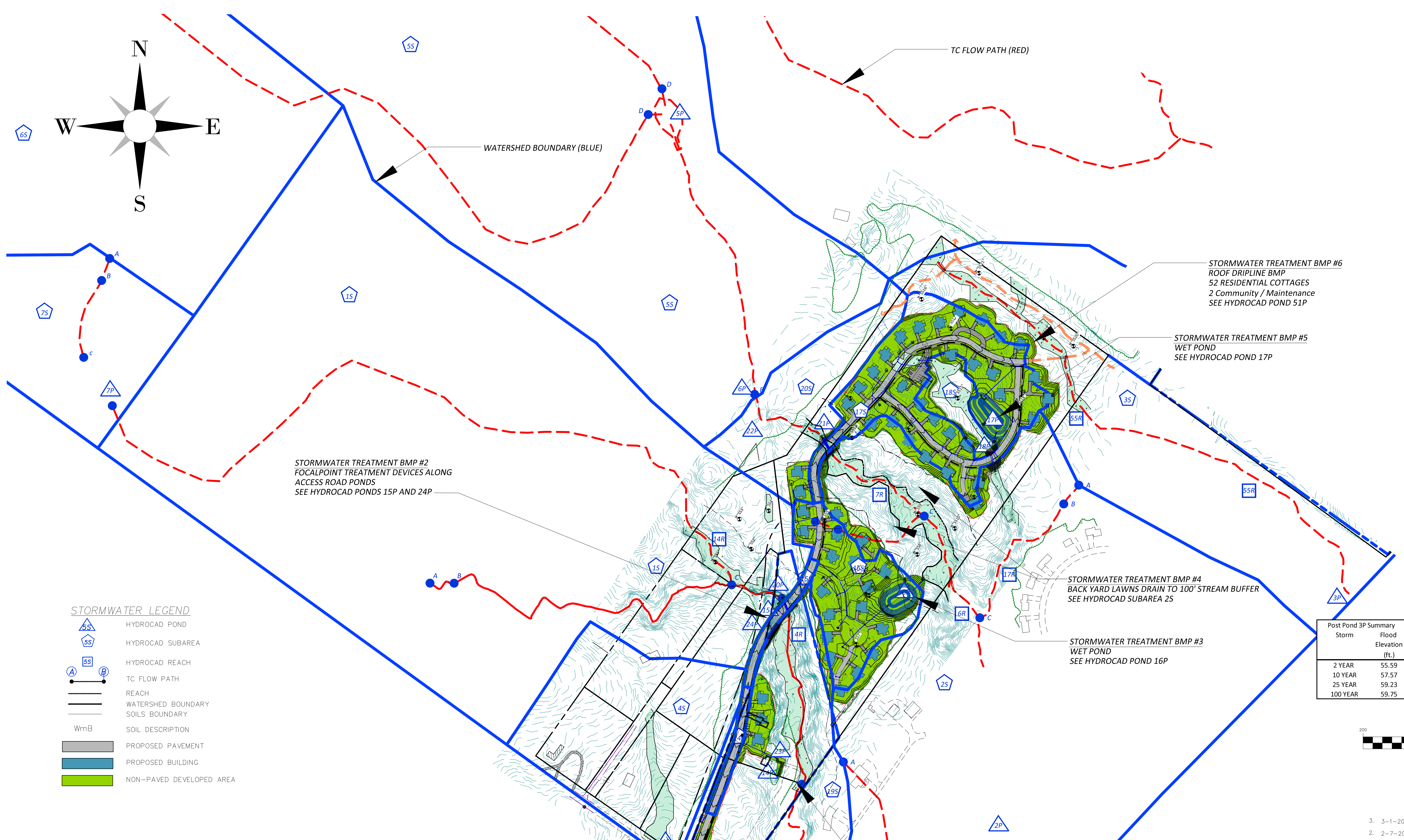
Oceanview @ Cumberland LLC
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED PROFESSIONAL ENGINEER
3-1-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE: 1"=200'	SHEET:
DRN BY:	JOB #: 109	Pre
CH'D BY:	SS:	
DATE: 3-1-2018	FILE:	



FLOODING STANDARD RESULTS POND 1P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	38.34	36.38	-5%
10 YEAR	96.83	90.39	-7%
25 YEAR	144.34	132.66	-9%
50 YEAR	189.15	171.99	-10%
100 YEAR	239.06	212.2	-13%

FLOODING STANDARD RESULTS POND 2P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	55.7	54.15	-3%
10 YEAR	89.77	88.83	-1%
25 YEAR	107.91	107.16	-1%
50 YEAR	141.82	137.87	-3%
100 YEAR	237.6	234.77	-1%

FLOODING STANDARD RESULTS POND 3P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	12.99	11.45	-13%
10 YEAR	26.68	24.24	-10%
25 YEAR	48.56	38.26	-27%
50 YEAR	70.97	58.08	-22%
100 YEAR	93.27	76.14	-22%

FLOODING STANDARD RESULTS POND 4P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	4.55	4.55	0%
10 YEAR	8.95	8.95	0%
25 YEAR	11.61	11.61	0%
50 YEAR	13.6	13.6	0%
100 YEAR	15.83	15.83	0%

FLOODING STANDARD RESULTS REACH 3R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	48.66	45.72	-6%
10 YEAR	103.64	95.42	-9%
25 YEAR	151.56	138.13	-10%
50 YEAR	196.96	177.46	-11%
100 YEAR	248.09	217.18	-14%

FLOODING STANDARD RESULTS REACH 6R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	94.2	87.63	-7%
10 YEAR	194.34	180.21	-8%
25 YEAR	265.34	250.22	-6%
50 YEAR	375.46	357.08	-5%
100 YEAR	493.76	462.13	-7%

FLOODING STANDARD RESULTS REACH 55R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	14.17	12.06	-17%
10 YEAR	35.23	29.2	-21%
25 YEAR	54.61	44.85	-22%
50 YEAR	73.49	60.06	-22%
100 YEAR	94.84	77.22	-23%

Post Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.59
10 YEAR	57.57
25 YEAR	59.23
100 YEAR	59.75

Post Pond 2P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	47.48
10 YEAR	51.4
25 YEAR	54.24
100 YEAR	57.41

Post Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Post Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	69.71
10 YEAR	71.38
25 YEAR	71.66
100 YEAR	72.07

Post Development Watershed Areas and General Standard Calculations for Cumberland Senior Housing - Tuttle Road - 3-1-2018

Subarea	Total Area sf	Total Area acres	Existing Impervious acres	New Impervious Area acres	New Impervious Area Treated acres	Existing Lawn acres	New Lawn acres	New Developed Area acres	New Developed Area Treated acres	Existing Woods/Field Undeveloped acres	Treatment BMP	Comments
1s	3717485	85.34	18.40	0.00	0.00	23.40	0.10	0.10	0.00	43.44		
2s	2954636	67.83	13.00	0.13	0.00	30.00	1.85	1.98	1.15	22.01	Forested Buffer	Zero Treatment - Proposed Trail. Back yards to Forested Buffer
3s	1580923	36.29	0.00	0.10	0.00	4.00	0.62	0.72	0.00	31.32	Zero Treatment	Added Proposed Trails = Zero Treatment
4s	566280	13.00	1.00	0.00	0.00	7.00	0.00	0.00	0.00	5.00	no change	no change
5s	5140080	118.00	36.00	0.00	0.00	35.00	0.00	0.00	0.00	47.00	no change	no change
6s	2874960	66.00	20.00	0.00	0.00	40.00	0.00	0.00	0.00	6.00	no change	no change
7s	479160	11.00	5.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	no change	no change
14s	21920	0.50	0.00	0.40	0.40	0.00	0.10	0.50	0.50	0.00	Forested Buffer	Forested Buffer, L =75', C soils, Stone Berm Level Spreader=50'
15s	24108	0.55	0.00	0.37	0.37	0.00	0.18	0.55	0.55	0.00	FocalPoint	Focalpoint system installed along the road
16s	210306	4.83	0.00	1.10	1.10	0.00	2.54	3.64	3.64	0.57	Wet Pond 16P	Wet Pond
17s	358935	8.24	0.00	2.40	2.40	0.00	4.64	7.04	7.04	0.22	wet Pond 17P	Wet Pond
18s	64392	1.48	0.00	0.00	0.00	0.00	0.68	0.68	0.00	0.45	Zero Treatment	Zero Treatment
19s	615502	14.13	0.60	0.15	0.00	1.60	0.94	1.09	0.00	10.66	Zero Treatment	Zero Treatment
20s	266076	6.11	0.00	0.00	0.00	0.00	0.29	0.29	0.00	5.82	Zero Treatment	Zero Treatment
51s	--	--	0.00	3.22	3.22	0.00	0.00	3.22	3.22	--	Roof Dripline BMP	54 Roof Areas draining to Roof Dripline BMP
	18874763	433.30	94.00	7.87	7.49	147.00	11.94	19.81	16.10	155		
				>95%	95%	✓		>80%	81%	✓		

3.	3-1-2018	Shift Road, Revise Buffer and BMP 1 Location	CSB
2.	2-7-2018	Response to Peer Review Comments, Re-submit to Town Submit to DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

Post Development Drainage Plan

Oceanview @ Cumberland
291 Tuttle Road, Cumberland, Maine

Oceanview @ Cumberland LLC
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED PROFESSIONAL ENGINEER
3-1-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

FIELD WK:	SCALE: 1"=200'	SHEET:
DRN BY:	JOB #: 109	Post
CH'D BY:	SS:	
DATE: 3-1-2018	FILE:	

3.	3-1-2018	Shift Road, Revise Buffer and BMP 1 Location	CSB
		Response to Peer Review Comments, Re-submit to Town	
2.	2-7-2018	Submit to DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

Post Development Drainage Plan
USGS Overlay

Oceanview @ Cumberland LLC
277Tuttle Road, Cumberland, Maine

Oceanview @ Cumberland LLC
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER 9098
LICENSED PROFESSIONAL ENGINEER
3-1-2018

BELANGER ENGINEERING
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FIELD WK:	SCALE: 1"=500'	SHEET:
DRN BY:	JOB #: 109	Post 2
CH'D BY:	SS:	
DATE: 3-1-2018	FILE:	

May 4, 2018

Ms. Christine Woodruff
Department of Environmental Protection
312 Canco Road
Portland, Maine 04103

Subject: Ben Viola Response # 1
OceanView At Cumberland
277 Tuttle Road, Cumberland, Maine

Dear Ms. Woodruff:

The following responds to Ben Viola's email dated April 17, 2018. Mr. Viola's original comments are underlined.

The following are my comments regarding the OceanView at Cumberland site location of development application currently being reviewed by the Department.

- *The Treatment Table on sheet "POST" appears to incorrectly calls out Treatment BMP of subcatchment 17.*

We have updated the chart on the post plan as suggested. Subareas 17S drains to pond 17P which is a wet pond. Subarea 18S models the wetland area beside the pond that does not receives treatment.

- *Wet pond P16 does not appear to meet the 3 to 1 length to width requirement. Please correct this.*

We have updated the pond shape to be 3:1 as required.

- *Boardwalk crossings are considered wetland impacts. Were they counted as wetland impacts?*

Yes. We have added notes on sheets C2, C3, C4, and C5 referring the impacts and the NRPA application.

- *Which plan (plans) best shows the locations of forested buffers?*

We have shaded the buffer areas brown on the "post stormwater" plan.

June 18, 2018

Ms. Christine Woodruff
Department of Environmental Protection
312 Canco Road
Portland, Maine 04103

Subject: Ben Viola Response # 2
OceanView At Cumberland
277 Tuttle Road, Cumberland, Maine

Dear Ms. Woodruff:

The following responds to Ben Viola's comments to Rick Licht by email dated June 6, 2018. Mr. Viola's original comments are underlined.

The following are issues that need to be resolved with the Oceanview site location of development application.

- *Sheet C24 – The emergency spillway in the location proposed forces water from the spillway to make a 90 degree turn at the end of the spillway. Please investigate moving the emergency spillway to the other side of the principal outlet. In that location there would not be the abrupt change in direction.*

We have moved the emergency spillway as requested. See Sheet C24.

- *Sheet C20 – The end view is of Box Culvert #2 not Box Culvert #1.*

We have updated the end view on sheet C20.

- *The Focal Point systems need to be moved out of the stream crossing. I will leave this up to you Chris to work out the details with Rick.*

We have revised the road profile and grading to move the low point back 100'. We will install a couple of catch basins at the low point and will pipe the stormwater to the pond and focal point system at Sta 19+50 right for treatment. This will move the system out of the wetland as required.

- *I also asked Rick to update the application form for any changes that have been or will be made.*

Rick Licht will update the application. The project creates 7.87 acres of impervious area and 19.81 acres of developed area.

Should you have questions, please call.

Very truly yours,

Christopher S. Belanger, P.E.
Enclosures

cc: Rick Licht, Licht Environmental Design
Matt Teare, Seacoast Management Company
Chris Wasileski, Seacoast Management Company

From:	rick licht
To:	"Viola, Ben"; "Woodruff, Christine"
Cc:	cbelanger@roadrunner.com; "Chris Wasileski"; "Christian Haynes"
Subject:	RE: Oceanview At Cumberland DEP SW Review Comments
Date:	Wednesday, June 6, 2018 2:44:43 PM

Thanks Ben and for the phone call. The changes are pretty minor and Chris B and I should turn around very quickly.

Christine- Ben discussed that the focal point units cannot go in the stream crossing area per NRPA rules. I will call to discuss so we understand why. The obvious low point of most stream crossings is somewhere near the stream which is where the drainage collects..

Best

Rick

Frederic (Rick) Licht, PE, LSE
Licht Environmental Design, LLC
35 Fran Circle
Gray, Maine 04039
(v) 207.749.4924
lichtenvironmentaldesign.com

From: Viola, Ben [mailto:Ben.Viola@maine.gov]
Sent: Wednesday, June 6, 2018 1:07 PM
To: Woodruff, Christine
Cc: rick licht
Subject: Oceanview

Chris,

The following are issues that need to be resolved with the Oceanview site location of development application.

- Sheet C24 – The emergency spillway in the location proposed forces water from the spillway to make a 90 degree turn at the end of the spillway. Please investigate moving the emergency spillway to the other side of the principal outlet. In that location there would not be the abrupt change in direction.

- Sheet C20 – The end view is of Box Culvert #2 not Box Culvert #1.

- The Focal Point systems need to be moved out of the stream crossing. I will leave this up to you Chris to work out the details with Rick.

- I also asked Rick to update the application form for any changes that have been or will be made.

I will continue my review when I receive a response to the above issues. As always please have the applicant explain how each comment is addressed in the cover accompanying the submittal.

If you or Rick have any questions please contact me.

Ben Viola, PE
Environmental Engineer in the Bureau of Land Resources
Phone: 207-822-6365 *(desk)*
207-822-6300 *(receptionist)* 207-822-6303 *(fax)*
www.maine.gov/dep

- *Sheet "POST" – not sure how dripline filters are counted. Which houses use roof drip line filters?*

  Every house will have a roof drip edge and underdrain to provide treatment for the buildings. The chart on the post plan shows subarea 51S which includes the roof areas for 54 buildings (3.22 acres).

- *Sheets "C29" and "C30" appear to have problems with lettering on my copy. Please provide new copies.*

  We have updated the focal point sheets and details. See sheets C27, C28, C29, C30, C31A, and C31B.

- *Sheet "C29" bypass manifold appears to bypass separator row from Focal Point system. How is the 1 inch and 0.4 inch of runoff ensured to be treated in the separator row?*

  We have updated the details and outlet design. The focal point underdrain will drain into the treatment row. Once the treatment row is flooded, runoff will overflow to the R-tank storage chambers. The R-tank will outlet into an outlet structure. The outlet structure will contain a 4" concrete baffle with a 2" orifice to provide slow release of runoff to the stream.

- *Sheet "C26" & "C27" – Based on the plan, I'm not understanding Focal Point installation. Perhaps there is a better way of showing this.*

  We have updated the focal point sheets and details. See sheets C27, C28, C29, C30, C31A, and C31B.

- *I could not locate test pit information for Focal Points in the application. Where is this information in the application?*

  The focal point system will be located adjacent to the road and is located in a fill condition. The bottom of the system is at elevation 85.0. Further Mark Hampton has provided test pits and high intensity soil survey plan. A separate test pit in the focal point area is not applicable in this condition.

- *Need more information on dewatering of wet ponds during construction. Please add dewatering details and show locations for dewatering silt sacks.*

  Construction dewatering notes is provided on Sheet C16. We have added a sediment trap and Geotextile filter bag location and note on the plans. See sheet C22 and C24. We have also added notes on C4 and C5 requiring the sediment basin be located a minimum 25' from the wetland.

I have spoken with Rick Licht about these comments and he will be making the appropriate changes. He should explain how each issue is addressed in the cover letter accompanying the response.

Should you have questions, please call.

Very truly yours,

Christopher S. Belanger, P.E.
Enclosures

cc: Matt Teare, Seacoast Management Company
Chris Wasileski, Seacoast Management Company

MARK HAMPTON ASSOCIATES, INC.

SOIL EVALUATION • WETLAND DELINEATIONS • SOIL SURVEYS • WETLAND PERMITTING

4674

May 7, 2018

Mr. Rick Licht
Licht Environmental Design LLC
35 Fran Circle
Gray, ME 04039

Re: Soil Evaluation, Proposed Stormwater Buffer, Oceanview of Cumberland Cumberland, ME

Dear Rick,

I completed a soil evaluation for the proposed stormwater buffer on the Allen property for the Oceanview of Cumberland project Cumberland, ME. The soil evaluation was conducted in accordance with the Maine Subsurface Wastewater Disposal Rules dated August 2015, as amended. I evaluated one hand excavated soil test pit in the center of the proposed stormwater buffer. The soils found on the parcel are moderately well drained marine laucustrine soils. There is a seasonal high watertable at approximately 20 inches. There was no observed groundwater table in the soil test pit. The soil test pit log description is attached.

If you have any questions or require additional information, please contact me.

Sincerely,

Mark J. Hampton L.S.E., C.S.S.
Licensed Site Evaluator #263
Certified Soil Scientist #216

P.O. BOX 1931 • PORTLAND, ME 04104-1931 • 207-756-2900 • mhampto1@maine.rr.com

4674

PAGE ____ OF ____

FORM F Rev. 07/11

SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name: Oceanview of Cumberland

Applicant Name: SeaCoast Management Co.

Project Location (municipality): Cumberland

Exploration Symbol # STW-1 ☒ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

____ " Depth of exploration or to refusal

Depth (inches)	Texture	Consistency	Color	Redox Features
0–~8	silt loam	Friable	Dark Brown	
~8–20	silt loam	Friable	Brown	
20–~35	Silty Clay loam	Firm	olive gray	common & Distinct

Soil Details by S.E. / S.S.:

Soil Classification Profile	Condition	Slope Percent	Limiting Factor Depth	
9	C	2	19"	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

Soil Series/Phase Name: Buxton MWD ☐ Hydric ☒ Non-hydric Hydrologic Soil Group: D

Exploration Symbol # ____ ☐ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

____ " Depth of exploration or to refusal

Depth (inches)	Texture	Consistency	Color	Redox Features

Soil Classification: ____ Profile ____ Condition Slope: ____ Percent Limiting Factor: ____" Depth ☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic ____ Soil Group

Exploration Symbol # ____ ☐ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

____ " Depth of exploration or to refusal

Depth (inches)	Texture	Consistency	Color	Redox Features

Soil Classification: ____ Profile ____ Condition Slope: ____ Percent Limiting Factor: ____" Depth ☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic ____ Soil Group

Exploration Symbol # ____ ☐ Test Pit ☐ Boring ☐ Probe

____ " Organic horizon thickness Ground surface elev. ____

____ " Depth of exploration or to refusal

Depth (inches)	Texture	Consistency	Color	Redox Features

Soil Classification: ____ Profile ____ Condition Slope: ____ Percent Limiting Factor: ____" Depth ☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

Soil Series/Phase Name: ☐ Hydric ☐ Non-hydric Hydrologic ____ Soil Group

INVESTIGATOR INFORMATION AND SIGNATURE

Signature: Mark J. Hampton

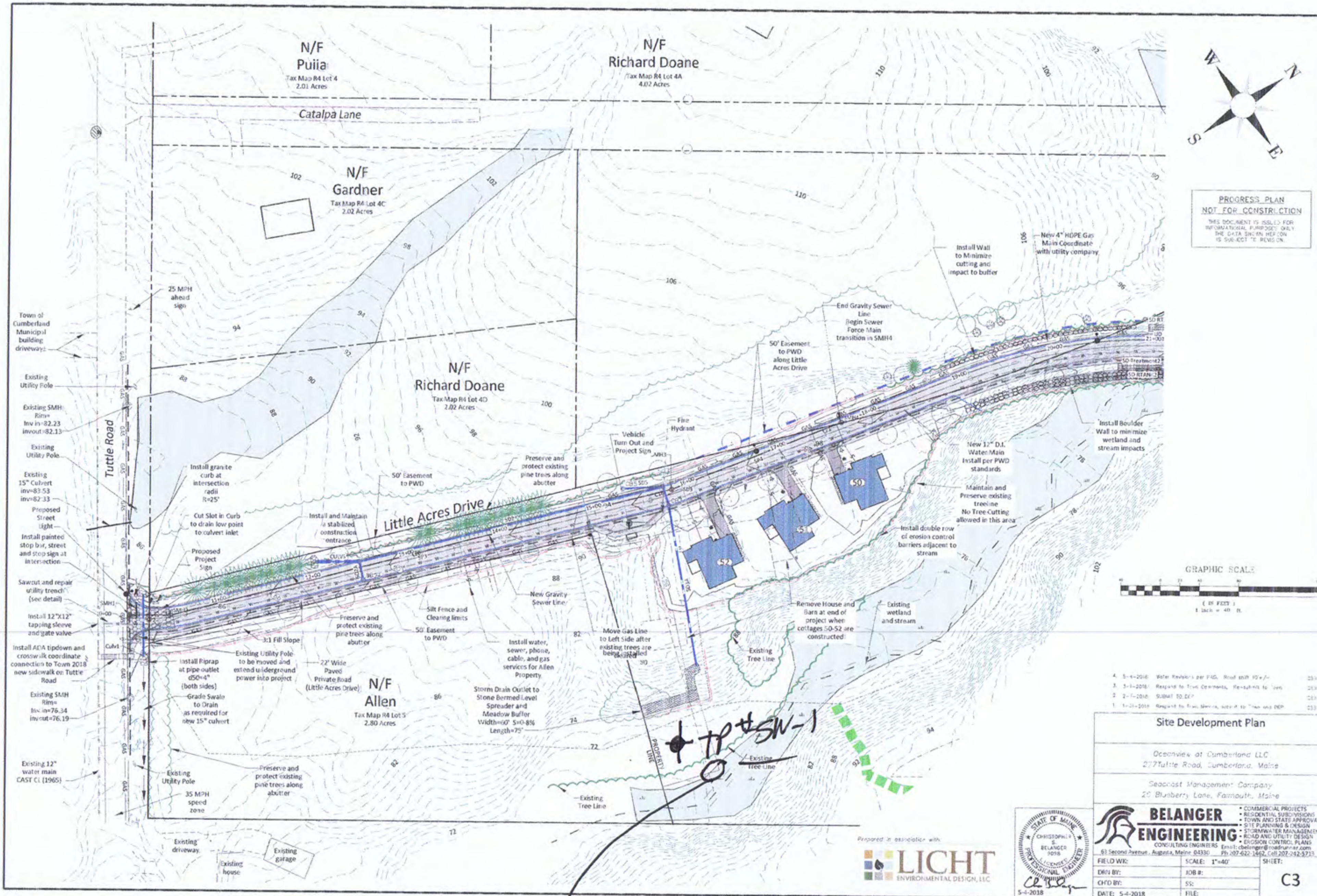
Date: 5/7/18

Name Printed: Mark J. Hampton

Cert/Lic/Reg. #: 263/216

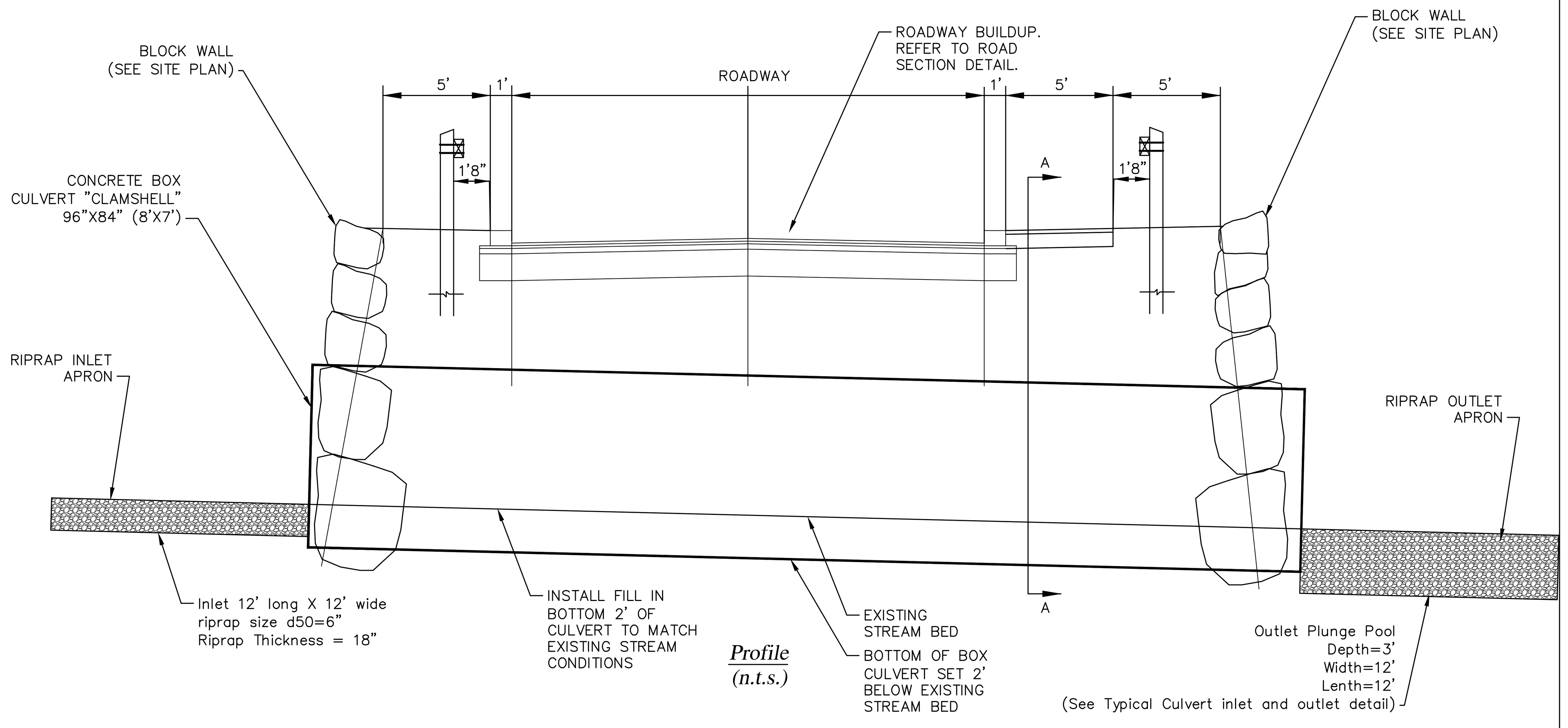
Title: ☒ Licensed Site Evaluator ☒ Certified Soil Scientist ☐ Certified Geologist ☐ Professional Engineer

affix professional seal

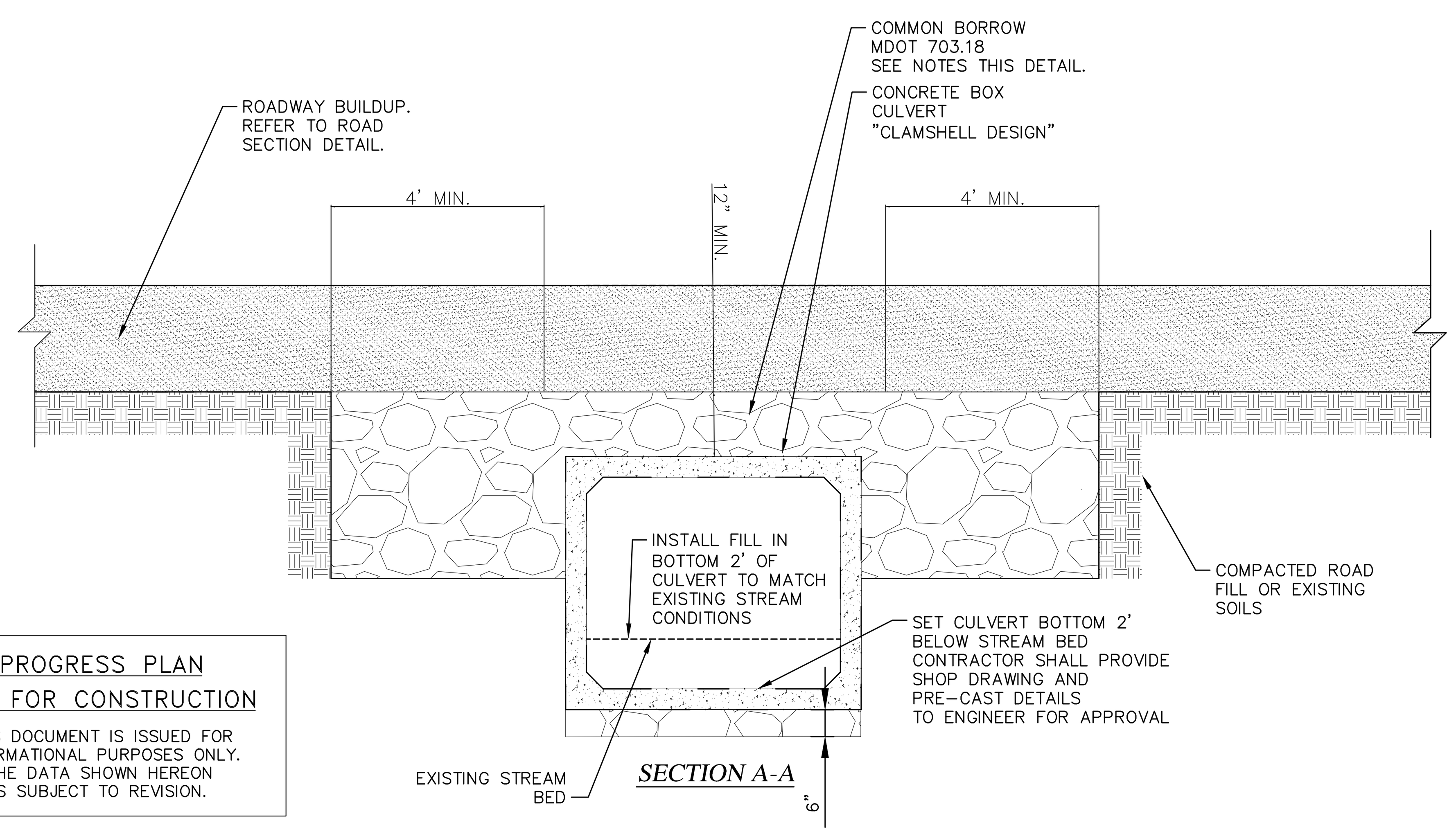


Chris: clip this corner in wetland and Bonwall catch this. RE

NOTES:
1. COMMON BORROW USED FOR BACKFILL SHALL CONSIST OF EARTH, SUITABLE FOR EMBANKMENT CONSTRUCTION. IT SHALL BE FREE FROM FROZEN MATERIAL, PERISHABLE RUBISSH, PEAT, AND OTHER UNSUITABLE MATERIALS INCLUDING MATERIAL CURRENTLY OR PREVIOUSLY CONTAMINATED BY CHEMICAL, RADIOLOGICAL, OR BIOLOGICAL AGENTS. ALL MATERIAL SHALL HAVE NO ROCKS WITH A MAXIMUM DIMENSION OVER 6 INCHES. ON-SITE MATERIAL MAY BE USED IF IT MEETS THE ABOVE SPECIFIED REQUIREMENTS.



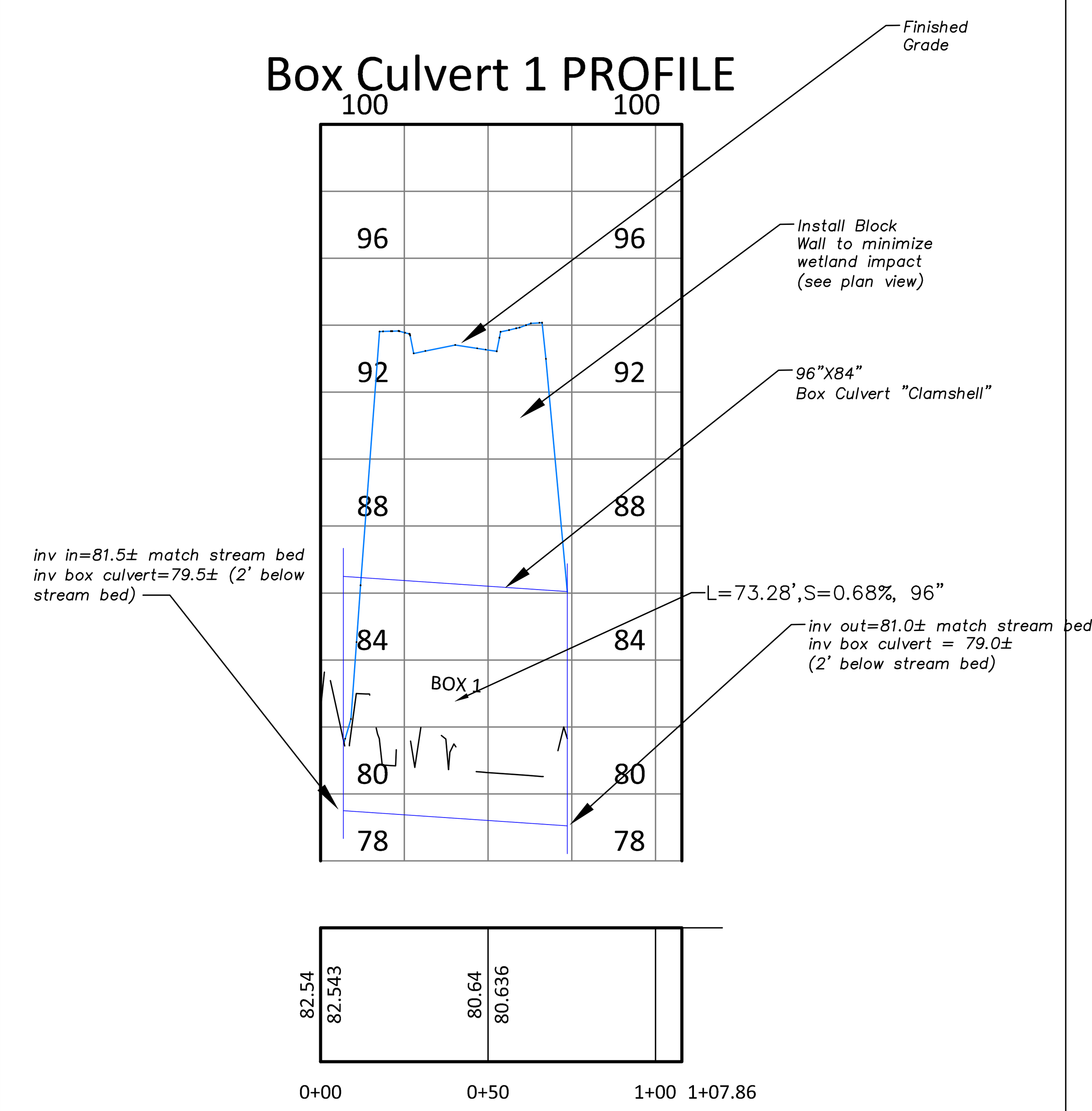
Profile
(n.t.s.)



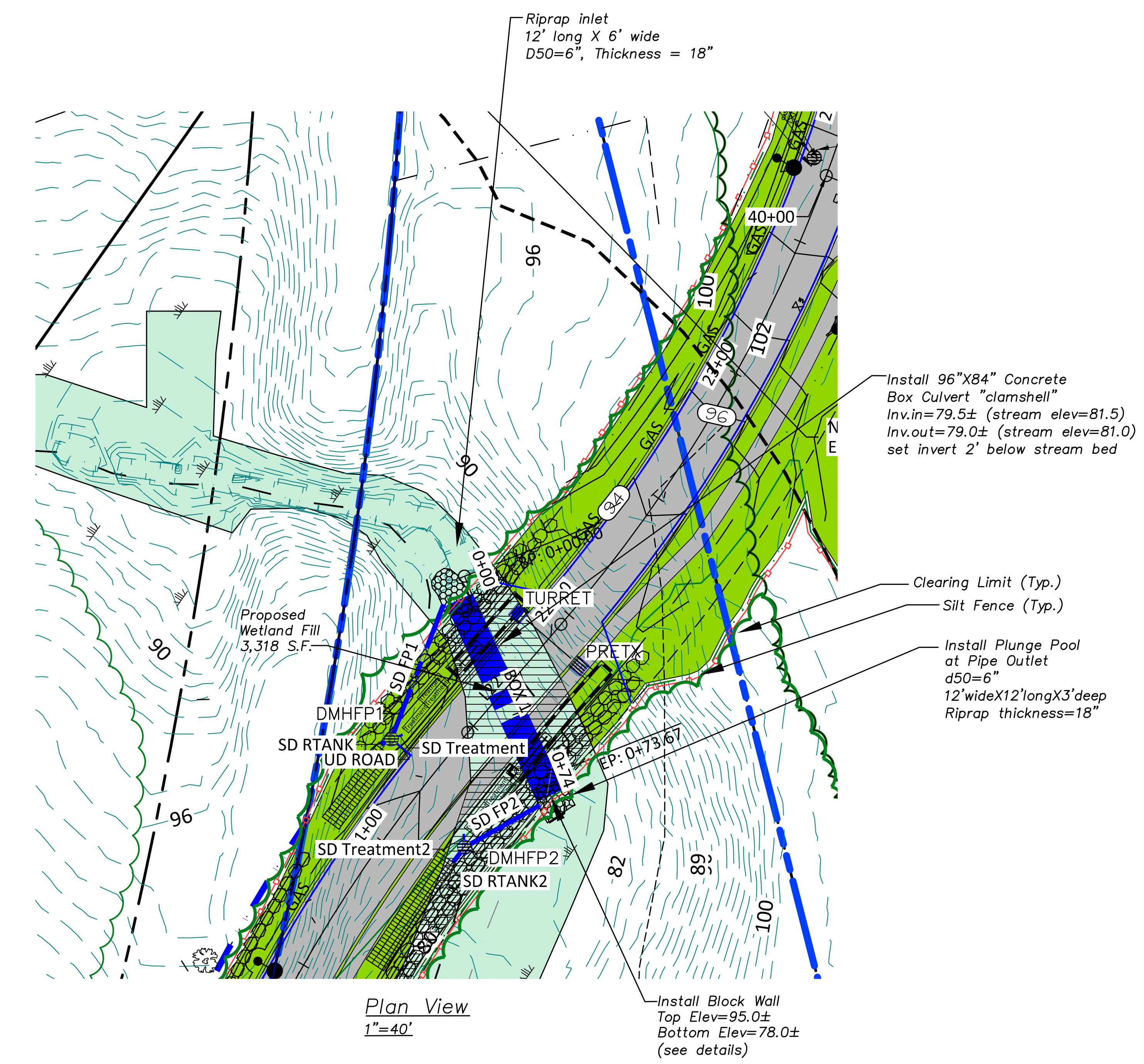
SECTION A-A

PROGRESS PLAN
NOT FOR CONSTRUCTION
THIS DOCUMENT IS ISSUED FOR INFORMATIONAL PURPOSES ONLY. THE DATA SHOWN HEREON IS SUBJECT TO REVISION.

Box Culvert 1 PROFILE

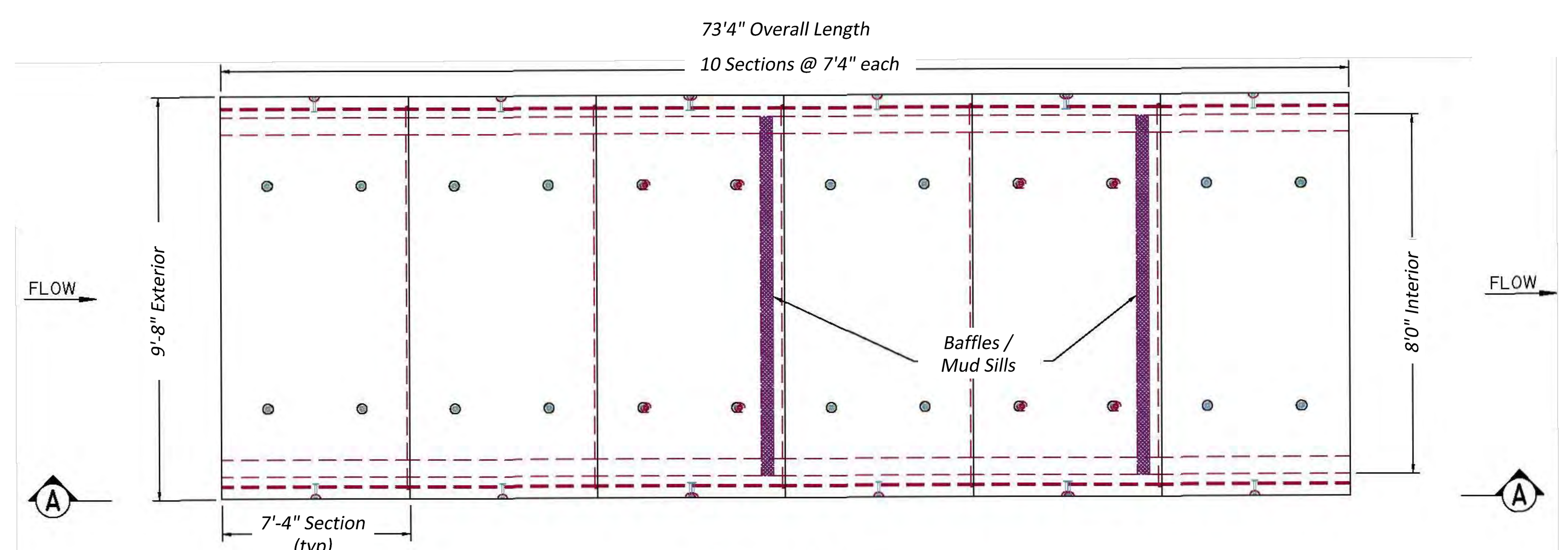


Profile View
1"=40'Horizontal
1"=4'Vertical

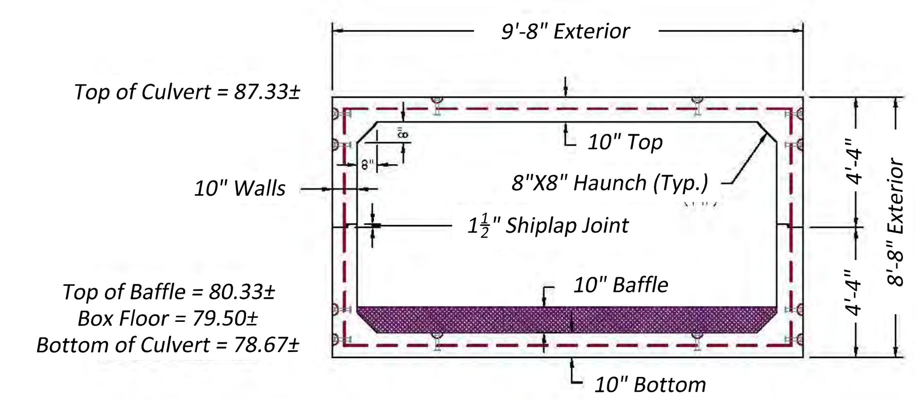


Plan View
1"=40'

Note:
1. CONTRACTOR SHALL PROVIDE SHOP DRAWING TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

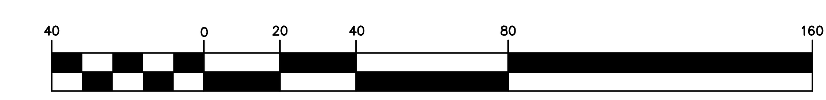


PLAN VIEW

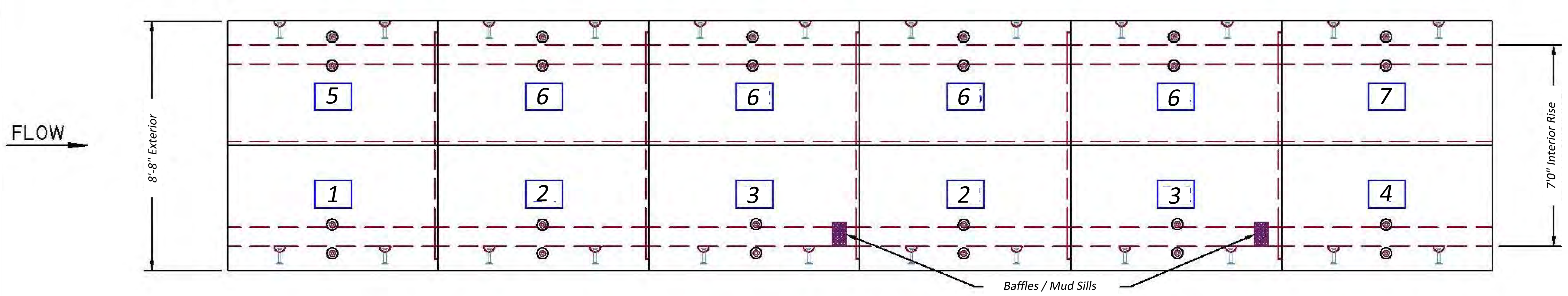


END VIEW *@inlet*

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.



ELEVATION A-A

American Concrete Industries
1717 Stillwater Ave. Veazie , ME
Tel: 207-947-8334
Fax: 207-947-3580

982 Minot Ave. Auburn, ME
Tel: 207-784-1388
Fax: 207-783-4039

ITEM	QTY	BILL OF MATERIALS
1	(1)	7'-4" UPSTREAM END BOTTOM (21,150 #)
5	(1)	7'-4" UPSTREAM END TOP (20,975 #)
2	(4)	7'-4" MID SECTION BOTTOM (21,350 # EA)
6	(8)	7'-4" MID SECTION TOP (21,150 # EA)
3	(4)	7'-4" MID BOTTOM W/ MUDSILL (22,200 # EA)
4	(1)	7'-4" DOWNSTREAM END BOTTOM (21,550 #)
7	(1)	7'-4" DOWNSTREAM END TOP (21,350 #)

Prepared in association with:

LICHT
ENVIRONMENTAL DESIGN, LLC

5.	6-15-2018	No changes this sheet	CSB
4.	5-4-2018	Convert to Box Culvert, Re-submit to ACOE and DEP	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
6-15-2018

Box Culvert (clamshell) Details
Sta 21+75

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

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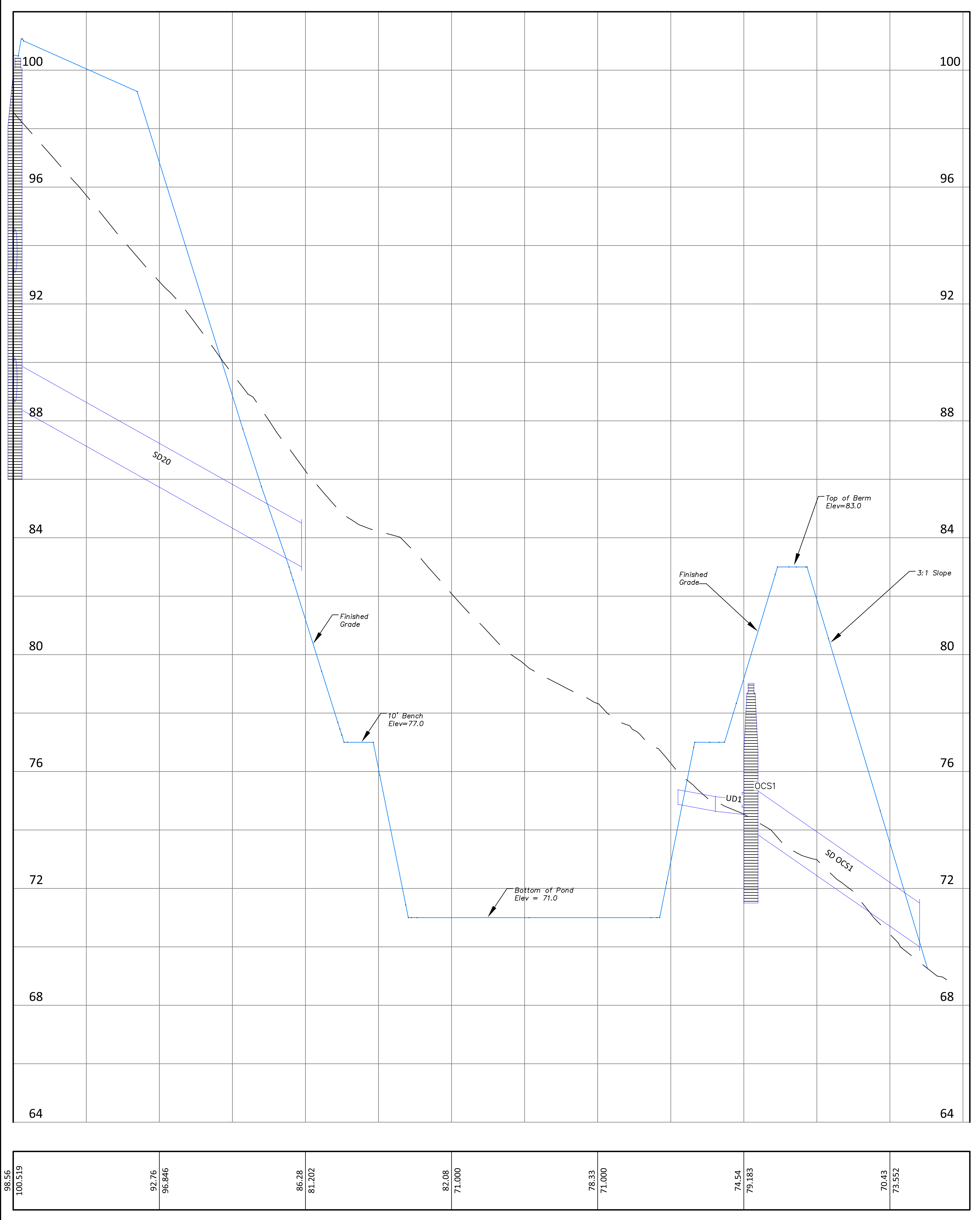
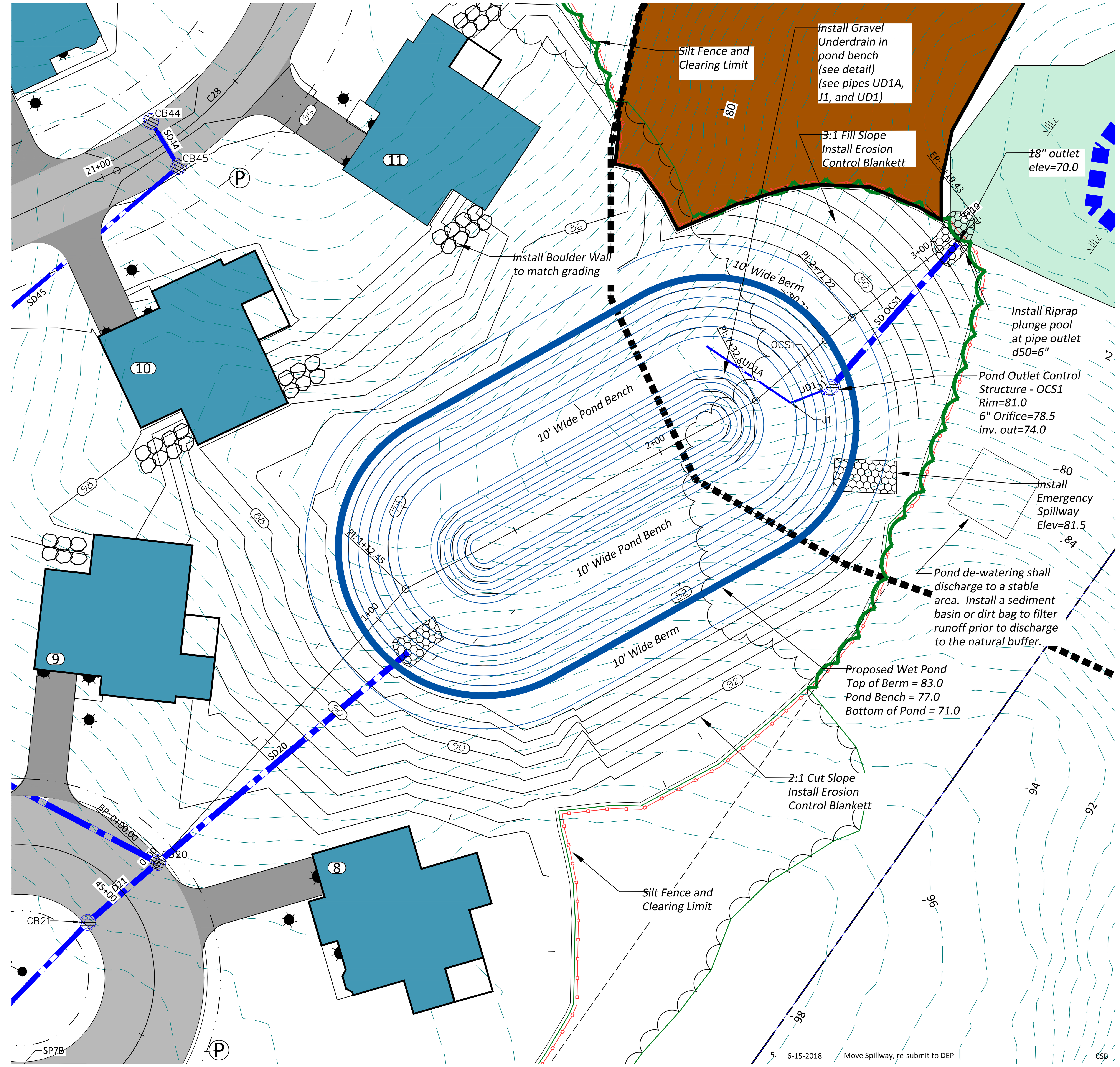
FIELD WK:	SCALE:	SHEET:
DRN BY:	JOB #: 109	C20
CH'D BY:	SS:	
DATE: 6-15-2018	FILE:	

Arctic Fox Section PROFILE





N
W
E
S

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

PROGRESS PLAN
NOT FOR CONSTRUCTION

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5.	6-15-2018	Move Spillway, re-submit to DEP	CSB
4.	5-4-2018	Respond to DEP Comments	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	SUBMIT TO DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Arctic Fox Wet Pond
Plan and Profile

Oceanview at Cumberland
291 Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE
CHRISTOPHER S. BELANGER
9098
LICENSED
PROFESSIONAL ENGINEER
6-15-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330 Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

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FIELD WK:	SCALE: 1"=20'	SHEET:
DRN BY:	JOB #: 109	C24
CH'D BY:	SS:	
DATE: 6-15-2018	FILE:	

6.	6-15-2018	move low point, move focal point re-submit to Maine DEP	CSB
5.	5-4-2018	Respond to DEP comments, re-submit to DEP	CSB
4.	4-5-2018	Submit revised details to Focalpoint	CSB
3.	3-1-2018	Respond to Town Memos, Re-submit to Town	CSB
2.	2-7-2018	Submit to Maine DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town and DEP	CSB

Site Development Plan
Focalpoint Sta 19+50 Right Side

Oceanview at Cumberland
291Tuttle Road, Cumberland, Maine

Seacoast Management Company
20 Blueberry Lane, Falmouth, Maine

PROGRESS PLAN
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LICHT ENVIRONMENTAL DESIGN, LLC

STATE OF MAINE
CHRISTOPHER S. BELANGER
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6-15-2018

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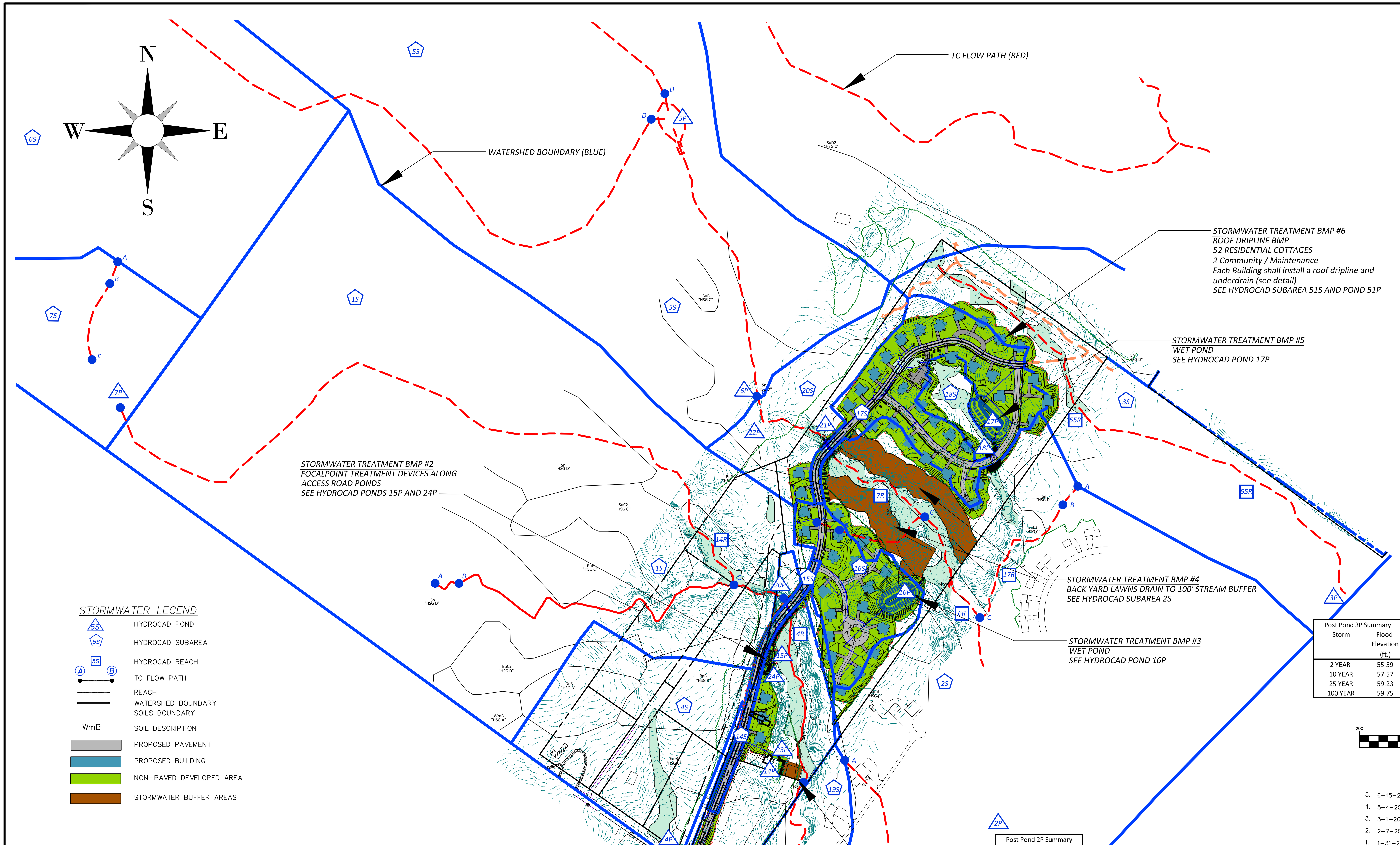
FIELD WK:	SCALE: 1"=10'	SHEET:
DRN BY:	JOB #:	C27
CH'D BY:	SS:	
DATE: 6-15-2018	FILE:	



FLOODING STANDARD RESULTS POND 1P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	38.34	36.38	-5%
10 YEAR	96.83	90.39	-7%
25 YEAR	144.34	132.66	-9%
50 YEAR	189.15	171.99	-10%
100 YEAR	239.06	212.2	-13%

FLOODING STANDARD RESULTS POND 2P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	55.7	54.26	-3%
10 YEAR	89.77	88.9	-1%
25 YEAR	107.91	107.21	-1%
50 YEAR	141.82	138.46	-2%
100 YEAR	237.6	234.91	-1%

FLOODING STANDARD RESULTS POND 3P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	12.99	11.45	-13%
10 YEAR	26.68	24.24	-10%
25 YEAR	48.56	38.26	-27%
50 YEAR	70.97	58.08	-22%
100 YEAR	93.27	76.14	-22%

FLOODING STANDARD RESULTS POND 4P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	4.55	4.55	0%
10 YEAR	8.95	8.95	0%
25 YEAR	11.61	11.61	0%
50 YEAR	13.6	13.6	0%
100 YEAR	15.83	15.83	0%

FLOODING STANDARD RESULTS REACH 3R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	48.66	45.72	-6%
10 YEAR	103.64	95.42	-9%
25 YEAR	151.56	138.13	-10%
50 YEAR	196.96	177.46	-11%
100 YEAR	248.09	217.18	-14%

FLOODING STANDARD RESULTS REACH 6R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	94.2	87.71	-7%
10 YEAR	194.34	180.52	-8%
25 YEAR	265.34	250.59	-6%
50 YEAR	375.46	359.26	-5%
100 YEAR	493.76	466.77	-6%

FLOODING STANDARD RESULTS REACH 55R			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE %
2 YEAR	14.17	12.06	-17%
10 YEAR	35.23	29.2	-21%
25 YEAR	54.61	44.85	-22%
50 YEAR	73.49	60.06	-22%
100 YEAR	94.84	77.22	-23%

Post Pond 3P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	55.59
10 YEAR	57.57
25 YEAR	59.23
100 YEAR	59.75

Post Pond 2P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	47.49
10 YEAR	51.41
25 YEAR	54.25
100 YEAR	57.41

Post Pond 4P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	86.04
10 YEAR	86.86
25 YEAR	87.61
100 YEAR	89.03

Post Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	69.71
10 YEAR	71.38
25 YEAR	71.66
100 YEAR	72.07

Post Development Watershed Areas and General Standard Calculations for Cumberland Senior Housing - Tuttle Road - 6-15-2018

Subarea	Total Area sf	Total Area acres	Existing Impervious acres	New Impervious Area acres	New Impervious Area Treated acres	Existing Lawn acres	New Lawn acres	New Developed Area acres	New Developed Area Treated acres	Existing Woods/Field Undeveloped acres	Treatment BMP	Comments
1s	3717485	85.34	18.40	0.00	0.00	23.40	0.10	0.10	0.00	43.44		
2s	2954636	67.83	13.00	0.13	0.00	30.00	1.85	1.98	1.15	22.01	Forested Buffer	Zero Treatment - Proposed Trail. Back yards to 100' Forested Stream Buffer
3s	1580923	36.29	0.00	0.10	0.00	4.00	0.62	0.72	0.00	31.32	Zero Treatment	Added Proposed Trails = Zero Treatment
4s	566280	13.00	1.00	0.00	0.00	7.00	0.00	0.00	0.00	5.00	no change	no change
5s	5140080	118.00	36.00	0.00	0.00	35.00	0.00	0.00	0.00	47.00	no change	no change
6s	2874960	66.00	20.00	0.00	0.00	40.00	0.00	0.00	0.00	6.00	no change	no change
7s	479160	11.00	5.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	no change	no change
14s	21920	0.50	0.00	0.40	0.40	0.00	0.10	0.50	0.50	0.00	Meadow Buffer	Meadow Buffer, L =75', C soils, Stone Berm Level Spreader=60'
15s	24108	0.55	0.00	0.37	0.37	0.00	0.18	0.55	0.55	0.00	FocalPoint	Focalpoint system installed along the road
16s	210306	4.83	0.00	1.10	1.10	0.00	2.54	3.64	3.64	0.57	Wet Pond 16P	Wet Pond
17s	358935	8.24	0.00	2.40	2.40	0.00	4.64	7.04	7.04	0.22	wet Pond 17P	Wet Pond
18s	64392	1.48	0.00	0.00	0.00	0.00	0.68	0.68	0.00	0.45	Zero Treatment	Zero Treatment
19s	615502	14.13	0.60	0.15	0.00	1.60	0.94	1.09	0.00	10.66	Zero Treatment	Zero Treatment
20s	266076	6.11	0.00	0.00	0.00	0.00	0.29	0.29	0.00	5.82	Zero Treatment	Zero Treatment
51s	--	--	0.00	3.22	3.22	0.00	0.00	3.22	3.22	--	Roof Dripline BMP	54 Roof Areas draining to Roof Dripline BMP
	18874763	433.30	94.00	7.87	7.49	147.00	11.94	19.81	16.10	155		
				>95%	95%	✓		>80%	81%	✓		

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

5.	6-15-2018	Move Focal Point storage. Re-submit to Maine DEP	CSB
4.	5-4-2018	Respond to Ben Viola comments	CSB
3.	3-1-2018	Shift Road, Revise Buffer and BMP 1 Location Response to Peer Review Comments, Re-submit to Town	CSB
2.	2-7-2018	Submit to DEP	CSB
1.	1-31-2018	Respond to Town Memos, submit to Town	CSB

Post Development Drainage Plan

Oceanview @ Cumberland
291 Tuttle Road, Cumberland, Maine

Oceanview @ Cumberland LLC
20 Blueberry Lane, Falmouth, Maine

STATE OF MAINE ★ CHRISTOPHER S. BELANGER 9098 ★ LICENSED PROFESSIONAL ENGINEER
6-15-2018

BELANGER ENGINEERING
CONSULTING ENGINEERS
63 Second Avenue , Augusta, Maine 04330
- COMMERCIAL PROJECTS
- RESIDENTIAL SUBDIVISIONS
- TOWN AND STATE APPROVALS
- SITE PLANNING & DESIGN
- STORMWATER MANAGEMENT
- ROAD AND UTILITY DESIGN
- EROSION CONTROL PLANS

Email: cbelanger@roadrunner.com
Ph 207-622-1462, Cell 207-242-5713

FIELD WK:	SCALE: 1"=200'	SHEET:
DRN BY:	JOB #: 109	Post
CH'D BY:	SS:	
DATE: 6-15-2018	FILE:	