TOWN OF BROOKLYN
PLANNING AND ZONING COMMISSION
Regular Meeting Agenda
Tuesday, September 21, 2021 6:30 p.m.

3 WAYS TO ATTEND: IN-PERSON, ONLINE, AND BY PHONE

<table>
<tr><td colspan="3">In-Person:
Brooklyn Middle School Auditorium, 119 Gorman Road, Brooklyn, CT
All attending in person are required to wear masks.</td></tr>
<tr><td>Online:
Click link below:
https://townofbrooklyn.my.webex.com/townofbrooklyn.my/j.php?MTID=m06601768d9f69b94af83afa453a07780</td><td>OR</td><td>Go to www.webex.com,
click Sign In
On the top right, click Join a Meeting
Enter meeting ID: 126 613 4783
Enter meeting password: Second</td></tr>
<tr><td colspan="3">Phone: Dial 1-415-655-0001
Enter meeting number: 126 613 4783
Enter meeting password: 732663
You can bypass attendee number by pressing #</td></tr>
</table>

I. **Call to Order**
II. **Roll Call**
III. **Seating of Alternates**
IV. **Adoption of Minutes:** Special Meeting August 8, 2021
V. **Public Commentary**
VI. **Unfinished Business:**
  a. **Reading of Legal Notice: None.**
  b. **New Public Hearings:**
    1. **SP 21-002:** Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack.
  c. **Continued Public Hearings: None.**
  d. **Other Unfinished Business**:
    1. **SP 21-002:** Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack.

VII. **New Business:**
  a. **Applications:**
    1. **SPR 21-003:** Site Plan Review Application for ground-mounted solar panels at 80 South Street, 8.6 acres, RA Zone, Applicant: Consolidated Edison Solutions, Inc.
    2. **SPR 21-004:** Site Plan Review Application for ground-mounted solar panels at 5 Front Street and 29 Tiffany Street, 1.8 acres, R-10 Zone, Applicant: CHIP Fund 6 LLC & CHIP Fund 8 LLC.
  b. **Other New Business: None.**

VIII. **Reports of Officers and Committees: None.**
IX. **Public Commentary**
X. **Adjourn**

Michelle Sigfridson, Chairman

TOWN OF BROOKLYN
PLANNING AND ZONING COMMISSION
Special Meeting
Monday, August 9, 2021 6:30 p.m.

3 WAYS TO ATTEND: IN-PERSON, ONLINE, AND BY PHONE

<table>
<tr><td colspan="3">In-Person:
Clifford B. Green Meeting Center, Suite 24, 69 South Main Street, Brooklyn, CT
All attending in person are required to wear masks.</td></tr>
<tr><td>Online:
Click link below:
https://townofbrooklyn.my.webex.com/townofbrooklyn.my/j.php?MTID=m201237d025518b68ff4c28a54e6d7721</td><td>OR</td><td>Go to www.webex.com,
click Sign In
On the top right, click Join a Meeting
Enter meeting ID: 182 040 0303
Enter meeting password: Special</td></tr>
<tr><td colspan="3">Phone: Dial 1-415-655-0001
Enter meeting number: 182 040 0303
Enter meeting password: 7732425
You can bypass attendee number by pressing #</td></tr>
</table>

MINUTES

I. **Call to Order –** Carlene Kelleher, Acting Chair, called the meeting to order at 6:36 p.m.

II. **Roll Call** – Carlene Kelleher, Austin Tanner, Earl Starks, Allen Fitzgerald, Seth Pember (all present in person).
Michelle Sigfridson (present via Webex, but turned over the position of Chair to C. Kelleher for this meeting), John Haefele (via Webex).
Charles Sczuroski was absent with notice.
J.R. Thayer was absent.

Staff Present: Jana Roberson, Director of Community Development (in person).

Also Present:
All Via Webex – Norm Thibeault, Killingly Engineering Associates; Attorney Nicholas Mancuso (6:54 p.m.); J.S. Perreault, Recording Secretary.

III. **Seating of Alternates**

Motion was made by A. Fitzgerald to seat Alternate S. Pember as a Voting Member for this meeting.
Second by E. Starks. No discussion.
Motion carried unanimously by voice vote (5-0-0).

Motion was made by A. Fitzgerald to seat Alternate J. Haefele as a Voting Member for this meeting.
Second by E. Starks. No discussion.
Motion carried unanimously by voice vote (6-0-0).

IV. **Adoption of Minutes:** Regular Meeting July 20, 2021

J. Roberson noted that references to “Martha” Washburn should be corrected to “Margaret” Washburn.

Motion was made by J. Haefele to accept the Minutes of the Regular Meeting of July 20, 2021, including the correction noted by J. Roberson that references to “Martha” Washburn should be “Margaret” Washburn.
Second by A. Fitzgerald.
Motion carried unanimously by voice vote (7-0-0).

V. **Public Commentary –** None.

VI. **Unfinished Business:**

a. **Reading of Legal Notices: None.**
b. **New Public Hearings: None.**
c. **Continued Public Hearings: None.**
d. **Other Unfinished Business**:

1. **SP 21-002**: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack. ***Selection of third party consultants. Public hearing rescheduled to open September 1, 2021***

J. Roberson explained that the Commission had decided at a previous meeting to hire third-party consultants for this Application: Drainage Engineer, Landscape Architect and Traffic Engineer. Information on all, who had submitted a proposal for consideration by the Commission, was included in packets to Commission Members. Ms. Roberson also explained that due to her concern regarding time, she had also sent the proposals to the Applicant, which she explained was a mistake as they must first come before the Commission for review and approval.

Ms. Roberson read, into the Record, a letter (e-mail dated July 21, 2021) that she had received from Attorney Nicholas Mancuso, who represents the Applicant, in which he explains the concerns of the Applicant regarding the selection of consultants, cost and duplication of work. Ms. Roberson forwarded the letter to the Town Attorney who advised her to follow procedure. Ms. Roberson stated that the Commission has the option to change its mind about the need for consultants and that it also has the option to choose whichever consultant(s) they wish. There was discussion regarding how the consultants were solicited.

Attorney Nicholas Mancuso made it known that he was now present (6:54 p.m.). There was discussion regarding local firms being solicited. Ms. Roberson stated that she had contacted three local firms and they were not interested for various reasons.

Norm Thibeault, Killingly Engineering, commented on the following:

- He understands the need to review the traffic study (as a peer review) due to the proximity to the School. He feels that it makes sense for the Traffic Engineers to come to a consensus as to what is important regarding how traffic is handled and how it might impact operations at the school.
- Mr. Thibeault also explained that he agrees, to some degree, with hiring a Landscape Architect as they had not hired a Landscape Architect for this particular project.
- Mr. Thibeault explained that he does not agree with hiring a Drainage Engineer because Syl Pauley had reviewed the drainage and civil plans quite extensively (three different rounds of review comments). He explained that Mr. Pauley was very detailed in his reviews. Mr. Thibeault stated that they had addressed every one of Mr. Pauley's drainage issues which Mr. Pauley then reviewed with regard to the State's Storm Water Quality Guidelines as well as with the Town's Storm Water Guidelines and, ultimately, he signed off on it. He asked, "If you don't trust Syl Pauley's review, then what's the point in having him as the Town Engineer?"

There was discussion regarding whether it is appropriate to discuss Syl Pauley's comments before the public hearing is opened. Ms. Roberson explained that it is okay in the context of the task at hand, but individual comments should not be discussed. She stated that Mr. Pauley had reviewed the project extensively for the IWWC and those comments are available. Ms. Roberson will provide copies of Mr. Pauley's comments to the PZC. Ms. Roberson explained that the origin of the concern for a Drainage Engineer Specialist was the scale of the development and the amount of impermeability in proximity to the School. She noted that the original plans had rain gardens in them and Mr. Pauley had asked for them to be taken out. Ms. Roberson explained that her concern is that Mr. Pauley (who is not a Specialist) may not be the best person to take the Town's Storm Water Management Standards (Zoning Regulations) into account. Attorney Mancuso stated agreement with Mr. Thibeault regarding this issue as it was already reviewed. Attorney Mancuso asked, for the record, the names of other consultants that she reached out to that did not submit proposals. Ms. Roberson stated the following: Provost & Rovero; J & D Engineering; and Paula Stall.

Discussion continued:

- S. Pember explained that he is in favor of hiring all three consultants as it is important to be as informed as possible about the project and what the impact will be.
- Tanner explained that he has faith in Syl Pauley who does a thorough job. He doesn't think that for a project this size, $5,000 to make sure things are done right, it a tremendous thing to ask.
- A. Fitzgerald referred to the Minutes of the PZC Meeting of June 2, 2021, and asked if Mr. Pauley's comments had all been addressed.
  There was discussion regarding Mr. Pauley's comments (which it was determined had been provided to Commission Members). Ms. Roberson explained that there were still some items that were still unaddressed.
- J. Haefele feels that there are legitimate concerns regarding the drainage. He is in favor of hiring all three consultants.
  There was discussion regarding whether there is time for the consultants to complete the work in time for the public hearing. M. Sigfridson explained that the hearing could be left open to give more time for consideration.

Ms. Kelleher called for a poll of the Commission Members:

- A. Fitzgerald – all three.
- E. Starks – all three.
- M. Sigfridson – all three. She feels it is not unreasonable.
- S. Pember – Asked about the Town Attorney's opinion regarding hiring all three. Ms. Roberson explained that he had read the Minutes and she referred to and read from the Town Attorney's letter, in which he states (regarding the Drainage Engineer) that "the Commission's concern goes beyond your typical drainage study and greater expertise is needed to advise the Commission." Ms. Roberson read from Section 7.8 of the Zoning Regulations – Storm Water Management.
  Mr. Pember – all three.
- A. Tanner – all three. The scope of the project justifies the cost of the experts.
- C. Kelleher – all three.
- J. Haefele – all three.

Ms. Sigfridson commented that all of the potential consultants are well qualified and suggested selecting the most cost effective in each category. Ms. Roberson suggested that they could attend virtually to lower the cost. Attorney Mancuso asked Mr. Thibeault how he feels about the consultants attending virtually vs. in person. Mr. Thibeault explained that, typically, when there is a third-party review, a written response is provided first, they, then can have a conversation based on the written comments. Therefore, Mr. Thibeault stated that if the report is delivered shortly before or on the night of the meeting and no one has had an opportunity to review the comments, he does not see a point in their coming to the meeting that night. Mr. Thibeault does not have an objection to consultants attending a meeting at some point. Attorney Mancuso stated that he has no problem with attending virtually.

Ms. Kelleher stated that the Commission could vote on each of the consultants.

Ms. Roberson read a statement from each of the Landscape Architects (LADA P.C. - $3,600 and BL Companies - $3,500) since their proposals were so close. There was discussion. Ms. Kelleher noted that LADA had included a site visit. Ms. Roberson commented that she thinks that they are all qualified. Ms. Kelleher commented that perhaps the most cost effective should be selected. Mr. Fitzgerald commented that he feels that LADA includes a site visit and it is only $100 more.

Motion was made by J. Haefele to accept Landscape Architect, LADA, P.C. - $3,600 as a third-party consultant for **SP 21-002**: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack.
Second by A. Fitzgerald. No discussion.
Motion carried unanimously by voice vote (7-0-0).

Ms. Roberson suggested that the sample motion on her Staff Guidance sheet be used.

Motion was made by A. Fitzgerald that, in accordance with the Town Ordinance 20-1.3.b.3, the Planning and Zoning Commission (also known as the Land Use Agency) approves the following estimate of costs for supplemental consulting services determined to be necessary on June 2, 2021 for SP 21-002: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack:

- Landscape Architect – LADA, P.C. - $3,600 (selected by unanimous vote)
  Still to decide on the following:
- Drainage Engineer – Trinkaus Engineering - $4,200 or BL Companies - $6,500
- Traffic Engineer – KWH Enterprise, LLC - $6,000 or BL Companies - $4,500

Second by E. Starks.
The Commission will next discuss the selection of a Drainage Engineer.
There was no vote on this Motion.

The Commission discussed Drainage Engineers:

Ms. Kelleher noted that there is a big difference in cost between the two (Trinkaus Engineering - $4,200 and BL Companies - $6,500) and she asked the Commission to consider taking the lower bid.

Motion was made by A. Fitzgerald to select Trinkaus Engineering - $4,200 as a third-party consultant (Drainage Engineer) for **SP 21-002**: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack.
Second by J. Haefele.
Discussion: Attorney Mancuso stated that he would like to speak with the Applicant before any consultants begin work because there is a possibility that they will change the Application. They may consider a different type of housing, possibly affordable housing, which will take some of these issues off the table. Ms. Roberson stated, for the Record, that it is confusing to her how the type of housing would change any of this. She will make sure that no works starts before she hears from Attorney Mancuso (by Monday, August 16, 2021, the latest). Ms. Roberson spoke of procedure regarding an additional application fee, plus a 25 percent contingency, payable by the Applicant within ten days. She said that the Town will not sign any contracts with any consultants until the check is received. Vote was taken during discussion regarding selection of a Traffic Engineer. See Below*.

The Commission discussed selection of a Traffic Engineer:

J. Haefele suggested that BL Companies be selected as the Traffic Engineer.

Norm Thibeault commented that he had spoken with his Traffic Engineer who is familiar with KWH Enterprise, LLC because he has worked with them in the past. However, Mr. Thibeault stated that they do not object if the Commission selects the most cost effective option.

* At this time the vote was taken for the Drainage Engineer above. Motion carried unanimously by voice vote (7-0-0).

Discussion regarding selection of a Traffic Engineer continued:

The Commission had hired KWH Enterprise, LLC before for a gravel pit. It was clarified that the consultant would review the traffic report prepared by Hesketh Associates. Mr. Fitzgerald and Ms. Kelleher stated that they feel that the biggest issue is the traffic, specifically at the School twice per day. Ms. Kelleher feels that this information should be included in the traffic study. Ms. Kelleher suggested that the School Superintendent be contacted to get an accurate representation of the traffic flow and times of day that it occurs (pick up and drop off). Ms. Roberson commented that September 1st is the first day of school. Ms. Roberson stated that the Applicant's Traffic Engineer was able to capture some of that data before school ended in the spring. Ms. Kelleher would still like the information from the School Superintendent, but there is no need to ask for it again if it has already been obtained.

Motion was made by A. Fitzgerald to select KWH Enterprise, LLC - $6,000 as a third-party consultant (Traffic Engineer) for **SP 21-002**: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack.
Second by E. Starks.
There was discussion regarding the scope of services. Mr. Tanner feels that it is too general and the Town should be more specific.
Mr. Haefele commented that he doesn't see a tremendous difference between the two proposals and asked what more KWH Enterprise, LLC would be providing for the additional cost.
Ms. Roberson explained that all of the Scopes of Services are similar and have only been tweaked a little for each one and that the School was not mentioned in any of them. She read aloud and summarized from each of the two proposals.
Mr. Thibeault explained that traffic engineering is a non-subjective type of analysis. It is based upon counts and numbers and turning motions and impacts to roads. It is a very numbers-oriented type of engineering.
Mr. Tanner stated that he doesn't see a reason to pick one over the other, so he can't see spending the extra money. Mr. Haefele stated agreement with Mr. Tanner.
Motion carried by voice vote (4-3-0). A. Tanner – no; J. Haefele – no; C. Kelleher – no. They had all expressed during discussion that they preferred selecting the lower price.

There was discussion regarding confusion about the Motions for the third-party consultants. The following Motion was made to include all three consultants rather than three separate votes:

Motion was made by A. Fitzgerald that, in accordance with the Town Ordinance 20-1.3.b.3, the Planning and Zoning Commission (also known as the Land Use Agency) approves the following estimate of costs for supplemental consulting services determined to be necessary on June 2, 2021 for SP 21-002: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack, the Engineers shall be:

- Landscape Architect – LADA, P.C. - $3,600
- Drainage Engineer – Trinkaus Engineering - $4,200
- Traffic Engineer – KWH Enterprise, LLC - $6,000

Second by S. Pember.
A voice vote was taken, but was incomplete.
During the vote there was discussion regarding that this combined Motion does not reflect the vote for the Traffic Engineer and Mr. Fitzgerald rescinded his Motion and Mr. Pember rescinded his Second to the Motion. Motions #4, #6 and #7 reflect the vote of the Commission for the third-party consultants.

VII. New Business:

a. **Applications: None.**

b. **Other New Business:**

1. Discussion of communications strategy for Affordable Housing Plan

There was discussion and J. Roberson explained that she and someone from the NECCOG Staff will be at the Brooklyn Fair (she invited PZC Members to attend also). They are working on an interactive game/activity to raise public awareness regarding Affordable Housing and to get public feedback. They may have business cards (with the website) available at the Fair. There will be short, themed articles/slide shows geared toward educating a general audience (including a short survey) on the website. Ms. Sigfridson will post to FaceBook. The Affordable Housing Plan will be a chapter in the POCD. There is no guidance for the Plan from the State. She said that if people identify with it, that would be a success.

2. Discussion of cannabis legislation pertaining to zoning (PA 21-01)

   There was discussion and Ms. Roberson stated that she had attended a webinar where there was a slide show and she had included a slide in packets to Commission Members outlining the new zoning authorities relating to cannabis establishments (selling of recreational marijuana – dispensary). Public Act 21-01 took effect July 1, 2021. Ms. Roberson explained what can be done right now:
   - Prohibit siting of cannabis establishments;
   - Allow, but restrict proximity to schools, etc.;
   - Allow, but restrict hours and signage;

   She explained that if you do nothing, they would be treated the same as any other retail. There are eleven different licenses for cannabis under this legislation (grow it, sell it, delivery services, hybrid retail, people who turn it into other things like edibles, micro and mega cultivators). It is not considered agriculture.

   Ms. Roberson asked for direction from the Commission. There was discussion regarding what zone(s) it could be allowed in and signage.

   There was agreement among the Commission Members not to prohibit it.

   Ms. Roberson will draft language to add this use (micro-cultivator and retailer) to the Regulations allowing both by Special Permit in the Planned Commercial Zone. There was discussion regarding the possibility of micro-cultivator in the Industrial Zone.

VIII. Reports of Officers and Committees:

a. Staff Reports
   Margaret Washburn, ZEO, will attend the next meeting. Ms. Washburn would like to discuss contractors because they have been getting more requests. He report was included in packets to Commission Members.
b. Budget Update – None.
c. Correspondence – None.
d. Chairman's Report – None.

IX. Public Commentary – None.

X. Adjourn

Motion was made by J. Haefele to adjourn at 8:45 p.m. Second by A. Fitzgerald.
Motion carried unanimously by voice vote (7-0-0).

Respectfully submitted,

J.S. Perreault
Recording Secretary

SP 21-002: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (Assessor's Map 33, Lot 19), 13.5 acres, R-30 Zone, Applicant: Shane Pollack.

Document Record 9-16-2021:

Page 1	Application forms for Special Permit and Site Plan Review
Page 3	Statement of Use prepared by Killingly Engineering Associates
Page 4	Sanitary Report prepared by Killingly Engineering Associates
Page 5	Wetlands Assessment prepared by Joseph Theroux, Soils Scientist, dated 9-23-2020
Page 12	Inland Wetlands and Watercourses Notice of Action, dated 4-22-2021
Page 15	CT Water Co. approval email, dated 5-25-2021
Page 16	Brooklyn Water Pollution Control Authority approval letter, dated 3-11-2021
Page 18	Drainage Report prepared by Killingly Engineering Associates, revised January 2021
Page 153	Traffic Impact Report prepared by Hesketh and Associates, dated 7-13-2021
Page 199	Engineering Plan Review prepared by NECCOG, revised 3-5-2021
Page 224	Plan set titled "Proposed Multifamily Condominium Development" prepared by Killingly Engineering Associates, 11 sheets, revised 4-20-2021
Page 235	Comments addressing planner's request email, dated 9-16-2021
Page 236	Revised plan sheets 1 and 2, dated 9-16-2021
Page 238	Architectural renderings for units 4-7, 9-13, 14-18, received 9-10-2021
Page 244	Public hearing legal notice for hearing dated 9-21-2021
Page 245	Abutters' notices mailed 9-2-2021
Page 254	Public Hearing sign posted 9-2-2021
Page 255	Peer Review of Traffic Impact Report prepared by KWH Enterprise, dated 9-7-2021
Page 261	Fire Marshal review dated 9-10-2021
Page 264	Peer Review of Site Plan and Special Permit Objectives prepare by LADA, dated 9-13-2021
Page 272	Peer Review of Stormwater Management and Erosion and Sedimentation Control Measures prepared by Trinkhaus Engineering, dated 9-14-2021
Page 287	Architectural review prepared by NECCOG, dated 9-16-2021

RECEIVED

MAY 13 2021

PLANNING AND ZONING COMMISSION

TOWN OF BROOKLYN

CONECTICUT

Received Date ____________

Application #SP 21-002

Check # 3225

APPLICATION FOR SPECIAL PERMIT

Name of Applicant SHANE POLLOCK Phone 860-888-3129

Mailing Address 101 MACKIN DR., GRISWOLD, CT 06351 Phone________

Name of Engineer/Surveyor KILLINGLY ENGINEERING ASSOCIATES

Address 114 WESTCOTT ROAD PO BOX 421 KILLINGLY CT 06241

Contact Person NORMAND THIBEAULT Phone 860 779-7299 Fax —

Name of Attorney NICHOLAS MANCUSO

Address 116 PARUM RD. ~~CO~~ COLCHESTER, CT 06415

Phone 860 603 2258 Fax —

Property location/address LOUISE BERRY DRIVE

Map# 33 Lot# 19 Zone RA30 Total Acres 13.497 AC

Sewage Disposal: Private______ Public X Existing______ Proposed X

Water: Private______ Public X Existing______ Proposed X

Proposed Activity MULTI FAMILY DEVELOPMENT (51 SINGLE FAMILY CONDOMINIUM UNITS)

Compliance with Article 4, Site Plan Requirements

Is parcel located within 500 feet of an adjoining Town? NO

The following shall accompany the application when required:

Fee $ 1,320.00 **State Fee ($60.00)** 60.00 3 copies of plans ✓ Sanitary Report ✓

4.5.5 Application/ Report of Decision from the Inland Wetlands Commission

4.5.5 Applications filed with other Agencies

12.1 Erosion and Sediment Control Plans

The owner and applicant hereby grant the Brooklyn Planning and Zoning Commission, the Board of Selectman, Authorized Agents of the Planning and Zoning Commission or Board of Selectman, permission to enter the property to which the application is requested for the purpose of inspection and enforcement of the Zoning regulations and the Subdivision regulations of the Town of Brooklyn

Applicant: Shane J Pollock Date 5-12-21

Owner: Shane J Pollock Date 5-12-21

*Note: All consulting fees shall be paid by the applicant

PLANNING AND ZONING COMMISSION
TOWN OF BROOKLYN
CONECTICUT

Received Date __________ Application #SPR____________
Action Date_________ Check#____________

APPLICATION FOR SITE PLAN REVIEW

Name of Applicant SHANE POLLOCK Phone 860-888-3129
Mailing Address 101 MACKIN DR., GRISWOLD, CT 06351 Phone____________

Name of Owner BLB, LLC Phone________________
Mailing Address PO BOX 327 BROOKLYN, CT 06234 Phone____________

Name of Engineer/Surveyor KILLINGLY ENGINEERING ASSOCIATES
Address PO BOX 421 KILLINGLY CT 06241
Contact Person NORMAND THIBEAULT, P.E. Phone 8607797299 Fax______________

Property location/address LOUISE BERRY DRIVE
Map # 33 Lot # 19 Zone ~~RA~~ R-30 Total Acres 13.497

Proposed Activity MULTI FAMILY DEVELOPMENT (51 SINGLE FAMILY CONDOMINIUM UNITS)

Change of Use: Yes____ No X If Yes, Previous Use____________________
Area of Proposed Structure(s) or Expansion ____________________

Utilities - Septic: On Site______ Municipal X Existing_______ Proposed X
Water: Private______ Public X Existing_______ Proposed X

Compliance with Article 4, Site Plan Requirements

The following shall accompany the application when required:

Fee$ 1,320.00 **State Fee ($60.00)** 60.00 3 copies of plans ✓ Sanitary Report ✓
4.5.5 Application/ Report of Decision from the Inland Wetlands Commission
4.5.5 Applications filed with other Agencies
12.1 Erosion and Sediment Control Plans
See also Site Plan Review Worksheet

Variances obtained N/A Date____________________

The owner and applicant hereby grant the Brooklyn Planning and Zoning Commission, the Board of Selectman, Authorized Agents of the Planning and Zoning Commission or Board of Selectman, permission to enter the property to which the application is requested for the purpose of inspection and enforcement of the Zoning regulations and the Subdivision regulations of the Town of Brooklyn

Applicant: [signature] Shane J Pollock Date 5-12-21

Owner: [signature] Shane J Pollock Date 5-12-21

*Note: Any consulting fees will be paid by the applicant

Killingly Engineering Associates
Civil Engineering & Surveying
P.O. Box 421 Dayville, CT 06241
Phone: 860-779-7299
Fax: 860-774-3703

Proposed 51-Unit Condominium Development
for Shane Pollock
Louise Berry Drive
Brooklyn, CT

Statement of Use

The referenced project will result in the construction of a 1,000' cul-de-sac road with access from Louise Berry Drive, installation of public water and sanitary sewer and the construction of 51 single-family condominiums that will be "for sale" units. The sanitary sewer design has been reviewed and approved by the Brooklyn WPCA and the waterline extension and installation is approved by CT Water. The plans have been submitted to the Brooklyn Fire Marshal for review and comment.

The total area of the property is 13.497 acres and approximately half of the property will require clearing to facilitate construction. The condominiums will be constructed in groups of 2-7 units and have been positioned a minimum of 40' apart in a manner that will alleviate the necessity for excessive cuts and fills for the project.
The Brooklyn Inland Wetlands Commission approved the application at their April 2021 meeting; no clearing is proposed in the wetlands and there will be slightly over 2 acres of disturbance within the regulated upland review area.

During construction, the transport of sediment will be controlled by means of silt fencing backed with double staked haybales between the disturbed areas and the wetlands. A proposed stormwater swale that is proposed for the final stabilized site will be utilized as a temporary sedimentation swale during construction and drainage will be conveyed to a temporary sediment trap which will ultimately be the stormwater basin for the project. Fill slopes have been designed to a controllable 3H:1V grade and will be stabilized with a biodegradable erosion control fabric over seeding.

The stormwater system has been designed in accordance with the Town of Brooklyn requirements for stormwater quality and infiltration, defined per the 2004 State of CT stormwater Quality Guidelines. The design encourages overland flow where possible to preserve the integrity of the wetlands on the site. For paved areas, stormwater will be collected in a series of catch basins and pipe and conveyed to a proposed stormwater basin which has been designed to limit peak flows for up to a 100-year design storm. The basin will be constructed with an underdrain to ensure that it empties completely within 24 hours of any storm event to maintain full design capacity. In addition, by emptying completely after storm events, the design will alleviate any potential habitat for mosquitos and other vector insects.

The roadway and stormwater system will be privately owned and maintained by the homeowner's association and will not be the responsibility of the Town of Brooklyn. It is anticipated that construction of the roadway and installation of utilities will commence in 2022 and will take 3-4 months to complete. Construction of residences will commence upon the completion of the road up to the binder course and will occur in a phased manner, likely beginning with the units at the roadway terminus and working back toward Louise Berry Drive to limit activity in the vicinity of residences where families may be residing.

Killingly Engineering Associates
Civil Engineering & Surveying
P.O. Box 421 Dayville, CT 06241
Phone: 860-779-7299
Fax: 860-774-3703

Proposed 51-Unit Condominium Development
for Shane Pollock
Louise Berry Drive
Brooklyn, CT

Sanitary Report

As required by the Town of Brooklyn Zoning Regulations, this project will be served by public sanitary sewer. Each unit will be individually served and conveyed to a collection system prior to discharge to an existing Town owned sanitary manhole. The plans have been reviewed and approved by the Town of Brooklyn Water Pollution Control Authority, Alan Carpenter, P.E., the WPCA's reviewing Engineer, and Syl Pauley, P.E. from the Northeast Connecticut Council of Governments.

JOSEPH R. THEROUX

~ CERTIFIED FORESTER/ SOIL SCIENTIST ~
PHONE 860-428-7992~ FAX 860-376-6842
P.O. BOX 32, VOLUNTOWN, CT. 06384
FORESTRY SERVICES ~ WETLAND IMPACT ASSESSMENTS
WETLAND DELINEATIONS AND PERMITTING ~ E&S/SITE
MONITORING
WETLAND FUNCTION & VALUE ASSESSMENTS

9/23/20

Killingly Engineering Associates
P.O. Box 421
Dayville, CT. 06241

Re: Wetland function/value and impact assessment report for the proposed site development for Shane Pollock, Louise Berry Drive, Brooklyn, Connecticut.

Dear Mr. Thibeault,

At your request, I have reviewed the site plans entitled: "PROPOSED MULTI- FAMILY DEVELOPMENT, LOUISE BERRY DRIVE BROOKLYN, CONNECTICUT. PREPARED FOR SHANE POLLOCK, dated April 23, 2020, revised to August 24, 2020 and the above referenced property for the purposes of assessing the wetland functions and values and potential impacts to the inland wetlands and watercourses in proximity to the proposed housing development.

The wetland function and value assessment was conducted on 9/22/2020.

Existing Conditions

The property is 13.497 acres in size and is located on the south side of Louise Berry Drive, in Brooklyn, CT.

The majority of the parcel is comprised of uplands, with gentle to moderate slopes and gravelly, well drained soils. The southern portion of the property is occupied by a large palustrine forested/scrub-shrub wetland & watercourse complex and adjacent forested uplands along the southern property line.

Upland Review Areas

The 125 foot upland review area around the delineated forested/scrub-shrub wetland/watercourse is vegetated in the overstory with a mix of white pine and mixed hardwoods in the sawtimber and polewood size classes. The mixed hardwoods include white, black and scarlet oaks, hickory, black birch and red maple.

The site was heavily logged several years ago resulting in the removal of the majority of the overstory. This increase in light has released the understory saplings, shrub and herbaceous species resulting in a very dense understory, especially in and adjacent to the wetlands.

This densely vegetated understory is comprised of polewood and saplings in these species as well as shrub species such as, spicebush, winterberry, Japanese barberry, multiflora rose and highbush blueberry. Herbaceous vegetation includes numerous fern species, goldenrod, black raspberry and miscellaneous grasses.

Wetlands

A palustrine forested/scrub-shrub wetland with 2 watercourses were delineated in the southern and eastern portions of the property. (See wetland delineation report).

One intermittent watercourse flows to the south along the eastern property boundary. The only source of hydrology for the watercourse is from storm water discharges from the impervious surfaces associated with the school, and from Louise Berry Drive.

The other watercourse, (Anderson Brook), flows onto the property in the southeast property corner, and joins with the eastern watercourse. It then flows to the west off the parcel along the western property line. Storm water discharges from Franklin Drive enter the wetlands and watercourse on the southern property line.

The wetlands and watercourses were inundated on the date of the delineation, (12/28/15 and 5/4/20). On the date of the assessment, (9/22/2020), the wetlands were not inundated nor were the watercourses flowing, however a few small pockets were inundated within the watercourse, due to perched water trapped in depressions.

It should also be noted that floodplain soils were found adjacent to Anderson Brook which flows to the west off the parcel.

The majority of this wetland/watercourse is densely vegetated with red maple, white oak, white ash and elm in the overstory, and in the understory saplings and typical wetland shrub species such as highbush blueberry, speckled alder, arrowwood, sweet pepperbush, winterberry and spicebush. Other species included Japanese barberry, multiflora rose, grapevines and bittersweet.

Herbaceous vegetation included sphagnum moss, sensitive, Christmas, interrupted, hay scented, lady & cinnamon ferns, black raspberry, sedges, rushes, skunk cabbage, goldenrod, jewelweed and misc. grasses.

Wildlife tracks/sign found and directly observed in and adjacent to the wetland/watercourse included mammals and bird species such as: white tailed deer, eastern coyote, red fox, raccoon gray & red squirrels, red tailed hawk, American crow, red wing blackbird, and numerous songbird species.

Amphibians found included green and pickerel frogs. Undoubtedly, this wetland complex serves as habitat to numerous reptile and amphibian species.

I am uncertain if a fish population exists within Anderson Brook, due to its shallow average depths and status as intermittent. I do not believe it is possible for fish to inhabit the eastern intermittent watercourse due to its steep, rocky slope, intermittent nature and poor water quality due to the untreated, non-attenuated storm water discharges that severely erode the stream channel during significant storm events.

Wetland Functions and Values

The forested/scrub-shrub wetland and watercourse(s), were inspected to determine wetland functions and values utilizing the Army Corps. Of Engineers methodology as outlined in "The Highway Methodology Workbook Supplement".

This methodology recognizes 8 separate wetland functions: groundwater recharge/discharge, floodflow alteration/storage, fish/shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization and wildlife habitat. The 4 wetland values include: recreational value, educational/scientific value, uniqueness/heritage value and threatened/endangered species habitat.

For each wetland function or value to be determined, 2 to 31 different considerations/or qualifiers are considered as rationale to apply or eliminate that specific function or value.

Palustrine forested/scrub-shrub wetland & Anderson Brook functions:

The following is a list of the wetland functions exhibited by this wetland/watercourse and their descriptions:

Ground water recharge: Ground water recharge function is possible due to the perched water table being trapped in small inundated pockets within the wetlands and slowly infiltrating during dry season. Anderson Brook stream flows off the property diminishes this function.

Sediment/toxicant retention: Dense herbaceous vegetation, shrubs and flat topography in the wetlands can effectively trap sediments/toxicants from surface flows from the adjacent topography. Although with no current sources of sediments or toxicants present, this wetland has little opportunity to provide this function.

Nutrient removal/retention: Herbaceous and shrub vegetation in the wetlands can effectively trap and utilize potential nutrients before reaching watercourses. Nitrogen fixing bacteria in wetland soils also trap nitrogen. Although with no current sources of nutrients present, this wetland has little opportunity to provide this function.

Production export: numerous tree, shrub and herbaceous plant species in the wetlands provide food, berries and seeds for wildlife. Invertebrates and amphibians provide food for birds and mammals.

Sediment and shoreline stabilization: Roots from herbaceous grasses and plants, shrub species and trees found in wetlands adjacent to the watercourses help bind and stabilize soils which helps prevent erosion along steeper edges of wetlands and streambanks.

Wildlife habitat: Numerous amphibians, reptile, mammal, and bird species inhabit this wetland and watercourse complex. The wetland and upland riparian zones adjacent to the wetland serve as wildlife habitat. Wildlife habitat is the primary function of this wetland.

This wetland did not exhibit the wetland functions of fish habitat nor floodflow alteration due to the lack of significant deep-water habitat areas capable of sustaining fish or storing flood waters.

<u>**Palustrine forested scrub-shrub wetland & Anderson Brook values**</u>

The following wetland values were exhibited by this wetland/watercourse:

Recreation: This wetland/watercourse complex holds the potential for active or passive recreational opportunities such as hiking, hunting or viewing of wildlife, although with no public access on this property, this wetland has little opportunity to provide this value.

Educational/scientific value: this wetland/watercourse is relatively undisturbed, contains multiple wetland classes, and is considered as valuable wildlife habitat, although with no public access on this property, this wetland has little opportunity to provide this value.

Uniqueness/heritage value: this wetland/watercourse serves an important role in the ecological system of the area, it is a typical wetland class for the area, and serves as valuable wildlife habitat.

Visual/aesthetic value: the wetland/watercourse is visible from multiple viewing locations due to its position in the landscape, it contains a diversity of vegetation that turns vibrant colors during different seasons, it is considered valuable wildlife habitat, and is not significantly disturbed.

This wetland/watercourse did not exhibit the value of threatened/endangered species habitat as the site was not shown within the shaded areas on the current natural diversity database maps.

<u>**Potential wetland impacts**</u>

The project plans and site were reviewed to assess the potential impacts to the wetlands from the proposed parking area expansion.

On this parcel, a 51-unit development is proposed with an access road/cul de sac, utilities, water, sanitary sewer & storm water discharge/treatment systems.

Along the southern limits of the development, a 3:1 slope or less is proposed as shown on the site plan.

The clearing limits and E&S measures shown on the plans vary from approx. 120 feet in width to immediately adjacent to the wetlands.

The topsoil stockpile is shown a considerable distance from the wetlands and silt fencing is shown along its downslope perimeter.

A two-bay grassed storm water basin is proposed to remove sediments and attenuate storm water flows before discharge.

E&S Measures:

The submitted project plans show the proposed E&S measures around the perimeter of the clearing limits adjacent to the wetlands as silt fencing.

It should be noted that the proposed storm water treatment basin and swale are proposed to be utilized as a temporary sediment basin during construction to prevent potential sediment discharges from reaching the wetlands.

Jute netting is proposed to help hold and establish vegetation on steeper slopes.

It would be my recommendation that the E&S measures be installed as soon as possible after the initial timber cutting/land clearing and before the stumping and topsoil removal operation. It is during this phase where the most likely opportunity will occur for erosion and sedimentation. In the northeast area the existing slopes adjacent to the wetlands/watercourse are moderate, and the excavation, filling and grading are proposed directly adjacent to the wetlands.

Along the portions of the clearing limits within 75 feet of the wetlands, I would recommend either super silt fencing or silt fencing backed by staked hay bales should be proposed and implemented. The silt fencing will also prevent reptiles and amphibians from entering the development areas.

Silt fencing should be shown along wetland flags WF-37 to WF-39 for the excavation/installation of the rip rap level spreader and pipe.

I would also recommend that E&S inspections be conducted on a frequent basis during the land clearing/stumping/topsoil stripping phases, and prior to significant storm events.

Direct wetland impacts:

No direct wetland or watercourse disturbance is proposed.

Potential short-term impacts:

The potential short-term impacts associated with the land clearing, stumping, top soil stripping and construction would be limited to potential sediment discharges during significant storm events.

Provided that the proposed/recommended E&S measures/inspections are correctly implemented and maintained throughout the project timeframe, the disturbance directly adjacent to the wetlands will not significantly impact the wetlands or their existing functions due to erosion and sedimentation. Once the top soils are removed, the well-drained, sandy/gravelly soils will allow for good infiltration of storm water runoff both pre and post construction.

The quick and permanent establishment of vegetation in the disturbed areas is crucial to the prevention of erosion. To minimize the potential for these impacts, E&S control measures have been incorporated into the project plans on sheet 7 of 9.

Potential long-term impacts:

Wetland hydrology

I see no direct or long-term impacts to the wetland/watercourse hydrology as a result of the proposed development, or storm water treatment basin. The storm water associated with the access drives, parking areas and the impervious surfaces, (roof areas), will be a significant input to the existing hydrology, through some minor overland flow, but mostly through the storm water basin, impervious grass & rip rap swale, as ground water recharge or as direct discharge during significant storm events after treatment. It is my opinion that these inputs from the impervious surfaces will augment the existing hydrology.

Currently, the storm water associated with the school storm water system, Louise Berry Drive and Franklin Drive and ground water discharge are all inputs into the hydrology of Anderson Brook and the wetlands. These inputs will not change as a result of the construction of the development.

It should be noted that currently the sources of hydrology for the wetlands/watercourses are ground water, off site stream and storm water flows, minor overland storm water & precipitation flows and a small measure of direct infiltration through the well-drained gravelly soils within the upland areas adjacent to the wetlands.

Water quality:

Due to the incorporation of the paved parking surfaces, rip rap and grass lined water swales, the 2-bay grassed storm water treatment basin, rain garden, and some direct infiltration of storm water in the well-drained, sandy, gravelly soils, I see no significant or adverse impacts to the existing water quality of the wetlands or Anderson Brook from storm water discharges.

Adjacent upland wildlife habitat

Potential long-term impacts to the upland habitat from the project would include the loss of a significant portion of the URA serving as riparian zones and upland wildlife habitat adjacent to the wetlands and brook corridor. This intrusion will force wildlife into the vegetated corridor in and around the wetlands and brook, during and after the construction timeframe, and into other areas where the uplands are not disturbed.

The remaining non-developed southern portion of the property below the development varies in width from 100 feet to 270 feet in width, within this area, the wetlands and adjacent upland riparian zones will still provide for all of the wetland functions/values and significant wildlife habitat.

In summary, the design of the project implements features intended to minimize or eliminate potential impacts to the wetlands such as storm water runoff, significant loss of wetland and watercourse habitats, and erosion and sedimentation associated with construction activities.

I feel these proposed measures are adequate to protect the wetlands provided that the recommended erosion and sedimentation control features are implemented and maintained throughout the development timeframe.

The existing wetlands and watercourses will still have the ability to provide the same wetland functions and values they currently provide.

If you have any questions concerning the site assessment or this report, please feel free to contact me.

Sincerely,

Joseph R. Theroux

Joseph R. Theroux
Certified Forester and Soil Scientist
Member SSSSNE, SSSA

Brooklyn Inland Wetlands
Commission
P.O. Box 356
Brooklyn, Connecticut 06234

9489 0090 0027 6215 8996 26

CERTIFIED#

Shane Pollock
101 Mackin Drive
Griswold, CT 06351

April 22, 2021

RE: Notice of Decision – 020921A Shane Pollock and Fran Mancuso, Applicants/Owners; Louise Berry Drive, Map 33, Lot 19, R-30 Zone; Construction of 51 Single Family Condominium Units with activity in the upland review area.

Title of the approved plan: Proposed Multi-Family Condominium Development Louise Berry Drive Brooklyn, CT. Final revision date of the approved plan: 4/20/2021.

Dear Mr. Pollock:

Because the site plan meets the regulations of the Brooklyn 2021 Inland Wetlands and Watercourses Commission, at the April 13, 2021 meeting of the Inland Wetlands and Watercourse commission your application – 020921A Shane Pollock and Fran Mancuso, Applicants/Owners; Louise Berry Drive, Map 33, Lot 19, R-30 Zone; Construction of 51 Single Family Condominium Units with activity in the upland review area was approved with the following conditions, in addition to the standard conditions:

The only work allowed prior to installing the perimeter sediment controls shall be clearing vegetation. No grubbing shall be allowed until the perimeter sediment controls have been installed as per the plan. Call (860) 779-3411, ext. 31, for an inspection of the perimeter sediment controls. The perimeter sediment controls must be approved in writing by the IWWC Agent or a Commission member prior to commencing any other work.

The temporary sediment basin and swale must be at least temporarily stabilized prior to discharging any stormwater into them. Call (860) 779-3411, ext. 31, for an inspection of the temporary sediment basin and swale. The temporary stabilization of the temporary sediment basin and swale must be approved in writing by the IWWC Agent or a Commission member prior to discharging any stormwater into them.

Detention basin side slopes and bottom shall be mowed annually by 6/30 and 10/1 for the life of the basin, in perpetuity.

The Condominium Association shall be responsible for maintenance of the stormwater basin and its outlets in perpetuity.

The construction of the temporary sediment basin and swale shall begin between April 14 and September 1 to allow for vegetation to become at least temporarily established in the basin prior to discharging stormwater into the temporary sediment basin and swale. The basin and swale should be substantially completed by September 1. Construction of the temporary sediment basin and swale shall not commence between September 2 and April 13 in accordance with the provisions of Section 11.1 of the Brooklyn IWWC Regulations.

The plan shall be revised to show two terraced walls and a slope not steeper than 3:1 between the handicapped accessible dwelling units and the adjacent wetlands.

The plan shall be revised to include rip rap or crushed stone outlet protection for all roof drains that discharge on or in close proximity to any slopes 3H:1V or steeper.

A legal notice of this approval was published on the Town of Brooklyn's Website, brooklynct.org, Inland Wetlands page, under minutes/notice of action on Wednesday, April 14, 2020. Please note that this action of the Inland Wetlands and Watercourses Commission may be appealed for a fifteen-day period following the publication of the legal notice.

If you have any questions, please contact me at 860-779-3411 Extension 31.

Sincerely,

Margaret Washburn

Margaret Washburn, M.S., R.P.S.S.
Wetlands Enforcement Officer

MW/acl
CC: File, Fran Mancuso,
Killingly Engineering
Enc: Standard Conditions

BROOKLYN INLAND WETLANDS AND WATERCOURSES COMMISSION
STANDARD CONDITIONS FOR IWWC PERMITS 12/13/16

APPLICANT: READ CAREFULLY

IWWC Permit Document. A copy of the IWWC approval motion and the conditions stated herein shall constitute the IWWC permit for the approved activity when the permit document is signed and dated by the IWWC Agent.

Notice of Start and Finish. Permittee shall notify the IWWC agent at least 48 hours before the approved activity commences and within 72 hours after completion of the activity.

Permit Duration. This permit is valid for a period in accordance with Section 11.6 of the Brooklyn Inland Wetlands and Watercourses Regulations and the Connecticut General Statutes. Any request to renew or extend the expiration date of a permit can be granted only as authorized by the IWWC Regulations. Expired permits may not be renewed.

Erosion and Sedimentation Controls. Permittee is responsible for implementing the approved erosion and sediment control plan. This responsibility includes the installation and maintenance of control measures, informing all parties engaged on the construction site of the requirements and objectives of the plan. The permittee shall inspect the erosion controls weekly and after rains and repair deficiencies within twenty-four hours. The IWWC and its staff may require additional erosion if needed to prevent erosion and sedimentation. Restabilization of the site shall take place as soon as possible.

Stockpile locations. During construction, piles of fill, erodible material and debris shall not be created within regulated areas. The locations of debris and other stockpiled materials shall be shown on the submitted plans. Any material excavated at the site shall be disposed of at upland or off-site locations reviewed and approved by staff.

Permit Transfer. The permittee shall not transfer this permit without the written permission of the IWWC.

Work in Watercourse to Occur During Low Flow. Work within a watercourse is limited to periods of low flow. Low flow periods normally occur between August and October. Upon request of permittee, wetlands staff can determine if the activity can occur at other times following an on-site field investigation.

Scope of Permit. This permit is for the approved activity ONLY. Additional activity may require an additional permit. Note that if an approval or permit is granted by another agency and

(1) the approved activity will affect wetlands and/or watercourses; and/or

(2) the activity occurs within 125 feet of flagged boundaries and 175 feet from watercourses;

and such activities have not been addressed by this permit, then the applicant shall resubmit the application for further consideration by the Inland Wetlands and Watercourses Commission before any work begins.

Ongoing Compliance with Permit. The permittee shall comply at all times with the permit.

Other Approvals May be Required. Other permits may be required from Town, state or federal agencies. An Army Corps of Engineers permit may be required: U.S. Army Corps of Engineers, 424 Trapelo Rd., Waltham, MA 02254 1-800-362-4367.

From: nthibeault@killinglyea.com
Sent: Tuesday, May 25, 2021 9:44 AM
To: Jana Roberson
Subject: FW: WM Mark out - School St, Brooklyn
Attachments: CWC APPROVED.pdf; Final Policies and Procedures rev 2021 (N5738331).pdf

Jana - this is what I have from CT Water for approval of the waterline connection and design. I will sent
the plans for the project shortly

Norm

From: Kevin Schwabe <Kevin.Schwabe@ctwater.com>
Sent: Friday, February 26, 2021 1:36 PM
To: 'nthibeault@killinglyea.com' <nthibeault@killinglyea.com>
Subject: RE: WM Mark out - School St, Brooklyn

Norm

Please accept this email as your plan approval. I've attached sheets 6 & 7 with my approval stamp.
When the developer is ready to move forward, please have them contact to me to arrange a meeting to
review the paperwork.

You can used this approved plan to generate your easement map. I've also attached our easement
policies and procedures for you to consult in the easement map preparation.

Let me know if you need anything else. Thanks

Kevin Schwabe
Developer Services Coordinator
Connecticut Water Company
93 West Main Street
Clinton, CT 06413
860-664-6137

550 North Main Street
Suite 6
Attleboro, MA 02703
Phone: 508.659.7020
Fax: 508.659.7021

March 11, 2021

Mr. Norm Thibeault, PE
Killingly Engineering Associates
114 Westcott Rd,
Danielson, CT 06239

RE: Brooklyn Water Pollution Control Authority 2-24-21 Approval of Pollock 51-Unit Condominium Project, Louise Berry Drive, Assessors Lot 19 Map 33, Brooklyn, CT
CPH Project No. B17303

Dear Mr. Thibeault:

At their regular meeting on February 24, 2021, the Brooklyn, Connecticut Water Pollution Control Authority (BWPCA) approved the above project with conditions. This letter summarizes the approval and conditions and shall be a binding commitment of the Authority and the Developer relating to the project as presented by the Developer and approved by the Authority.

The plans approved are those dated April 4, 2021 (as revised 4-23-21) in their entirety and shall be subject to the following conditions:

From BWPCA 2-24-21 meeting minutes:
Robert Kelleher made a motion to approve the application for Shane Pollock-51 Condo Units on Louise Berry Drive, plans dated 2/4/2021 from Killingly Engineering Associates as presented with the added conditions that inspection fees are to be paid by the developer and if any changes are made to the plans, the project needs to come back before the WPCA board. Derek Lindia seconded the motion. All members in favor so voted.

General Conditions of the Approval
As provided in the approved plans, we require that the entire system be constructed/installed in accordance with the Town of Brooklyn WPCA construction standards by the Developer. We require the system be inspected by our representatives during construction, tested by the Developer and certified by his engineer and 'cleared for use' by our representatives before the system can be used. Per the Approval conditions, all inspection fees shall be paid by the Developer.

Unless you provide us with documented proof of anticipated usage, we have calculated the anticipated sewer usage for this development at 22,950 Gallons per day. (51 units X 450 GPD/per unit).

As provided in the plans, prior to the commencement of construction of the sewer system, we require a pre-construction meeting be scheduled by the Developer, to include at a minimum, an invite to the BWPCA 72-hours minimum in advance of the meeting and attendance by The Developer, his engineer, the general contractor and utility contractor (if different entities). No connections to the system will be permitted until the main trunk line is built, tested and cleared for use and the permanent easement is created, approved by the BWPCA and recorded in the Town of Brooklyn Land Records.

As previously stated, ALL costs relating to the creation of this utility extension, and the legal control and documentation of it shall be borne entirely by the developer.

Connection fees, per unit, shall be paid prior to the issuance of a building permit and connection of the individual units to the system and **the only guarantee of system capacity availability is receipt of the connection fees by the BWPCA.**

As stated in our 'Commitment to Serve Letter' previously, we are not currently aware of any other development proposed along this section of the BWPCA system.

Sherri Soucy will be responsible for establishing the connection fees for the proposed connections to the system and invoicing for them.

This approval/permit shall be good for a period of 3-years from the date of approval. Extension of the approval beyond 3-years may be granted by the BWPCA providing system conditions have not changed and the Developer returns to the Authority to request extension prior to February 24, 2024.

Please let us know if you have any questions or if you need any additional information.

Sincerely,
CPH Design, Inc.

Alan R. Carpenter, P.E.,
Vice President/Regional Manager
(Consulting Engineer to the BWPCA)

Cc: Mr. Robert Kiley, Chairman, BWPCA
Jana Roberson, Town Planner
Margret Washburn, ZOE/WEO/BEO

DRAINAGE REPORT

Prepared for

PROPOSED MULTI-FAMILY DEVELOPMENT
LOUISE BERRY DRIVE
BROOKLYN, CT

August 2020
Revised to January 2021

Prepared for

Shane Pollock

Prepared by

Killingly Engineering Associates
Civil Engineering & Surveying

Normand Thibeault Jr., P.E.
CT License #22834

Introduction

Shane Pollock has submitted a proposal to the Town of Brooklyn to construct a 51-unit condominium development with access from Louise Berry Drive in Brooklyn. The project will require construction of a 1000-foot-long paved roadway with a cul-de-sac turnaround, and public water and sewer. The proposal is the second version of the project, the first of which proposed 100-units. The current design results in creation of impervious surfaces consisting of pavement and roof but a significant reduction from the amount of impervious surface from the design that was originally proposed.

Summary

According to the USDA-SCS Soil Survey, the area of disturbance consists of Canton and Charlton fine sandy loams and wetlands consist of Ridgebury, Leicester and Whitman Soils. A walk of the property appears to verify that these descriptions are accurate. These soils are associated with hydrologic soil groups B and D. The site sheet flow primarily to the south to a linear wetlands system and west to areas off site. To the greatest degree possible, the drainage patterns will be preserved.

The bulk of the drainage from developed areas will be collected in a closed stormwater collection system consisting of catch basins and HDPE pipe and will be conveyed to a proposed stormwater basin at the southwestern portion of the property. Overland runoff from newly landscaped and grassed areas will be collected in a swale at the toe of fill slopes and also conveyed to the stormwater basin. Discharge from the basin will be directed back toward the wetlands that flows off the property at the southwestern boundary.

The calculations utilized HydroCAD® Stormwater Modeling System, a computer model, to analyze pre-and post-development drainage conditions, and to aid in the design of the stormwater detention system. The model used the Soil Conservation Service TR-20 method with a Type III 24-hour rainfall to calculate the runoff. The 2 through 100-year frequency storms were analyzed to evaluate peak runoff for pre-and post-construction conditions. Table 1 summarizes our findings:

Table 1. Existing & Proposed Peak Flows to

Design Storm	Depth (in)	Existing peak	Proposed peak	Difference
2-Year	3.37	3.01 CFS	2.64 CFS	-0.37 CFS
5-Year	4.28	6.48 CFS	6.18 CFS	-0.30 CFS
10-Year	5.04	10.87 CFS	10.06 CFS	-0.81 CFS
25-Year	6.08	17.63 CFS	15.11 CFS	-2.52 CFS
50-Year	6.85	23.03 CFS	18.90 CFS	-4.13 CFS
100-Year	7.68	29.21 CFS	24.03 CFS	-5.18 CFS

Installation of the proposed stormwater basin will reduce peak runoff rates from the site for all design storms. To keep the basin functioning properly and alleviate the potential for standing water in the basin, the design incorporates an underdrain around the perimeter of the basin that will discharge through the outlet structure. Based upon the channelized topography that the wetlands follow, it is our opinion that the discharge rates for this storm will not detrimentally impact downstream properties.

In addition to addressing pre- and post-construction peak runoff rates from the property to the wetlands and adjacent property, the design considers stormwater treatment and water quality for the project. Wherever possible, overland sheet flow is encouraged, catch basins will be constructed with 4ô sediment sumps, the final catch basin prior to discharge to the stormwater basin will be retrofitted with a hooded outlet, and the detention/water quality basin accounts for Water Quality Volume (WQV) in accordance with the parameters set forth in the 2004 CTDEEP Stormwater Quality Guidelines. Following are computation for the stormwater basin and the WQV provided.

Section 7.4.1 Water Quality Volume

<u>Basin Water Quality Volume (WQV)</u>

WQV = (1ò) (R)(A)/12

R= 0.05 + 0.009(I) I = % Impervious = 48.33% (Stormwater System Drainage Area)

R = 0.05 + 0.009(48.33) = 0.485

A = 4.781 acres

WQV = (1ò) (0.485) (4.781)/12 = 0.193 ac-ft

8417 c.f.

Basin forebay + outlet side of basin provides 8,628 c.f.

Section 7.4.2 Water Quality Volume

This section is utilized for treatment mechanisms such as grass swales or proprietary treatment devices. Although the project calls for a grassed swale at the toe of the fill slope, this swale will not convey runoff from impervious surfaces.

Section 7.5.1 Groundwater Recharge Volume (GRV)

Intended to maintain pre-development and groundwater recharge volumes by capturing and infiltrating stormwater runoff.

GRV = (D)(A)(I) / 12

D = Depth of runoff to be recharged per table 7-4 of the CSQM based upon soil type
A = Site Area in acres
I = Percent Impervious (or net increase in impervious)

D = 0.25 (Hydrologic Soil Group ñBò)
A = 5.46 Acres
I = 40.6% (0.0453)

GRV = 0.25 x 5.46 x 0.406 / 12 = 0.0462 ac-ft
= 2,011 c.f.

Based upon soil testing, the bottom of the basin will remain ñwetò. The area of the basin from elevations 242.5 to 245 will be available to provide the opportunity infiltrate. The percolation rate measured in this area was 6.7 minutes per inch (about 8.9 inches per hour). We utilized a conservative rate of 4.5 inches per hour over the horizontal area (assuming no infiltration in the basin bottom) which provides the following infiltration volumes for each design storm.

Table 2. Summary of Infiltration Volume

Design Storm	Depth (in)	Infiltration Volume (Ac-ft)	Infiltration Volume (Cubic ft.)
2-Year	3.37	0.433	18,861 CF
5-Year	4.27	0.562	24,481 CF
10-Year	5.02	0.628	27,355 CF
25-Year	6.05	0.679	29,577 CF
50-Year	6.85	0.718	31,276 CF
100-Year	7.64	0.755	32,888 CF

Infiltration requirements are exceeded for all design storms

Section 7.5.2 Runoff Capture Volume (RCV)

Not utilized for this application. This method is typically utilized to capture ñcleanò stormwater from surfaces such as rooftops and infiltrate it into the soil.

Section 7.6 Peak Flow Control

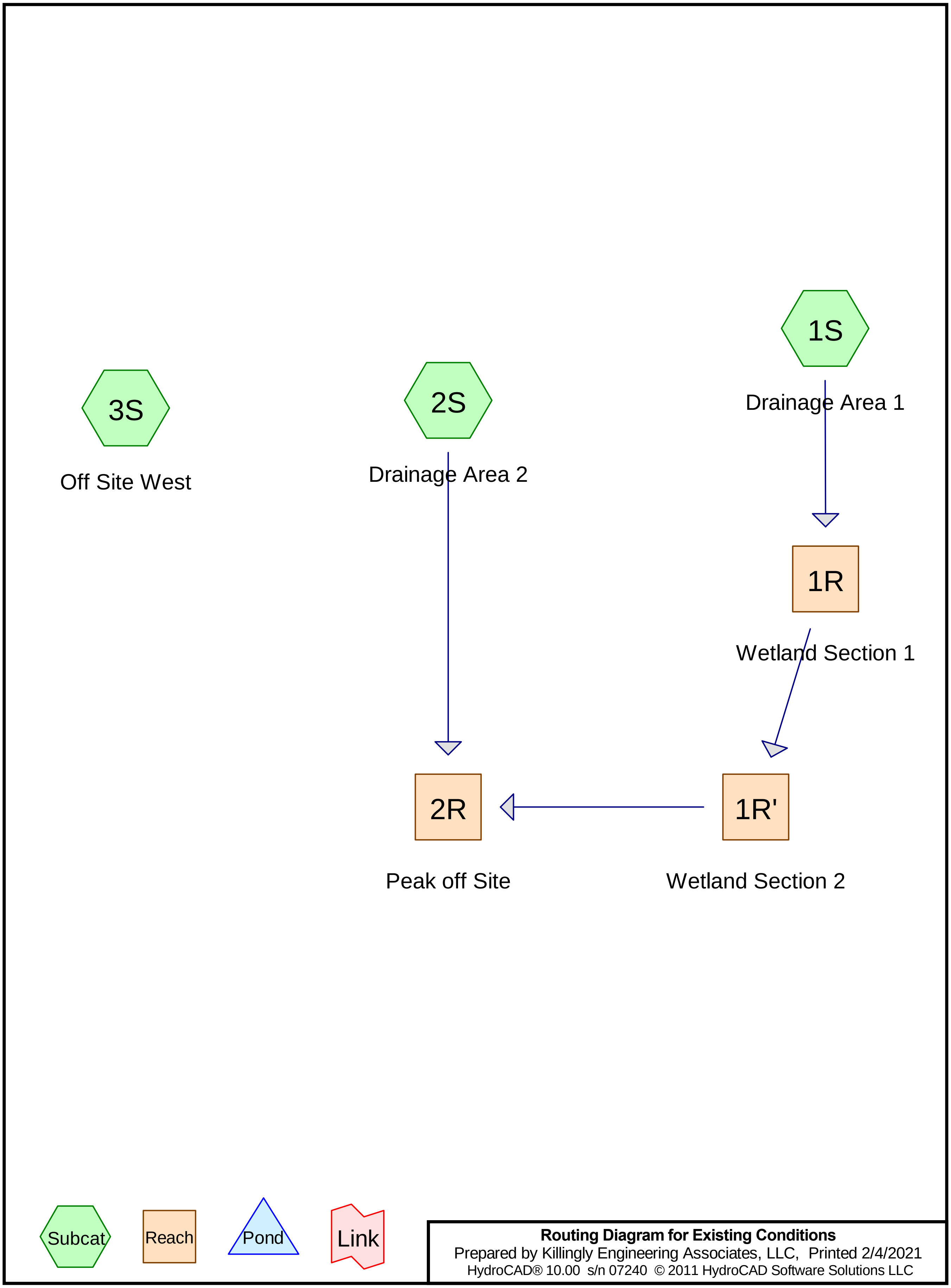
Summary of Peak Flow to Wetlands

Design Storm	Depth (in)	Existing peak	Proposed peak	Difference
10-Year	5.08	10.87 CFS	8.96 CFS	-1.91 CFS
25-Year	6.08	17.63 CFS	14.21 CFS	-3.42 CFS
100-Year	7.69	29.21 CFS	25.66 CFS	-3.55 CFS

As shown above and in table 2 previously in this report, the peak flows will be attenuated for all design storms.

HYDROCAD CALCULATIONS

EXISTING CONDITIONS


1S
Drainage Area 1
2S
Drainage Area 2
3S
Off Site West
1R
Wetland Section 1
1R'
Wetland Section 2
2R
Peak off Site
Subcat
Reach
Pond
Link
Routing Diagram for Existing Conditions
Prepared by Killingly Engineering Associates, LLC, Printed 2/4/2021
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.986	55	Woods, Good, HSG B (1S, 2S, 3S)
2.348	77	Woods, Good, HSG D - Wetlands (1S, 2S)
14.334	**59**	**TOTAL AREA**

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

Subcatchment 1S: Drainage Area 1 Runoff Area=3.314 ac 0.00% Impervious Runoff Depth>0.45"
Flow Length=270' Slope=0.1110 '/' Tc=5.6 min CN=61 Runoff=1.37 cfs 0.125 af

Subcatchment 2S: Drainage Area 2 Runoff Area=7.387 ac 0.00% Impervious Runoff Depth>0.38"
Flow Length=600' Slope=0.1240 '/' Tc=10.6 min CN=59 Runoff=1.90 cfs 0.235 af

Subcatchment 3S: Off Site West Runoff Area=3.633 ac 0.00% Impervious Runoff Depth>0.26"
Flow Length=564' Slope=0.1250 '/' Tc=11.2 min CN=55 Runoff=0.48 cfs 0.078 af

Reach 1R: Wetland Section 1 Avg. Flow Depth=0.07' Max Vel=1.02 fps Inflow=1.37 cfs 0.125 af
n=0.050 L=240.0' S=0.0667 '/' Capacity=1,610.63 cfs Outflow=1.17 cfs 0.124 af

Reach 1R': Wetland Section 2 Avg. Flow Depth=0.06' Max Vel=4.59 fps Inflow=1.17 cfs 0.124 af
n=0.013 L=145.0' S=0.1241 '/' Capacity=2,590.64 cfs Outflow=1.16 cfs 0.124 af

Reach 2R: Peak off Site Avg. Flow Depth=0.14' Max Vel=1.19 fps Inflow=3.01 cfs 0.359 af
n=0.050 L=640.0' S=0.0375 '/' Capacity=789.38 cfs Outflow=2.52 cfs 0.351 af

Total Runoff Area = 14.334 ac Runoff Volume = 0.437 af Average Runoff Depth = 0.37"
100.00% Pervious = 14.334 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 1.37 cfs @ 12.12 hrs, Volume= 0.125 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (ac)	CN	Description
*	0.930	77	Woods, Good, HSG D - Wetlands
	2.384	55	Woods, Good, HSG B
	3.314	61	Weighted Average
	3.314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	270	0.1110	0.80		**Lag/CN Method, Tc 1**

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 1.90 cfs @ 12.22 hrs, Volume= 0.235 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (ac)	CN	Description
*	1.418	77	Woods, Good, HSG D - Wetlands
	5.969	55	Woods, Good, HSG B
	7.387	59	Weighted Average
	7.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	600	0.1240	0.94		**Lag/CN Method, Tc-2**

Summary for Subcatchment 3S: Off Site West

Runoff = 0.48 cfs @ 12.38 hrs, Volume= 0.078 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

Area (ac)	CN	Description
3.633	55	Woods, Good, HSG B
3.633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	564	0.1250	0.84		**Lag/CN Method, Tc-3**

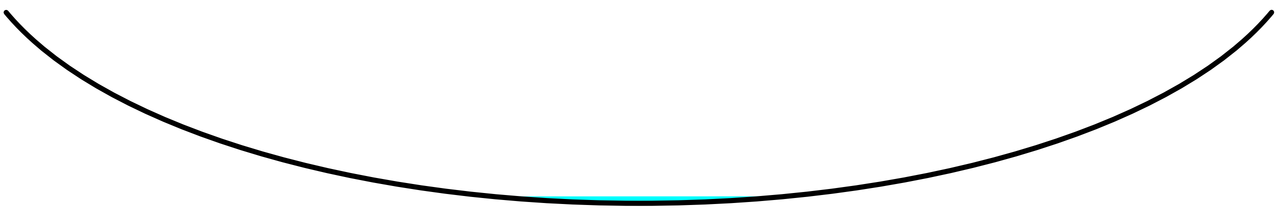
Summary for Reach 1R: Wetland Section 1

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 0.45" for 2-year event
Inflow = 1.37 cfs @ 12.12 hrs, Volume= 0.125 af
Outflow = 1.17 cfs @ 12.25 hrs, Volume= 0.124 af, Atten= 15%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.02 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 7.3 min

Peak Storage= 283 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 2.00' Flow Area= 173.3 sf, Capacity= 1,610.63 cfs

130.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 240.0' Slope= 0.0667 '/'
Inlet Invert= 296.00', Outlet Invert= 280.00'



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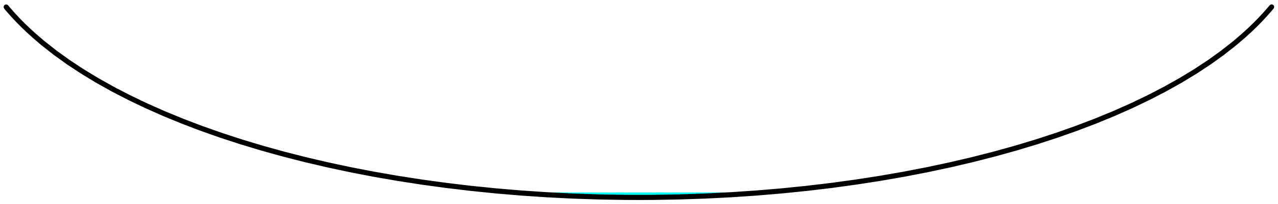
Summary for Reach 1R': Wetland Section 2

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 0.45" for 2-year event
Inflow = 1.17 cfs @ 12.25 hrs, Volume= 0.124 af
Outflow = 1.16 cfs @ 12.27 hrs, Volume= 0.124 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.59 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.60 fps, Avg. Travel Time= 0.9 min

Peak Storage= 37 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 2.00' Flow Area= 53.3 sf, Capacity= 2,590.64 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 145.0' Slope= 0.1241 '/'
Inlet Invert= 280.00', Outlet Invert= 262.00'



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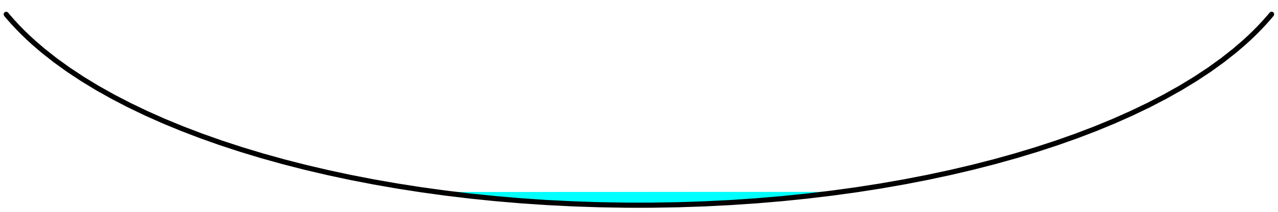
Summary for Reach 2R: Peak off Site

Inflow Area = 10.701 ac, 0.00% Impervious, Inflow Depth > 0.40" for 2-year event
Inflow = 3.01 cfs @ 12.26 hrs, Volume= 0.359 af
Outflow = 2.52 cfs @ 12.57 hrs, Volume= 0.351 af, Atten= 16%, Lag= 18.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.19 fps, Min. Travel Time= 9.0 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 15.3 min

Peak Storage= 1,357 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 789.38 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 640.0' Slope= 0.0375 '/'
Inlet Invert= 262.00', Outlet Invert= 238.00'



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

Subcatchment 1S: Drainage Area 1 Runoff Area=3.314 ac 0.00% Impervious Runoff Depth>0.86"
Flow Length=270' Slope=0.1110 '/' Tc=5.6 min CN=61 Runoff=3.17 cfs 0.237 af

Subcatchment 2S: Drainage Area 2 Runoff Area=7.387 ac 0.00% Impervious Runoff Depth>0.75"
Flow Length=600' Slope=0.1240 '/' Tc=10.6 min CN=59 Runoff=4.92 cfs 0.465 af

Subcatchment 3S: Off Site West Runoff Area=3.633 ac 0.00% Impervious Runoff Depth>0.57"
Flow Length=564' Slope=0.1250 '/' Tc=11.2 min CN=55 Runoff=1.53 cfs 0.171 af

Reach 1R: Wetland Section 1 Avg. Flow Depth=0.11' Max Vel=1.33 fps Inflow=3.17 cfs 0.237 af
n=0.050 L=240.0' S=0.0667 '/' Capacity=1,610.63 cfs Outflow=2.90 cfs 0.236 af

Reach 1R': Wetland Section 2 Avg. Flow Depth=0.09' Max Vel=6.06 fps Inflow=2.90 cfs 0.236 af
n=0.013 L=145.0' S=0.1241 '/' Capacity=2,590.64 cfs Outflow=2.87 cfs 0.236 af

Reach 2R: Peak off Site Avg. Flow Depth=0.22' Max Vel=1.59 fps Inflow=7.74 cfs 0.700 af
n=0.050 L=640.0' S=0.0375 '/' Capacity=789.38 cfs Outflow=6.48 cfs 0.690 af

Total Runoff Area = 14.334 ac Runoff Volume = 0.873 af Average Runoff Depth = 0.73"
100.00% Pervious = 14.334 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 3.17 cfs @ 12.10 hrs, Volume= 0.237 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.28"

	Area (ac)	CN	Description
*	0.930	77	Woods, Good, HSG D - Wetlands
	2.384	55	Woods, Good, HSG B
	3.314	61	Weighted Average
	3.314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	270	0.1110	0.80		**Lag/CN Method, Tc 1**

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 4.92 cfs @ 12.18 hrs, Volume= 0.465 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.28"

	Area (ac)	CN	Description
*	1.418	77	Woods, Good, HSG D - Wetlands
	5.969	55	Woods, Good, HSG B
	7.387	59	Weighted Average
	7.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	600	0.1240	0.94		**Lag/CN Method, Tc-2**

Summary for Subcatchment 3S: Off Site West

Runoff = 1.53 cfs @ 12.21 hrs, Volume= 0.171 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.28"

Area (ac)	CN	Description
3.633	55	Woods, Good, HSG B
3.633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	564	0.1250	0.84		**Lag/CN Method, Tc-3**

Summary for Reach 1R: Wetland Section 1

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 0.86" for 5-year event
Inflow = 3.17 cfs @ 12.10 hrs, Volume= 0.237 af
Outflow = 2.90 cfs @ 12.20 hrs, Volume= 0.236 af, Atten= 9%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.33 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 6.2 min

Peak Storage= 521 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 173.3 sf, Capacity= 1,610.63 cfs

130.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 240.0' Slope= 0.0667 '/'
Inlet Invert= 296.00', Outlet Invert= 280.00'

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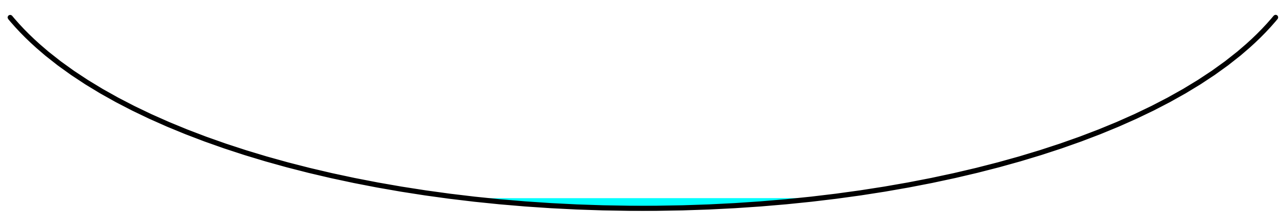


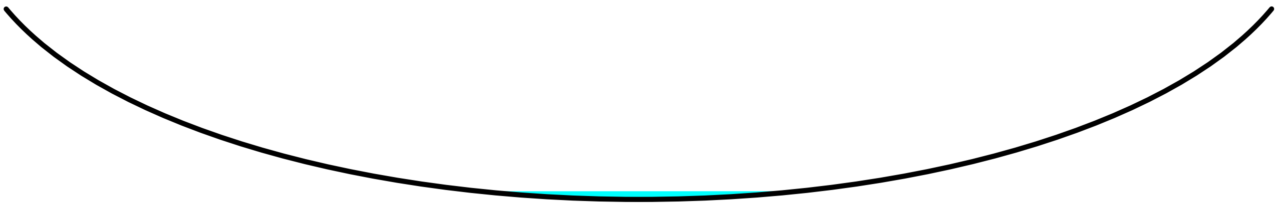
Summary for Reach 1R': Wetland Section 2

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 0.85" for 5-year event
Inflow = 2.90 cfs @ 12.20 hrs, Volume= 0.236 af
Outflow = 2.87 cfs @ 12.21 hrs, Volume= 0.236 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.06 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.94 fps, Avg. Travel Time= 0.8 min

Peak Storage= 70 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 2.00' Flow Area= 53.3 sf, Capacity= 2,590.64 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 145.0' Slope= 0.1241 '/'
Inlet Invert= 280.00', Outlet Invert= 262.00'



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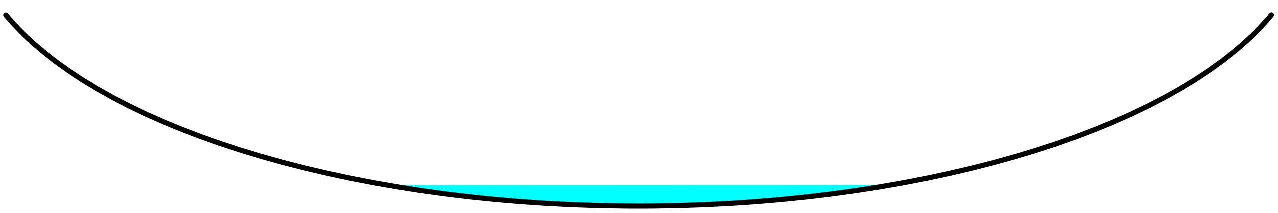
Summary for Reach 2R: Peak off Site

Inflow Area = 10.701 ac, 0.00% Impervious, Inflow Depth > 0.79" for 5-year event
Inflow = 7.74 cfs @ 12.19 hrs, Volume= 0.700 af
Outflow = 6.48 cfs @ 12.41 hrs, Volume= 0.690 af, Atten= 16%, Lag= 12.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.59 fps, Min. Travel Time= 6.7 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 13.0 min

Peak Storage= 2,615 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 789.38 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 640.0' Slope= 0.0375 '/'
Inlet Invert= 262.00', Outlet Invert= 238.00'



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

Subcatchment 1S: Drainage Area 1 Runoff Area=3.314 ac 0.00% Impervious Runoff Depth>1.26"
Flow Length=270' Slope=0.1110 '/' Tc=5.6 min CN=61 Runoff=4.92 cfs 0.348 af

Subcatchment 2S: Drainage Area 2 Runoff Area=7.387 ac 0.00% Impervious Runoff Depth>1.13"
Flow Length=600' Slope=0.1240 '/' Tc=10.6 min CN=59 Runoff=8.13 cfs 0.696 af

Subcatchment 3S: Off Site West Runoff Area=3.633 ac 0.00% Impervious Runoff Depth>0.89"
Flow Length=564' Slope=0.1250 '/' Tc=11.2 min CN=55 Runoff=2.81 cfs 0.269 af

Reach 1R: Wetland Section 1 Avg. Flow Depth=0.13' Max Vel=1.53 fps Inflow=4.92 cfs 0.348 af
n=0.050 L=240.0' S=0.0667 '/' Capacity=1,610.63 cfs Outflow=4.49 cfs 0.347 af

Reach 1R': Wetland Section 2 Avg. Flow Depth=0.11' Max Vel=6.89 fps Inflow=4.49 cfs 0.347 af
n=0.013 L=145.0' S=0.1241 '/' Capacity=2,590.64 cfs Outflow=4.46 cfs 0.346 af

Reach 2R: Peak off Site Avg. Flow Depth=0.28' Max Vel=1.87 fps Inflow=12.42 cfs 1.042 af
n=0.050 L=640.0' S=0.0375 '/' Capacity=789.38 cfs Outflow=10.87 cfs 1.030 af

Total Runoff Area = 14.334 ac Runoff Volume = 1.313 af Average Runoff Depth = 1.10"
100.00% Pervious = 14.334 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 4.92 cfs @ 12.10 hrs, Volume= 0.348 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.04"

	Area (ac)	CN	Description
*	0.930	77	Woods, Good, HSG D - Wetlands
	2.384	55	Woods, Good, HSG B
	3.314	61	Weighted Average
	3.314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	270	0.1110	0.80		**Lag/CN Method, Tc 1**

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 8.13 cfs @ 12.17 hrs, Volume= 0.696 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.04"

	Area (ac)	CN	Description
*	1.418	77	Woods, Good, HSG D - Wetlands
	5.969	55	Woods, Good, HSG B
	7.387	59	Weighted Average
	7.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	600	0.1240	0.94		**Lag/CN Method, Tc-2**

Summary for Subcatchment 3S: Off Site West

Runoff = 2.81 cfs @ 12.19 hrs, Volume= 0.269 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.04"

Area (ac)	CN	Description
3.633	55	Woods, Good, HSG B
3.633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	564	0.1250	0.84		**Lag/CN Method, Tc-3**

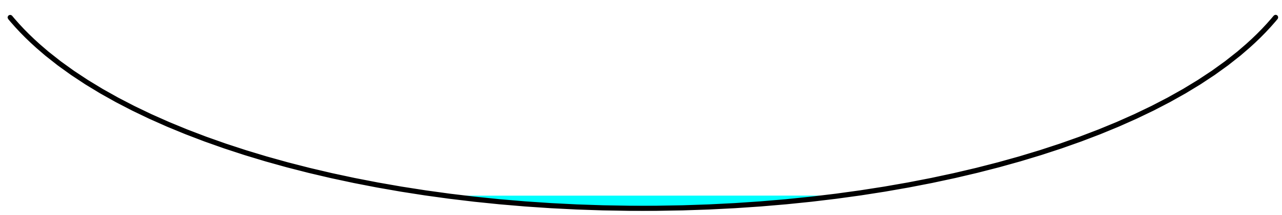
Summary for Reach 1R: Wetland Section 1

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 1.26" for 10-year event
Inflow = 4.92 cfs @ 12.10 hrs, Volume= 0.348 af
Outflow = 4.49 cfs @ 12.18 hrs, Volume= 0.347 af, Atten= 9%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.53 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 5.7 min

Peak Storage= 714 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 173.3 sf, Capacity= 1,610.63 cfs

130.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 240.0' Slope= 0.0667 '/'
Inlet Invert= 296.00', Outlet Invert= 280.00'



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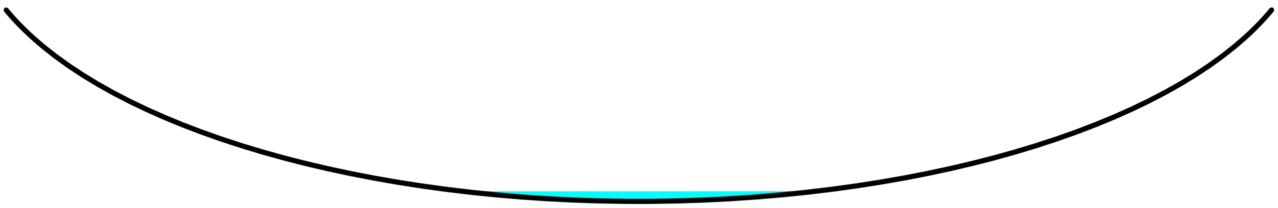
Summary for Reach 1R': Wetland Section 2

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 1.26" for 10-year event
Inflow = 4.49 cfs @ 12.18 hrs, Volume= 0.347 af
Outflow = 4.46 cfs @ 12.19 hrs, Volume= 0.346 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.89 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.21 fps, Avg. Travel Time= 0.8 min

Peak Storage= 94 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 53.3 sf, Capacity= 2,590.64 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 145.0' Slope= 0.1241 '/'
Inlet Invert= 280.00', Outlet Invert= 262.00'



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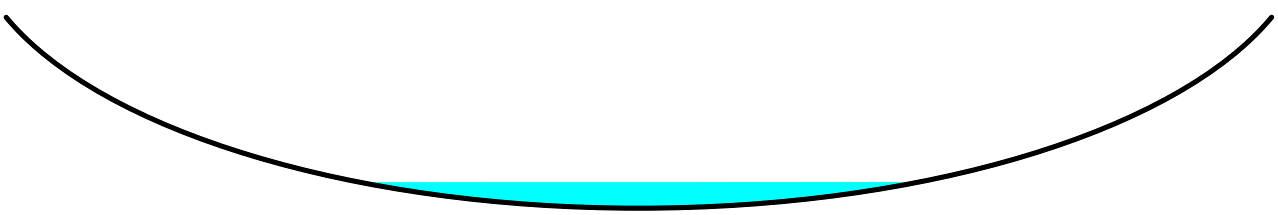
Summary for Reach 2R: Peak off Site

Inflow Area = 10.701 ac, 0.00% Impervious, Inflow Depth > 1.17" for 10-year event
Inflow = 12.42 cfs @ 12.18 hrs, Volume= 1.042 af
Outflow = 10.87 cfs @ 12.35 hrs, Volume= 1.030 af, Atten= 12%, Lag= 10.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.87 fps, Min. Travel Time= 5.7 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 12.0 min

Peak Storage= 3,743 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 789.38 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 640.0' Slope= 0.0375 '/'
Inlet Invert= 262.00', Outlet Invert= 238.00'



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

Subcatchment 1S: Drainage Area 1 Runoff Area=3.314 ac 0.00% Impervious Runoff Depth>1.88"
Flow Length=270' Slope=0.1110 '/' Tc=5.6 min CN=61 Runoff=7.60 cfs 0.520 af

Subcatchment 2S: Drainage Area 2 Runoff Area=7.387 ac 0.00% Impervious Runoff Depth>1.72"
Flow Length=600' Slope=0.1240 '/' Tc=10.6 min CN=59 Runoff=13.01 cfs 1.057 af

Subcatchment 3S: Off Site West Runoff Area=3.633 ac 0.00% Impervious Runoff Depth>1.41"
Flow Length=564' Slope=0.1250 '/' Tc=11.2 min CN=55 Runoff=4.88 cfs 0.426 af

Reach 1R: Wetland Section 1 Avg. Flow Depth=0.16' Max Vel=1.75 fps Inflow=7.60 cfs 0.520 af
n=0.050 L=240.0' S=0.0667 '/' Capacity=1,610.63 cfs Outflow=7.07 cfs 0.518 af

Reach 1R': Wetland Section 2 Avg. Flow Depth=0.13' Max Vel=7.91 fps Inflow=7.07 cfs 0.518 af
n=0.013 L=145.0' S=0.1241 '/' Capacity=2,590.64 cfs Outflow=6.97 cfs 0.517 af

Reach 2R: Peak off Site Avg. Flow Depth=0.35' Max Vel=2.16 fps Inflow=19.96 cfs 1.574 af
n=0.050 L=640.0' S=0.0375 '/' Capacity=789.38 cfs Outflow=17.63 cfs 1.559 af

Total Runoff Area = 14.334 ac Runoff Volume = 2.003 af Average Runoff Depth = 1.68"
100.00% Pervious = 14.334 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 7.60 cfs @ 12.09 hrs, Volume= 0.520 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.08"

	Area (ac)	CN	Description
*	0.930	77	Woods, Good, HSG D - Wetlands
	2.384	55	Woods, Good, HSG B
	3.314	61	Weighted Average
	3.314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	270	0.1110	0.80		**Lag/CN Method, Tc 1**

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 13.01 cfs @ 12.16 hrs, Volume= 1.057 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.08"

	Area (ac)	CN	Description
*	1.418	77	Woods, Good, HSG D - Wetlands
	5.969	55	Woods, Good, HSG B
	7.387	59	Weighted Average
	7.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	600	0.1240	0.94		**Lag/CN Method, Tc-2**

Summary for Subcatchment 3S: Off Site West

Runoff = 4.88 cfs @ 12.18 hrs, Volume= 0.426 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.08"

Area (ac)	CN	Description
3.633	55	Woods, Good, HSG B
3.633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	564	0.1250	0.84		**Lag/CN Method, Tc-3**

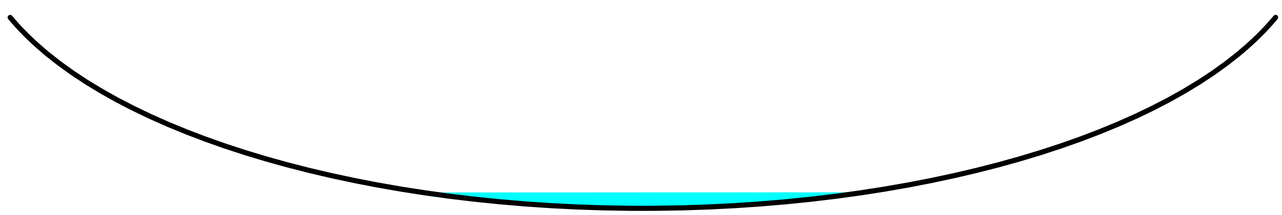
Summary for Reach 1R: Wetland Section 1

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 1.88" for 25-year event
Inflow = 7.60 cfs @ 12.09 hrs, Volume= 0.520 af
Outflow = 7.07 cfs @ 12.16 hrs, Volume= 0.518 af, Atten= 7%, Lag= 4.1 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= 2.3 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 5.3 min

Peak Storage= 985 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 173.3 sf, Capacity= 1,610.63 cfs

130.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 240.0' Slope= 0.0667 '/'
Inlet Invert= 296.00', Outlet Invert= 280.00'



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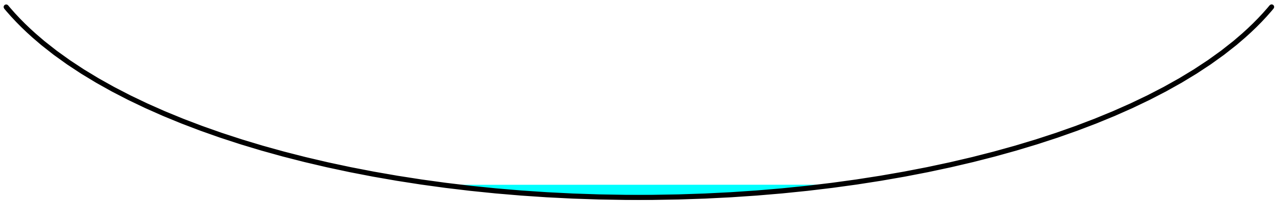
Summary for Reach 1R': Wetland Section 2

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 1.87" for 25-year event
Inflow = 7.07 cfs @ 12.16 hrs, Volume= 0.518 af
Outflow = 6.97 cfs @ 12.17 hrs, Volume= 0.517 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.91 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.49 fps, Avg. Travel Time= 0.7 min

Peak Storage= 129 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 53.3 sf, Capacity= 2,590.64 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 145.0' Slope= 0.1241 '/'
Inlet Invert= 280.00', Outlet Invert= 262.00'



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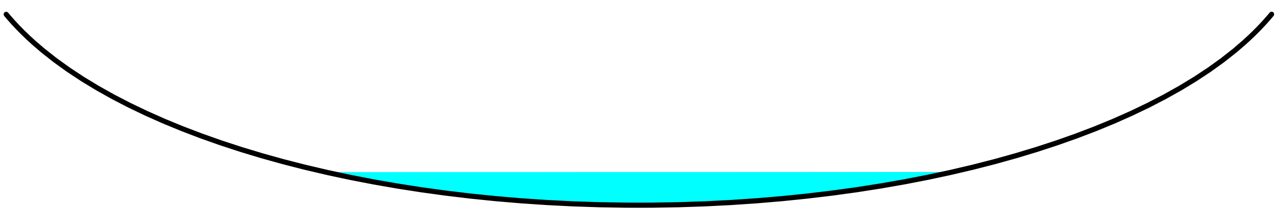
Summary for Reach 2R: Peak off Site

Inflow Area = 10.701 ac, 0.00% Impervious, Inflow Depth > 1.77" for 25-year event
Inflow = 19.96 cfs @ 12.17 hrs, Volume= 1.574 af
Outflow = 17.63 cfs @ 12.31 hrs, Volume= 1.559 af, Atten= 12%, Lag= 8.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.16 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 11.0 min

Peak Storage= 5,237 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 789.38 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 640.0' Slope= 0.0375 '/'
Inlet Invert= 262.00', Outlet Invert= 238.00'



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

Subcatchment 1S: Drainage Area 1 Runoff Area=3.314 ac 0.00% Impervious Runoff Depth>2.38"
Flow Length=270' Slope=0.1110 '/' Tc=5.6 min CN=61 Runoff=9.74 cfs 0.658 af

Subcatchment 2S: Drainage Area 2 Runoff Area=7.387 ac 0.00% Impervious Runoff Depth>2.19"
Flow Length=600' Slope=0.1240 '/' Tc=10.6 min CN=59 Runoff=16.95 cfs 1.351 af

Subcatchment 3S: Off Site West Runoff Area=3.633 ac 0.00% Impervious Runoff Depth>1.84"
Flow Length=564' Slope=0.1250 '/' Tc=11.2 min CN=55 Runoff=6.67 cfs 0.557 af

Reach 1R: Wetland Section 1 Avg. Flow Depth=0.19' Max Vel=1.90 fps Inflow=9.74 cfs 0.658 af
n=0.050 L=240.0' S=0.0667 '/' Capacity=1,610.63 cfs Outflow=9.08 cfs 0.655 af

Reach 1R': Wetland Section 2 Avg. Flow Depth=0.15' Max Vel=8.56 fps Inflow=9.08 cfs 0.655 af
n=0.013 L=145.0' S=0.1241 '/' Capacity=2,590.64 cfs Outflow=8.97 cfs 0.655 af

Reach 2R: Peak off Site Avg. Flow Depth=0.40' Max Vel=2.36 fps Inflow=25.91 cfs 2.006 af
n=0.050 L=640.0' S=0.0375 '/' Capacity=789.38 cfs Outflow=23.03 cfs 1.989 af

Total Runoff Area = 14.334 ac Runoff Volume = 2.565 af Average Runoff Depth = 2.15"
100.00% Pervious = 14.334 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 9.74 cfs @ 12.09 hrs, Volume= 0.658 af, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (ac)	CN	Description
*	0.930	77	Woods, Good, HSG D - Wetlands
	2.384	55	Woods, Good, HSG B
	3.314	61	Weighted Average
	3.314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	270	0.1110	0.80		**Lag/CN Method, Tc 1**

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 16.95 cfs @ 12.16 hrs, Volume= 1.351 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (ac)	CN	Description
*	1.418	77	Woods, Good, HSG D - Wetlands
	5.969	55	Woods, Good, HSG B
	7.387	59	Weighted Average
	7.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	600	0.1240	0.94		**Lag/CN Method, Tc-2**

Summary for Subcatchment 3S: Off Site West

Runoff = 6.67 cfs @ 12.17 hrs, Volume= 0.557 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

Area (ac)	CN	Description
3.633	55	Woods, Good, HSG B
3.633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	564	0.1250	0.84		**Lag/CN Method, Tc-3**

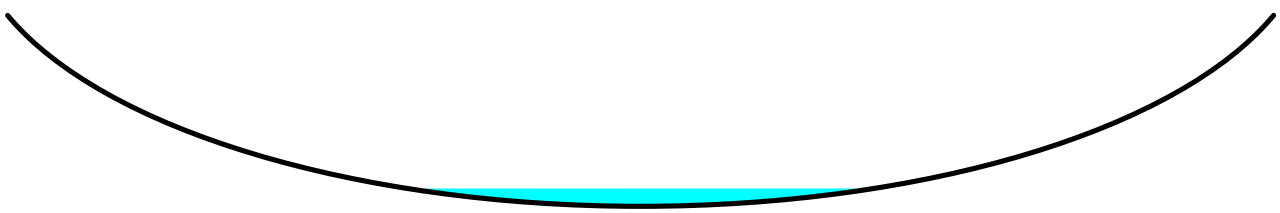
Summary for Reach 1R: Wetland Section 1

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 2.38" for 50-year event
Inflow = 9.74 cfs @ 12.09 hrs, Volume= 0.658 af
Outflow = 9.08 cfs @ 12.16 hrs, Volume= 0.655 af, Atten= 7%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.90 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 5.0 min

Peak Storage= 1,176 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 2.00' Flow Area= 173.3 sf, Capacity= 1,610.63 cfs

130.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 240.0' Slope= 0.0667 '/'
Inlet Invert= 296.00', Outlet Invert= 280.00'



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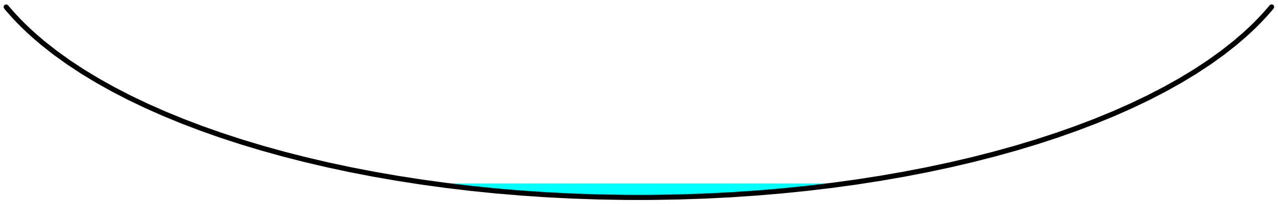
Summary for Reach 1R': Wetland Section 2

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 2.37" for 50-year event
Inflow = 9.08 cfs @ 12.16 hrs, Volume= 0.655 af
Outflow = 8.97 cfs @ 12.16 hrs, Volume= 0.655 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.56 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.66 fps, Avg. Travel Time= 0.7 min

Peak Storage= 154 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 53.3 sf, Capacity= 2,590.64 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 145.0' Slope= 0.1241 '/'
Inlet Invert= 280.00', Outlet Invert= 262.00'



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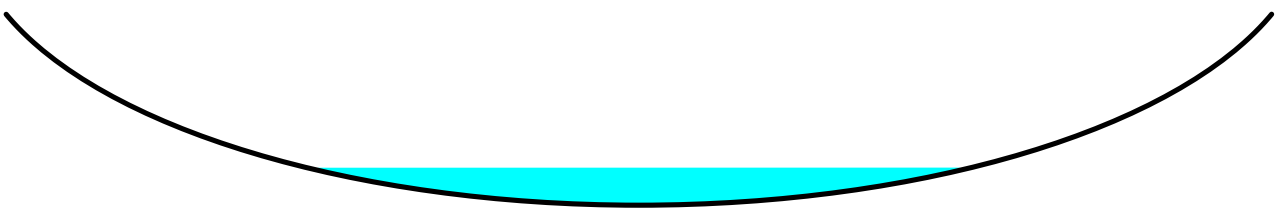
Summary for Reach 2R: Peak off Site

Inflow Area = 10.701 ac, 0.00% Impervious, Inflow Depth > 2.25" for 50-year event
Inflow = 25.91 cfs @ 12.16 hrs, Volume= 2.006 af
Outflow = 23.03 cfs @ 12.30 hrs, Volume= 1.989 af, Atten= 11%, Lag= 8.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.36 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 10.5 min

Peak Storage= 6,367 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 789.38 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 640.0' Slope= 0.0375 '/'
Inlet Invert= 262.00', Outlet Invert= 238.00'



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

Subcatchment 1S: Drainage Area 1 Runoff Area=3.314 ac 0.00% Impervious Runoff Depth>2.95"
Flow Length=270' Slope=0.1110 '/' Tc=5.6 min CN=61 Runoff=12.15 cfs 0.815 af

Subcatchment 2S: Drainage Area 2 Runoff Area=7.387 ac 0.00% Impervious Runoff Depth>2.74"
Flow Length=600' Slope=0.1240 '/' Tc=10.6 min CN=59 Runoff=21.44 cfs 1.688 af

Subcatchment 3S: Off Site West Runoff Area=3.633 ac 0.00% Impervious Runoff Depth>2.34"
Flow Length=564' Slope=0.1250 '/' Tc=11.2 min CN=55 Runoff=8.67 cfs 0.708 af

Reach 1R: Wetland Section 1 Avg. Flow Depth=0.21' Max Vel=2.04 fps Inflow=12.15 cfs 0.815 af
n=0.050 L=240.0' S=0.0667 '/' Capacity=1,610.63 cfs Outflow=11.35 cfs 0.813 af

Reach 1R': Wetland Section 2 Avg. Flow Depth=0.16' Max Vel=9.17 fps Inflow=11.35 cfs 0.813 af
n=0.013 L=145.0' S=0.1241 '/' Capacity=2,590.64 cfs Outflow=11.23 cfs 0.812 af

Reach 2R: Peak off Site Avg. Flow Depth=0.44' Max Vel=2.54 fps Inflow=32.66 cfs 2.500 af
n=0.050 L=640.0' S=0.0375 '/' Capacity=789.38 cfs Outflow=29.21 cfs 2.481 af

Total Runoff Area = 14.334 ac Runoff Volume = 3.211 af Average Runoff Depth = 2.69"
100.00% Pervious = 14.334 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 12.15 cfs @ 12.09 hrs, Volume= 0.815 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.68"

	Area (ac)	CN	Description
*	0.930	77	Woods, Good, HSG D - Wetlands
	2.384	55	Woods, Good, HSG B
	3.314	61	Weighted Average
	3.314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	270	0.1110	0.80		**Lag/CN Method, Tc 1**

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 21.44 cfs @ 12.16 hrs, Volume= 1.688 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.68"

	Area (ac)	CN	Description
*	1.418	77	Woods, Good, HSG D - Wetlands
	5.969	55	Woods, Good, HSG B
	7.387	59	Weighted Average
	7.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	600	0.1240	0.94		**Lag/CN Method, Tc-2**

Summary for Subcatchment 3S: Off Site West

Runoff = 8.67 cfs @ 12.17 hrs, Volume= 0.708 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.68"

Area (ac)	CN	Description
3.633	55	Woods, Good, HSG B
3.633		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	564	0.1250	0.84		**Lag/CN Method, Tc-3**

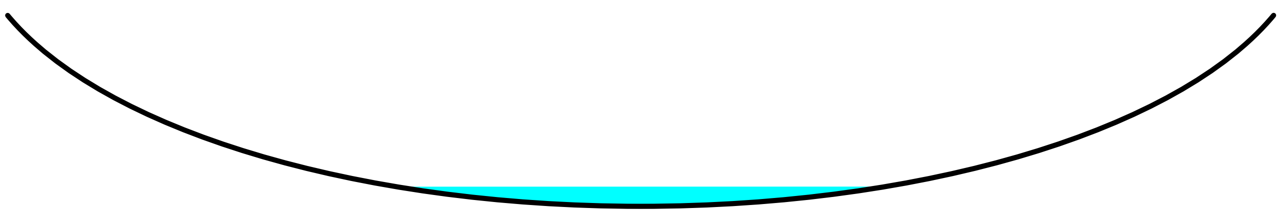
Summary for Reach 1R: Wetland Section 1

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 2.95" for 100-year event
Inflow = 12.15 cfs @ 12.09 hrs, Volume= 0.815 af
Outflow = 11.35 cfs @ 12.15 hrs, Volume= 0.813 af, Atten= 7%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.04 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 4.8 min

Peak Storage= 1,378 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 173.3 sf, Capacity= 1,610.63 cfs

130.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 240.0' Slope= 0.0667 '/'
Inlet Invert= 296.00', Outlet Invert= 280.00'



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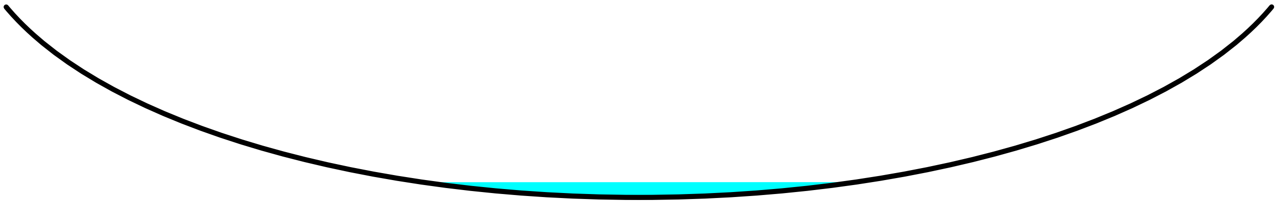
Summary for Reach 1R': Wetland Section 2

Inflow Area = 3.314 ac, 0.00% Impervious, Inflow Depth > 2.94" for 100-year event
Inflow = 11.35 cfs @ 12.15 hrs, Volume= 0.813 af
Outflow = 11.23 cfs @ 12.16 hrs, Volume= 0.812 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.17 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.82 fps, Avg. Travel Time= 0.6 min

Peak Storage= 180 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 53.3 sf, Capacity= 2,590.64 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 145.0' Slope= 0.1241 '/'
Inlet Invert= 280.00', Outlet Invert= 262.00'



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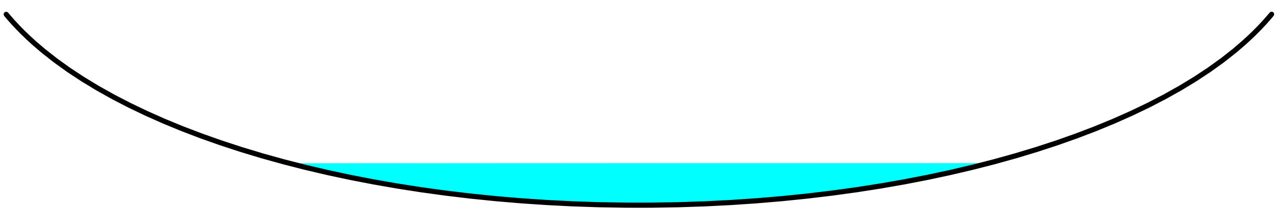
Summary for Reach 2R: Peak off Site

Inflow Area = 10.701 ac, 0.00% Impervious, Inflow Depth > 2.80" for 100-year event
Inflow = 32.66 cfs @ 12.16 hrs, Volume= 2.500 af
Outflow = 29.21 cfs @ 12.28 hrs, Volume= 2.481 af, Atten= 11%, Lag= 7.5 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= 4.2 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 10.0 min

Peak Storage= 7,527 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 789.38 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 640.0' Slope= 0.0375 '/'
Inlet Invert= 262.00', Outlet Invert= 238.00'



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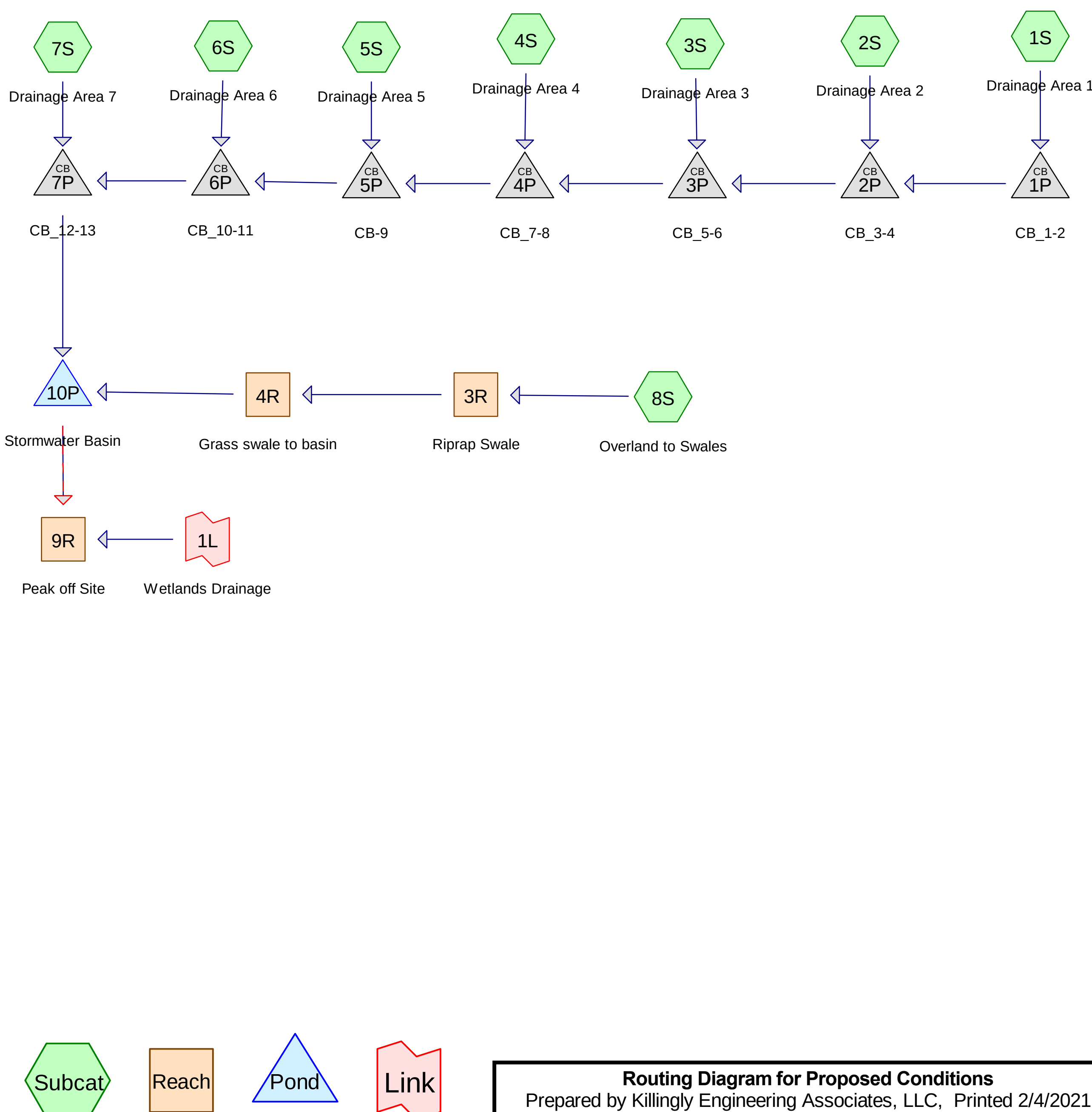
PROPOSED CONDITIONS



Routing Diagram for Proposed Conditions
Prepared by Killingly Engineering Associates, LLC, Printed 2/4/2021
HydroCAD® 10.00 s/n 07240 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.523	55	Woods, Good, HSG B (4S, 6S)
0.772	58	>75% Grass cover, Good, HSG B (8S)
1.786	61	>75% Grass cover, Good, HSG B (1S, 3S, 4S, 5S, 6S)
0.161	74	>75% Grass cover, Good, HSG B/D (2S, 7S)
0.693	98	Paved parking & roof HSG A (4S)
0.095	98	Paved parking, HSG B (1S)
0.196	98	Paved parking/roof (3S)
0.309	98	Paved surfaces & roof (5S)
0.483	98	Pavement/Roofs, HSG B (6S)
0.282	98	Roof & Pavement (7S)
0.161	98	Roof/pavement (2S)
5.461	**75**	**TOTAL AREA**

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

Subcatchment 1S: Drainage Area 1 Runoff Area=8,570 sf 48.07% Impervious Runoff Depth>1.35"
Flow Length=111' Slope=0.0710 '/' Tc=9.1 min CN=79 Runoff=0.29 cfs 0.022 af

Subcatchment 2S: Drainage Area 2 Runoff Area=13,320 sf 52.80% Impervious Runoff Depth>1.94"
Flow Length=125' Slope=0.0100 '/' Tc=1.0 min CN=87 Runoff=0.82 cfs 0.049 af

Subcatchment 3S: Drainage Area 3 Runoff Area=24,738 sf 34.48% Impervious Runoff Depth>1.05"
Flow Length=265' Tc=5.7 min CN=74 Runoff=0.73 cfs 0.050 af

Subcatchment 4S: Drainage Area 4 Runoff Area=69,700 sf 43.33% Impervious Runoff Depth>1.11"
Flow Length=130' Slope=0.0100 '/' Tc=1.9 min CN=75 Runoff=2.43 cfs 0.148 af

Subcatchment 5S: Drainage Area 5 Runoff Area=27,597 sf 48.74% Impervious Runoff Depth>1.36"
Flow Length=180' Slope=0.0500 '/' Tc=1.3 min CN=79 Runoff=1.18 cfs 0.072 af

Subcatchment 6S: Drainage Area 6 Runoff Area=47,315 sf 44.44% Impervious Runoff Depth>1.23"
Flow Length=180' Slope=0.0500 '/' Tc=3.9 min CN=77 Runoff=1.75 cfs 0.111 af

Subcatchment 7S: Drainage Area 7 Runoff Area=13,011 sf 94.50% Impervious Runoff Depth>2.84"
Flow Length=175' Slope=0.0580 '/' Tc=1.2 min CN=97 Runoff=1.07 cfs 0.071 af

Subcatchment 8S: Overland to Swales Runoff Area=33,644 sf 0.00% Impervious Runoff Depth>0.35"
Flow Length=130' Slope=0.1240 '/' Tc=8.3 min CN=58 Runoff=0.18 cfs 0.022 af

Reach 3R: Riprap Swale Avg. Flow Depth=0.04' Max Vel=1.13 fps Inflow=0.18 cfs 0.022 af
n=0.045 L=210.0' S=0.0952 '/' Capacity=48.58 cfs Outflow=0.17 cfs 0.022 af

Reach 4R: Grass swale to basin Avg. Flow Depth=0.04' Max Vel=1.02 fps Inflow=0.17 cfs 0.022 af
n=0.035 L=205.0' S=0.0439 '/' Capacity=42.41 cfs Outflow=0.17 cfs 0.022 af

Reach 9R: Peak off Site Inflow=2.64 cfs 0.352 af
Outflow=2.64 cfs 0.352 af

Pond 1P: CB_1-2 Peak Elev=311.75' Inflow=0.29 cfs 0.022 af
15.0" Round Culvert n=0.012 L=128.7' S=0.0975 '/' Outflow=0.29 cfs 0.022 af

Pond 2P: CB_3-4 Peak Elev=299.32' Inflow=0.97 cfs 0.072 af
15.0" Round Culvert n=0.012 L=131.1' S=0.0934 '/' Outflow=0.97 cfs 0.072 af

Pond 3P: CB_5-6 Peak Elev=287.11' Inflow=1.59 cfs 0.121 af
15.0" Round Culvert n=0.012 L=168.9' S=0.0823 '/' Outflow=1.59 cfs 0.121 af

Pond 4P: CB_7-8 Peak Elev=273.58' Inflow=4.00 cfs 0.269 af
15.0" Round Culvert n=0.012 L=128.2' S=0.0686 '/' Outflow=4.00 cfs 0.269 af

Pond 5P: CB-9 Peak Elev=264.99' Inflow=5.16 cfs 0.341 af
15.0" Round Culvert n=0.012 L=100.6' S=0.1044 '/' Outflow=5.16 cfs 0.341 af

Pond 6P: CB_10-11 Peak Elev=254.39' Inflow=6.86 cfs 0.452 af
18.0" Round Culvert n=0.012 L=172.0' S=0.0459 '/' Outflow=6.86 cfs 0.452 af

Pond 7P: CB_12-13 Peak Elev=246.60' Inflow=7.84 cfs 0.523 af
18.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=7.84 cfs 0.523 af

Pond 10P: Stormwater Basin Peak Elev=243.69' Storage=9,216 cf Inflow=7.84 cfs 0.545 af
Discarded=0.69 cfs 0.447 af Primary=0.41 cfs 0.076 af Secondary=0.00 cfs 0.000 af Outflow=1.10 cfs 0.523 af

Link 1L: 2-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce Inflow=2.24 cfs 0.276 af
Area= 5.540 ac 1.13% Imperv. Primary=2.24 cfs 0.276 af

Total Runoff Area = 5.461 ac Runoff Volume = 0.545 af Average Runoff Depth = 1.20"
59.37% Pervious = 3.242 ac 40.63% Impervious = 2.219 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.022 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

Area (sf)	CN	Description
4,120	98	Paved parking, HSG B
4,450	61	>75% Grass cover, Good, HSG B
8,570	79	Weighted Average
4,450		51.93% Pervious Area
4,120		48.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	111	0.0710	0.20		**Sheet Flow, Tc-1** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 0.82 cfs @ 12.02 hrs, Volume= 0.049 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	6,287	74	>75% Grass cover, Good, HSG B/D
*	7,033	98	Roof/pavement
	13,320	87	Weighted Average
	6,287		47.20% Pervious Area
	7,033		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Tc-2** Paved Kv= 20.3 fps

Summary for Subcatchment 3S: Drainage Area 3

Runoff = 0.73 cfs @ 12.10 hrs, Volume= 0.050 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	8,529	98	Paved parking/roof
	16,209	61	>75% Grass cover, Good, HSG B
	24,738	74	Weighted Average
	16,209		65.52% Pervious Area
	8,529		34.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	105	0.1100	0.35		**Sheet Flow, Tc-4a** Grass: Short n= 0.150 P2= 3.37"
0.7	160	0.0310	3.57		**Shallow Concentrated Flow, Tc-4b** Paved Kv= 20.3 fps
5.7	265	Total			

Summary for Subcatchment 4S: Drainage Area 4

Runoff = 2.43 cfs @ 12.04 hrs, Volume= 0.148 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	30,200	98	Paved parking & roof HSG A
	20,000	61	>75% Grass cover, Good, HSG B
	19,500	55	Woods, Good, HSG B
	69,700	75	Weighted Average
	39,500		56.67% Pervious Area
	30,200		43.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	130	0.0100	1.13		**Sheet Flow, Tc-3** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 5S: Drainage Area 5

Runoff = 1.18 cfs @ 12.03 hrs, Volume= 0.072 af, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	13,450	98	Paved surfaces & roof
	14,147	61	>75% Grass cover, Good, HSG B
	27,597	79	Weighted Average
	14,147		51.26% Pervious Area
	13,450		48.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	180	0.0500	2.29		**Sheet Flow, Tc-5**
					Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 6S: Drainage Area 6

Runoff = 1.75 cfs @ 12.06 hrs, Volume= 0.111 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	21,025	98	Pavement/Roofs, HSG B
	22,990	61	>75% Grass cover, Good, HSG B
	3,300	55	Woods, Good, HSG B
	47,315	77	Weighted Average
	26,290		55.56% Pervious Area
	21,025		44.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	180	0.0500	0.76		**Lag/CN Method, Tc-6**

Summary for Subcatchment 7S: Drainage Area 7

Runoff = 1.07 cfs @ 12.02 hrs, Volume= 0.071 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	12,295	98	Roof & Pavement
*	716	74	>75% Grass cover, Good, HSG B/D
	13,011	97	Weighted Average
	716		5.50% Pervious Area
	12,295		94.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	175	0.0580	2.42		**Sheet Flow, Tc-7**
					Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 8S: Overland to Swales

Runoff = 0.18 cfs @ 12.19 hrs, Volume= 0.022 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	33,644	58	>75% Grass cover, Good, HSG B
	33,644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	130	0.1240	0.26		**Sheet Flow, Tc-8** Grass: Dense n= 0.240 P2= 3.37"

Summary for Reach 3R: Riprap Swale

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 0.35" for 2-year event
Inflow = 0.18 cfs @ 12.19 hrs, Volume= 0.022 af
Outflow = 0.17 cfs @ 12.31 hrs, Volume= 0.022 af, Atten= 3%, Lag= 6.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.13 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 6.0 min

Peak Storage= 32 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 48.58 cfs

4.00' x 1.00' deep channel, n= 0.045
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 210.0' Slope= 0.0952 '/'
Inlet Invert= 276.00', Outlet Invert= 256.00'

Summary for Reach 4R: Grass swale to basin

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 0.35" for 2-year event
Inflow = 0.17 cfs @ 12.31 hrs, Volume= 0.022 af
Outflow = 0.17 cfs @ 12.42 hrs, Volume= 0.022 af, Atten= 2%, Lag= 7.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.02 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.53 fps, Avg. Travel Time= 6.5 min

Peak Storage= 33 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.41 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 205.0' Slope= 0.0439 '/'
Inlet Invert= 256.00', Outlet Invert= 247.00'

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Summary for Reach 9R: Peak off Site

Inflow Area = 11.002 ac, 20.74% Impervious, Inflow Depth > 0.38" for 2-year event
Inflow = 2.64 cfs @ 12.60 hrs, Volume= 0.352 af
Outflow = 2.64 cfs @ 12.60 hrs, Volume= 0.352 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: CB_1-2

Inflow Area = 0.197 ac, 48.07% Impervious, Inflow Depth > 1.35" for 2-year event
Inflow = 0.29 cfs @ 12.14 hrs, Volume= 0.022 af
Outflow = 0.29 cfs @ 12.14 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.14 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.75' @ 12.14 hrs
Flood Elev= 316.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**15.0" Round Culvert** L= 128.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 298.95' S= 0.0975 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.29 cfs @ 12.14 hrs HW=311.75' (Free Discharge)
1=Culvert (Inlet Controls 0.29 cfs @ 1.69 fps)

Summary for Pond 2P: CB_3-4

Inflow Area = 0.503 ac, 50.95% Impervious, Inflow Depth > 1.71" for 2-year event
Inflow = 0.97 cfs @ 12.03 hrs, Volume= 0.072 af
Outflow = 0.97 cfs @ 12.03 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.03 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 299.32' @ 12.03 hrs
Flood Elev= 303.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	298.85'	**15.0" Round Culvert** L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 298.85' / 286.60' S= 0.0934 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.95 cfs @ 12.03 hrs HW=299.31' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.95 cfs @ 2.31 fps)

Summary for Pond 3P: CB_5-6

Inflow Area = 1.070 ac, 42.21% Impervious, Inflow Depth > 1.36" for 2-year event
Inflow = 1.59 cfs @ 12.06 hrs, Volume= 0.121 af
Outflow = 1.59 cfs @ 12.06 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.06 hrs, Volume= 0.121 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 287.11' @ 12.06 hrs
Flood Elev= 291.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**15.0" Round Culvert** L= 168.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 286.50' / 272.60' S= 0.0823 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.56 cfs @ 12.06 hrs HW=287.11' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.56 cfs @ 2.65 fps)

Summary for Pond 4P: CB_7-8

Inflow Area = 2.671 ac, 42.88% Impervious, Inflow Depth > 1.21" for 2-year event
Inflow = 4.00 cfs @ 12.05 hrs, Volume= 0.269 af
Outflow = 4.00 cfs @ 12.05 hrs, Volume= 0.269 af, Atten= 0%, Lag= 0.0 min
Primary = 4.00 cfs @ 12.05 hrs, Volume= 0.269 af

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

Peak Elev= 273.58' @ 12.05 hrs
Flood Elev= 277.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	272.50'	**15.0" Round Culvert** L= 128.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.50' / 263.70' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.96 cfs @ 12.05 hrs HW=273.57' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.96 cfs @ 3.53 fps)

Summary for Pond 5P: CB-9

Inflow Area = 3.304 ac, 44.00% Impervious, Inflow Depth > 1.24" for 2-year event
Inflow = 5.16 cfs @ 12.04 hrs, Volume= 0.341 af
Outflow = 5.16 cfs @ 12.04 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min
Primary = 5.16 cfs @ 12.04 hrs, Volume= 0.341 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 264.99' @ 12.04 hrs
Flood Elev= 267.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	263.60'	**15.0" Round Culvert** L= 100.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 263.60' / 253.10' S= 0.1044 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=5.05 cfs @ 12.04 hrs HW=264.95' (Free Discharge)
↑**1=Culvert** (Inlet Controls 5.05 cfs @ 4.11 fps)

Summary for Pond 6P: CB_10-11

Inflow Area = 4.390 ac, 44.11% Impervious, Inflow Depth > 1.24" for 2-year event
Inflow = 6.86 cfs @ 12.05 hrs, Volume= 0.452 af
Outflow = 6.86 cfs @ 12.05 hrs, Volume= 0.452 af, Atten= 0%, Lag= 0.0 min
Primary = 6.86 cfs @ 12.05 hrs, Volume= 0.452 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 254.39' @ 12.05 hrs
Flood Elev= 259.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**18.0" Round Culvert** L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.00' / 245.10' S= 0.0459 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=6.84 cfs @ 12.05 hrs HW=254.39' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.84 cfs @ 4.01 fps)

Summary for Pond 7P: CB_12-13

Inflow Area =	4.689 ac, 47.32% Impervious, Inflow Depth > 1.34" for 2-year event		
Inflow =	7.84 cfs @ 12.04 hrs, Volume=	0.523 af	
Outflow =	7.84 cfs @ 12.04 hrs, Volume=	0.523 af,	Atten= 0%, Lag= 0.0 min
Primary =	7.84 cfs @ 12.04 hrs, Volume=	0.523 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 246.60' @ 12.05 hrs
Flood Elev= 249.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	245.00'	**18.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 245.00' / 244.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=7.72 cfs @ 12.04 hrs HW=246.57' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.72 cfs @ 4.37 fps)

Summary for Pond 10P: Stormwater Basin

Inflow Area =	5.461 ac, 40.63% Impervious, Inflow Depth > 1.20" for 2-year event		
Inflow =	7.84 cfs @ 12.04 hrs, Volume=	0.545 af	
Outflow =	1.10 cfs @ 12.77 hrs, Volume=	0.523 af,	Atten= 86%, Lag= 43.3 min
Discarded =	0.69 cfs @ 12.77 hrs, Volume=	0.447 af	
Primary =	0.41 cfs @ 12.77 hrs, Volume=	0.076 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= 243.69' @ 12.77 hrs Surf.Area= 6,623 sf Storage= 9,216 cf

Plug-Flow detention time= 115.2 min calculated for 0.523 af (96% of inflow)
Center-of-Mass det. time= 100.3 min (899.7 - 799.4)

Volume	Invert	Avail.Storage	Storage Description
#1	242.00'	46,796 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.00	4,270	0	0
244.00	7,051	11,321	11,321
246.00	8,985	16,036	27,357
248.00	10,454	19,439	46,796

Device	Routing	Invert	Outlet Devices
#1	Primary	242.50'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 242.50' / 242.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	243.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	243.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	244.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	246.50'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	247.00'	**18.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#7	Discarded	242.00'	**4.500 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.69 cfs @ 12.77 hrs HW=243.69' (Free Discharge)
└**7=Exfiltration** (Exfiltration Controls 0.69 cfs)

Primary OutFlow Max=0.41 cfs @ 12.77 hrs HW=243.69' (Free Discharge)
└**1=Culvert** (Passes 0.41 cfs of 3.84 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 3.49 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.49 fps)
  ├**4=Orifice/Grate** (Controls 0.00 cfs)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=242.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Wetlands Drainage

Inflow Area =	5.540 ac,	1.13% Impervious,	Inflow Depth > 0.60"	for 2-year event
Inflow =	2.24 cfs @	12.59 hrs, Volume=	0.276 af	
Primary =	2.24 cfs @	12.59 hrs, Volume=	0.276 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

2-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce

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

Subcatchment 1S: Drainage Area 1 Runoff Area=8,570 sf 48.07% Impervious Runoff Depth>2.03"
Flow Length=111' Slope=0.0710 '/' Tc=9.1 min CN=79 Runoff=0.44 cfs 0.033 af

Subcatchment 2S: Drainage Area 2 Runoff Area=13,320 sf 52.80% Impervious Runoff Depth>2.72"
Flow Length=125' Slope=0.0100 '/' Tc=1.0 min CN=87 Runoff=1.14 cfs 0.069 af

Subcatchment 3S: Drainage Area 3 Runoff Area=24,738 sf 34.48% Impervious Runoff Depth>1.66"
Flow Length=265' Tc=5.7 min CN=74 Runoff=1.17 cfs 0.078 af

Subcatchment 4S: Drainage Area 4 Runoff Area=69,700 sf 43.33% Impervious Runoff Depth>1.73"
Flow Length=130' Slope=0.0100 '/' Tc=1.9 min CN=75 Runoff=3.83 cfs 0.231 af

Subcatchment 5S: Drainage Area 5 Runoff Area=27,597 sf 48.74% Impervious Runoff Depth>2.03"
Flow Length=180' Slope=0.0500 '/' Tc=1.3 min CN=79 Runoff=1.78 cfs 0.107 af

Subcatchment 6S: Drainage Area 6 Runoff Area=47,315 sf 44.44% Impervious Runoff Depth>1.88"
Flow Length=180' Slope=0.0500 '/' Tc=3.9 min CN=77 Runoff=2.71 cfs 0.170 af

Subcatchment 7S: Drainage Area 7 Runoff Area=13,011 sf 94.50% Impervious Runoff Depth>3.67"
Flow Length=175' Slope=0.0580 '/' Tc=1.2 min CN=97 Runoff=1.36 cfs 0.091 af

Subcatchment 8S: Overland to Swales Runoff Area=33,644 sf 0.00% Impervious Runoff Depth>0.70"
Flow Length=130' Slope=0.1240 '/' Tc=8.3 min CN=58 Runoff=0.50 cfs 0.045 af

Reach 3R: Riprap Swale Avg. Flow Depth=0.07' Max Vel=1.68 fps Inflow=0.50 cfs 0.045 af
n=0.045 L=210.0' S=0.0952 '/' Capacity=48.58 cfs Outflow=0.48 cfs 0.045 af

Reach 4R: Grass swale to basin Avg. Flow Depth=0.07' Max Vel=1.53 fps Inflow=0.48 cfs 0.045 af
n=0.035 L=205.0' S=0.0439 '/' Capacity=42.41 cfs Outflow=0.46 cfs 0.045 af

Reach 9R: Peak off Site Inflow=6.18 cfs 0.741 af
Outflow=6.18 cfs 0.741 af

Pond 1P: CB_1-2 Peak Elev=311.81' Inflow=0.44 cfs 0.033 af
15.0" Round Culvert n=0.012 L=128.7' S=0.0975 '/' Outflow=0.44 cfs 0.033 af

Pond 2P: CB_3-4 Peak Elev=299.41' Inflow=1.37 cfs 0.102 af
15.0" Round Culvert n=0.012 L=131.1' S=0.0934 '/' Outflow=1.37 cfs 0.102 af

Pond 3P: CB_5-6 Peak Elev=287.28' Inflow=2.40 cfs 0.181 af
15.0" Round Culvert n=0.012 L=168.9' S=0.0823 '/' Outflow=2.40 cfs 0.181 af

Pond 4P: CB_7-8 Peak Elev=274.22' Inflow=6.19 cfs 0.412 af
15.0" Round Culvert n=0.012 L=128.2' S=0.0686 '/' Outflow=6.19 cfs 0.412 af

Pond 5P: CB-9 Peak Elev=266.02' Inflow=7.92 cfs 0.519 af
15.0" Round Culvert n=0.012 L=100.6' S=0.1044 '/' Outflow=7.92 cfs 0.519 af

Pond 6P: CB_10-11 Peak Elev=255.29' Inflow=10.56 cfs 0.689 af
18.0" Round Culvert n=0.012 L=172.0' S=0.0459 '/' Outflow=10.56 cfs 0.689 af

Pond 7P: CB_12-13 Peak Elev=247.68' Inflow=11.82 cfs 0.781 af
18.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=11.82 cfs 0.781 af

Pond 10P: Stormwater Basin Peak Elev=244.34' Storage=13,799 cf Inflow=11.84 cfs 0.825 af
Discarded=0.77 cfs 0.508 af Primary=1.61 cfs 0.253 af Secondary=0.00 cfs 0.000 af Outflow=2.38 cfs 0.761 af

Link 1L: 5-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce Inflow=4.58 cfs 0.488 af
Area= 5.540 ac 1.13% Imperv. Primary=4.58 cfs 0.488 af

Total Runoff Area = 5.461 ac Runoff Volume = 0.826 af Average Runoff Depth = 1.81"
59.37% Pervious = 3.242 ac 40.63% Impervious = 2.219 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 0.44 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

Area (sf)	CN	Description
4,120	98	Paved parking, HSG B
4,450	61	>75% Grass cover, Good, HSG B
8,570	79	Weighted Average
4,450		51.93% Pervious Area
4,120		48.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	111	0.0710	0.20		**Sheet Flow, Tc-1** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 1.14 cfs @ 12.02 hrs, Volume= 0.069 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	6,287	74	>75% Grass cover, Good, HSG B/D
*	7,033	98	Roof/pavement
	13,320	87	Weighted Average
	6,287		47.20% Pervious Area
	7,033		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Tc-2** Paved Kv= 20.3 fps

Summary for Subcatchment 3S: Drainage Area 3

Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.078 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	8,529	98	Paved parking/roof
	16,209	61	>75% Grass cover, Good, HSG B
	24,738	74	Weighted Average
	16,209		65.52% Pervious Area
	8,529		34.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	105	0.1100	0.35		**Sheet Flow, Tc-4a** Grass: Short n= 0.150 P2= 3.37"
0.7	160	0.0310	3.57		**Shallow Concentrated Flow, Tc-4b** Paved Kv= 20.3 fps
5.7	265	Total			

Summary for Subcatchment 4S: Drainage Area 4

Runoff = 3.83 cfs @ 12.04 hrs, Volume= 0.231 af, Depth> 1.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	30,200	98	Paved parking & roof HSG A
	20,000	61	>75% Grass cover, Good, HSG B
	19,500	55	Woods, Good, HSG B
	69,700	75	Weighted Average
	39,500		56.67% Pervious Area
	30,200		43.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	130	0.0100	1.13		**Sheet Flow, Tc-3** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 5S: Drainage Area 5

Runoff = 1.78 cfs @ 12.02 hrs, Volume= 0.107 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	13,450	98	Paved surfaces & roof
	14,147	61	>75% Grass cover, Good, HSG B
	27,597	79	Weighted Average
	14,147		51.26% Pervious Area
	13,450		48.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	180	0.0500	2.29		**Sheet Flow, Tc-5** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 6S: Drainage Area 6

Runoff = 2.71 cfs @ 12.06 hrs, Volume= 0.170 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	21,025	98	Pavement/Roofs, HSG B
	22,990	61	>75% Grass cover, Good, HSG B
	3,300	55	Woods, Good, HSG B
	47,315	77	Weighted Average
	26,290		55.56% Pervious Area
	21,025		44.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	180	0.0500	0.76		**Lag/CN Method, Tc-6**

Summary for Subcatchment 7S: Drainage Area 7

Runoff = 1.36 cfs @ 12.02 hrs, Volume= 0.091 af, Depth> 3.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	12,295	98	Roof & Pavement
*	716	74	>75% Grass cover, Good, HSG B/D
	13,011	97	Weighted Average
	716		5.50% Pervious Area
	12,295		94.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	175	0.0580	2.42		**Sheet Flow, Tc-7** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 8S: Overland to Swales

Runoff = 0.50 cfs @ 12.15 hrs, Volume= 0.045 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	33,644	58	>75% Grass cover, Good, HSG B
	33,644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	130	0.1240	0.26		**Sheet Flow, Tc-8** Grass: Dense n= 0.240 P2= 3.37"

Summary for Reach 3R: Riprap Swale

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 0.70" for 5-year event
Inflow = 0.50 cfs @ 12.15 hrs, Volume= 0.045 af
Outflow = 0.48 cfs @ 12.22 hrs, Volume= 0.045 af, Atten= 3%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 4.9 min

Peak Storage= 61 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 48.58 cfs

4.00' x 1.00' deep channel, n= 0.045
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 210.0' Slope= 0.0952 '/'
Inlet Invert= 276.00', Outlet Invert= 256.00'

Summary for Reach 4R: Grass swale to basin

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 0.70" for 5-year event
Inflow = 0.48 cfs @ 12.22 hrs, Volume= 0.045 af
Outflow = 0.46 cfs @ 12.29 hrs, Volume= 0.045 af, Atten= 4%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.53 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.66 fps, Avg. Travel Time= 5.2 min

Peak Storage= 63 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.41 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 205.0' Slope= 0.0439 '/'
Inlet Invert= 256.00', Outlet Invert= 247.00'

Summary for Reach 9R: Peak off Site

Inflow Area =	11.002 ac, 20.74% Impervious,	Inflow Depth > 0.81"	for 5-year event
Inflow =	6.18 cfs @ 12.49 hrs,	Volume=	0.741 af
Outflow =	6.18 cfs @ 12.49 hrs,	Volume=	0.741 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: CB_1-2

Inflow Area =	0.197 ac, 48.07% Impervious,	Inflow Depth > 2.03"	for 5-year event
Inflow =	0.44 cfs @ 12.13 hrs,	Volume=	0.033 af
Outflow =	0.44 cfs @ 12.13 hrs,	Volume=	0.033 af, Atten= 0%, Lag= 0.0 min
Primary =	0.44 cfs @ 12.13 hrs,	Volume=	0.033 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.81' @ 12.13 hrs
Flood Elev= 316.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**15.0" Round Culvert** L= 128.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 298.95' S= 0.0975 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.43 cfs @ 12.13 hrs HW=311.80' (Free Discharge)
1=Culvert (Inlet Controls 0.43 cfs @ 1.88 fps)

Summary for Pond 2P: CB_3-4

Inflow Area =	0.503 ac, 50.95% Impervious, Inflow Depth > 2.45"	for 5-year event	
Inflow =	1.37 cfs @ 12.03 hrs, Volume=	0.102 af	
Outflow =	1.37 cfs @ 12.03 hrs, Volume=	0.102 af, Atten= 0%, Lag= 0.0 min	
Primary =	1.37 cfs @ 12.03 hrs, Volume=	0.102 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 299.41' @ 12.03 hrs
Flood Elev= 303.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	298.85'	**15.0" Round Culvert** L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 298.85' / 286.60' S= 0.0934 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.34 cfs @ 12.03 hrs HW=299.41' (Free Discharge)
1=Culvert (Inlet Controls 1.34 cfs @ 2.54 fps)

Summary for Pond 3P: CB_5-6

Inflow Area =	1.070 ac, 42.21% Impervious, Inflow Depth > 2.03"	for 5-year event	
Inflow =	2.40 cfs @ 12.06 hrs, Volume=	0.181 af	
Outflow =	2.40 cfs @ 12.06 hrs, Volume=	0.181 af, Atten= 0%, Lag= 0.0 min	
Primary =	2.40 cfs @ 12.06 hrs, Volume=	0.181 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 287.28' @ 12.06 hrs
Flood Elev= 291.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**15.0" Round Culvert** L= 168.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 286.50' / 272.60' S= 0.0823 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.35 cfs @ 12.06 hrs HW=287.27' (Free Discharge)
1=Culvert (Inlet Controls 2.35 cfs @ 2.98 fps)

Summary for Pond 4P: CB_7-8

Inflow Area =	2.671 ac, 42.88% Impervious, Inflow Depth > 1.85"	for 5-year event	
Inflow =	6.19 cfs @ 12.04 hrs, Volume=	0.412 af	
Outflow =	6.19 cfs @ 12.04 hrs, Volume=	0.412 af, Atten= 0%, Lag= 0.0 min	
Primary =	6.19 cfs @ 12.04 hrs, Volume=	0.412 af	

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

Peak Elev= 274.22' @ 12.05 hrs
Flood Elev= 277.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	272.50'	**15.0" Round Culvert** L= 128.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.50' / 263.70' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=6.10 cfs @ 12.04 hrs HW=274.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.10 cfs @ 4.97 fps)

Summary for Pond 5P: CB-9

Inflow Area = 3.304 ac, 44.00% Impervious, Inflow Depth > 1.89" for 5-year event
Inflow = 7.92 cfs @ 12.04 hrs, Volume= 0.519 af
Outflow = 7.92 cfs @ 12.04 hrs, Volume= 0.519 af, Atten= 0%, Lag= 0.0 min
Primary = 7.92 cfs @ 12.04 hrs, Volume= 0.519 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 266.02' @ 12.04 hrs
Flood Elev= 267.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	263.60'	**15.0" Round Culvert** L= 100.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 263.60' / 253.10' S= 0.1044 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=7.73 cfs @ 12.04 hrs HW=265.94' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.73 cfs @ 6.30 fps)

Summary for Pond 6P: CB_10-11

Inflow Area = 4.390 ac, 44.11% Impervious, Inflow Depth > 1.88" for 5-year event
Inflow = 10.56 cfs @ 12.05 hrs, Volume= 0.689 af
Outflow = 10.56 cfs @ 12.05 hrs, Volume= 0.689 af, Atten= 0%, Lag= 0.0 min
Primary = 10.56 cfs @ 12.05 hrs, Volume= 0.689 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 255.29' @ 12.05 hrs
Flood Elev= 259.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**18.0" Round Culvert** L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.00' / 245.10' S= 0.0459 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=10.45 cfs @ 12.05 hrs HW=255.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.45 cfs @ 5.92 fps)

Summary for Pond 7P: CB_12-13

Inflow Area = 4.689 ac, 47.32% Impervious, Inflow Depth > 2.00" for 5-year event
Inflow = 11.82 cfs @ 12.04 hrs, Volume= 0.781 af
Outflow = 11.82 cfs @ 12.04 hrs, Volume= 0.781 af, Atten= 0%, Lag= 0.0 min
Primary = 11.82 cfs @ 12.04 hrs, Volume= 0.781 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 247.68' @ 12.04 hrs
Flood Elev= 249.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	245.00'	**18.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 245.00' / 244.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=11.60 cfs @ 12.04 hrs HW=247.61' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.60 cfs @ 6.57 fps)

Summary for Pond 10P: Stormwater Basin

Inflow Area = 5.461 ac, 40.63% Impervious, Inflow Depth > 1.81" for 5-year event
Inflow = 11.84 cfs @ 12.04 hrs, Volume= 0.825 af
Outflow = 2.38 cfs @ 12.52 hrs, Volume= 0.761 af, Atten= 80%, Lag= 28.7 min
Discarded = 0.77 cfs @ 12.52 hrs, Volume= 0.508 af
Primary = 1.61 cfs @ 12.52 hrs, Volume= 0.253 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= 244.34' @ 12.52 hrs Surf.Area= 7,383 sf Storage= 13,799 cf

Plug-Flow detention time= 106.8 min calculated for 0.759 af (92% of inflow)
Center-of-Mass det. time= 80.2 min (872.5 - 792.3)

Volume	Invert	Avail.Storage	Storage Description
#1	242.00'	46,796 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.00	4,270	0	0
244.00	7,051	11,321	11,321
246.00	8,985	16,036	27,357
248.00	10,454	19,439	46,796

Device	Routing	Invert	Outlet Devices
#1	Primary	242.50'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 242.50' / 242.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	243.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	243.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	244.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	246.50'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	247.00'	**18.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#7	Discarded	242.00'	**4.500 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.77 cfs @ 12.52 hrs HW=244.34' (Free Discharge)
└─**7=Exfiltration** (Exfiltration Controls 0.77 cfs)

Primary OutFlow Max=1.60 cfs @ 12.52 hrs HW=244.34' (Free Discharge)
└─**1=Culvert** (Passes 1.60 cfs of 5.51 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.22 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.73 cfs @ 3.70 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.42 cfs @ 1.99 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=242.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Wetlands Drainage

Inflow Area =	5.540 ac,	1.13% Impervious, Inflow Depth >	1.06"	for 5-year event
Inflow =	4.58 cfs @	12.49 hrs, Volume=	0.488 af	
Primary =	4.58 cfs @	12.49 hrs, Volume=	0.488 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

5-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce

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

Subcatchment 1S: Drainage Area 1 Runoff Area=8,570 sf 48.07% Impervious Runoff Depth>2.63"
Flow Length=111' Slope=0.0710 '/' Tc=9.1 min CN=79 Runoff=0.57 cfs 0.043 af

Subcatchment 2S: Drainage Area 2 Runoff Area=13,320 sf 52.80% Impervious Runoff Depth>3.38"
Flow Length=125' Slope=0.0100 '/' Tc=1.0 min CN=87 Runoff=1.41 cfs 0.086 af

Subcatchment 3S: Drainage Area 3 Runoff Area=24,738 sf 34.48% Impervious Runoff Depth>2.21"
Flow Length=265' Tc=5.7 min CN=74 Runoff=1.56 cfs 0.104 af

Subcatchment 4S: Drainage Area 4 Runoff Area=69,700 sf 43.33% Impervious Runoff Depth>2.29"
Flow Length=130' Slope=0.0100 '/' Tc=1.9 min CN=75 Runoff=5.07 cfs 0.306 af

Subcatchment 5S: Drainage Area 5 Runoff Area=27,597 sf 48.74% Impervious Runoff Depth>2.63"
Flow Length=180' Slope=0.0500 '/' Tc=1.3 min CN=79 Runoff=2.30 cfs 0.139 af

Subcatchment 6S: Drainage Area 6 Runoff Area=47,315 sf 44.44% Impervious Runoff Depth>2.46"
Flow Length=180' Slope=0.0500 '/' Tc=3.9 min CN=77 Runoff=3.54 cfs 0.222 af

Subcatchment 7S: Drainage Area 7 Runoff Area=13,011 sf 94.50% Impervious Runoff Depth>4.36"
Flow Length=175' Slope=0.0580 '/' Tc=1.2 min CN=97 Runoff=1.61 cfs 0.109 af

Subcatchment 8S: Overland to Swales Runoff Area=33,644 sf 0.00% Impervious Runoff Depth>1.06"
Flow Length=130' Slope=0.1240 '/' Tc=8.3 min CN=58 Runoff=0.83 cfs 0.068 af

Reach 3R: Riprap Swale Avg. Flow Depth=0.10' Max Vel=2.06 fps Inflow=0.83 cfs 0.068 af
n=0.045 L=210.0' S=0.0952 '/' Capacity=48.58 cfs Outflow=0.80 cfs 0.068 af

Reach 4R: Grass swale to basin Avg. Flow Depth=0.10' Max Vel=1.86 fps Inflow=0.80 cfs 0.068 af
n=0.035 L=205.0' S=0.0439 '/' Capacity=42.41 cfs Outflow=0.78 cfs 0.068 af

Reach 9R: Peak off Site Inflow=10.06 cfs 1.133 af
Outflow=10.06 cfs 1.133 af

Pond 1P: CB_1-2 Peak Elev=311.85' Inflow=0.57 cfs 0.043 af
15.0" Round Culvert n=0.012 L=128.7' S=0.0975 '/' Outflow=0.57 cfs 0.043 af

Pond 2P: CB_3-4 Peak Elev=299.49' Inflow=1.71 cfs 0.129 af
15.0" Round Culvert n=0.012 L=131.1' S=0.0934 '/' Outflow=1.71 cfs 0.129 af

Pond 3P: CB_5-6 Peak Elev=287.41' Inflow=3.10 cfs 0.234 af
15.0" Round Culvert n=0.012 L=168.9' S=0.0823 '/' Outflow=3.10 cfs 0.234 af

Pond 4P: CB_7-8 Peak Elev=275.01' Inflow=8.12 cfs 0.539 af
15.0" Round Culvert n=0.012 L=128.2' S=0.0686 '/' Outflow=8.12 cfs 0.539 af

Pond 5P: CB-9 Peak Elev=267.28' Inflow=10.35 cfs 0.678 af
15.0" Round Culvert n=0.012 L=100.6' S=0.1044 '/' Outflow=10.35 cfs 0.678 af

Pond 6P: CB_10-11 Peak Elev=256.38' Inflow=13.80 cfs 0.901 af
18.0" Round Culvert n=0.012 L=172.0' S=0.0459 '/' Outflow=13.80 cfs 0.901 af

Pond 7P: CB_12-13 Peak Elev=248.97' Inflow=15.29 cfs 1.009 af
18.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=15.29 cfs 1.009 af

Pond 10P: Stormwater Basin Peak Elev=244.81' Storage=17,356 cf Inflow=15.46 cfs 1.077 af
Discarded=0.82 cfs 0.547 af Primary=3.17 cfs 0.441 af Secondary=0.00 cfs 0.000 af Outflow=3.98 cfs 0.989 af

Link 1L: 10-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce Inflow=6.89 cfs 0.691 af
Area= 5.540 ac 1.13% Imperv. Primary=6.89 cfs 0.691 af

Total Runoff Area = 5.461 ac Runoff Volume = 1.077 af Average Runoff Depth = 2.37"
59.37% Pervious = 3.242 ac 40.63% Impervious = 2.219 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 0.57 cfs @ 12.13 hrs, Volume= 0.043 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

Area (sf)	CN	Description
4,120	98	Paved parking, HSG B
4,450	61	>75% Grass cover, Good, HSG B
8,570	79	Weighted Average
4,450		51.93% Pervious Area
4,120		48.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	111	0.0710	0.20		**Sheet Flow, Tc-1**
					Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 1.41 cfs @ 12.01 hrs, Volume= 0.086 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	6,287	74	>75% Grass cover, Good, HSG B/D
*	7,033	98	Roof/pavement
	13,320	87	Weighted Average
	6,287		47.20% Pervious Area
	7,033		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Tc-2**
					Paved Kv= 20.3 fps

Summary for Subcatchment 3S: Drainage Area 3

Runoff = 1.56 cfs @ 12.09 hrs, Volume= 0.104 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	8,529	98	Paved parking/roof
	16,209	61	>75% Grass cover, Good, HSG B
	24,738	74	Weighted Average
	16,209		65.52% Pervious Area
	8,529		34.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	105	0.1100	0.35		**Sheet Flow, Tc-4a** Grass: Short n= 0.150 P2= 3.37"
0.7	160	0.0310	3.57		**Shallow Concentrated Flow, Tc-4b** Paved Kv= 20.3 fps
5.7	265	Total			

Summary for Subcatchment 4S: Drainage Area 4

Runoff = 5.07 cfs @ 12.04 hrs, Volume= 0.306 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	30,200	98	Paved parking & roof HSG A
	20,000	61	>75% Grass cover, Good, HSG B
	19,500	55	Woods, Good, HSG B
	69,700	75	Weighted Average
	39,500		56.67% Pervious Area
	30,200		43.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	130	0.0100	1.13		**Sheet Flow, Tc-3** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 5S: Drainage Area 5

Runoff = 2.30 cfs @ 12.02 hrs, Volume= 0.139 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	13,450	98	Paved surfaces & roof
	14,147	61	>75% Grass cover, Good, HSG B
	27,597	79	Weighted Average
	14,147		51.26% Pervious Area
	13,450		48.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	180	0.0500	2.29		**Sheet Flow, Tc-5** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 6S: Drainage Area 6

Runoff = 3.54 cfs @ 12.06 hrs, Volume= 0.222 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	21,025	98	Pavement/Roofs, HSG B
	22,990	61	>75% Grass cover, Good, HSG B
	3,300	55	Woods, Good, HSG B
	47,315	77	Weighted Average
	26,290		55.56% Pervious Area
	21,025		44.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	180	0.0500	0.76		**Lag/CN Method, Tc-6**

Summary for Subcatchment 7S: Drainage Area 7

Runoff = 1.61 cfs @ 12.02 hrs, Volume= 0.109 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	12,295	98	Roof & Pavement
*	716	74	>75% Grass cover, Good, HSG B/D
	13,011	97	Weighted Average
	716		5.50% Pervious Area
	12,295		94.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	175	0.0580	2.42		**Sheet Flow, Tc-7** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 8S: Overland to Swales

Runoff = 0.83 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	33,644	58	>75% Grass cover, Good, HSG B
	33,644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	130	0.1240	0.26		**Sheet Flow, Tc-8** Grass: Dense n= 0.240 P2= 3.37"

Summary for Reach 3R: Riprap Swale

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 1.06" for 10-year event
Inflow = 0.83 cfs @ 12.14 hrs, Volume= 0.068 af
Outflow = 0.80 cfs @ 12.20 hrs, Volume= 0.068 af, Atten= 4%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.06 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 4.3 min

Peak Storage= 85 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 48.58 cfs

4.00' x 1.00' deep channel, n= 0.045
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 210.0' Slope= 0.0952 '/'
Inlet Invert= 276.00', Outlet Invert= 256.00'

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Summary for Reach 4R: Grass swale to basin

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 1.05" for 10-year event
Inflow = 0.80 cfs @ 12.20 hrs, Volume= 0.068 af
Outflow = 0.78 cfs @ 12.25 hrs, Volume= 0.068 af, Atten= 3%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.86 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 4.6 min

Peak Storage= 87 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.41 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 205.0' Slope= 0.0439 '/'
Inlet Invert= 256.00', Outlet Invert= 247.00'


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Summary for Reach 9R: Peak off Site

Inflow Area =	11.002 ac,	20.74% Impervious,	Inflow Depth > 1.24"	for 10-year event	
Inflow =	10.06 cfs @	12.44 hrs,	Volume=	1.133 af	
Outflow =	10.06 cfs @	12.44 hrs,	Volume=	1.133 af,	Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: CB_1-2

Inflow Area =	0.197 ac,	48.07% Impervious,	Inflow Depth > 2.63"	for 10-year event	
Inflow =	0.57 cfs @	12.13 hrs,	Volume=	0.043 af	
Outflow =	0.57 cfs @	12.13 hrs,	Volume=	0.043 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.57 cfs @	12.13 hrs,	Volume=	0.043 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.85' @ 12.13 hrs
Flood Elev= 316.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**15.0" Round Culvert** L= 128.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 298.95' S= 0.0975 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.56 cfs @ 12.13 hrs HW=311.85' (Free Discharge)
1=Culvert (Inlet Controls 0.56 cfs @ 2.01 fps)

Summary for Pond 2P: CB_3-4

Inflow Area = 0.503 ac, 50.95% Impervious, Inflow Depth > 3.09" for 10-year event
Inflow = 1.71 cfs @ 12.03 hrs, Volume= 0.129 af
Outflow = 1.71 cfs @ 12.03 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.03 hrs, Volume= 0.129 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 299.49' @ 12.03 hrs
Flood Elev= 303.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	298.85'	**15.0" Round Culvert** L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 298.85' / 286.60' S= 0.0934 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.67 cfs @ 12.03 hrs HW=299.48' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.67 cfs @ 2.70 fps)

Summary for Pond 3P: CB_5-6

Inflow Area = 1.070 ac, 42.21% Impervious, Inflow Depth > 2.62" for 10-year event
Inflow = 3.10 cfs @ 12.06 hrs, Volume= 0.234 af
Outflow = 3.10 cfs @ 12.06 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.0 min
Primary = 3.10 cfs @ 12.06 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 287.41' @ 12.06 hrs
Flood Elev= 291.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**15.0" Round Culvert** L= 168.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 286.50' / 272.60' S= 0.0823 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.04 cfs @ 12.06 hrs HW=287.40' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.04 cfs @ 3.23 fps)

Summary for Pond 4P: CB_7-8

Inflow Area = 2.671 ac, 42.88% Impervious, Inflow Depth > 2.42" for 10-year event
Inflow = 8.12 cfs @ 12.04 hrs, Volume= 0.539 af
Outflow = 8.12 cfs @ 12.04 hrs, Volume= 0.539 af, Atten= 0%, Lag= 0.0 min
Primary = 8.12 cfs @ 12.04 hrs, Volume= 0.539 af

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

Peak Elev= 275.01' @ 12.04 hrs
Flood Elev= 277.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	272.50'	**15.0" Round Culvert** L= 128.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.50' / 263.70' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=7.98 cfs @ 12.04 hrs HW=274.95' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.98 cfs @ 6.50 fps)

Summary for Pond 5P: CB-9

Inflow Area = 3.304 ac, 44.00% Impervious, Inflow Depth > 2.46" for 10-year event
Inflow = 10.35 cfs @ 12.04 hrs, Volume= 0.678 af
Outflow = 10.35 cfs @ 12.04 hrs, Volume= 0.678 af, Atten= 0%, Lag= 0.0 min
Primary = 10.35 cfs @ 12.04 hrs, Volume= 0.678 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 267.28' @ 12.04 hrs
Flood Elev= 267.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	263.60'	**15.0" Round Culvert** L= 100.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 263.60' / 253.10' S= 0.1044 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=10.08 cfs @ 12.04 hrs HW=267.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 10.08 cfs @ 8.21 fps)

Summary for Pond 6P: CB_10-11

Inflow Area = 4.390 ac, 44.11% Impervious, Inflow Depth > 2.46" for 10-year event
Inflow = 13.80 cfs @ 12.05 hrs, Volume= 0.901 af
Outflow = 13.80 cfs @ 12.05 hrs, Volume= 0.901 af, Atten= 0%, Lag= 0.0 min
Primary = 13.80 cfs @ 12.05 hrs, Volume= 0.901 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 256.38' @ 12.05 hrs
Flood Elev= 259.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**18.0" Round Culvert** L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.00' / 245.10' S= 0.0459 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=13.63 cfs @ 12.05 hrs HW=256.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 13.63 cfs @ 7.71 fps)

Summary for Pond 7P: CB_12-13

Inflow Area =	4.689 ac, 47.32% Impervious,	Inflow Depth > 2.58"	for 10-year event
Inflow =	15.29 cfs @ 12.04 hrs,	Volume=	1.009 af
Outflow =	15.29 cfs @ 12.04 hrs,	Volume=	1.009 af, Atten= 0%, Lag= 0.0 min
Primary =	15.29 cfs @ 12.04 hrs,	Volume=	1.009 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 248.97' @ 12.04 hrs
Flood Elev= 249.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	245.00'	**18.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 245.00' / 244.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=14.99 cfs @ 12.04 hrs HW=248.85' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 14.99 cfs @ 8.48 fps)

Summary for Pond 10P: Stormwater Basin

Inflow Area =	5.461 ac, 40.63% Impervious,	Inflow Depth > 2.37"	for 10-year event
Inflow =	15.46 cfs @ 12.04 hrs,	Volume=	1.077 af
Outflow =	3.98 cfs @ 12.46 hrs,	Volume=	0.989 af, Atten= 74%, Lag= 24.9 min
Discarded =	0.82 cfs @ 12.46 hrs,	Volume=	0.547 af
Primary =	3.17 cfs @ 12.46 hrs,	Volume=	0.441 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= 244.81' @ 12.46 hrs Surf.Area= 7,835 sf Storage= 17,356 cf

Plug-Flow detention time= 95.5 min calculated for 0.989 af (92% of inflow)
Center-of-Mass det. time= 67.3 min (854.9 - 787.6)

Volume	Invert	Avail.Storage	Storage Description
#1	242.00'	46,796 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.00	4,270	0	0
244.00	7,051	11,321	11,321
246.00	8,985	16,036	27,357
248.00	10,454	19,439	46,796

Device	Routing	Invert	Outlet Devices
#1	Primary	242.50'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 242.50' / 242.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	243.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	243.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	244.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	246.50'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	247.00'	**18.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#7	Discarded	242.00'	**4.500 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.82 cfs @ 12.46 hrs HW=244.81' (Free Discharge)
└─**7=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=3.17 cfs @ 12.46 hrs HW=244.81' (Free Discharge)
└─**1=Culvert** (Passes 3.17 cfs of 6.59 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.54 cfs @ 6.17 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.97 cfs @ 4.96 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 1.66 cfs @ 3.06 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=242.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Wetlands Drainage

Inflow Area =	5.540 ac,	1.13% Impervious, Inflow Depth >	1.50"	for 10-year event
Inflow =	6.89 cfs @	12.44 hrs, Volume=	0.691 af	
Primary =	6.89 cfs @	12.44 hrs, Volume=	0.691 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

10-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce

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

Subcatchment 1S: Drainage Area 1 Runoff Area=8,570 sf 48.07% Impervious Runoff Depth>3.48"
Flow Length=111' Slope=0.0710 '/' Tc=9.1 min CN=79 Runoff=0.76 cfs 0.057 af

Subcatchment 2S: Drainage Area 2 Runoff Area=13,320 sf 52.80% Impervious Runoff Depth>4.32"
Flow Length=125' Slope=0.0100 '/' Tc=1.0 min CN=87 Runoff=1.77 cfs 0.110 af

Subcatchment 3S: Drainage Area 3 Runoff Area=24,738 sf 34.48% Impervious Runoff Depth>3.00"
Flow Length=265' Tc=5.7 min CN=74 Runoff=2.12 cfs 0.142 af

Subcatchment 4S: Drainage Area 4 Runoff Area=69,700 sf 43.33% Impervious Runoff Depth>3.10"
Flow Length=130' Slope=0.0100 '/' Tc=1.9 min CN=75 Runoff=6.84 cfs 0.414 af

Subcatchment 5S: Drainage Area 5 Runoff Area=27,597 sf 48.74% Impervious Runoff Depth>3.49"
Flow Length=180' Slope=0.0500 '/' Tc=1.3 min CN=79 Runoff=3.03 cfs 0.184 af

Subcatchment 6S: Drainage Area 6 Runoff Area=47,315 sf 44.44% Impervious Runoff Depth>3.29"
Flow Length=180' Slope=0.0500 '/' Tc=3.9 min CN=77 Runoff=4.73 cfs 0.298 af

Subcatchment 7S: Drainage Area 7 Runoff Area=13,011 sf 94.50% Impervious Runoff Depth>5.30"
Flow Length=175' Slope=0.0580 '/' Tc=1.2 min CN=97 Runoff=1.95 cfs 0.132 af

Subcatchment 8S: Overland to Swales Runoff Area=33,644 sf 0.00% Impervious Runoff Depth>1.62"
Flow Length=130' Slope=0.1240 '/' Tc=8.3 min CN=58 Runoff=1.35 cfs 0.104 af

Reach 3R: Riprap Swale Avg. Flow Depth=0.13' Max Vel=2.47 fps Inflow=1.35 cfs 0.104 af
n=0.045 L=210.0' S=0.0952 '/' Capacity=48.58 cfs Outflow=1.30 cfs 0.104 af

Reach 4R: Grass swale to basin Avg. Flow Depth=0.14' Max Vel=2.23 fps Inflow=1.30 cfs 0.104 af
n=0.035 L=205.0' S=0.0439 '/' Capacity=42.41 cfs Outflow=1.26 cfs 0.104 af

Reach 9R: Peak off Site Inflow=15.11 cfs 1.731 af
Outflow=15.11 cfs 1.731 af

Pond 1P: CB_1-2 Peak Elev=311.91' Inflow=0.76 cfs 0.057 af
15.0" Round Culvert n=0.012 L=128.7' S=0.0975 '/' Outflow=0.76 cfs 0.057 af

Pond 2P: CB_3-4 Peak Elev=299.58' Inflow=2.19 cfs 0.167 af
15.0" Round Culvert n=0.012 L=131.1' S=0.0934 '/' Outflow=2.19 cfs 0.167 af

Pond 3P: CB_5-6 Peak Elev=287.60' Inflow=4.09 cfs 0.309 af
15.0" Round Culvert n=0.012 L=168.9' S=0.0823 '/' Outflow=4.09 cfs 0.309 af

Pond 4P: CB_7-8 Peak Elev=276.49' Inflow=10.85 cfs 0.723 af
15.0" Round Culvert n=0.012 L=128.2' S=0.0686 '/' Outflow=10.85 cfs 0.723 af

Pond 5P: CB-9 Peak Elev=269.65' Inflow=13.79 cfs 0.908 af
15.0" Round Culvert n=0.012 L=100.6' S=0.1044 '/' Outflow=13.79 cfs 0.908 af

Pond 6P: CB_10-11 Peak Elev=258.42' Inflow=18.39 cfs 1.206 af
18.0" Round Culvert n=0.012 L=172.0' S=0.0459 '/' Outflow=18.39 cfs 1.206 af

Pond 7P: CB_12-13 Peak Elev=251.37' Inflow=20.20 cfs 1.338 af
18.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=20.20 cfs 1.338 af

Pond 10P: Stormwater Basin Peak Elev=245.52' Storage=23,126 cf Inflow=20.63 cfs 1.441 af
Discarded=0.89 cfs 0.597 af Primary=4.65 cfs 0.731 af Secondary=0.00 cfs 0.000 af Outflow=5.54 cfs 1.328 af

Link 1L: 25-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce Inflow=10.47 cfs 1.000 af
Area= 5.540 ac 1.13% Imperv. Primary=10.47 cfs 1.000 af

Total Runoff Area = 5.461 ac Runoff Volume = 1.442 af Average Runoff Depth = 3.17"
59.37% Pervious = 3.242 ac 40.63% Impervious = 2.219 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 0.76 cfs @ 12.13 hrs, Volume= 0.057 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
	4,120	98	Paved parking, HSG B
	4,450	61	>75% Grass cover, Good, HSG B
	8,570	79	Weighted Average
	4,450		51.93% Pervious Area
	4,120		48.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	111	0.0710	0.20		**Sheet Flow, Tc-1** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 1.77 cfs @ 12.01 hrs, Volume= 0.110 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	6,287	74	>75% Grass cover, Good, HSG B/D
*	7,033	98	Roof/pavement
	13,320	87	Weighted Average
	6,287		47.20% Pervious Area
	7,033		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Tc-2** Paved Kv= 20.3 fps

Summary for Subcatchment 3S: Drainage Area 3

Runoff = 2.12 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	8,529	98	Paved parking/roof
	16,209	61	>75% Grass cover, Good, HSG B
	24,738	74	Weighted Average
	16,209		65.52% Pervious Area
	8,529		34.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	105	0.1100	0.35		**Sheet Flow, Tc-4a** Grass: Short n= 0.150 P2= 3.37"
0.7	160	0.0310	3.57		**Shallow Concentrated Flow, Tc-4b** Paved Kv= 20.3 fps
5.7	265	Total			

Summary for Subcatchment 4S: Drainage Area 4

Runoff = 6.84 cfs @ 12.04 hrs, Volume= 0.414 af, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	30,200	98	Paved parking & roof HSG A
	20,000	61	>75% Grass cover, Good, HSG B
	19,500	55	Woods, Good, HSG B
	69,700	75	Weighted Average
	39,500		56.67% Pervious Area
	30,200		43.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	130	0.0100	1.13		**Sheet Flow, Tc-3** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 5S: Drainage Area 5

Runoff = 3.03 cfs @ 12.02 hrs, Volume= 0.184 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	13,450	98	Paved surfaces & roof
	14,147	61	>75% Grass cover, Good, HSG B
	27,597	79	Weighted Average
	14,147		51.26% Pervious Area
	13,450		48.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	180	0.0500	2.29		**Sheet Flow, Tc-5** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 6S: Drainage Area 6

Runoff = 4.73 cfs @ 12.06 hrs, Volume= 0.298 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	21,025	98	Pavement/Roofs, HSG B
	22,990	61	>75% Grass cover, Good, HSG B
	3,300	55	Woods, Good, HSG B
	47,315	77	Weighted Average
	26,290		55.56% Pervious Area
	21,025		44.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	180	0.0500	0.76		**Lag/CN Method, Tc-6**

Summary for Subcatchment 7S: Drainage Area 7

Runoff = 1.95 cfs @ 12.02 hrs, Volume= 0.132 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	12,295	98	Roof & Pavement
*	716	74	>75% Grass cover, Good, HSG B/D
	13,011	97	Weighted Average
	716		5.50% Pervious Area
	12,295		94.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	175	0.0580	2.42		**Sheet Flow, Tc-7** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 8S: Overland to Swales

Runoff = 1.35 cfs @ 12.13 hrs, Volume= 0.104 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	33,644	58	>75% Grass cover, Good, HSG B
	33,644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	130	0.1240	0.26		**Sheet Flow, Tc-8** Grass: Dense n= 0.240 P2= 3.37"

Summary for Reach 3R: Riprap Swale

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 1.62" for 25-year event
Inflow = 1.35 cfs @ 12.13 hrs, Volume= 0.104 af
Outflow = 1.30 cfs @ 12.18 hrs, Volume= 0.104 af, Atten= 4%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.47 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 3.8 min

Peak Storage= 115 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 48.58 cfs

4.00' x 1.00' deep channel, n= 0.045
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 210.0' Slope= 0.0952 '/'
Inlet Invert= 276.00', Outlet Invert= 256.00'

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Summary for Reach 4R: Grass swale to basin

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 1.62" for 25-year event
Inflow = 1.30 cfs @ 12.18 hrs, Volume= 0.104 af
Outflow = 1.26 cfs @ 12.22 hrs, Volume= 0.104 af, Atten= 3%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.23 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 4.1 min

Peak Storage= 119 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.41 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 205.0' Slope= 0.0439 '/'
Inlet Invert= 256.00', Outlet Invert= 247.00'

Summary for Reach 9R: Peak off Site

Inflow Area =	11.002 ac,	20.74% Impervious, Inflow Depth >	1.89"	for 25-year event
Inflow =	15.11 cfs @	12.41 hrs, Volume=	1.731 af	
Outflow =	15.11 cfs @	12.41 hrs, Volume=	1.731 af,	Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: CB_1-2

Inflow Area =	0.197 ac,	48.07% Impervious, Inflow Depth >	3.48"	for 25-year event
Inflow =	0.76 cfs @	12.13 hrs, Volume=	0.057 af	
Outflow =	0.76 cfs @	12.13 hrs, Volume=	0.057 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.76 cfs @	12.13 hrs, Volume=	0.057 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.91' @ 12.13 hrs
Flood Elev= 316.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**15.0" Round Culvert** L= 128.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 298.95' S= 0.0975 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.74 cfs @ 12.13 hrs HW=311.90' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.74 cfs @ 2.16 fps)

Summary for Pond 2P: CB_3-4

Inflow Area = 0.503 ac, 50.95% Impervious, Inflow Depth > 3.99" for 25-year event
Inflow = 2.19 cfs @ 12.03 hrs, Volume= 0.167 af
Outflow = 2.19 cfs @ 12.03 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min
Primary = 2.19 cfs @ 12.03 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 299.58' @ 12.03 hrs
Flood Elev= 303.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	298.85'	**15.0" Round Culvert** L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 298.85' / 286.60' S= 0.0934 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.13 cfs @ 12.03 hrs HW=299.57' (Free Discharge)
1=Culvert (Inlet Controls 2.13 cfs @ 2.90 fps)

Summary for Pond 3P: CB_5-6

Inflow Area = 1.070 ac, 42.21% Impervious, Inflow Depth > 3.47" for 25-year event
Inflow = 4.09 cfs @ 12.06 hrs, Volume= 0.309 af
Outflow = 4.09 cfs @ 12.06 hrs, Volume= 0.309 af, Atten= 0%, Lag= 0.0 min
Primary = 4.09 cfs @ 12.06 hrs, Volume= 0.309 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 287.60' @ 12.06 hrs
Flood Elev= 291.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**15.0" Round Culvert** L= 168.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 286.50' / 272.60' S= 0.0823 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=4.02 cfs @ 12.06 hrs HW=287.59' (Free Discharge)
1=Culvert (Inlet Controls 4.02 cfs @ 3.55 fps)

Summary for Pond 4P: CB_7-8

Inflow Area = 2.671 ac, 42.88% Impervious, Inflow Depth > 3.25" for 25-year event
Inflow = 10.85 cfs @ 12.04 hrs, Volume= 0.723 af
Outflow = 10.85 cfs @ 12.04 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.0 min
Primary = 10.85 cfs @ 12.04 hrs, Volume= 0.723 af

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

Peak Elev= 276.49' @ 12.04 hrs
Flood Elev= 277.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	272.50'	**15.0" Round Culvert** L= 128.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.50' / 263.70' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=10.64 cfs @ 12.04 hrs HW=276.37' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.64 cfs @ 8.67 fps)

Summary for Pond 5P: CB-9

Inflow Area = 3.304 ac, 44.00% Impervious, Inflow Depth > 3.30" for 25-year event
Inflow = 13.79 cfs @ 12.04 hrs, Volume= 0.908 af
Outflow = 13.79 cfs @ 12.04 hrs, Volume= 0.908 af, Atten= 0%, Lag= 0.0 min
Primary = 13.79 cfs @ 12.04 hrs, Volume= 0.908 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 269.65' @ 12.04 hrs
Flood Elev= 267.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	263.60'	**15.0" Round Culvert** L= 100.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 263.60' / 253.10' S= 0.1044 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=13.40 cfs @ 12.04 hrs HW=269.37' (Free Discharge)
└─**1=Culvert** (Inlet Controls 13.40 cfs @ 10.92 fps)

Summary for Pond 6P: CB_10-11

Inflow Area = 4.390 ac, 44.11% Impervious, Inflow Depth > 3.30" for 25-year event
Inflow = 18.39 cfs @ 12.04 hrs, Volume= 1.206 af
Outflow = 18.39 cfs @ 12.04 hrs, Volume= 1.206 af, Atten= 0%, Lag= 0.0 min
Primary = 18.39 cfs @ 12.04 hrs, Volume= 1.206 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 258.42' @ 12.05 hrs
Flood Elev= 259.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**18.0" Round Culvert** L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.00' / 245.10' S= 0.0459 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=18.11 cfs @ 12.04 hrs HW=258.28' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 18.11 cfs @ 10.25 fps)

Summary for Pond 7P: CB_12-13

Inflow Area = 4.689 ac, 47.32% Impervious, Inflow Depth > 3.42" for 25-year event
Inflow = 20.20 cfs @ 12.04 hrs, Volume= 1.338 af
Outflow = 20.20 cfs @ 12.04 hrs, Volume= 1.338 af, Atten= 0%, Lag= 0.0 min
Primary = 20.20 cfs @ 12.04 hrs, Volume= 1.338 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 251.37' @ 12.04 hrs
Flood Elev= 249.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	245.00'	**18.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 245.00' / 244.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=19.77 cfs @ 12.04 hrs HW=251.15' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 19.77 cfs @ 11.19 fps)

Summary for Pond 10P: Stormwater Basin

Inflow Area = 5.461 ac, 40.63% Impervious, Inflow Depth > 3.17" for 25-year event
Inflow = 20.63 cfs @ 12.04 hrs, Volume= 1.441 af
Outflow = 5.54 cfs @ 12.44 hrs, Volume= 1.328 af, Atten= 73%, Lag= 23.9 min
Discarded = 0.89 cfs @ 12.44 hrs, Volume= 0.597 af
Primary = 4.65 cfs @ 12.44 hrs, Volume= 0.731 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= 245.52' @ 12.44 hrs Surf.Area= 8,518 sf Storage= 23,126 cf

Plug-Flow detention time= 85.6 min calculated for 1.324 af (92% of inflow)
Center-of-Mass det. time= 58.6 min (840.7 - 782.1)

Volume	Invert	Avail.Storage	Storage Description
#1	242.00'	46,796 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.00	4,270	0	0
244.00	7,051	11,321	11,321
246.00	8,985	16,036	27,357
248.00	10,454	19,439	46,796

Device	Routing	Invert	Outlet Devices
#1	Primary	242.50'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 242.50' / 242.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	243.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	243.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	244.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	246.50'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	247.00'	**18.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#7	Discarded	242.00'	**4.500 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.89 cfs @ 12.44 hrs HW=245.52' (Free Discharge)
└─**7=Exfiltration** (Exfiltration Controls 0.89 cfs)

Primary OutFlow Max=4.65 cfs @ 12.44 hrs HW=245.52' (Free Discharge)
└─**1=Culvert** (Passes 4.65 cfs of 7.94 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.64 cfs @ 7.38 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.26 cfs @ 6.40 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 2.75 cfs @ 5.05 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=242.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Wetlands Drainage

Inflow Area =	5.540 ac,	1.13% Impervious,	Inflow Depth > 2.17"	for 25-year event
Inflow =	10.47 cfs @	12.40 hrs, Volume=	1.000 af	
Primary =	10.47 cfs @	12.40 hrs, Volume=	1.000 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

25-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce

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

Subcatchment 1S: Drainage Area 1 Runoff Area=8,570 sf 48.07% Impervious Runoff Depth>4.17"
Flow Length=111' Slope=0.0710 '/' Tc=9.1 min CN=79 Runoff=0.90 cfs 0.068 af

Subcatchment 2S: Drainage Area 2 Runoff Area=13,320 sf 52.80% Impervious Runoff Depth>5.05"
Flow Length=125' Slope=0.0100 '/' Tc=1.0 min CN=87 Runoff=2.05 cfs 0.129 af

Subcatchment 3S: Drainage Area 3 Runoff Area=24,738 sf 34.48% Impervious Runoff Depth>3.65"
Flow Length=265' Tc=5.7 min CN=74 Runoff=2.57 cfs 0.173 af

Subcatchment 4S: Drainage Area 4 Runoff Area=69,700 sf 43.33% Impervious Runoff Depth>3.76"
Flow Length=130' Slope=0.0100 '/' Tc=1.9 min CN=75 Runoff=8.25 cfs 0.501 af

Subcatchment 5S: Drainage Area 5 Runoff Area=27,597 sf 48.74% Impervious Runoff Depth>4.18"
Flow Length=180' Slope=0.0500 '/' Tc=1.3 min CN=79 Runoff=3.61 cfs 0.221 af

Subcatchment 6S: Drainage Area 6 Runoff Area=47,315 sf 44.44% Impervious Runoff Depth>3.97"
Flow Length=180' Slope=0.0500 '/' Tc=3.9 min CN=77 Runoff=5.67 cfs 0.359 af

Subcatchment 7S: Drainage Area 7 Runoff Area=13,011 sf 94.50% Impervious Runoff Depth>6.03"
Flow Length=175' Slope=0.0580 '/' Tc=1.2 min CN=97 Runoff=2.21 cfs 0.150 af

Subcatchment 8S: Overland to Swales Runoff Area=33,644 sf 0.00% Impervious Runoff Depth>2.11"
Flow Length=130' Slope=0.1240 '/' Tc=8.3 min CN=58 Runoff=1.79 cfs 0.136 af

Reach 3R: Riprap Swale Avg. Flow Depth=0.15' Max Vel=2.75 fps Inflow=1.79 cfs 0.136 af
n=0.045 L=210.0' S=0.0952 '/' Capacity=48.58 cfs Outflow=1.74 cfs 0.135 af

Reach 4R: Grass swale to basin Avg. Flow Depth=0.16' Max Vel=2.47 fps Inflow=1.74 cfs 0.135 af
n=0.035 L=205.0' S=0.0439 '/' Capacity=42.41 cfs Outflow=1.69 cfs 0.135 af

Reach 9R: Peak off Site Inflow=18.90 cfs 2.232 af
Outflow=18.90 cfs 2.232 af

Pond 1P: CB_1-2 Peak Elev=311.95' Inflow=0.90 cfs 0.068 af
15.0" Round Culvert n=0.012 L=128.7' S=0.0975 '/' Outflow=0.90 cfs 0.068 af

Pond 2P: CB_3-4 Peak Elev=299.66' Inflow=2.55 cfs 0.197 af
15.0" Round Culvert n=0.012 L=131.1' S=0.0934 '/' Outflow=2.55 cfs 0.197 af

Pond 3P: CB_5-6 Peak Elev=287.80' Inflow=4.88 cfs 0.370 af
15.0" Round Culvert n=0.012 L=168.9' S=0.0823 '/' Outflow=4.88 cfs 0.370 af

Pond 4P: CB_7-8 Peak Elev=277.97' Inflow=13.02 cfs 0.871 af
15.0" Round Culvert n=0.012 L=128.2' S=0.0686 '/' Outflow=13.02 cfs 0.871 af

Pond 5P: CB-9 Peak Elev=272.00' Inflow=16.51 cfs 1.092 af
15.0" Round Culvert n=0.012 L=100.6' S=0.1044 '/' Outflow=16.51 cfs 1.092 af

Pond 6P: CB_10-11 Peak Elev=260.44' Inflow=22.02 cfs 1.451 af
18.0" Round Culvert n=0.012 L=172.0' S=0.0459 '/' Outflow=22.02 cfs 1.451 af

Pond 7P: CB_12-13 Peak Elev=253.74' Inflow=24.08 cfs 1.601 af
18.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=24.08 cfs 1.601 af

Pond 10P: Stormwater Basin Peak Elev=246.10' Storage=28,287 cf Inflow=24.74 cfs 1.736 af
Discarded=0.94 cfs 0.633 af Primary=5.58 cfs 0.974 af Secondary=0.00 cfs 0.000 af Outflow=6.52 cfs 1.608 af

Link 1L: 50-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce Inflow=13.34 cfs 1.257 af
Area= 5.540 ac 1.13% Imperv. Primary=13.34 cfs 1.257 af

Total Runoff Area = 5.461 ac Runoff Volume = 1.737 af Average Runoff Depth = 3.82"
59.37% Pervious = 3.242 ac 40.63% Impervious = 2.219 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 0.90 cfs @ 12.13 hrs, Volume= 0.068 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

Area (sf)	CN	Description
4,120	98	Paved parking, HSG B
4,450	61	>75% Grass cover, Good, HSG B
8,570	79	Weighted Average
4,450		51.93% Pervious Area
4,120		48.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	111	0.0710	0.20		**Sheet Flow, Tc-1** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 2.05 cfs @ 12.01 hrs, Volume= 0.129 af, Depth> 5.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	6,287	74	>75% Grass cover, Good, HSG B/D
*	7,033	98	Roof/pavement
	13,320	87	Weighted Average
	6,287		47.20% Pervious Area
	7,033		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Tc-2** Paved Kv= 20.3 fps

Summary for Subcatchment 3S: Drainage Area 3

Runoff = 2.57 cfs @ 12.09 hrs, Volume= 0.173 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	8,529	98	Paved parking/roof
	16,209	61	>75% Grass cover, Good, HSG B
	24,738	74	Weighted Average
	16,209		65.52% Pervious Area
	8,529		34.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	105	0.1100	0.35		**Sheet Flow, Tc-4a**
					Grass: Short n= 0.150 P2= 3.37"
0.7	160	0.0310	3.57		**Shallow Concentrated Flow, Tc-4b**
					Paved Kv= 20.3 fps
5.7	265	Total			

Summary for Subcatchment 4S: Drainage Area 4

Runoff = 8.25 cfs @ 12.04 hrs, Volume= 0.501 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	30,200	98	Paved parking & roof HSG A
	20,000	61	>75% Grass cover, Good, HSG B
	19,500	55	Woods, Good, HSG B
	69,700	75	Weighted Average
	39,500		56.67% Pervious Area
	30,200		43.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	130	0.0100	1.13		**Sheet Flow, Tc-3**
					Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 5S: Drainage Area 5

Runoff = 3.61 cfs @ 12.02 hrs, Volume= 0.221 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	13,450	98	Paved surfaces & roof
	14,147	61	>75% Grass cover, Good, HSG B
	27,597	79	Weighted Average
	14,147		51.26% Pervious Area
	13,450		48.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	180	0.0500	2.29		**Sheet Flow, Tc-5** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 6S: Drainage Area 6

Runoff = 5.67 cfs @ 12.06 hrs, Volume= 0.359 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	21,025	98	Pavement/Roofs, HSG B
	22,990	61	>75% Grass cover, Good, HSG B
	3,300	55	Woods, Good, HSG B
	47,315	77	Weighted Average
	26,290		55.56% Pervious Area
	21,025		44.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	180	0.0500	0.76		**Lag/CN Method, Tc-6**

Summary for Subcatchment 7S: Drainage Area 7

Runoff = 2.21 cfs @ 12.02 hrs, Volume= 0.150 af, Depth> 6.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	12,295	98	Roof & Pavement
*	716	74	>75% Grass cover, Good, HSG B/D
	13,011	97	Weighted Average
	716		5.50% Pervious Area
	12,295		94.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	175	0.0580	2.42		**Sheet Flow, Tc-7** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 8S: Overland to Swales

Runoff = 1.79 cfs @ 12.13 hrs, Volume= 0.136 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	33,644	58	>75% Grass cover, Good, HSG B
	33,644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	130	0.1240	0.26		**Sheet Flow, Tc-8** Grass: Dense n= 0.240 P2= 3.37"

Summary for Reach 3R: Riprap Swale

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 2.11" for 50-year event
Inflow = 1.79 cfs @ 12.13 hrs, Volume= 0.136 af
Outflow = 1.74 cfs @ 12.17 hrs, Volume= 0.135 af, Atten= 3%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.75 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 3.6 min

Peak Storage= 137 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 48.58 cfs

4.00' x 1.00' deep channel, n= 0.045
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 210.0' Slope= 0.0952 '/'
Inlet Invert= 276.00', Outlet Invert= 256.00'

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Summary for Reach 4R: Grass swale to basin

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 2.10" for 50-year event
Inflow = 1.74 cfs @ 12.17 hrs, Volume= 0.135 af
Outflow = 1.69 cfs @ 12.21 hrs, Volume= 0.135 af, Atten= 3%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.47 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 3.8 min

Peak Storage= 142 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.41 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 205.0' Slope= 0.0439 '/'
Inlet Invert= 256.00', Outlet Invert= 247.00'

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Summary for Reach 9R: Peak off Site

Inflow Area = 11.002 ac, 20.74% Impervious, Inflow Depth > 2.43" for 50-year event
Inflow = 18.90 cfs @ 12.39 hrs, Volume= 2.232 af
Outflow = 18.90 cfs @ 12.39 hrs, Volume= 2.232 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: CB_1-2

Inflow Area = 0.197 ac, 48.07% Impervious, Inflow Depth > 4.17" for 50-year event
Inflow = 0.90 cfs @ 12.13 hrs, Volume= 0.068 af
Outflow = 0.90 cfs @ 12.13 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 12.13 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.95' @ 12.13 hrs
Flood Elev= 316.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**15.0" Round Culvert** L= 128.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 298.95' S= 0.0975 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.88 cfs @ 12.13 hrs HW=311.94' (Free Discharge)
1=Culvert (Inlet Controls 0.88 cfs @ 2.26 fps)

Summary for Pond 2P: CB_3-4

Inflow Area = 0.503 ac, 50.95% Impervious, Inflow Depth > 4.70" for 50-year event
Inflow = 2.55 cfs @ 12.03 hrs, Volume= 0.197 af
Outflow = 2.55 cfs @ 12.03 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min
Primary = 2.55 cfs @ 12.03 hrs, Volume= 0.197 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 299.66' @ 12.03 hrs
Flood Elev= 303.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	298.85'	**15.0" Round Culvert** L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 298.85' / 286.60' S= 0.0934 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.49 cfs @ 12.03 hrs HW=299.64' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.49 cfs @ 3.03 fps)

Summary for Pond 3P: CB_5-6

Inflow Area = 1.070 ac, 42.21% Impervious, Inflow Depth > 4.15" for 50-year event
Inflow = 4.88 cfs @ 12.06 hrs, Volume= 0.370 af
Outflow = 4.88 cfs @ 12.06 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.0 min
Primary = 4.88 cfs @ 12.06 hrs, Volume= 0.370 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 287.80' @ 12.06 hrs
Flood Elev= 291.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**15.0" Round Culvert** L= 168.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 286.50' / 272.60' S= 0.0823 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=4.78 cfs @ 12.06 hrs HW=287.78' (Free Discharge)
↑**1=Culvert** (Inlet Controls 4.78 cfs @ 3.89 fps)

Summary for Pond 4P: CB_7-8

Inflow Area = 2.671 ac, 42.88% Impervious, Inflow Depth > 3.91" for 50-year event
Inflow = 13.02 cfs @ 12.04 hrs, Volume= 0.871 af
Outflow = 13.02 cfs @ 12.04 hrs, Volume= 0.871 af, Atten= 0%, Lag= 0.0 min
Primary = 13.02 cfs @ 12.04 hrs, Volume= 0.871 af

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

Peak Elev= 277.97' @ 12.04 hrs
Flood Elev= 277.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	272.50'	**15.0" Round Culvert** L= 128.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.50' / 263.70' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=12.75 cfs @ 12.04 hrs HW=277.78' (Free Discharge)
└─**1=Culvert** (Inlet Controls 12.75 cfs @ 10.39 fps)

Summary for Pond 5P: CB-9

Inflow Area = 3.304 ac, 44.00% Impervious, Inflow Depth > 3.97" for 50-year event
Inflow = 16.51 cfs @ 12.04 hrs, Volume= 1.092 af
Outflow = 16.51 cfs @ 12.04 hrs, Volume= 1.092 af, Atten= 0%, Lag= 0.0 min
Primary = 16.51 cfs @ 12.04 hrs, Volume= 1.092 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 272.00' @ 12.04 hrs
Flood Elev= 267.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	263.60'	**15.0" Round Culvert** L= 100.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 263.60' / 253.10' S= 0.1044 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=16.03 cfs @ 12.04 hrs HW=271.58' (Free Discharge)
└─**1=Culvert** (Inlet Controls 16.03 cfs @ 13.06 fps)

Summary for Pond 6P: CB_10-11

Inflow Area = 4.390 ac, 44.11% Impervious, Inflow Depth > 3.97" for 50-year event
Inflow = 22.02 cfs @ 12.04 hrs, Volume= 1.451 af
Outflow = 22.02 cfs @ 12.04 hrs, Volume= 1.451 af, Atten= 0%, Lag= 0.0 min
Primary = 22.02 cfs @ 12.04 hrs, Volume= 1.451 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 260.44' @ 12.04 hrs
Flood Elev= 259.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**18.0" Round Culvert** L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.00' / 245.10' S= 0.0459 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=21.66 cfs @ 12.04 hrs HW=260.23' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 21.66 cfs @ 12.26 fps)

Summary for Pond 7P: CB_12-13

Inflow Area =	4.689 ac, 47.32% Impervious,	Inflow Depth > 4.10"	for 50-year event
Inflow =	24.08 cfs @ 12.04 hrs,	Volume=	1.601 af
Outflow =	24.08 cfs @ 12.04 hrs,	Volume=	1.601 af, Atten= 0%, Lag= 0.0 min
Primary =	24.08 cfs @ 12.04 hrs,	Volume=	1.601 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 253.74' @ 12.04 hrs
Flood Elev= 249.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	245.00'	**18.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 245.00' / 244.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=23.55 cfs @ 12.04 hrs HW=253.41' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 23.55 cfs @ 13.33 fps)

Summary for Pond 10P: Stormwater Basin

Inflow Area =	5.461 ac, 40.63% Impervious,	Inflow Depth > 3.81"	for 50-year event
Inflow =	24.74 cfs @ 12.04 hrs,	Volume=	1.736 af
Outflow =	6.52 cfs @ 12.44 hrs,	Volume=	1.608 af, Atten= 74%, Lag= 24.1 min
Discarded =	0.94 cfs @ 12.44 hrs,	Volume=	0.633 af
Primary =	5.58 cfs @ 12.44 hrs,	Volume=	0.974 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= 246.10' @ 12.44 hrs Surf.Area= 9,061 sf Storage= 28,287 cf

Plug-Flow detention time= 82.4 min calculated for 1.608 af (93% of inflow)
Center-of-Mass det. time= 56.5 min (835.0 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	242.00'	46,796 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.00	4,270	0	0
244.00	7,051	11,321	11,321
246.00	8,985	16,036	27,357
248.00	10,454	19,439	46,796

Device	Routing	Invert	Outlet Devices
#1	Primary	242.50'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 242.50' / 242.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	243.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	243.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	244.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	246.50'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	247.00'	**18.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#7	Discarded	242.00'	**4.500 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.94 cfs @ 12.44 hrs HW=246.10' (Free Discharge)
└**7=Exfiltration** (Exfiltration Controls 0.94 cfs)

Primary OutFlow Max=5.58 cfs @ 12.44 hrs HW=246.10' (Free Discharge)
└**1=Culvert** (Passes 5.58 cfs of 8.91 cfs potential flow)
 ├**2=Orifice/Grate** (Orifice Controls 0.72 cfs @ 8.25 fps)
 ├**3=Orifice/Grate** (Orifice Controls 1.45 cfs @ 7.38 fps)
 ├**4=Orifice/Grate** (Orifice Controls 3.41 cfs @ 6.25 fps)
 └**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=242.00' (Free Discharge)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Wetlands Drainage

Inflow Area = 5.540 ac, 1.13% Impervious, Inflow Depth > 2.72" for 50-year event
Inflow = 13.34 cfs @ 12.39 hrs, Volume= 1.257 af
Primary = 13.34 cfs @ 12.39 hrs, Volume= 1.257 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

50-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce

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

Subcatchment 1S: Drainage Area 1 Runoff Area=8,570 sf 48.07% Impervious Runoff Depth>4.86"
Flow Length=111' Slope=0.0710 '/' Tc=9.1 min CN=79 Runoff=1.04 cfs 0.080 af

Subcatchment 2S: Drainage Area 2 Runoff Area=13,320 sf 52.80% Impervious Runoff Depth>5.77"
Flow Length=125' Slope=0.0100 '/' Tc=1.0 min CN=87 Runoff=2.33 cfs 0.147 af

Subcatchment 3S: Drainage Area 3 Runoff Area=24,738 sf 34.48% Impervious Runoff Depth>4.31"
Flow Length=265' Tc=5.7 min CN=74 Runoff=3.02 cfs 0.204 af

Subcatchment 4S: Drainage Area 4 Runoff Area=69,700 sf 43.33% Impervious Runoff Depth>4.42"
Flow Length=130' Slope=0.0100 '/' Tc=1.9 min CN=75 Runoff=9.65 cfs 0.590 af

Subcatchment 5S: Drainage Area 5 Runoff Area=27,597 sf 48.74% Impervious Runoff Depth>4.87"
Flow Length=180' Slope=0.0500 '/' Tc=1.3 min CN=79 Runoff=4.18 cfs 0.257 af

Subcatchment 6S: Drainage Area 6 Runoff Area=47,315 sf 44.44% Impervious Runoff Depth>4.64"
Flow Length=180' Slope=0.0500 '/' Tc=3.9 min CN=77 Runoff=6.60 cfs 0.420 af

Subcatchment 7S: Drainage Area 7 Runoff Area=13,011 sf 94.50% Impervious Runoff Depth>6.75"
Flow Length=175' Slope=0.0580 '/' Tc=1.2 min CN=97 Runoff=2.47 cfs 0.168 af

Subcatchment 8S: Overland to Swales Runoff Area=33,644 sf 0.00% Impervious Runoff Depth>2.62"
Flow Length=130' Slope=0.1240 '/' Tc=8.3 min CN=58 Runoff=2.26 cfs 0.168 af

Reach 3R: Riprap Swale Avg. Flow Depth=0.17' Max Vel=2.98 fps Inflow=2.26 cfs 0.168 af
n=0.045 L=210.0' S=0.0952 '/' Capacity=48.58 cfs Outflow=2.20 cfs 0.168 af

Reach 4R: Grass swale to basin Avg. Flow Depth=0.18' Max Vel=2.68 fps Inflow=2.20 cfs 0.168 af
n=0.035 L=205.0' S=0.0439 '/' Capacity=42.41 cfs Outflow=2.13 cfs 0.167 af

Reach 9R: Peak off Site Inflow=24.03 cfs 2.750 af
Outflow=24.03 cfs 2.750 af

Pond 1P: CB_1-2 Peak Elev=311.98' Inflow=1.04 cfs 0.080 af
15.0" Round Culvert n=0.012 L=128.7' S=0.0975 '/' Outflow=1.04 cfs 0.080 af

Pond 2P: CB_3-4 Peak Elev=299.72' Inflow=2.91 cfs 0.227 af
15.0" Round Culvert n=0.012 L=131.1' S=0.0934 '/' Outflow=2.91 cfs 0.227 af

Pond 3P: CB_5-6 Peak Elev=288.04' Inflow=5.66 cfs 0.431 af
15.0" Round Culvert n=0.012 L=168.9' S=0.0823 '/' Outflow=5.66 cfs 0.431 af

Pond 4P: CB_7-8 Peak Elev=279.71' Inflow=15.18 cfs 1.021 af
15.0" Round Culvert n=0.012 L=128.2' S=0.0686 '/' Outflow=15.18 cfs 1.021 af

Pond 5P: CB-9 Peak Elev=274.76' Inflow=19.22 cfs 1.278 af
15.0" Round Culvert n=0.012 L=100.6' S=0.1044 '/' Outflow=19.22 cfs 1.278 af

Pond 6P: CB_10-11 Peak Elev=262.82' Inflow=25.64 cfs 1.698 af
18.0" Round Culvert n=0.012 L=172.0' S=0.0459 '/' Outflow=25.64 cfs 1.698 af

Pond 7P: CB_12-13 Peak Elev=256.51' Inflow=27.94 cfs 1.866 af
18.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=27.94 cfs 1.866 af

Pond 10P: Stormwater Basin Peak Elev=246.63' Storage=33,197 cf Inflow=28.85 cfs 2.034 af
Discarded=0.98 cfs 0.667 af Primary=7.82 cfs 1.226 af Secondary=0.00 cfs 0.000 af Outflow=8.81 cfs 1.893 af

Link 1L: 100-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce Inflow=16.37 cfs 1.524 af
Area= 5.540 ac 1.13% Imperv. Primary=16.37 cfs 1.524 af

Total Runoff Area = 5.461 ac Runoff Volume = 2.035 af Average Runoff Depth = 4.47"
59.37% Pervious = 3.242 ac 40.63% Impervious = 2.219 ac

Summary for Subcatchment 1S: Drainage Area 1

Runoff = 1.04 cfs @ 12.13 hrs, Volume= 0.080 af, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

Area (sf)	CN	Description
4,120	98	Paved parking, HSG B
4,450	61	>75% Grass cover, Good, HSG B
8,570	79	Weighted Average
4,450		51.93% Pervious Area
4,120		48.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	111	0.0710	0.20		**Sheet Flow, Tc-1** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 2S: Drainage Area 2

Runoff = 2.33 cfs @ 12.01 hrs, Volume= 0.147 af, Depth> 5.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	6,287	74	>75% Grass cover, Good, HSG B/D
*	7,033	98	Roof/pavement
	13,320	87	Weighted Average
	6,287		47.20% Pervious Area
	7,033		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Tc-2** Paved Kv= 20.3 fps

Summary for Subcatchment 3S: Drainage Area 3

Runoff = 3.02 cfs @ 12.09 hrs, Volume= 0.204 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	8,529	98	Paved parking/roof
	16,209	61	>75% Grass cover, Good, HSG B
	24,738	74	Weighted Average
	16,209		65.52% Pervious Area
	8,529		34.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	105	0.1100	0.35		**Sheet Flow, Tc-4a** Grass: Short n= 0.150 P2= 3.37"
0.7	160	0.0310	3.57		**Shallow Concentrated Flow, Tc-4b** Paved Kv= 20.3 fps
5.7	265	Total			

Summary for Subcatchment 4S: Drainage Area 4

Runoff = 9.65 cfs @ 12.04 hrs, Volume= 0.590 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	30,200	98	Paved parking & roof HSG A
	20,000	61	>75% Grass cover, Good, HSG B
	19,500	55	Woods, Good, HSG B
	69,700	75	Weighted Average
	39,500		56.67% Pervious Area
	30,200		43.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	130	0.0100	1.13		**Sheet Flow, Tc-3** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 5S: Drainage Area 5

Runoff = 4.18 cfs @ 12.02 hrs, Volume= 0.257 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	13,450	98	Paved surfaces & roof
	14,147	61	>75% Grass cover, Good, HSG B
	27,597	79	Weighted Average
	14,147		51.26% Pervious Area
	13,450		48.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	180	0.0500	2.29		**Sheet Flow, Tc-5** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 6S: Drainage Area 6

Runoff = 6.60 cfs @ 12.06 hrs, Volume= 0.420 af, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	21,025	98	Pavement/Roofs, HSG B
	22,990	61	>75% Grass cover, Good, HSG B
	3,300	55	Woods, Good, HSG B
	47,315	77	Weighted Average
	26,290		55.56% Pervious Area
	21,025		44.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	180	0.0500	0.76		**Lag/CN Method, Tc-6**

Summary for Subcatchment 7S: Drainage Area 7

Runoff = 2.47 cfs @ 12.02 hrs, Volume= 0.168 af, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	12,295	98	Roof & Pavement
*	716	74	>75% Grass cover, Good, HSG B/D
	13,011	97	Weighted Average
	716		5.50% Pervious Area
	12,295		94.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	175	0.0580	2.42		**Sheet Flow, Tc-7** Smooth surfaces n= 0.011 P2= 3.37"

Summary for Subcatchment 8S: Overland to Swales

Runoff = 2.26 cfs @ 12.13 hrs, Volume= 0.168 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	33,644	58	>75% Grass cover, Good, HSG B
	33,644		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	130	0.1240	0.26		**Sheet Flow, Tc-8** Grass: Dense n= 0.240 P2= 3.37"

Summary for Reach 3R: Riprap Swale

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 2.62" for 100-year event
Inflow = 2.26 cfs @ 12.13 hrs, Volume= 0.168 af
Outflow = 2.20 cfs @ 12.16 hrs, Volume= 0.168 af, Atten= 3%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.98 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 3.4 min

Peak Storage= 159 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 48.58 cfs

4.00' x 1.00' deep channel, n= 0.045
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 210.0' Slope= 0.0952 '/'
Inlet Invert= 276.00', Outlet Invert= 256.00'

Summary for Reach 4R: Grass swale to basin

Inflow Area = 0.772 ac, 0.00% Impervious, Inflow Depth > 2.61" for 100-year event
Inflow = 2.20 cfs @ 12.16 hrs, Volume= 0.168 af
Outflow = 2.13 cfs @ 12.20 hrs, Volume= 0.167 af, Atten= 3%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.68 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 3.6 min

Peak Storage= 165 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.41 cfs

4.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 205.0' Slope= 0.0439 '/'
Inlet Invert= 256.00', Outlet Invert= 247.00'

Summary for Reach 9R: Peak off Site

Inflow Area = 11.002 ac, 20.74% Impervious, Inflow Depth > 3.00" for 100-year event
Inflow = 24.03 cfs @ 12.38 hrs, Volume= 2.750 af
Outflow = 24.03 cfs @ 12.38 hrs, Volume= 2.750 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: CB_1-2

Inflow Area = 0.197 ac, 48.07% Impervious, Inflow Depth > 4.86" for 100-year event
Inflow = 1.04 cfs @ 12.13 hrs, Volume= 0.080 af
Outflow = 1.04 cfs @ 12.13 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min
Primary = 1.04 cfs @ 12.13 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.98' @ 12.13 hrs
Flood Elev= 316.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**15.0" Round Culvert** L= 128.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 311.50' / 298.95' S= 0.0975 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.02 cfs @ 12.13 hrs HW=311.98' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.02 cfs @ 2.36 fps)

Summary for Pond 2P: CB_3-4

Inflow Area = 0.503 ac, 50.95% Impervious, Inflow Depth > 5.41" for 100-year event
Inflow = 2.91 cfs @ 12.03 hrs, Volume= 0.227 af
Outflow = 2.91 cfs @ 12.03 hrs, Volume= 0.227 af, Atten= 0%, Lag= 0.0 min
Primary = 2.91 cfs @ 12.03 hrs, Volume= 0.227 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 299.72' @ 12.03 hrs
Flood Elev= 303.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	298.85'	**15.0" Round Culvert** L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 298.85' / 286.60' S= 0.0934 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.85 cfs @ 12.03 hrs HW=299.71' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.85 cfs @ 3.16 fps)

Summary for Pond 3P: CB_5-6

Inflow Area = 1.070 ac, 42.21% Impervious, Inflow Depth > 4.83" for 100-year event
Inflow = 5.66 cfs @ 12.06 hrs, Volume= 0.431 af
Outflow = 5.66 cfs @ 12.06 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min
Primary = 5.66 cfs @ 12.06 hrs, Volume= 0.431 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 288.04' @ 12.06 hrs
Flood Elev= 291.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	286.50'	**15.0" Round Culvert** L= 168.9' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 286.50' / 272.60' S= 0.0823 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=5.55 cfs @ 12.06 hrs HW=288.01' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.55 cfs @ 4.52 fps)

Summary for Pond 4P: CB_7-8

Inflow Area = 2.671 ac, 42.88% Impervious, Inflow Depth > 4.59" for 100-year event
Inflow = 15.18 cfs @ 12.04 hrs, Volume= 1.021 af
Outflow = 15.18 cfs @ 12.04 hrs, Volume= 1.021 af, Atten= 0%, Lag= 0.0 min
Primary = 15.18 cfs @ 12.04 hrs, Volume= 1.021 af

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

Peak Elev= 279.71' @ 12.04 hrs
Flood Elev= 277.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	272.50'	**15.0" Round Culvert** L= 128.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.50' / 263.70' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=14.86 cfs @ 12.04 hrs HW=279.45' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.86 cfs @ 12.11 fps)

Summary for Pond 5P: CB-9

Inflow Area =	3.304 ac,	44.00% Impervious,	Inflow Depth > 4.64"	for 100-year event	
Inflow =	19.22 cfs @	12.04 hrs,	Volume=	1.278 af	
Outflow =	19.22 cfs @	12.04 hrs,	Volume=	1.278 af,	Atten= 0%, Lag= 0.0 min
Primary =	19.22 cfs @	12.04 hrs,	Volume=	1.278 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 274.76' @ 12.04 hrs
Flood Elev= 267.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	263.60'	**15.0" Round Culvert** L= 100.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 263.60' / 253.10' S= 0.1044 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=18.65 cfs @ 12.04 hrs HW=274.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 18.65 cfs @ 15.20 fps)

Summary for Pond 6P: CB_10-11

Inflow Area =	4.390 ac,	44.11% Impervious,	Inflow Depth > 4.64"	for 100-year event	
Inflow =	25.64 cfs @	12.04 hrs,	Volume=	1.698 af	
Outflow =	25.64 cfs @	12.04 hrs,	Volume=	1.698 af,	Atten= 0%, Lag= 0.0 min
Primary =	25.64 cfs @	12.04 hrs,	Volume=	1.698 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 262.82' @ 12.04 hrs
Flood Elev= 259.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	253.00'	**18.0" Round Culvert** L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 253.00' / 245.10' S= 0.0459 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=25.20 cfs @ 12.04 hrs HW=262.52' (Free Discharge)
↑**1=Culvert** (Inlet Controls 25.20 cfs @ 14.26 fps)

Summary for Pond 7P: CB_12-13

Inflow Area = 4.689 ac, 47.32% Impervious, Inflow Depth > 4.78" for 100-year event
Inflow = 27.94 cfs @ 12.04 hrs, Volume= 1.866 af
Outflow = 27.94 cfs @ 12.04 hrs, Volume= 1.866 af, Atten= 0%, Lag= 0.0 min
Primary = 27.94 cfs @ 12.04 hrs, Volume= 1.866 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 256.51' @ 12.04 hrs
Flood Elev= 249.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	245.00'	**18.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 245.00' / 244.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=27.31 cfs @ 12.04 hrs HW=256.05' (Free Discharge)
↑**1=Culvert** (Inlet Controls 27.31 cfs @ 15.45 fps)

Summary for Pond 10P: Stormwater Basin

Inflow Area = 5.461 ac, 40.63% Impervious, Inflow Depth > 4.47" for 100-year event
Inflow = 28.85 cfs @ 12.04 hrs, Volume= 2.034 af
Outflow = 8.81 cfs @ 12.40 hrs, Volume= 1.893 af, Atten= 69%, Lag= 21.7 min
Discarded = 0.98 cfs @ 12.41 hrs, Volume= 0.667 af
Primary = 7.82 cfs @ 12.40 hrs, Volume= 1.226 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= 246.63' @ 12.41 hrs Surf.Area= 9,450 sf Storage= 33,197 cf

Plug-Flow detention time= 80.1 min calculated for 1.893 af (93% of inflow)
Center-of-Mass det. time= 55.4 min (830.9 - 775.4)

Volume	Invert	Avail.Storage	Storage Description
#1	242.00'	46,796 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.00	4,270	0	0
244.00	7,051	11,321	11,321
246.00	8,985	16,036	27,357
248.00	10,454	19,439	46,796

Device	Routing	Invert	Outlet Devices
#1	Primary	242.50'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 242.50' / 242.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	243.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	243.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	244.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	246.50'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	247.00'	**18.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#7	Discarded	242.00'	**4.500 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.98 cfs @ 12.41 hrs HW=246.63' (Free Discharge)
└─**7=Exfiltration** (Exfiltration Controls 0.98 cfs)

Primary OutFlow Max=7.78 cfs @ 12.40 hrs HW=246.63' (Free Discharge)
└─**1=Culvert** (Passes 7.78 cfs of 9.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.78 cfs @ 8.96 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.61 cfs @ 8.17 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 3.91 cfs @ 7.17 fps)
  └─**5=Orifice/Grate** (Weir Controls 1.48 cfs @ 1.19 fps)

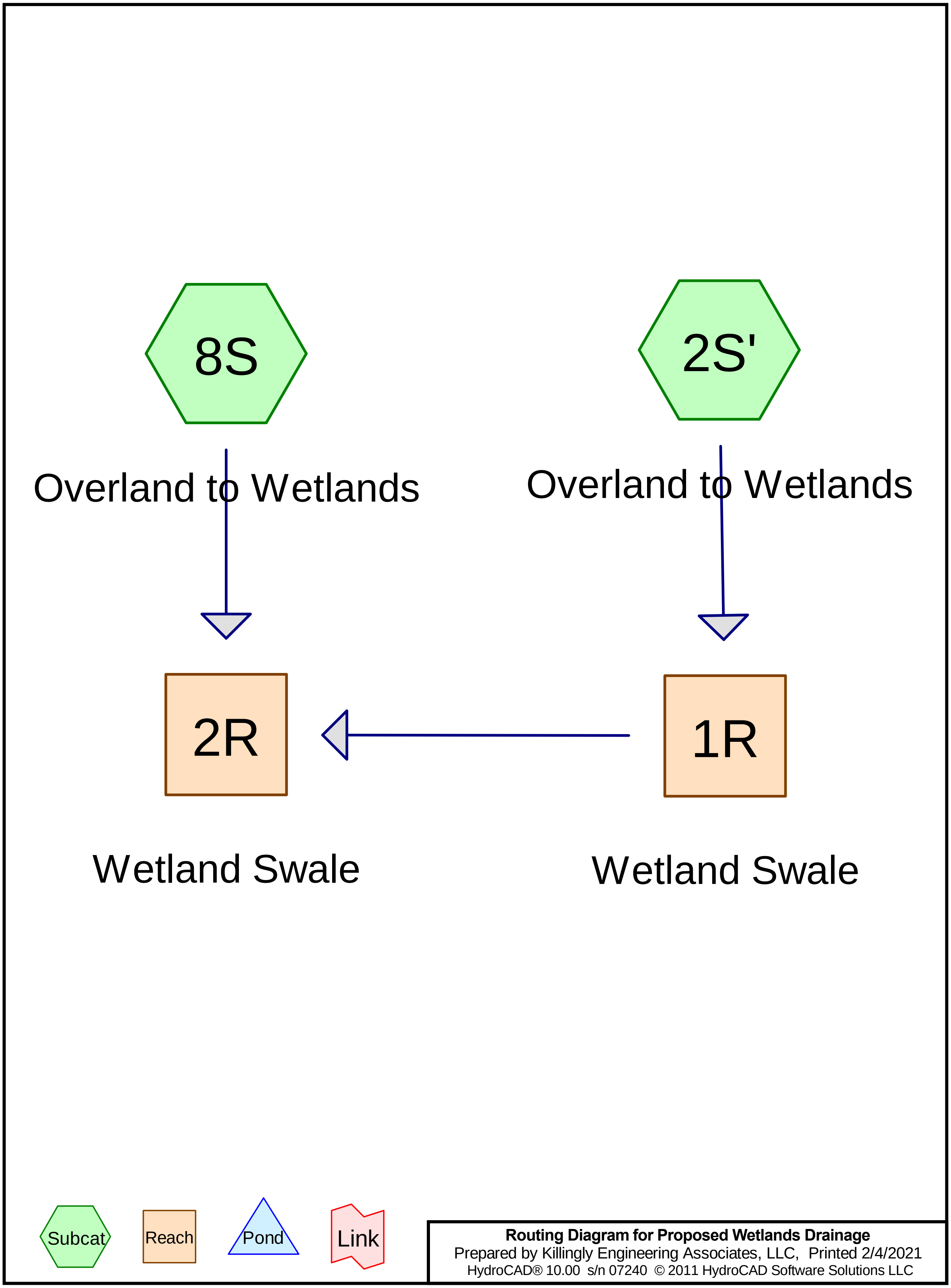
Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=242.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Wetlands Drainage

Inflow Area = 5.540 ac, 1.13% Impervious, Inflow Depth > 3.30" for 100-year event
Inflow = 16.37 cfs @ 12.37 hrs, Volume= 1.524 af
Primary = 16.37 cfs @ 12.37 hrs, Volume= 1.524 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

100-year Outflow Imported from Proposed Wetlands Drainage~Reach 2R.hce


8S
Overland to Wetlands
2S'
Overland to Wetlands
2R
Wetland Swale
1R
Wetland Swale
Subcat
Reach
Pond
Link
Routing Diagram for Proposed Wetlands Drainage
Prepared by Killingly Engineering Associates, LLC, Printed 2/4/2021
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.735	55	Woods, Good, HSG B (2S', 8S)
0.441	58	>75% Grass cover, Good, HSG B (2S')
1.423	77	Woods, Good, HSG D (8S)
0.880	77	Woods, Good, HSG D - Wetlands (2S')
0.063	98	Roofs, HSG B (2S')
5.540	**65**	**TOTAL AREA**

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

Subcatchment 2S': Overland to Wetlands Runoff Area=81,744 sf 3.33% Impervious Runoff Depth>0.70"
Flow Length=200' Slope=0.1100 '/' Tc=12.2 min CN=67 Runoff=1.18 cfs 0.109 af

Subcatchment 8S: Overland to Wetlands Runoff Area=159,593 sf 0.00% Impervious Runoff Depth>0.57"
Flow Length=152' Slope=0.1240 '/' Tc=14.1 min CN=64 Runoff=1.64 cfs 0.173 af

Reach 1R: Wetland Swale Avg. Flow Depth=0.08' Max Vel=1.21 fps Inflow=1.18 cfs 0.109 af
n=0.050 L=290.0' S=0.0759 '/' Capacity=1,056.58 cfs Outflow=1.10 cfs 0.108 af

Reach 2R: Wetland Swale Avg. Flow Depth=0.13' Max Vel=1.25 fps Inflow=2.64 cfs 0.281 af
n=0.050 L=712.0' S=0.0478 '/' Capacity=890.78 cfs Outflow=2.24 cfs 0.276 af

Total Runoff Area = 5.540 ac Runoff Volume = 0.282 af Average Runoff Depth = 0.61"
98.87% Pervious = 5.478 ac 1.13% Impervious = 0.063 ac

Summary for Subcatchment 2S': Overland to Wetlands

Runoff = 1.18 cfs @ 12.20 hrs, Volume= 0.109 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

	Area (sf)	CN	Description
*	38,320	77	Woods, Good, HSG D - Wetlands
	21,500	55	Woods, Good, HSG B
	2,724	98	Roofs, HSG B
*	19,200	58	>75% Grass cover, Good, HSG B
	81,744	67	Weighted Average
	79,020		96.67% Pervious Area
	2,724		3.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	200	0.1100	0.27		**Sheet Flow, Tc-2s** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 8S: Overland to Wetlands

Runoff = 1.64 cfs @ 12.24 hrs, Volume= 0.173 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.37"

Area (sf)	CN	Description
97,618	55	Woods, Good, HSG B
61,975	77	Woods, Good, HSG D
159,593	64	Weighted Average
159,593		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	152	0.1240	0.18		**Sheet Flow, Tc-8** Woods: Light underbrush n= 0.400 P2= 3.37"

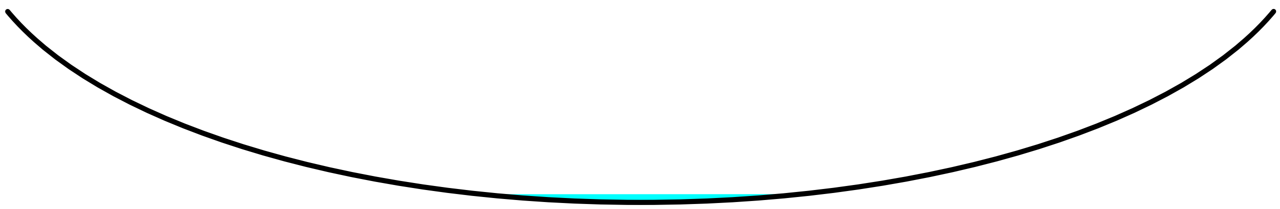
Summary for Reach 1R: Wetland Swale

Inflow Area = 1.877 ac, 3.33% Impervious, Inflow Depth > 0.70" for 2-year event
Inflow = 1.18 cfs @ 12.20 hrs, Volume= 0.109 af
Outflow = 1.10 cfs @ 12.32 hrs, Volume= 0.108 af, Atten= 7%, Lag= 7.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.21 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 7.8 min

Peak Storage= 267 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 2.00' Flow Area= 106.7 sf, Capacity= 1,056.58 cfs

80.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 290.0' Slope= 0.0759 '/'
Inlet Invert= 294.00', Outlet Invert= 272.00'



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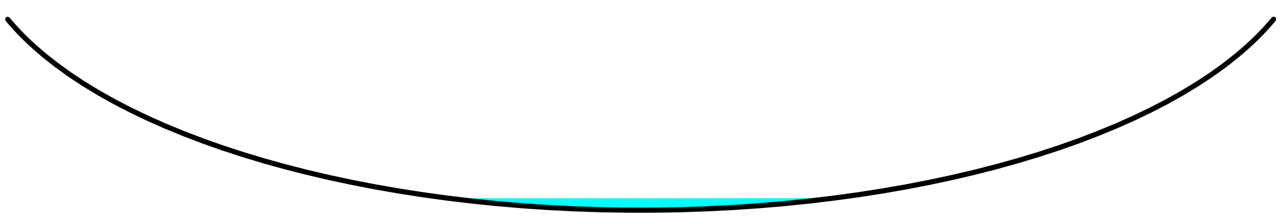
Summary for Reach 2R: Wetland Swale

Inflow Area = 5.540 ac, 1.13% Impervious, Inflow Depth > 0.61" for 2-year event
Inflow = 2.64 cfs @ 12.29 hrs, Volume= 0.281 af
Outflow = 2.24 cfs @ 12.59 hrs, Volume= 0.276 af, Atten= 15%, Lag= 18.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.25 fps, Min. Travel Time= 9.5 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 17.3 min

Peak Storage= 1,280 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 890.78 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 712.0' Slope= 0.0478 '/'
Inlet Invert= 272.00', Outlet Invert= 238.00'



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

Subcatchment 2S': Overland to Wetlands Runoff Area=81,744 sf 3.33% Impervious Runoff Depth>1.19"
Flow Length=200' Slope=0.1100 '/' Tc=12.2 min CN=67 Runoff=2.17 cfs 0.186 af

Subcatchment 8S: Overland to Wetlands Runoff Area=159,593 sf 0.00% Impervious Runoff Depth>1.02"
Flow Length=152' Slope=0.1240 '/' Tc=14.1 min CN=64 Runoff=3.33 cfs 0.310 af

Reach 1R: Wetland Swale Avg. Flow Depth=0.11' Max Vel=1.46 fps Inflow=2.17 cfs 0.186 af
n=0.050 L=290.0' S=0.0759 '/' Capacity=1,056.58 cfs Outflow=2.06 cfs 0.185 af

Reach 2R: Wetland Swale Avg. Flow Depth=0.18' Max Vel=1.56 fps Inflow=5.26 cfs 0.495 af
n=0.050 L=712.0' S=0.0478 '/' Capacity=890.78 cfs Outflow=4.58 cfs 0.488 af

Total Runoff Area = 5.540 ac Runoff Volume = 0.496 af Average Runoff Depth = 1.08"
98.87% Pervious = 5.478 ac 1.13% Impervious = 0.063 ac

Summary for Subcatchment 2S': Overland to Wetlands

Runoff = 2.17 cfs @ 12.19 hrs, Volume= 0.186 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

	Area (sf)	CN	Description
*	38,320	77	Woods, Good, HSG D - Wetlands
	21,500	55	Woods, Good, HSG B
	2,724	98	Roofs, HSG B
*	19,200	58	>75% Grass cover, Good, HSG B
	81,744	67	Weighted Average
	79,020		96.67% Pervious Area
	2,724		3.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	200	0.1100	0.27		**Sheet Flow, Tc-2s**
					Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 8S: Overland to Wetlands

Runoff = 3.33 cfs @ 12.22 hrs, Volume= 0.310 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-year Rainfall=4.27"

Area (sf)	CN	Description
97,618	55	Woods, Good, HSG B
61,975	77	Woods, Good, HSG D
159,593	64	Weighted Average
159,593		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	152	0.1240	0.18		**Sheet Flow, Tc-8**
					Woods: Light underbrush n= 0.400 P2= 3.37"

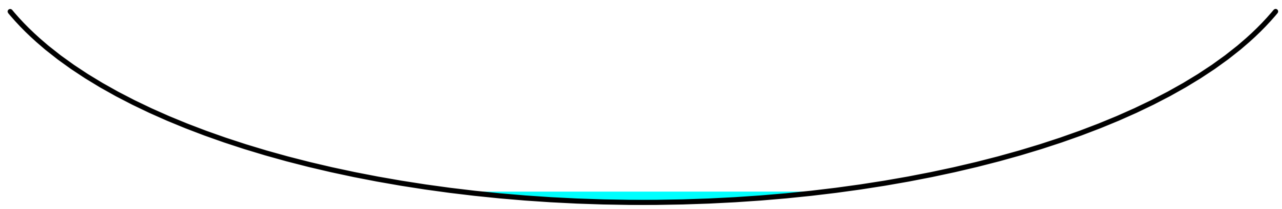
Summary for Reach 1R: Wetland Swale

Inflow Area = 1.877 ac, 3.33% Impervious, Inflow Depth > 1.19" for 5-year event
Inflow = 2.17 cfs @ 12.19 hrs, Volume= 0.186 af
Outflow = 2.06 cfs @ 12.29 hrs, Volume= 0.185 af, Atten= 5%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.46 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 6.9 min

Peak Storage= 411 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 106.7 sf, Capacity= 1,056.58 cfs

80.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 290.0' Slope= 0.0759 '/'
Inlet Invert= 294.00', Outlet Invert= 272.00'



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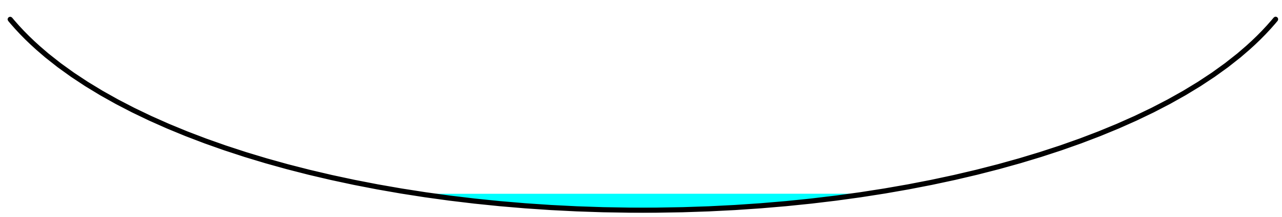
Summary for Reach 2R: Wetland Swale

Inflow Area =	5.540 ac,	1.13% Impervious,	Inflow Depth > 1.07"	for 5-year event
Inflow =	5.26 cfs @	12.25 hrs, Volume=	0.495 af	
Outflow =	4.58 cfs @	12.49 hrs, Volume=	0.488 af, Atten= 13%,	Lag= 14.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.56 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 15.5 min

Peak Storage= 2,108 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 890.78 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 712.0' Slope= 0.0478 '/'
Inlet Invert= 272.00', Outlet Invert= 238.00'



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

Subcatchment 2S': Overland to Wetlands Runoff Area=81,744 sf 3.33% Impervious Runoff Depth>1.66"
Flow Length=200' Slope=0.1100 '/' Tc=12.2 min CN=67 Runoff=3.10 cfs 0.260 af

Subcatchment 8S: Overland to Wetlands Runoff Area=159,593 sf 0.00% Impervious Runoff Depth>1.45"
Flow Length=152' Slope=0.1240 '/' Tc=14.1 min CN=64 Runoff=4.94 cfs 0.442 af

Reach 1R: Wetland Swale Avg. Flow Depth=0.13' Max Vel=1.63 fps Inflow=3.10 cfs 0.260 af
n=0.050 L=290.0' S=0.0759 '/' Capacity=1,056.58 cfs Outflow=3.01 cfs 0.258 af

Reach 2R: Wetland Swale Avg. Flow Depth=0.21' Max Vel=1.76 fps Inflow=7.75 cfs 0.700 af
n=0.050 L=712.0' S=0.0478 '/' Capacity=890.78 cfs Outflow=6.89 cfs 0.691 af

Total Runoff Area = 5.540 ac Runoff Volume = 0.701 af Average Runoff Depth = 1.52"
98.87% Pervious = 5.478 ac 1.13% Impervious = 0.063 ac

Summary for Subcatchment 2S': Overland to Wetlands

Runoff = 3.10 cfs @ 12.18 hrs, Volume= 0.260 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

	Area (sf)	CN	Description
*	38,320	77	Woods, Good, HSG D - Wetlands
	21,500	55	Woods, Good, HSG B
	2,724	98	Roofs, HSG B
*	19,200	58	>75% Grass cover, Good, HSG B
	81,744	67	Weighted Average
	79,020		96.67% Pervious Area
	2,724		3.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	200	0.1100	0.27		**Sheet Flow, Tc-2s** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 8S: Overland to Wetlands

Runoff = 4.94 cfs @ 12.21 hrs, Volume= 0.442 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.02"

Area (sf)	CN	Description
97,618	55	Woods, Good, HSG B
61,975	77	Woods, Good, HSG D
159,593	64	Weighted Average
159,593		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	152	0.1240	0.18		**Sheet Flow, Tc-8** Woods: Light underbrush n= 0.400 P2= 3.37"

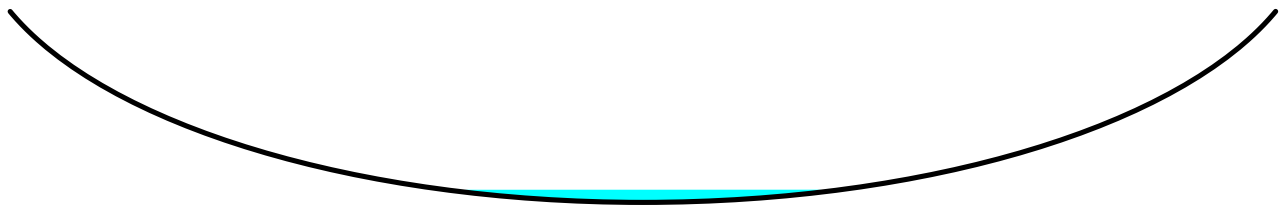
Summary for Reach 1R: Wetland Swale

Inflow Area = 1.877 ac, 3.33% Impervious, Inflow Depth > 1.66" for 10-year event
Inflow = 3.10 cfs @ 12.18 hrs, Volume= 0.260 af
Outflow = 3.01 cfs @ 12.27 hrs, Volume= 0.258 af, Atten= 3%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.63 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 6.5 min

Peak Storage= 533 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 106.7 sf, Capacity= 1,056.58 cfs

80.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 290.0' Slope= 0.0759 '/'
Inlet Invert= 294.00', Outlet Invert= 272.00'



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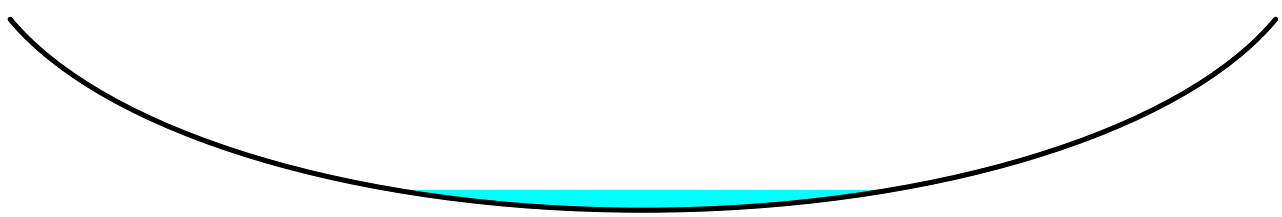
Summary for Reach 2R: Wetland Swale

Inflow Area =	5.540 ac,	1.13% Impervious,	Inflow Depth >	1.52"	for 10-year event
Inflow =	7.75 cfs @	12.24 hrs,	Volume=	0.700 af	
Outflow =	6.89 cfs @	12.44 hrs,	Volume=	0.691 af,	Atten= 11%, Lag= 12.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.76 fps, Min. Travel Time= 6.7 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 14.5 min

Peak Storage= 2,801 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 890.78 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 712.0' Slope= 0.0478 '/'
Inlet Invert= 272.00', Outlet Invert= 238.00'



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

Subcatchment 2S': Overland to Wetlands Runoff Area=81,744 sf 3.33% Impervious Runoff Depth>2.36"
Flow Length=200' Slope=0.1100 '/' Tc=12.2 min CN=67 Runoff=4.48 cfs 0.370 af

Subcatchment 8S: Overland to Wetlands Runoff Area=159,593 sf 0.00% Impervious Runoff Depth>2.10"
Flow Length=152' Slope=0.1240 '/' Tc=14.1 min CN=64 Runoff=7.37 cfs 0.642 af

Reach 1R: Wetland Swale Avg. Flow Depth=0.16' Max Vel=1.83 fps Inflow=4.48 cfs 0.370 af
n=0.050 L=290.0' S=0.0759 '/' Capacity=1,056.58 cfs Outflow=4.34 cfs 0.368 af

Reach 2R: Wetland Swale Avg. Flow Depth=0.26' Max Vel=2.01 fps Inflow=11.46 cfs 1.010 af
n=0.050 L=712.0' S=0.0478 '/' Capacity=890.78 cfs Outflow=10.47 cfs 1.000 af

Total Runoff Area = 5.540 ac Runoff Volume = 1.012 af Average Runoff Depth = 2.19"
98.87% Pervious = 5.478 ac 1.13% Impervious = 0.063 ac

Summary for Subcatchment 2S': Overland to Wetlands

Runoff = 4.48 cfs @ 12.18 hrs, Volume= 0.370 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	38,320	77	Woods, Good, HSG D - Wetlands
	21,500	55	Woods, Good, HSG B
	2,724	98	Roofs, HSG B
*	19,200	58	>75% Grass cover, Good, HSG B
	81,744	67	Weighted Average
	79,020		96.67% Pervious Area
	2,724		3.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	200	0.1100	0.27		**Sheet Flow, Tc-2s** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 8S: Overland to Wetlands

Runoff = 7.37 cfs @ 12.21 hrs, Volume= 0.642 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.05"

Area (sf)	CN	Description
97,618	55	Woods, Good, HSG B
61,975	77	Woods, Good, HSG D
159,593	64	Weighted Average
159,593		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	152	0.1240	0.18		**Sheet Flow, Tc-8** Woods: Light underbrush n= 0.400 P2= 3.37"

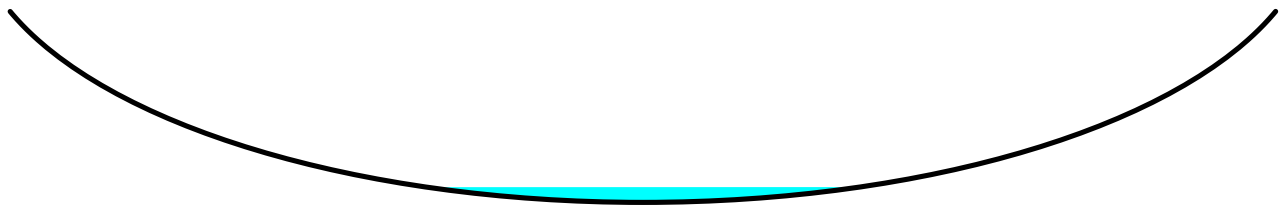
Summary for Reach 1R: Wetland Swale

Inflow Area = 1.877 ac, 3.33% Impervious, Inflow Depth > 2.36" for 25-year event
Inflow = 4.48 cfs @ 12.18 hrs, Volume= 0.370 af
Outflow = 4.34 cfs @ 12.26 hrs, Volume= 0.368 af, Atten= 3%, Lag= 5.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.83 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 6.1 min

Peak Storage= 692 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 106.7 sf, Capacity= 1,056.58 cfs

80.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 290.0' Slope= 0.0759 '/'
Inlet Invert= 294.00', Outlet Invert= 272.00'



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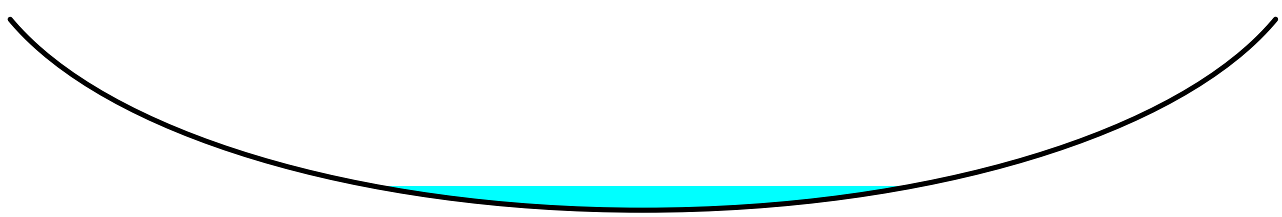
Summary for Reach 2R: Wetland Swale

Inflow Area =	5.540 ac,	1.13% Impervious, Inflow Depth > 2.19"	for 25-year event
Inflow =	11.46 cfs @	12.23 hrs, Volume=	1.010 af
Outflow =	10.47 cfs @	12.40 hrs, Volume=	1.000 af, Atten= 9%, Lag= 10.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 5.9 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 13.4 min

Peak Storage= 3,721 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 890.78 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 712.0' Slope= 0.0478 '/'
Inlet Invert= 272.00', Outlet Invert= 238.00'



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

Subcatchment 2S': Overland to Wetlands Runoff Area=81,744 sf 3.33% Impervious Runoff Depth>2.94"
Flow Length=200' Slope=0.1100 '/' Tc=12.2 min CN=67 Runoff=5.65 cfs 0.461 af

Subcatchment 8S: Overland to Wetlands Runoff Area=159,593 sf 0.00% Impervious Runoff Depth>2.65"
Flow Length=152' Slope=0.1240 '/' Tc=14.1 min CN=64 Runoff=9.39 cfs 0.810 af

Reach 1R: Wetland Swale Avg. Flow Depth=0.18' Max Vel=1.97 fps Inflow=5.65 cfs 0.461 af
n=0.050 L=290.0' S=0.0759 '/' Capacity=1,056.58 cfs Outflow=5.44 cfs 0.459 af

Reach 2R: Wetland Swale Avg. Flow Depth=0.29' Max Vel=2.16 fps Inflow=14.62 cfs 1.269 af
n=0.050 L=712.0' S=0.0478 '/' Capacity=890.78 cfs Outflow=13.34 cfs 1.257 af

Total Runoff Area = 5.540 ac Runoff Volume = 1.271 af Average Runoff Depth = 2.75"
98.87% Pervious = 5.478 ac 1.13% Impervious = 0.063 ac

Summary for Subcatchment 2S': Overland to Wetlands

Runoff = 5.65 cfs @ 12.17 hrs, Volume= 0.461 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

	Area (sf)	CN	Description
*	38,320	77	Woods, Good, HSG D - Wetlands
	21,500	55	Woods, Good, HSG B
	2,724	98	Roofs, HSG B
*	19,200	58	>75% Grass cover, Good, HSG B
	81,744	67	Weighted Average
	79,020		96.67% Pervious Area
	2,724		3.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	200	0.1100	0.27		**Sheet Flow, Tc-2s** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 8S: Overland to Wetlands

Runoff = 9.39 cfs @ 12.20 hrs, Volume= 0.810 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=6.85"

Area (sf)	CN	Description
97,618	55	Woods, Good, HSG B
61,975	77	Woods, Good, HSG D
159,593	64	Weighted Average
159,593		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	152	0.1240	0.18		**Sheet Flow, Tc-8** Woods: Light underbrush n= 0.400 P2= 3.37"

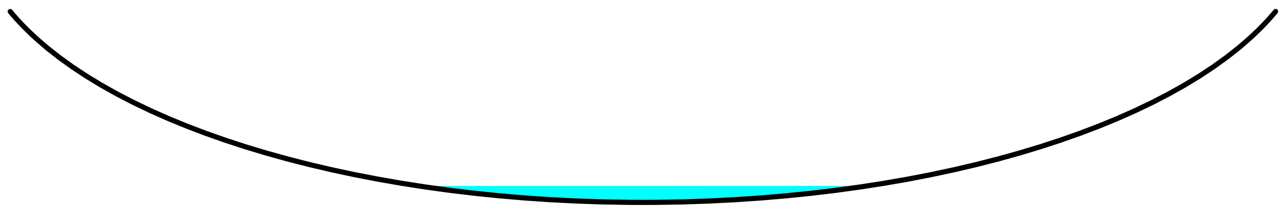
Summary for Reach 1R: Wetland Swale

Inflow Area = 1.877 ac, 3.33% Impervious, Inflow Depth > 2.94" for 50-year event
Inflow = 5.65 cfs @ 12.17 hrs, Volume= 0.461 af
Outflow = 5.44 cfs @ 12.25 hrs, Volume= 0.459 af, Atten= 4%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.97 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 5.8 min

Peak Storage= 810 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 106.7 sf, Capacity= 1,056.58 cfs

80.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 290.0' Slope= 0.0759 '/'
Inlet Invert= 294.00', Outlet Invert= 272.00'



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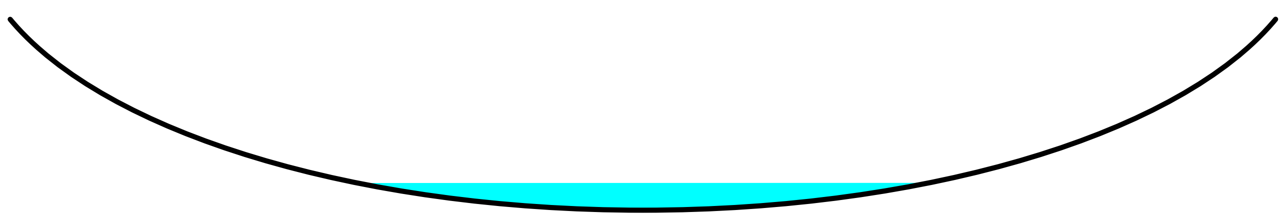
Summary for Reach 2R: Wetland Swale

Inflow Area = 5.540 ac, 1.13% Impervious, Inflow Depth > 2.75" for 50-year event
Inflow = 14.62 cfs @ 12.22 hrs, Volume= 1.269 af
Outflow = 13.34 cfs @ 12.39 hrs, Volume= 1.257 af, Atten= 9%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.16 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 12.8 min

Peak Storage= 4,416 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 890.78 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 712.0' Slope= 0.0478 '/'
Inlet Invert= 272.00', Outlet Invert= 238.00'



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

Subcatchment 2S': Overland to Wetlands Runoff Area=81,744 sf 3.33% Impervious Runoff Depth>3.54"
Flow Length=200' Slope=0.1100 '/' Tc=12.2 min CN=67 Runoff=6.81 cfs 0.554 af

Subcatchment 8S: Overland to Wetlands Runoff Area=159,593 sf 0.00% Impervious Runoff Depth>3.23"
Flow Length=152' Slope=0.1240 '/' Tc=14.1 min CN=64 Runoff=11.46 cfs 0.985 af

Reach 1R: Wetland Swale Avg. Flow Depth=0.19' Max Vel=2.09 fps Inflow=6.81 cfs 0.554 af
n=0.050 L=290.0' S=0.0759 '/' Capacity=1,056.58 cfs Outflow=6.56 cfs 0.552 af

Reach 2R: Wetland Swale Avg. Flow Depth=0.32' Max Vel=2.30 fps Inflow=17.81 cfs 1.537 af
n=0.050 L=712.0' S=0.0478 '/' Capacity=890.78 cfs Outflow=16.37 cfs 1.524 af

Total Runoff Area = 5.540 ac Runoff Volume = 1.539 af Average Runoff Depth = 3.33"
98.87% Pervious = 5.478 ac 1.13% Impervious = 0.063 ac

Summary for Subcatchment 2S': Overland to Wetlands

Runoff = 6.81 cfs @ 12.17 hrs, Volume= 0.554 af, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

	Area (sf)	CN	Description
*	38,320	77	Woods, Good, HSG D - Wetlands
	21,500	55	Woods, Good, HSG B
	2,724	98	Roofs, HSG B
*	19,200	58	>75% Grass cover, Good, HSG B
	81,744	67	Weighted Average
	79,020		96.67% Pervious Area
	2,724		3.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	200	0.1100	0.27		**Sheet Flow, Tc-2s** Grass: Dense n= 0.240 P2= 3.37"

Summary for Subcatchment 8S: Overland to Wetlands

Runoff = 11.46 cfs @ 12.20 hrs, Volume= 0.985 af, Depth> 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.64"

Area (sf)	CN	Description
97,618	55	Woods, Good, HSG B
61,975	77	Woods, Good, HSG D
159,593	64	Weighted Average
159,593		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	152	0.1240	0.18		**Sheet Flow, Tc-8** Woods: Light underbrush n= 0.400 P2= 3.37"

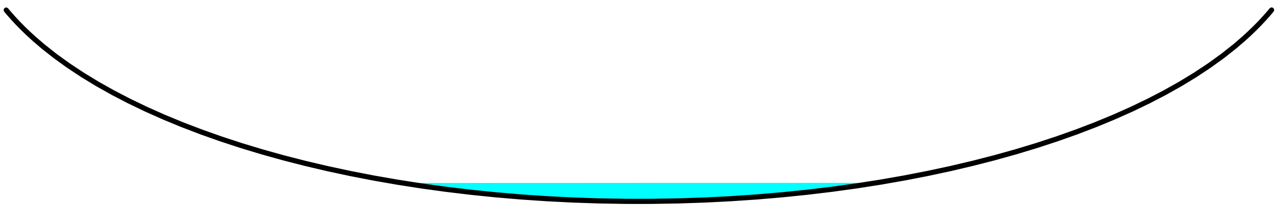
Summary for Reach 1R: Wetland Swale

Inflow Area = 1.877 ac, 3.33% Impervious, Inflow Depth > 3.54" for 100-year event
Inflow = 6.81 cfs @ 12.17 hrs, Volume= 0.554 af
Outflow = 6.56 cfs @ 12.25 hrs, Volume= 0.552 af, Atten= 4%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.09 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 5.6 min

Peak Storage= 924 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 2.00' Flow Area= 106.7 sf, Capacity= 1,056.58 cfs

80.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 290.0' Slope= 0.0759 '/'
Inlet Invert= 294.00', Outlet Invert= 272.00'



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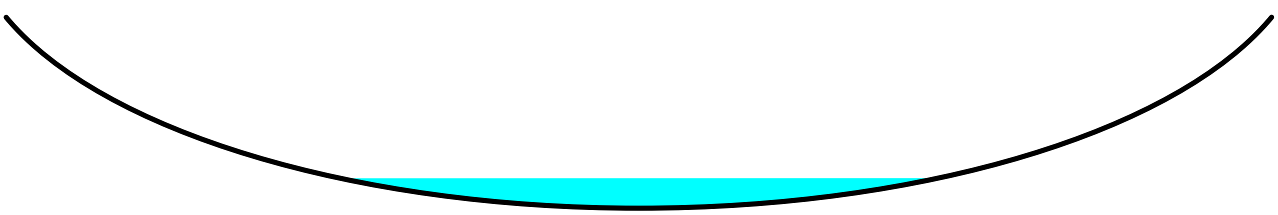
Summary for Reach 2R: Wetland Swale

Inflow Area =	5.540 ac, 1.13% Impervious, Inflow Depth > 3.33"	for 100-year event	
Inflow =	17.81 cfs @ 12.22 hrs, Volume=	1.537 af	
Outflow =	16.37 cfs @ 12.37 hrs, Volume=	1.524 af, Atten= 8%, Lag= 9.1 min	

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.30 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 12.3 min

Peak Storage= 5,084 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 2.00' Flow Area= 113.3 sf, Capacity= 890.78 cfs

85.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 712.0' Slope= 0.0478 '/'
Inlet Invert= 272.00', Outlet Invert= 238.00'



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SUPPORTING DOCUMENTATION

NOAA Point Precipitation Estimates
Web Soil Survey

NOAA Atlas 14, Volume 10, Version 3
Location name: Brooklyn, Connecticut, USA*
Latitude: 41.7827°, Longitude: -71.9363°
Elevation: 329.49 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.337 (0.256-0.442)	0.400 (0.304-0.525)	0.503 (0.381-0.662)	0.587 (0.443-0.777)	0.704 (0.515-0.965)	0.793 (0.569-1.11)	0.884 (0.618-1.27)	0.982 (0.658-1.45)	1.12 (0.723-1.70)	1.23 (0.775-1.89)
10-min	0.477 (0.363-0.626)	0.566 (0.430-0.743)	0.711 (0.539-0.937)	0.831 (0.627-1.10)	0.997 (0.730-1.37)	1.12 (0.807-1.57)	1.25 (0.876-1.80)	1.39 (0.932-2.05)	1.58 (1.02-2.40)	1.74 (1.10-2.68)
15-min	0.562 (0.427-0.737)	0.666 (0.506-0.875)	0.836 (0.634-1.10)	0.978 (0.738-1.30)	1.17 (0.859-1.61)	1.32 (0.949-1.84)	1.47 (1.03-2.12)	1.64 (1.10-2.41)	1.86 (1.21-2.83)	2.04 (1.29-3.15)
30-min	0.775 (0.590-1.02)	0.919 (0.699-1.21)	1.16 (0.875-1.52)	1.35 (1.02-1.79)	1.62 (1.19-2.22)	1.82 (1.31-2.54)	2.03 (1.42-2.92)	2.26 (1.51-3.33)	2.57 (1.66-3.90)	2.82 (1.78-4.35)
60-min	0.988 (0.752-1.30)	1.17 (0.891-1.54)	1.47 (1.12-1.94)	1.72 (1.30-2.28)	2.07 (1.51-2.83)	2.33 (1.67-3.25)	2.59 (1.81-3.73)	2.88 (1.93-4.24)	3.28 (2.12-4.97)	3.59 (2.28-5.55)
2-hr	1.26 (0.966-1.65)	1.50 (1.15-1.96)	1.89 (1.44-2.47)	2.21 (1.67-2.91)	2.65 (1.95-3.62)	2.98 (2.15-4.15)	3.32 (2.35-4.78)	3.72 (2.49-5.44)	4.28 (2.78-6.45)	4.74 (3.01-7.28)
3-hr	1.46 (1.12-1.90)	1.73 (1.33-2.26)	2.18 (1.66-2.85)	2.55 (1.93-3.35)	3.06 (2.26-4.17)	3.44 (2.50-4.78)	3.84 (2.72-5.52)	4.31 (2.90-6.28)	4.99 (3.24-7.49)	5.55 (3.53-8.49)
6-hr	1.87 (1.44-2.42)	2.22 (1.70-2.88)	2.79 (2.13-3.63)	3.26 (2.49-4.26)	3.91 (2.90-5.32)	4.40 (3.21-6.10)	4.92 (3.51-7.05)	5.53 (3.73-8.02)	6.43 (4.19-9.60)	7.19 (4.58-10.9)
12-hr	2.36 (1.82-3.05)	2.81 (2.17-3.63)	3.53 (2.72-4.58)	4.14 (3.17-5.39)	4.97 (3.70-6.72)	5.59 (4.09-7.71)	6.25 (4.47-8.91)	7.03 (4.76-10.1)	8.17 (5.34-12.1)	9.14 (5.85-13.8)
24-hr	2.82 (2.19-3.62)	3.37 (2.61-4.34)	4.28 (3.30-5.52)	5.03 (3.87-6.52)	6.06 (4.54-8.16)	6.84 (5.03-9.38)	7.66 (5.50-10.9)	8.62 (5.86-12.4)	10.1 (6.59-14.8)	11.3 (7.22-16.9)
2-day	3.17 (2.47-4.06)	3.84 (2.99-4.92)	4.92 (3.82-6.33)	5.83 (4.50-7.52)	7.07 (5.31-9.48)	7.99 (5.90-10.9)	8.98 (6.48-12.7)	10.2 (6.92-14.5)	11.9 (7.83-17.4)	13.4 (8.62-19.9)
3-day	3.44 (2.68-4.39)	4.16 (3.25-5.32)	5.35 (4.16-6.85)	6.33 (4.90-8.14)	7.68 (5.79-10.3)	8.69 (6.44-11.8)	9.77 (7.08-13.8)	11.1 (7.55-15.7)	13.0 (8.58-19.0)	14.7 (9.48-21.8)
4-day	3.67 (2.88-4.68)	4.45 (3.47-5.67)	5.71 (4.45-7.30)	6.75 (5.23-8.67)	8.19 (6.18-10.9)	9.25 (6.87-12.6)	10.4 (7.56-14.7)	11.8 (8.06-16.7)	13.9 (9.17-20.2)	15.7 (10.1-23.2)
7-day	4.34	5.21	6.63	7.81	9.43	10.6	11.9	13.5	15.9	18.0

	(3.41-5.52)	(4.09-6.62)	(5.19-8.45)	(6.08-9.99)	(7.15-12.5)	(7.92-14.4)	(8.70-16.7)	(9.26-19.0)	(10.5-23.0)	(11.6-26.4)
10-day	**5.02** (3.95-6.36)	**5.95** (4.68-7.54)	**7.46** (5.84-9.48)	**8.71** (6.79-11.1)	**10.4** (7.92-13.8)	**11.7** (8.74-15.8)	**13.1** (9.54-18.3)	**14.7** (10.1-20.7)	**17.2** (11.4-24.8)	**19.3** (12.5-28.3)
20-day	**7.17** (5.67-9.05)	**8.16** (6.45-10.3)	**9.78** (7.70-12.4)	**11.1** (8.71-14.1)	**13.0** (9.85-17.0)	**14.4** (10.7-19.1)	**15.8** (11.4-21.6)	**17.4** (12.0-24.2)	**19.6** (13.0-28.0)	**21.3** (13.9-31.0)
30-day	**8.99** (7.12-11.3)	**10.0** (7.92-12.6)	**11.7** (9.20-14.7)	**13.0** (10.2-16.5)	**14.9** (11.3-19.4)	**16.4** (12.2-21.6)	**17.8** (12.8-24.1)	**19.3** (13.4-26.8)	**21.2** (14.2-30.2)	**22.6** (14.7-32.8)
45-day	**11.2** (8.93-14.1)	**12.3** (9.74-15.4)	**14.0** (11.1-17.6)	**15.4** (12.1-19.5)	**17.3** (13.2-22.4)	**18.9** (14.0-24.7)	**20.3** (14.6-27.1)	**21.7** (15.1-29.9)	**23.3** (15.6-33.0)	**24.3** (15.9-35.1)
60-day	**13.1** (10.4-16.4)	**14.2** (11.3-17.8)	**15.9** (12.6-20.0)	**17.4** (13.7-21.9)	**19.4** (14.7-24.9)	**21.0** (15.6-27.3)	**22.4** (16.1-29.8)	**23.7** (16.5-32.6)	**25.1** (16.9-35.5)	**26.0** (17.0-37.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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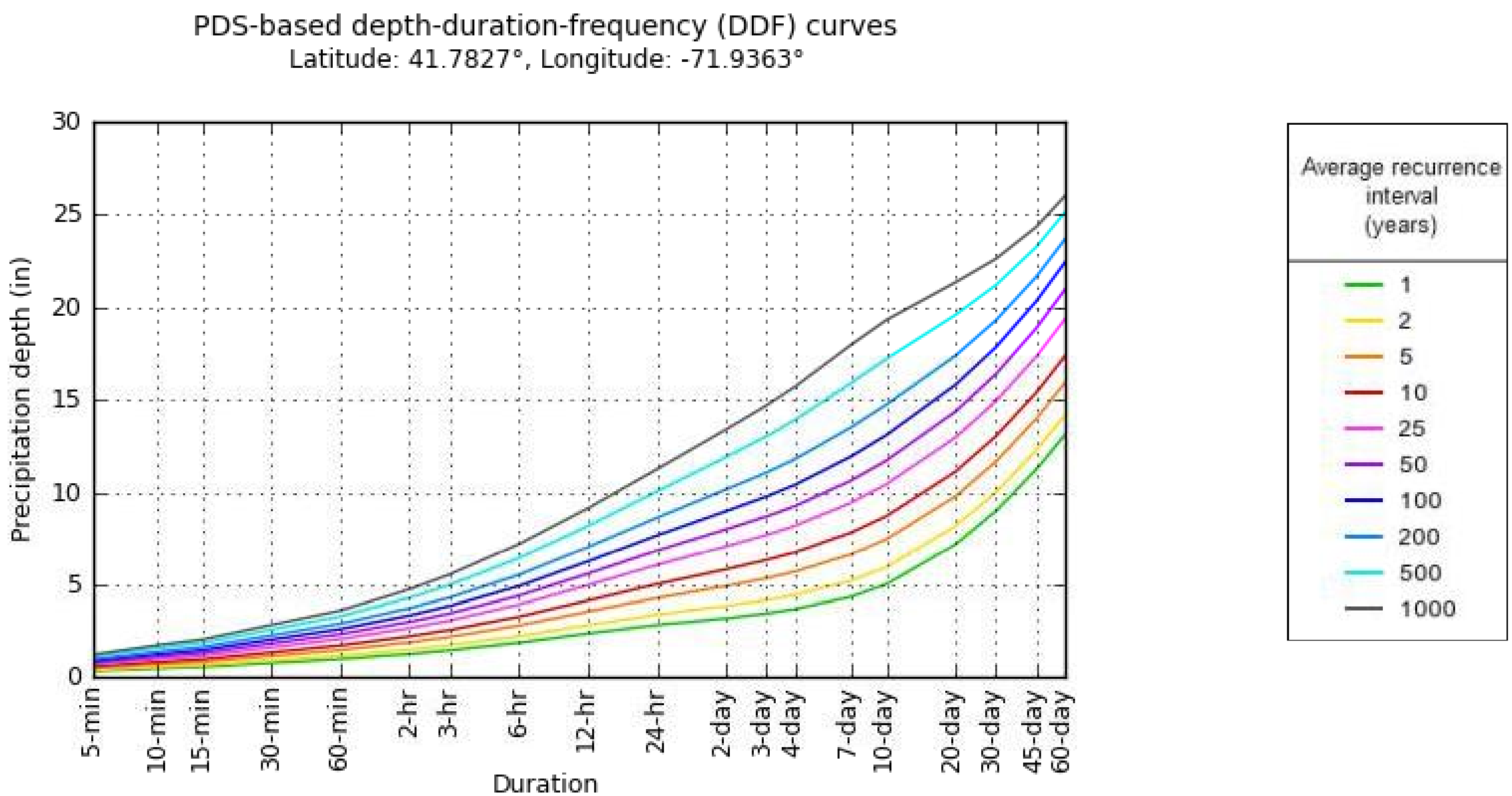
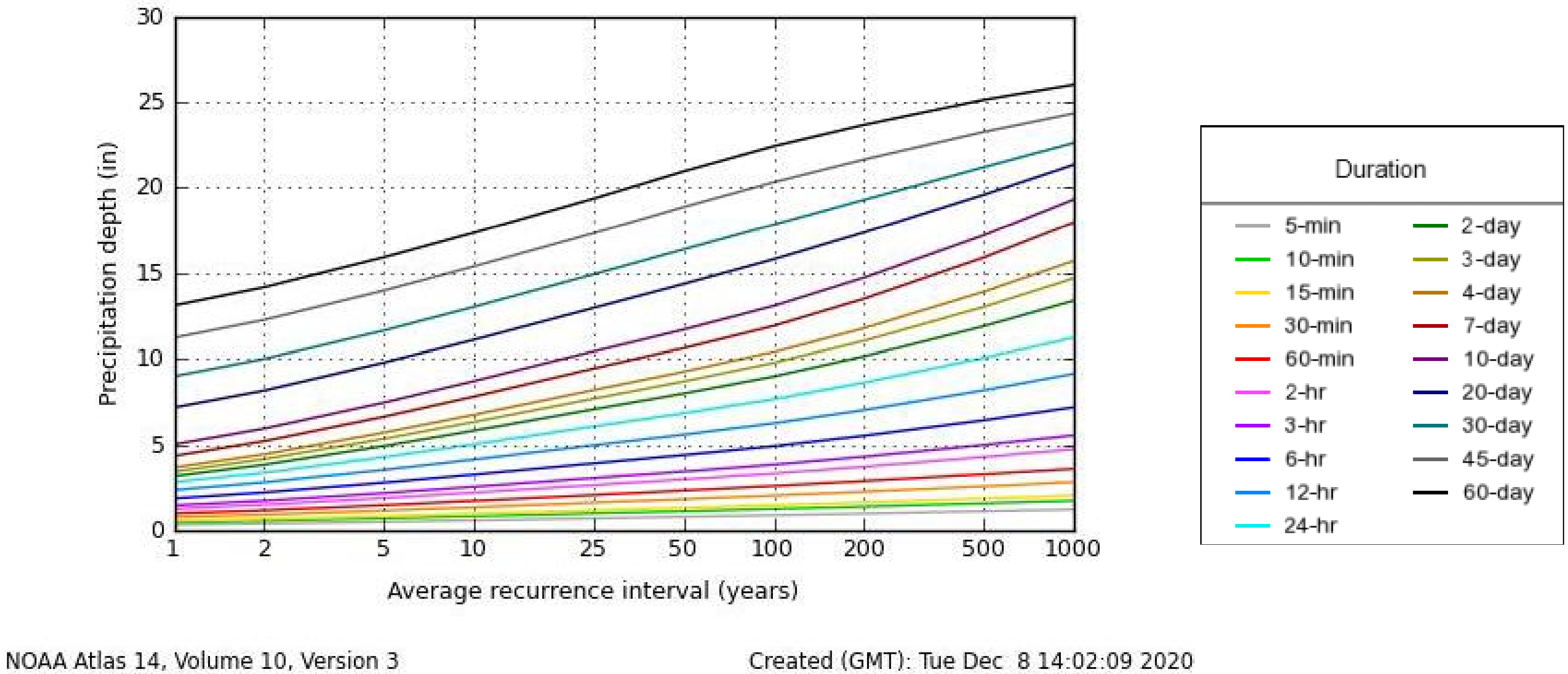
PF graphical





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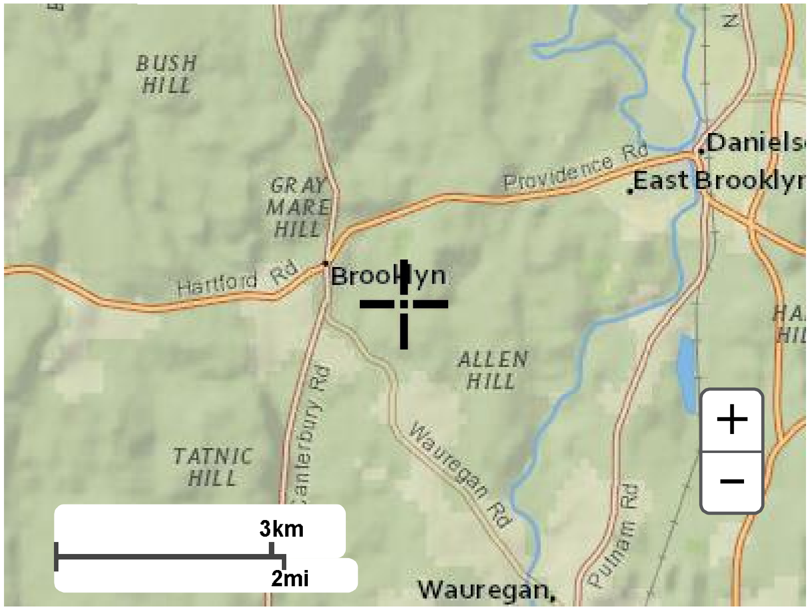
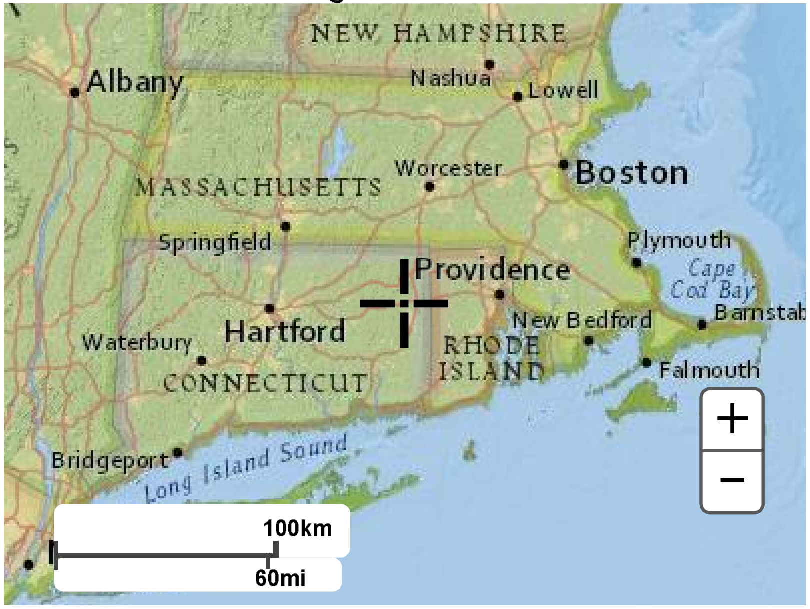
Maps & aerials

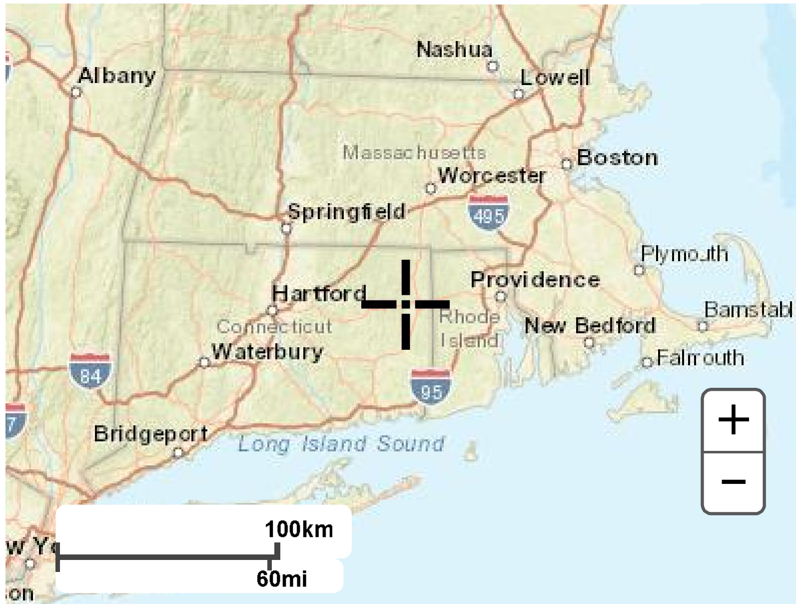
Small scale terrain



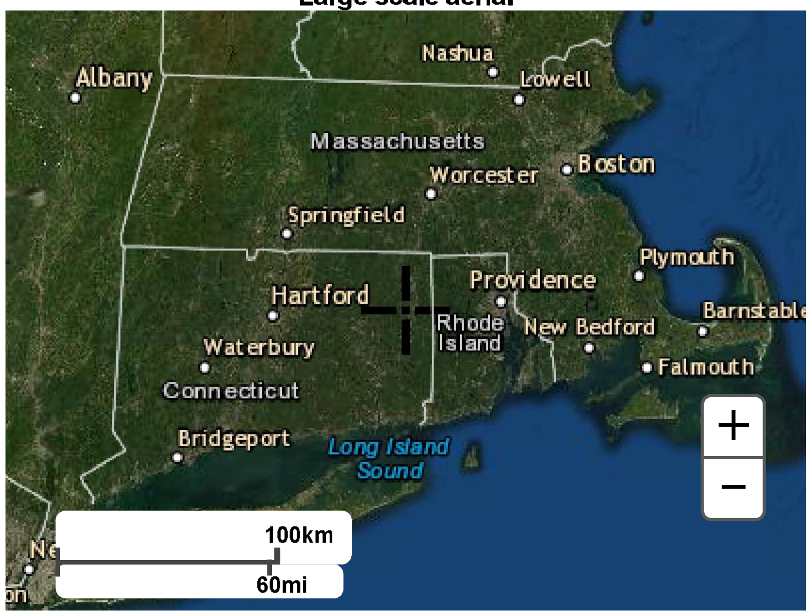
Large scale terrain



Large scale map



Large scale aerial



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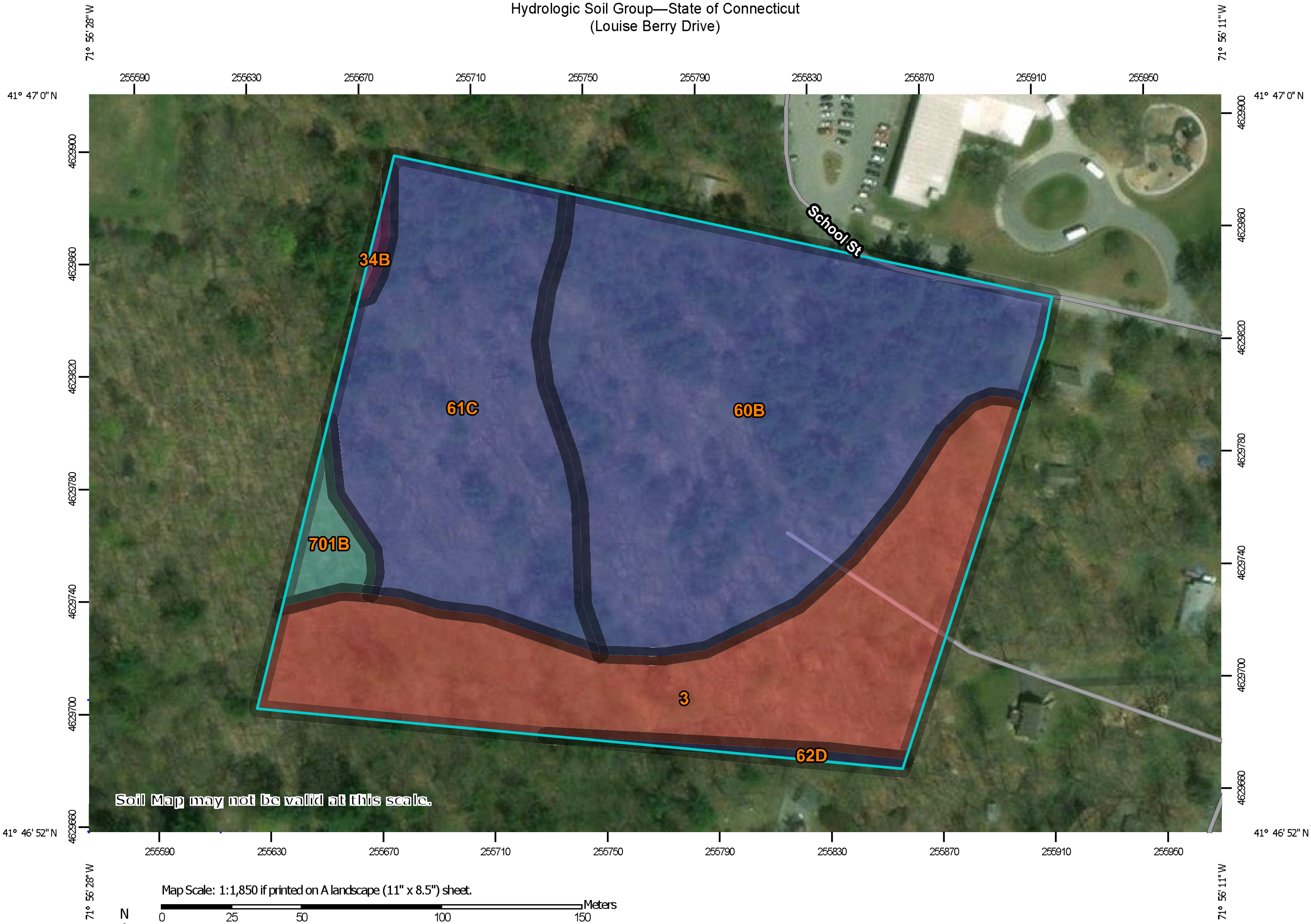
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer



Map Scale: 1:1,850 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 25, 50, 100, 150

Feet: 0, 50, 100, 200, 300

N

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Apr 14, 2011—Aug 27, 2016

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	3.1	27.8%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	0.0	0.4%
60B	Canton and Charlton fine sandy loams, 3 to 8 percent slopes	B	4.7	42.9%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	2.9	26.0%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	B	0.1	0.7%
701B	Ninigret fine sandy loam, 3 to 8 percent slopes	C	0.2	2.2%
Totals for Area of Interest			**11.0**	**100.0%**

Description

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

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

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

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

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

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

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

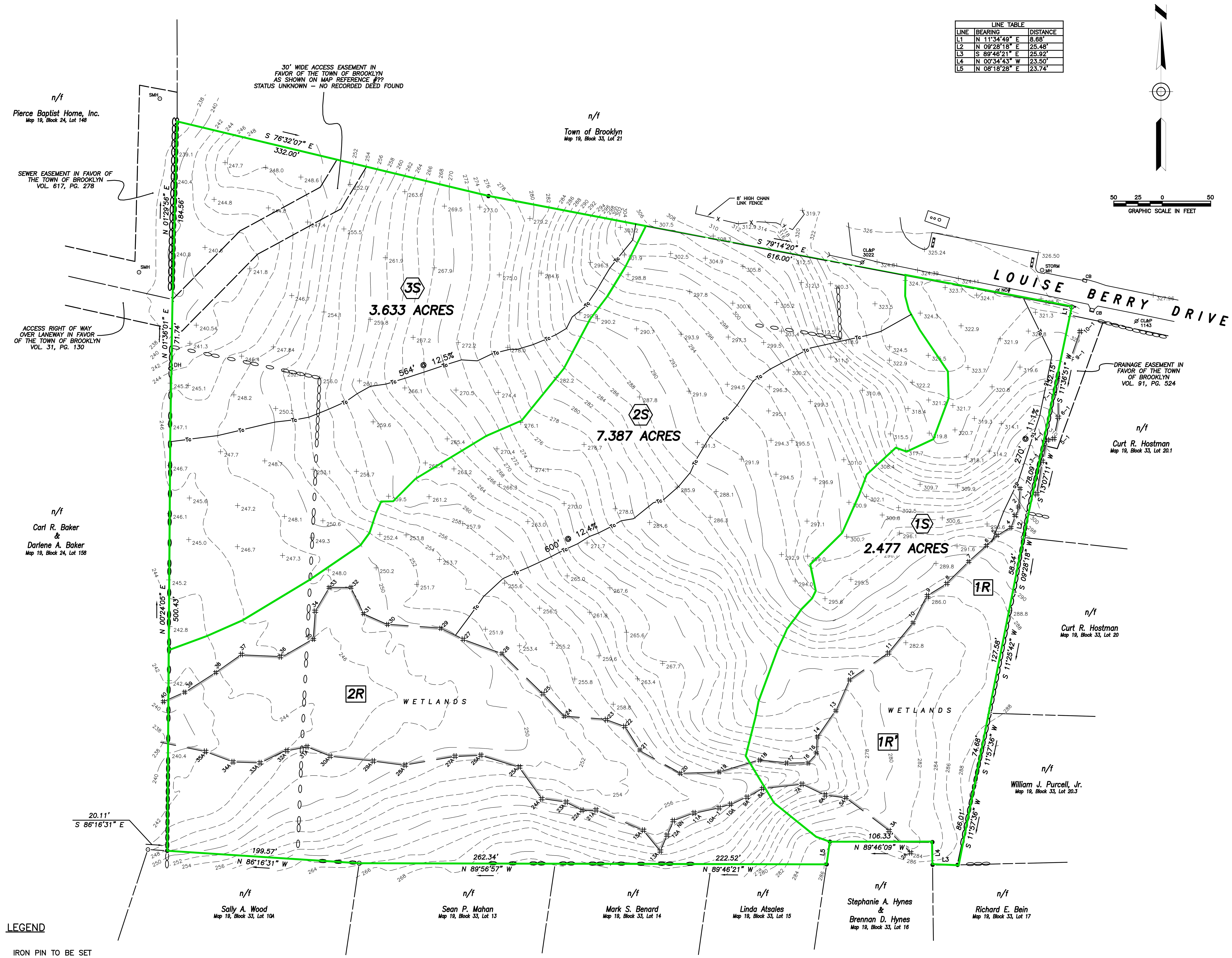
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

DRAINAGE AREA PLANS



LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 11°34'49" E	8.68'
L2	N 09°28'18" E	25.48'
L3	S 89°46'21" E	25.92'
L4	N 00°34'43" W	23.50'
L5	N 08°18'28" E	23.74'

LEGEND

IRON PIN TO BE SET
IRON PIN FOUND
DRILL HOLE FOUND
UTILITY POLE
CATCH BASIN
SANITARY MANHOLE
EXISTING CONTOURS
INLAND WETLANDS FLAG
STONE WALL
STONE WALL REMAINS

K:\20014\Drawings\E-DRAINAGE.dwg Dec 08, 2020 – 9:25 AM

DATE	DESCRIPTION
08/24/2020	PER TOWN REVIEW

REVISIONS

EXISTING DRAINAGE AREAS

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: NET
SCALE: 1" = 50'	DESIGN: NET
SHEET: 1 OF 2	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

DATE	DESCRIPTION
REVISIONS	

PROPOSED DRAINAGE AREAS

PREPARED FOR

SHANE POLLOCK

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NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 40'	DESIGN: NET
SHEET: 5 OF 9	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

July 13, 2021

Mr. Shane Pollock
101 Mackin Drive
Griswold, CT 06351

RE: Proposed Residential Development
Louise Berry Drive
Brooklyn, Connecticut
Our File # 21154

Dear Mr. Pollock:

Pursuant to your request our office has prepared this report to document our findings related to the potential traffic impact of a proposed 51-unit residential development located on Louise Berry Drive in the Town of Brooklyn, Connecticut. The site location is presented in Figure 1 with respect to the surrounding roadway network. This report presents our findings.

Site Plan

The site plan, prepared by Killingly Engineering Associates and dated April 23, 2020, shows 51 residential units with a total of 116 parking spaces. Access to the site is proposed from Louise Berry Drive at a point approximately 550 feet west of Gorman Road. The site access drive extends south into the site and then turns to the west extending a distance of approximately 900 feet, terminating in a cul-de-sac.

Description of Area

The site proposed for development is located on Louise Berry Drive. Louise Berry Drive is a local roadway that originates at an unsignalized intersection with Gorman Road and extends in a westerly direction approximately 600 feet, where it terminates in a parking lot for the Louise Berry elementary School. The roadway provides 22 feet of pavement with a single travel lane in each direction. The Louise Berry Drive approach to Gorman Road operates under stop-sign control.

Gorman Road is a local roadway that originates at a T-intersection with Prince Hill Road and extends in a southerly direction past Louise Berry Drive and then continuing to its terminus at an unsignalized intersection with Route 205 and Baily Woods Road. The west approach of Prince Hill Road operates under stop-sign control. Gorman Road typically provides approximately 24 feet of pavement with a single travel lane in each direction separated by a double yellow centerline. The posted speed limit is 25 miles per hour. Land use in the area is primarily residential. The Town of Brooklyn Elementary and Middle Schools are located on the roadway.

Current Traffic Volumes

The Connecticut DOT maintains a traffic volume count program on all state highways and some local roadways. Included within the DOT database is a count conducted on Gorman Road located south of Prince Hill Road. The count was conducted during September 2019 and indicates Gorman Road carries an average daily traffic volume (ADT) of 2,000 vehicles with peak hour volumes of 346 vehicles during the a.m. peak hour (8:00 a.m.) and 309 vehicles during the p.m. peak hour (3:00 p.m.). The ConnDOT counts are presented in Table 1.

A Manual turning movement count was conducted during the morning peak hours at the intersection of Gorman Drive and Louise Berry Drive. The count was conducted on June 7, 2021. Due to a heat wave, the Brooklyn Schools were releasing students early on June 7th, 8th, and 9th and the last day of school was scheduled to be June 10th. Therefore, afternoon counts were not conducted as the data would not have been representative of normal operating conditions. We therefore have estimated the afternoon peak hour traffic volumes based on the observed volumes during the morning peak hour and based on the ITE *Trip Generation* Report.

In addition to the ConnDOT counts described above, our office has reviewed the files of OSTA and the Town of Brooklyn to determine if there have been any recent approvals or submissions that may have an impact on traffic volumes in the vicinity. It is our understanding that there are no such developments. Figure 2 presents the background traffic volumes for the morning, mid-day and afternoon peak hours for the immediate area.

Site Generated Traffic

The proposal is to consist of a total of 51 residential units. In order to determine the trip generation for the proposed site, the Institute of Transportation Engineers (ITE) *Trip Generation* Report was consulted. *Trip Generation* presents trip generation estimates for many land uses based on counts conducted at existing facilities throughout the country. Included within the ITE database are several land uses that could be applicable to the proposed development. The most applicable land use that was used for analysis and that yields the highest trips generated is Land Use Code (LUC): 210 – Single Family Detached Housing. The report presents data based on the number of units. Trip generation was run for 51 units. The results are presented in Table 2. The proposed 51-unit development would have a trip generation potential of 560 trips on a daily basis with a morning peak hour volume of 44 trips, made up of 11 entering and 33 exiting movements.

Table 2 also presents the trip generation observed for the existing elementary school for the morning peak hour. This volume is the exiting volume on Louise Berry Drive only, and those staff and/or parents that entered from Louise Berry Drive. The Table also presents the Trip generation for a 90,000 s.f. elementary school based on the ITE Trip generation report. Figure 2, described above, includes the observed volumes for the morning peak hour, and the ITE volumes for the school and p.m. peak hour volumes.

The site generated traffic was then applied to the existing roadway network with a directional distribution of 70% oriented to and from the north along Gorman Road and 30% oriented to and from the south along Gorman Road. 100% of the site generated traffic will enter the site from a left-hand turn off of Louise Berry Drive, and 100% will exit the site drive via right-hand turn. The directional distribution is presented in Figure 4. Based on the directional distribution, the site generated traffic volumes for the morning peak hour are presented in Figure 5. By adding these volumes to the 2023 background traffic volumes from Figure 3, the combined traffic volumes, upon completion of the development, can be represented. The volumes present the 2023 combined traffic volumes as presented in Figure 6.

Intersection Capacity

In order to determine the impact of the site generated traffic on the existing roadway network, capacity analyses were conducted for the background and combined traffic volume conditions for the morning, mid-day and afternoon peak hours. The computer program *SYNCHRO,* which is based on the methodology in the Highway Capacity Manual, was utilized for this purpose. The general method determines how much of the capacity available for each movement is being utilized. This is converted into a delay for each movement, and the delay is rated on a level of service (LOS) scale from A to F, with A being the best level of service with low delays and F being the poorest level of service with high delays. An analysis was completed for the unsignalized intersections of Gorman Road at Louise Berry Drive and for the proposed site driveway at Louise Berry Drive. The level of service results are summarized in Table 3.

Gorman Road at Louise Berry Drive/Private - This is an existing un-signalized intersection with Gorman Road oriented in the north/south direction, Louise Berry Drive approaches from the west, and a private drive approaches from the east. Each approach provides a single lane. Louise Berry Drive and the private drive operate under stop-sign control. The analysis indicates that the northbound and southbound approaches operate at a LOS A during all peak hours under the background traffic volume conditions. The eastbound and westbound approaches operate at a LOS B, during the morning and afternoon peak hours, while the eastbound approach operates at a LOS C and the westbound approach operates at a LOS B during the afternoon school peak hour under the background conditions. With the introduction of the site generated traffic all approaches will continue to operate at the same levels of service as under the background conditions, except for the eastbound approach during the afternoon school peak hour, which will operate at a LOS D. A peak hour factor of 0.25 was used for the Louise Berry Drive approach based on observations made during the morning peak hour count. This indicates that most traffic on that approach occurred during a single 15 - minute period. The calculated LOS describes that peak 15 - minute period. The Intersection LOS during the remaining 45 minutes would be likely be a LOS A for all approaches.

Louise Berry Drive at Site Driveway - This is a proposed un-signalized "T" intersection with Louise Berry Drive oriented in the east/west direction. The proposed site driveway approaches from the south. All approaches provide a single lane approach. The proposed site driveway will operate under stop sign control. An analysis indicates that all approaches will operate at a LOS A during peak hours under the combined traffic conditions except for the site driveway approach, which will operate at a LOS B during the afternoon school peak hour. Again, this condition would last for only 15 minutes, with the remaining 45 minutes operating at a LOS A.

Site Driveway Location and Design

The proposed site driveway is located on Louise Berry Drive, approximately 550 feet west of Gorman Road. The proposed driveway will provide 24 feet of pavement with a single 12 foot lane for both entering and exiting traffic. The driveway approach will operate under stop sign control. We recommend a 12" white stop bar and stop sign be installed on the site driveway. The available intersection sight distance, with some clearing of vegetation across the subject parcel, extends to the intersection of Gorman Road looking to the right and to the end of the roadway looking to the left. The available sight distance meets the current ConnDOT criteria for an approach speed more than 45 miles per hour. Loise Berry Drive is assumed to posted at 25 mph.

The site driveway is located opposite from an existing 12 space parking area for the Louse Berry Elementary School. The spaces are used by staff during school hours.

School Operations

Observations of the school traffic patterns were made during the morning peak hour count. Louise Berry Drive is used by staff and some parents for both entering and exiting traffic. Staff begin arriving at about 8:15 A.M. A significant proportion of parents enter the school grounds from one of the schools northerly driveways from Gorman Road. These parents proceed behind the school and queue along the east side of the parking lot, behind the school. Parents begin to line up starting at about 9:00. Students are not allowed to exit their vehicles until 9:15 A.M. and the drop off period is completed by 9:30 A.M. Once a student has been dropped off, the parent exits the parking lot to Louise Berry Drive and then to Gorman Road. School buses do not use Louise Berry Drive. Although we did not review operations during the afternoon school peak period, we assume that the operation works in the same manner.

Since most people begin work by 9:00 a.m. and work until 4:00 P.M., at a minimum, and the peak period of school activity on Louise Berry Drive does not begin until 9:15 A.M. and likely ends by 4:00 P.M., the peak hours of the proposed residential development should not occur during the peak periods of the elementary school.

Accident Experience

The University of Connecticut gathers and compiles traffic accident data for all state highways and some major local roadways. A list of accidents occurring in the area from January 1st, 2018 through June 15th, 2021 includes the most recent 3 years of available data. In the appendix are the UConn tables relating the accidents to various conditions including date, time, roadway and weather conditions, collision types, and other variables as well as a short description of each accident.

Accident records were obtained for the entirety of Gorman Road. In total six (6) accidents occurred in the defined area over the past 3 years. Of those accidents, four (4) were not applicable for a manner of crash but involved a fix object, one (1) was an angled crash, and one (1) was a front to rear crash. Five (5) of the crashes involved property damage only, and one (1) crash involved possible injuries. There were no reported fatalities.

Conclusion

Based on the available traffic volume data, the projected site generated traffic volumes and the analysis as outlined in this report, it is our professional opinion that the traffic volumes associated with the proposed 51-unit residential development can readily be accommodated by the existing roadway network. The proposed site driveway is properly located with respect to adjacent intersections and with respect to available sight distances and are properly designed to accommodate the anticipated driveway volumes. It is our opinion that the proposed development will not result in a detrimental impact to the health, safety and welfare of the general public.

We appreciate the opportunity to provide this analysis to you. We will be available to offer testimony in support of your application before local planning agencies upon your request. If you require additional information regarding this application, please do not hesitate to contact our office.

Very truly yours,
F. A. Hesketh & Associates, Inc.

Scott F. Hesketh, P.E.
Manager of Transportation Engineering

cc: Mr. Norm Thibault, Killingly Engineering

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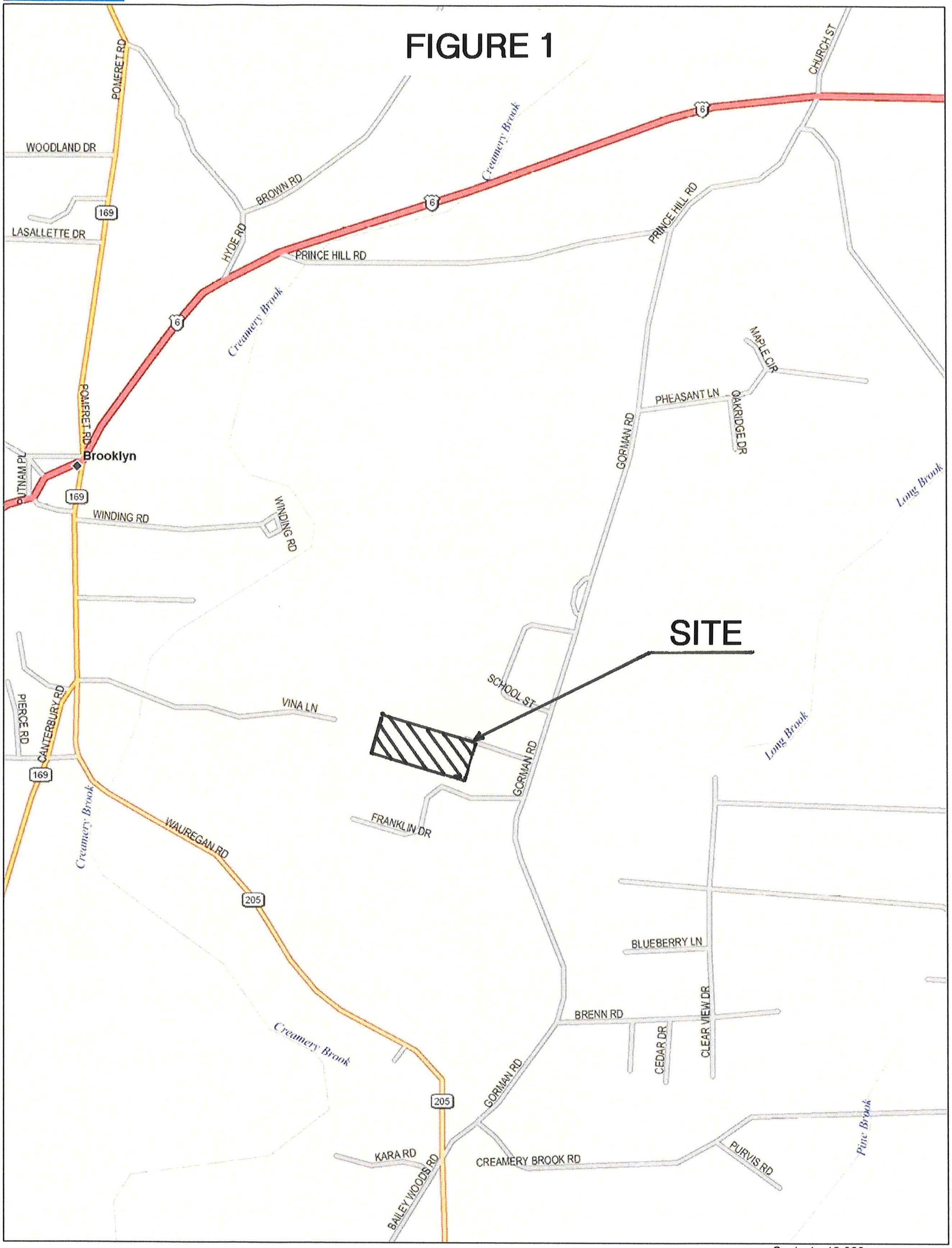

TN
MN (13.8°W)

Scale 1 : 12,800
1" = 1,066.7 ft
Data Zoom 14-0

TABLE 1
ConnDOT TRAFFIC VOLUMES
Gorman Road south of Prince Hill Road
STATION NO. 058

	27-Sep-19 Friday			28-Sep-19 Saturday			29-Sep-19 Sunday			30-Sep-19 Monday			1-Oct-19 Tuesday			2-Oct-19 Wednesday			3-Oct-19 Thursday		
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00				7	10	17	4	10	14	3	4	7	4	4	8	3	4	7	6	4	10
1:00				2	5	7	1	5	6	0	0	0	0	1	1	1	0	1	0	2	2
2:00				0	2	2	2	3	5	0	0	0	0	0	0	0	0	0	0	1	1
3:00				1	2	3	2	2	4	2	0	2	3	0	3	2	1	3	2	0	2
4:00				0	0	0	1	1	2	6	1	7	5	2	7	4	1	5	6	1	7
5:00				4	3	7	5	3	8	25	8	33	19	8	27	18	5	23	19	4	23
6:00				13	7	20	18	5	23	52	23	75	45	20	65	49	21	70	52	23	75
7:00				40	17	57	27	14	41	83	75	158	81	84	165	78	87	165	67	75	142
8:00				56	35	91	44	26	70	155	168	323	168	170	338	167	161	328	168	178	346
9:00				92	41	133	56	38	94	44	31	75	43	44	87	42	45	87	45	41	86
10:00	x	x	x	80	46	126	74	35	109	37	38	75	33	42	75	39	32	71	x	x	x
11:00	50	61	111	75	91	166	59	61	120	40	57	97	61	59	120	50	49	99			
12:00	86	69	155	81	64	145	62	78	140	56	50	106	67	52	119	63	50	113			
1:00	47	53	100	71	73	144	55	62	117	40	45	85	46	58	104	34	38	72			
2:00	67	110	177	71	82	153	61	58	119	55	98	153	61	106	167	48	84	132			
3:00	183	126	309	57	69	126	47	71	118	186	109	295	173	136	309	143	125	268			
4:00	112	97	209	48	65	113	57	57	114	118	148	266	136	124	260	115	125	240			
5:00	76	93	169	45	56	101	49	52	101	117	99	216	109	113	222	90	94	184			
6:00	68	82	150	39	53	92	46	53	99	59	72	131	47	73	120	68	65	133			
7:00	32	53	85	28	37	65	23	40	63	34	44	78	28	55	83	31	48	79			
8:00	27	33	60	25	40	65	23	34	57	19	26	45	8	31	39	15	29	44			
9:00	14	37	51	10	25	35	16	16	32	9	27	36	11	28	39	10	21	31			
10:00	18	16	34	12	12	24	4	10	14	5	8	13	8	10	18	9	12	21			
11:00	8	12	20	6	9	15	4	8	12	6	6	12	3	14	17	2	5	7			
	788	842	1630	863	844	1707	740	742	1482	1151	1137	2288	1159	1234	2393	1081	1102	2183	365	329	694

2019 ADT = 2,000 for station 058 in Brooklyn

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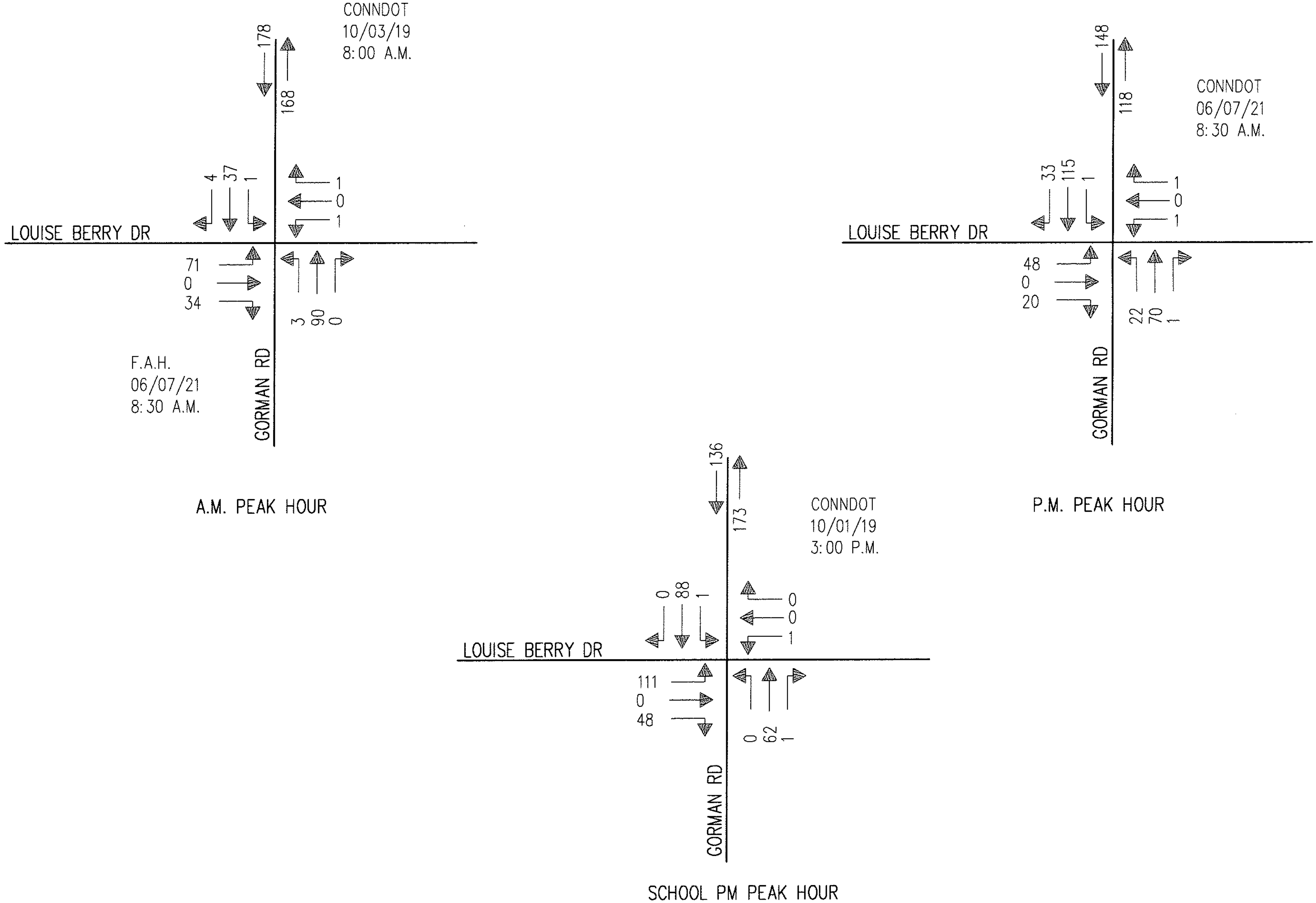

FIGURE 2 06-11-21

BACKGROUND TRAFFIC VOLUMES
AM, SCHOOL & PM PEAK HOURS
PROPOSED RESIDENTIAL DEVELOPMENT
LOUISE BERRY DRIVE
BROOKLYN, CT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026

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NOT TO SCALE

Table 2
Trip Generation
Proposed Residential Development
Louise Berry Drive - Brooklyn, CT

Land Use	Size	ADT	A.M. Peak Hour Enter	A.M. Peak Hour Exit	A.M. Peak Hour Total	School PM Peak Hour Enter	School PM Peak Hour Exit	School PM Peak Hour Total	P.M. Peak Hour Enter	P.M. Peak Hour Exit	P.M. Peak Hour Total
Single Family Detatched Housing											
	51 units*	560	11	33	44	10	11	21	36	21	57
Elementary School											
	Observed#		7	105	112						
	Based on ITE Data 90,000 s.f.		337	275	612	125	159	284	55	68	123

* - School PM Peak hour volumes assumed to be 50% of the AM Peak hour volume

\# - Observed volumes are those ~~exiting~~ observed on Louis Berry Drive during AM peak hour only

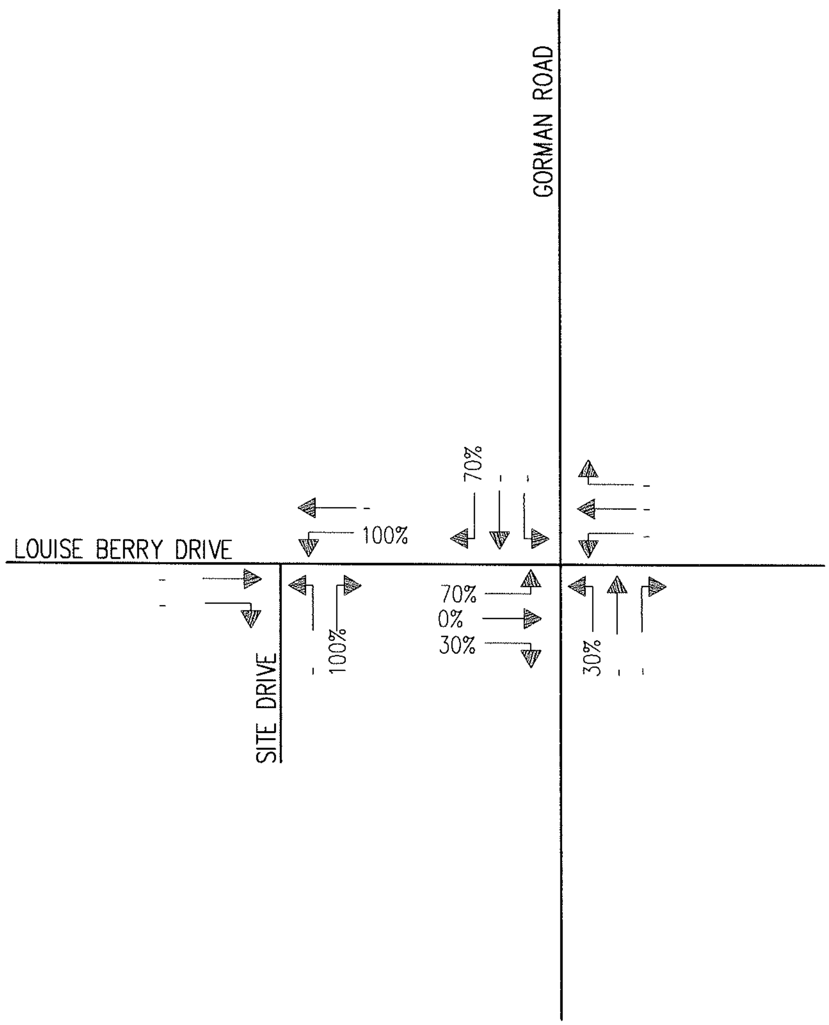

FIGURE 3

06-11-21

DIRECTIONAL DISTRIBUTION
OF SITE GENERATED TRAFFIC
PROPOSED RESIDENTIAL
DEVELOPMENT
LOUISE BERRY DRIVE
BROOKLYN, CT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026

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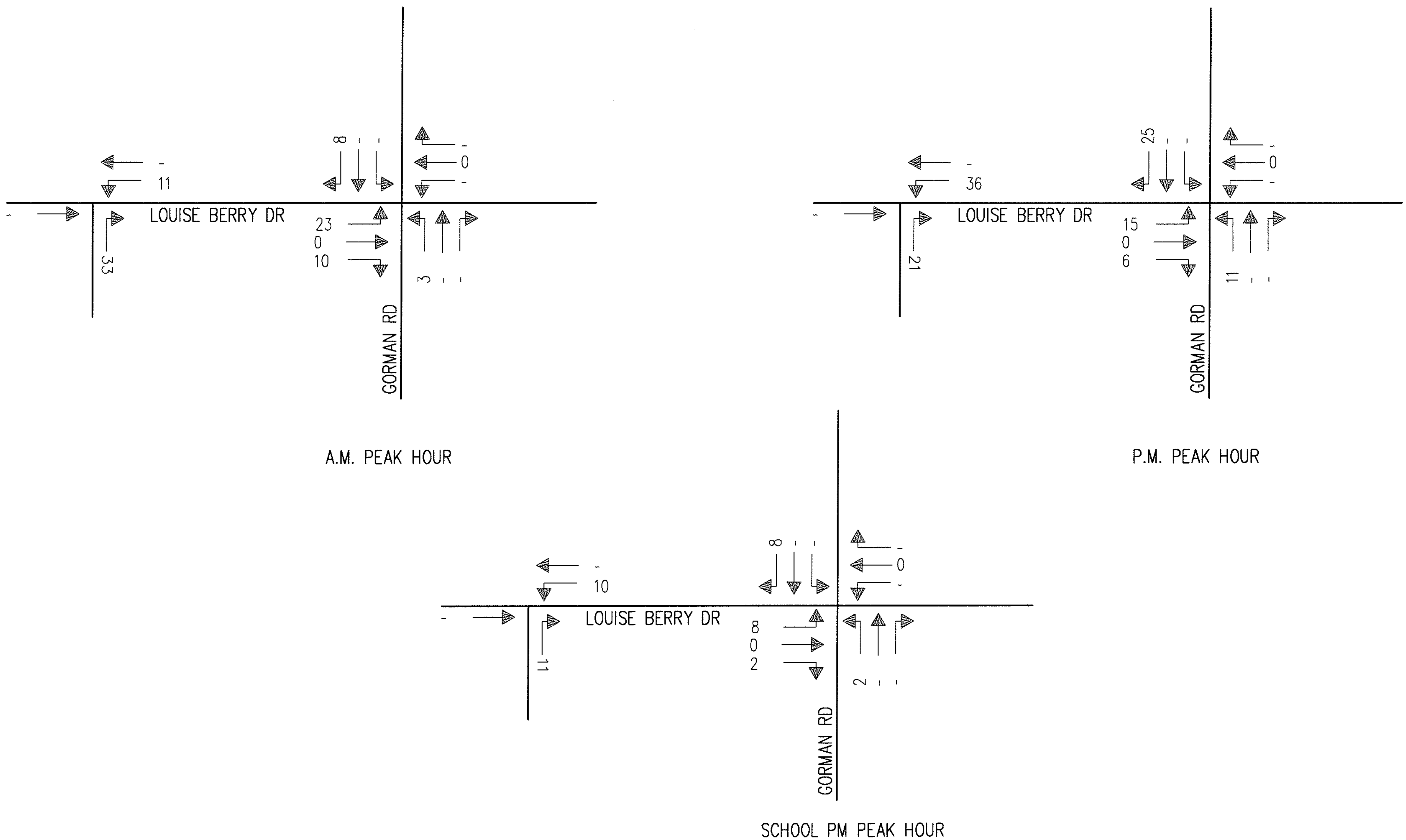

FIGURE 4 06-11-21

SITE GENERATED TRAFFIC
AM, SCHOOL & PM PEAK HOURS
PROPOSED RESIDENTIAL DEVELOPMENT
LOUISE BERRY DRIVE
BROOKLYN, CT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026

FAH

TRAFFIC PLANNING ENGINEERING DESIGN

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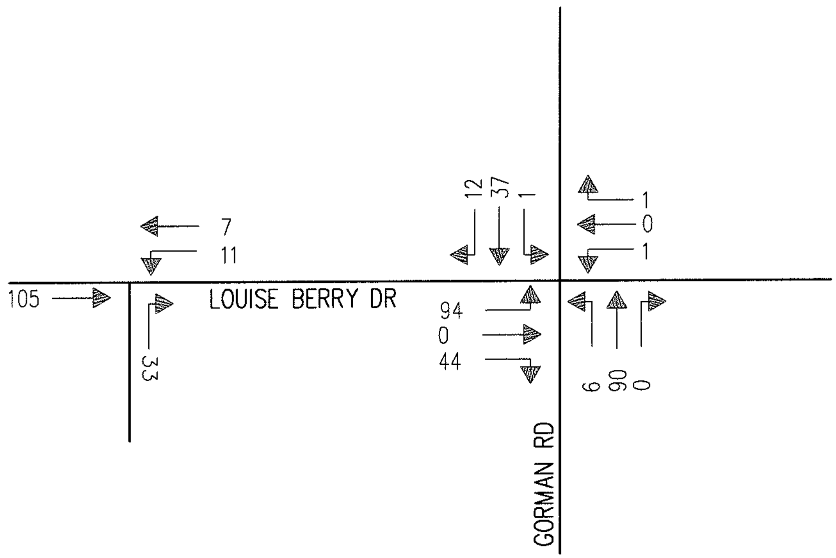
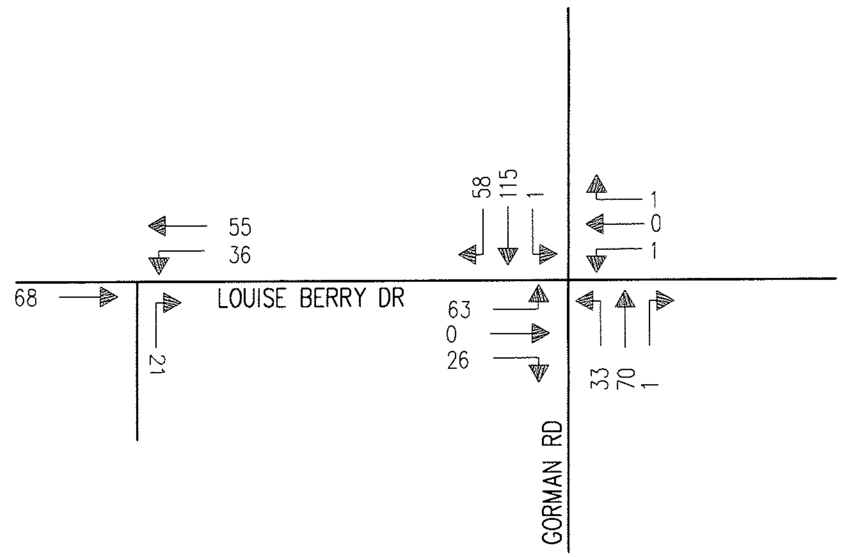
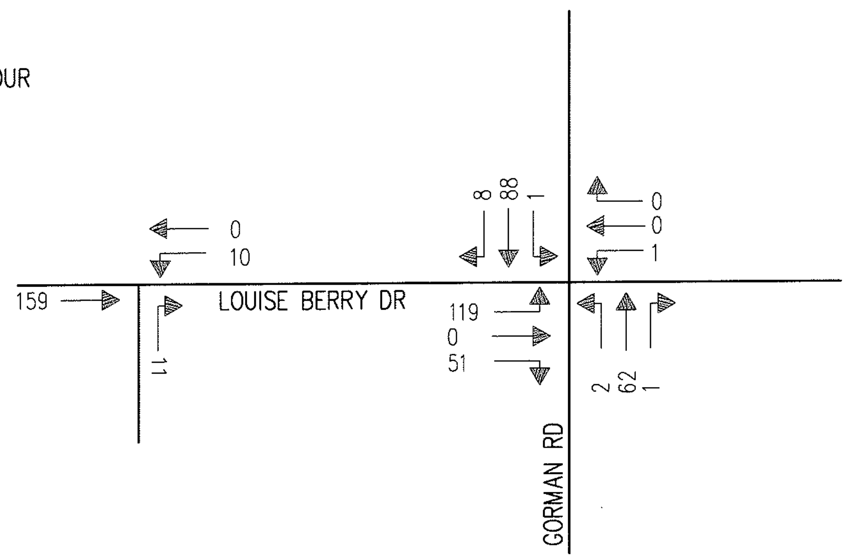


A.M. PEAK HOUR



P.M. PEAK HOUR



SCHOOL PM PEAK HOUR

FIGURE 5 06-11-21

COMBINED TRAFFIC VOLUMES
AM, SCHOOL & PM PEAK HOURS
PROPOSED RESIDENTIAL DEVELOPMENT
LOUISE BERRY DRIVE
BROOKLYN, CT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026

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Table 3

Level of Service Summary

Proposed Residential Development
Louise Berry Drive - Brooklyn, CT

Time Period	A.M. Peak Hour Background Traffic LOS	delay	v/c	Queue	A.M. Peak Hour Combined Traffic LOS	delay	v/c	Queue
Gorman Road at Louise Berry Drive/ Private Drive								
EB	B	13.5	0.50	71	B	13.5	0.50	71
WB	B	10.2	0.00	0	B	10.2	0.00	0
NB	A	0.3	0.00	0	A	0.3	0.00	0
SB	A	0.1	0.00	0	A	0.1	0.00	0
Louise Berry Drive at Site Drive								
EB	-	-	-	-	A	0.0	0.12	0
WB	-	-	-	-	A	4.0	0.01	1
NB	-	-	-	-	A	9.6	0.05	4

Time Period	Mid-Day School Peak Hour Background Traffic LOS	delay	v/c	Queue	Mid-Day School Peak Hour Combined Traffic LOS	delay	v/c	Queue
Gorman Road at Louise Berry Drive/ Private Drive								
EB	C	24.3	0.79	206	D	30.8	0.86	264
WB	B	13.0	0.00	0	B	13.5	0.00	0
NB	A	0.0	0.00	0	A	0.3	0.00	0
SB	A	0.1	0.00	0	A	0.1	0.00	0
Louise Berry Drive at Site Drive								
EB	-	-	-	-	A	0.0	0.37	0
WB	-	-	-	-	A	8.9	0.01	1
NB	-	-	-	-	B	12.8	0.03	2

Time Period	P.M. Peak Hour Background Traffic LOS	delay	v/c	Queue	P.M. Peak Hour Combined Traffic LOS	delay	v/c
Gorman Road at Louise Berry Drive/ Private Drive							
EB	B	11.7	0.20	19	B	13.0	0.28
WB	B	10.1	0.00	0	B	10.5	0.00
NB	A	1.9	0.02	2	A	2.7	0.03
SB	A	0.0	0.00	0.00	A	0.0	0.00
Louise Berry Drive at Site Drive							
EB	-	-	-	-	A	0.0	0.08
WB	-	-	-	-	A	2.5	0.03
NB	-	-	-	-	A	9.1	0.03

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APPENDIX

ConnDOT Traffic Counts

Status: OK North Combined South Class Speed

BROL-058 - Combined - n/s

[37]-Gorman Road - 1.46 mi South of Prince Hill Road

Town..............................Brooklyn
Station..................................58
Location.............. 41.79275,-71.931906
Posted Speed Limit..................30 MPH
2015-Major Collector 5.........2015-Urban
Start Report...........27-Sep-2019 11:00AM
End Report.............03-Oct-2019 10:00AM

24-Hour Count.... 2093 * G4(0.88) = 1841.8
Day 1...........+ 1707 * G4(1.03) = 3600.1
Day 2...........+ 1482 * G4(1.20) = 5378.4
Day 3...........+ 2288 * G4(0.96) = 7574.9
Day 4...........+ 2393 * G4(0.95) = 9848.3
Day 5..........+ 2183 * G4(0.95) = 11922.1
UnRounded AADT........11922.1 / 6 = 1987.0
OK 2019 Fri 27-Sep -this report-...2000
OK 2016 Wed 25-May 2300
REV 2010 Wed 05-May 2300

	27-Sep Fri	28-Sep Sat	29-Sep Sun	30-Sep Mon	01-Oct Tue	02-Oct Wed	03-Oct Thu
12:00am		17	14	7	8	7	10
01:00am		7	6	0	1	1	2
02:00am		2	5	0	0	0	1
03:00am		3	4	2	3	3	2
04:00am		0	2	7	7	5	7
05:00am		7	8	33	27	23	23
06:00am		20	23	75	65	70	75
07:00am		57	41	158	165	165	142
08:00am		91	70	323	338	328	346
09:00am		133	94	75	87	87	86
10:00am	x	126	109	75	75	71	x
11:00am	111	166	120	97	120	99	
12:00pm	155	145	140	106	119	113	
01:00pm	100	144	117	85	104	72	
02:00pm	177	153	119	153	167	132	
03:00pm	309	126	118	295	309	268	
04:00pm	209	113	114	266	260	240	
05:00pm	169	101	101	216	222	184	
06:00pm	150	92	99	131	120	133	
07:00pm	85	65	63	78	83	79	
08:00pm	60	65	57	45	39	44	
09:00pm	51	35	32	36	39	31	
10:00pm	34	24	14	13	18	21	
11:00pm	20	15	12	12	17	7	
Totals	1630	1707	1482	2288	2393	2183	694

Status: OK North Combined South Class Speed

BROL-058 - North

[37]-Gorman Road - 1.46 mi South of Prince Hill Road

Town...............................Brooklyn
Station...................................58
Location.............. 41.79275,-71.931906
Posted Speed Limit..................30 MPH
2015-Major Collector 5.........2015-Urban
Start Report..........27-Sep-2019 11:00AM
End Report............03-Oct-2019 10:00AM

24-Hour Count.... 1083 * G4(0.88) = 953.0
Day 1..........+ 863 * G4(1.03) = 1841.9
Day 2..........+ 740 * G4(1.20) = 2729.9
Day 3..........+ 1151 * G4(0.96) = 3834.9
Day 4..........+ 1159 * G4(0.95) = 4935.9
Day 5..........+ 1081 * G4(0.95) = 5962.9
UnRounded AADT.........5962.9 / 6 = 993.8
OK 2019 Fri 27-Sep -this report-...2000
OK 2016 Wed 25-May 2300
REV 2010 Wed 05-May 2300

	27-Sep Fri	28-Sep Sat	29-Sep Sun	30-Sep Mon	01-Oct Tue	02-Oct Wed	03-Oct Thu
12:00am		7	4	3	4	3	6
01:00am		2	1	0	0	1	0
02:00am		0	2	0	0	0	0
03:00am		1	2	2	3	2	2
04:00am		0	1	6	5	4	6
05:00am		4	5	25	19	18	19
06:00am		13	18	52	45	49	52
07:00am		40	27	83	81	78	67
08:00am		56	44	155	168	167	168
09:00am		92	56	44	43	42	45
10:00am	x	80	74	37	33	39	x
11:00am	50	75	59	40	61	50	
12:00pm	86	81	62	56	67	63	
01:00pm	47	71	55	40	46	34	
02:00pm	67	71	61	55	61	48	
03:00pm	183	57	47	186	173	143	
04:00pm	112	48	57	118	136	115	
05:00pm	76	45	49	117	109	90	
06:00pm	68	39	46	59	47	68	
07:00pm	32	28	23	34	28	31	
08:00pm	27	25	23	19	8	15	
09:00pm	14	10	16	9	11	10	
10:00pm	18	12	4	5	8	9	
11:00pm	8	6	4	6	3	2	
Totals	788	863	740	1151	1159	1081	365

Status: OK North Combined South Class Speed

BROL-058 - South

[37]-Gorman Road - 1.46 mi South of Prince Hill Road

Town............................Brooklyn
Station...............................58
Location............. 41.79275,-71.931906
Posted Speed Limit.................30 MPH
2015-Major Collector 5.........2015-Urban
Start Report..........27-Sep-2019 11:00AM
End Report............03-Oct-2019 10:00AM

24-Hour Count.... 1010 * G4(0.88) = 888.8
Day 1..........+ 844 * G4(1.03) = 1758.1
Day 2..........+ 742 * G4(1.20) = 2648.5
Day 3..........+ 1137 * G4(0.96) = 3740.0
Day 4..........+ 1234 * G4(0.95) = 4912.3
Day 5..........+ 1102 * G4(0.95) = 5959.2
UnRounded AADT.........5959.2 / 6 = 993.2
OK 2019 Fri 27-Sep -this report-...2000
OK 2016 Wed 25-May 2300
REV 2010 Wed 05-May 2300

	27-Sep Fri	28-Sep Sat	29-Sep Sun	30-Sep Mon	01-Oct Tue	02-Oct Wed	03-Oct Thu
12:00am		10	10	4	4	4	4
01:00am		5	5	0	1	0	2
02:00am		2	3	0	0	0	1
03:00am		2	2	0	0	1	0
04:00am		0	1	1	2	1	1
05:00am		3	3	8	8	5	4
06:00am		7	5	23	20	21	23
07:00am		17	14	75	84	87	75
08:00am		35	26	168	170	161	178
09:00am		41	38	31	44	45	41
10:00am	x	46	35	38	42	32	x
11:00am	61	91	61	57	59	49	
12:00pm	69	64	78	50	52	50	
01:00pm	53	73	62	45	58	38	
02:00pm	110	82	58	98	106	84	
03:00pm	126	69	71	109	136	125	
04:00pm	97	65	57	148	124	125	
05:00pm	93	56	52	99	113	94	
06:00pm	82	53	53	72	73	65	
07:00pm	53	37	40	44	55	48	
08:00pm	33	40	34	26	31	29	
09:00pm	37	25	16	27	28	21	
10:00pm	16	12	10	8	10	12	
11:00pm	12	9	8	6	14	5	
Totals	842	844	742	1137	1234	1102	329

FAH Manual Turning movement Counts

F.A. Hesketh & Associates, Inc.
6 Creamery Brook
East Granby, CT 06026
PH: (860) 653-8000 Fax: (860) 844-8600

Gorman Drive at
Louise Berry Drive
Brooklyn, CT
No. 11154

File Name : AM COUNT
Site Code : 05566778
Start Date : 6/7/2021
Page No : 1

Groups Printed- Unshifted

	Gorman Road From North					Private Driveway From East					Gorman Road From South					Louise Berry Drive From West					
Start Time	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:30 AM	2	4	0	0	6	0	0	1	0	1	0	10	3	0	13	1	0	2	0	3	23
07:45 AM	1	7	0	0	8	0	0	0	0	0	0	16	6	0	22	1	0	2	0	3	33
Total	3	11	0	0	14	0	0	1	0	1	0	26	9	0	35	2	0	4	0	6	56
08:00 AM	7	4	0	0	11	0	0	0	0	0	0	17	5	0	22	0	0	4	0	4	37
08:15 AM	5	5	0	0	10	1	0	0	0	1	0	20	4	0	24	0	0	1	0	1	36
08:30 AM	2	7	0	0	9	0	0	0	0	0	0	15	1	0	16	1	0	1	0	2	27
08:45 AM	0	2	1	0	3	1	0	0	0	1	0	19	2	0	21	1	0	1	0	2	27
Total	14	18	1	0	33	2	0	0	0	2	0	71	12	0	83	2	0	7	0	9	127
09:00 AM	1	8	0	0	9	0	0	1	0	1	0	31	0	0	31	0	0	2	0	2	43
09:15 AM	1	20	0	0	21	0	0	0	0	0	0	25	0	0	25	32	0	67	0	99	145
Grand Total	19	57	1	0	77	2	0	2	0	4	0	153	21	0	174	36	0	80	0	116	371
Apprch %	24.7	74.0	1.3	0.0		50.0	0.0	50.0	0.0		0.0	87.9	12.1	0.0		31.0	0.0	69.0	0.0		
Total %	5.1	15.4	0.3	0.0	20.8	0.5	0.0	0.5	0.0	1.1	0.0	41.2	5.7	0.0	46.9	9.7	0.0	21.6	0.0	31.3	

	Gorman Road From North					Private Driveway From East					Gorman Road From South					Louise Berry Drive From West					
Start Time	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Int. Total
Peak Hour From 07:30 AM to 09:15 AM - Peak 1 of 1																					
Intersection	08:30 AM																				
Volume	4	37	1	0	42	1	0	1	0	2	0	90	3	0	93	34	0	71	0	105	242
Percent	9.5	88.1	2.4	0.0		50.0	0.0	50.0	0.0		0.0	96.8	3.2	0.0		32.4	0.0	67.6	0.0		
09:15 Volume	1	20	0	0	21	0	0	0	0	0	0	25	0	0	25	32	0	67	0	99	145
Peak Factor																					0.417
High Int.	09:15 AM					08:45 AM					09:00 AM					09:15 AM					
Volume	1	20	0	0	21	1	0	0	0	1	0	31	0	0	31	32	0	67	0	99	
Peak Factor					0.500					0.500					0.750					0.265	

	Gorman Road From North					Private Driveway From East					Gorman Road From South					Louise Berry Drive From West				
Peak Hour From 07:30 AM to 09:15 AM - Peak 1 of 1																				
By Approach	08:30 AM					08:15 AM					08:30 AM					08:30 AM				
Volume	4	37	1	0	42	2	0	1	0	3	0	90	3	0	93	34	0	71	0	105
Percent	9.5	88.1	2.4	0.0		66.7	0.0	33.3	0.0		0.0	96.8	3.2	0.0		32.4	0.0	67.6	0.0	
High Int.	09:15 AM					08:15 AM					09:00 AM					09:15 AM				
Volume	1	20	0	0	21	1	0	0	0	1	0	31	0	0	31	32	0	67	0	99
Peak Factor					0.500					0.750					0.750					0.265

Brooklyn Public School Calendar

2020 -2021

Brooklyn Public Schools 2020-2021

A Days M, T | B Days Th, F | Remote Learning | Early Dismissal: 12:45

https://www.vertex42.com/ExcelTemplates/yearly-calendar.html

First day of school: August 25, 2020, Tentative last day: June 11, 2021

July '20

Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August '20

Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	**24**	**25**	26	27	28	29
30	31		1 student days			

1 student/6 staff days

September '20

Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			
			21 student days			

22 student/27 staff days

October '20

Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
			20 student			

42 student/48 staff days

November '20

Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	~~19~~	20	21
22	23	24	~~25~~	26	27	28
29	30					
			18 student days			

60 student/67 staff days

December '20

Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		
			16 student days			

76 student/83 staff days

January '21

Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31			19 student days			

95 student/102 staff days

February '21

Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						
			18 student days			

113 student/121 staff days

March '21

Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	~~25~~	26	27
28	29	30	31			
			22 student days			

135 student/144 staff days

April '21

Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	
			16 student days			

151 student/160 staff days

May '21

Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31		20 student days			

171 student/180 staff days

June '21

Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	~~10~~	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			
			8 student days			

179 student/188 staff days

BOE Revised 7/29/20, Updated 10/30/2

EASTCONN Bus: 860-412-0466

Date	Description
8/24-8/28	**Professional Development**
8/31, 9/3	First Day of School A group, B group
9/7/20	Labor Day
10/9/20	**Professional Development**
10/12/19	Columbus Day
11/3/20	**Election Day, Professional Development**
11/19/20	Early Dismissal for Conferences 12:45
11/25/20	Early Dismissal 12:45
11/26-27	Thanksgiving Break
12/23-1/1	Winter Break
1/18/21	Martin Luther King Day
2/15/21	President's Day
2/16/21	**Professional Development Day**
3/5/21	**Professional Development Day**
3/25/21	Early Dismissal for Conferences 12:45
4/2/21	Good Friday, 4/4/21 Easter
4/19-23	Spring Break
5/31/21	Memorial Day
6/11/21	Tentative Last Day

Snow Days 6 or more snow days by January 31st will result in school being held on the following days:

6th snow day: School on 2/16

7th snow day: School on 3/5

8th snow day: School on 4/19

9th snow day: School on 4/20

10th snow day: School on 4/21

BES Office: 860-774-7577

BES School Nurse: 860-774-4618

BMS Office: 860-774-9153

BMS School Nurse: 860-774-1498

Special Education: 860-774-1843

Central Office: 860-774-9732

Finance Office: 860-774-5925

Early Dismissal Days: Nov. 19, Nov. 25, March 25, last day

Prof. Devel: Aug. 24, 28; Oct. 9; Nov. 3; Feb. 16; March 5

PD Early dismissal days: 9/30, 12/2, 3/4, 5/19

ITE Trip Generation Worksheets

Graph Look Up

Query Filter

DATA SOURCE:
Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

INDEPENDENT VARIABLE (IV):
Dwelling Units

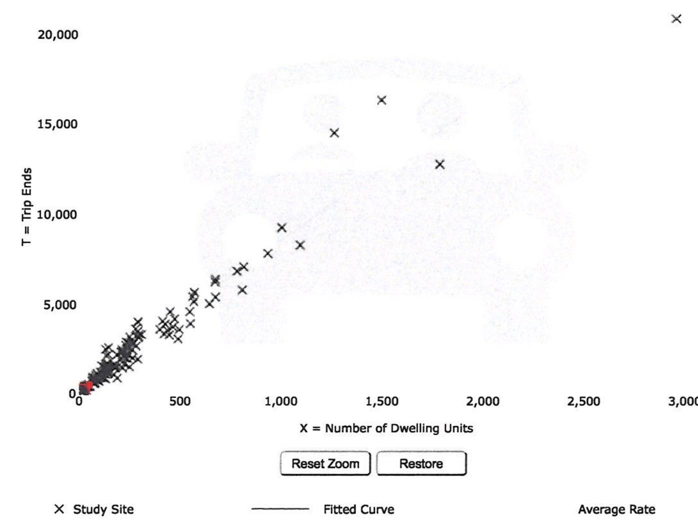
TIME PERIOD:
Weekday

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
51 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
159

Avg. Num. of Dwelling Units:
264

Average Rate:
9.44

Range of Rates:
4.81 - 19.39

Standard Deviation:
2.10

Fitted Curve Equation:
$Ln(T) = 0.92 Ln(X) + 2.71$

R^2:
0.95

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 481 (Total), 240 (Entry), 241 (Exit)
Fitted Curve: 560 (Total), 280 (Entry), 280 (Exit)

ITETripGen Web-based App

Help | Scott Hesketh | Sign out

Graph Look Up

ITETripGen Web-based App

Graph Look Up

Technical Support

Add Users

Comments

Query | Filter

DATA SOURCE:
Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

INDEPENDENT VARIABLE (IV):
Dwelling Units

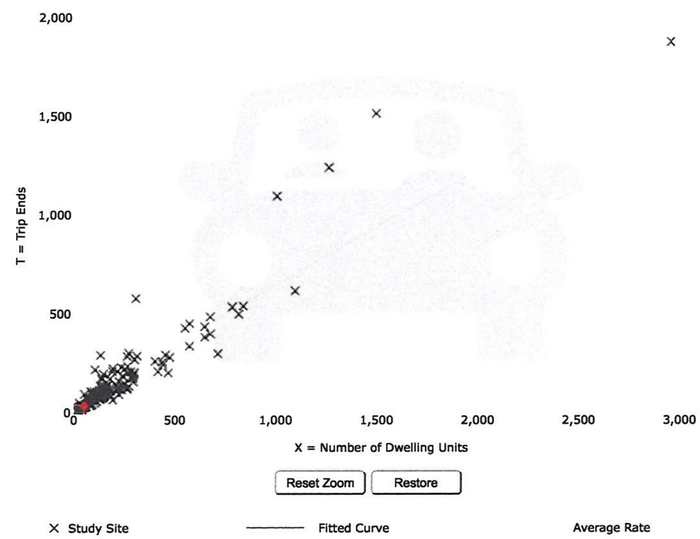
TIME PERIOD:
Weekday, AM Peak Hour of Generator

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
51 | Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday
AM Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
157

Avg. Num. of Dwelling Units:
231

Average Rate:
0.76

Range of Rates:
0.36 - 2.27

Standard Deviation:
0.26

Fitted Curve Equation:
Ln(T) = 0.91 Ln(X) + 0.20

R^2:
0.89

Directional Distribution:
26% entering, 74% exiting

Calculated Trip Ends:
Average Rate: 39 (Total), 10 (Entry), 29 (Exit)
Fitted Curve: 44 (Total), 11 (Entry), 33 (Exit)

Add-ons to do more

Try CTISS Pro

Graph Look Up

Query | Filter

DATA SOURCE: Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE: 210

LAND USE GROUP: (200-299) Residential

LAND USE : 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, PM Peak Hour of Generator

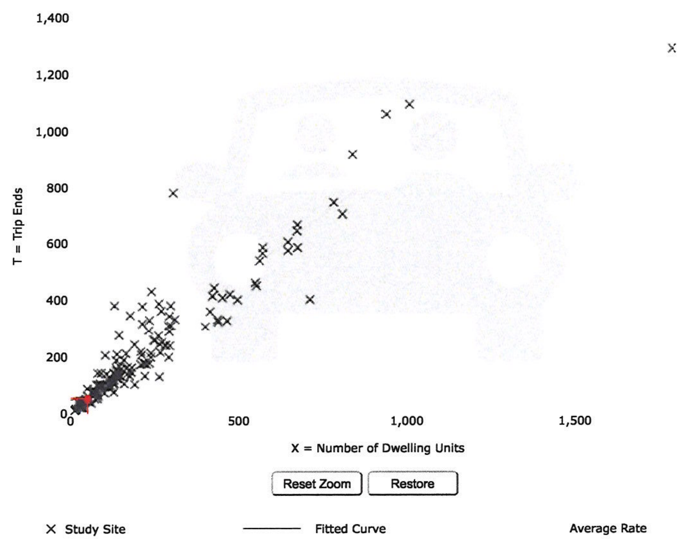
SETTING/LOCATION: General Urban/Suburban

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 51

Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday
PM Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
165

Avg. Num. of Dwelling Units:
217

Average Rate:
1.00

Range of Rates:
0.49 - 2.98

Standard Deviation:
0.31

Fitted Curve Equation:
$Ln(T) = 0.94 Ln(X) + 0.34$

R^2:
0.92

Directional Distribution:
64% entering, 36% exiting

Calculated Trip Ends:
Average Rate: 51 (Total), 33 (Entry), 18 (Exit)
Fitted Curve: 57 (Total), 36 (Entry), 21 (Exit)

ITETripGen Web-based App

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Graph Look Up

ITETripGen Web based App

Graph Look Up

Technical Support

Add Users

Comments

Query | Filter

DATA SOURCE:
Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

INDEPENDENT VARIABLE (IV):
Dwelling Units

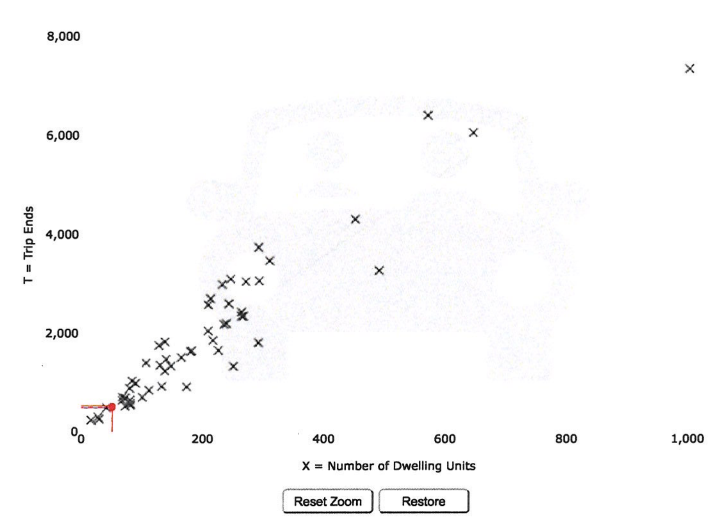
TIME PERIOD:
Saturday

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
51 | Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
52

Avg. Num. of Dwelling Units:
207

Average Rate:
9.54

Range of Rates:
5.32 - 15.25

Standard Deviation:
2.17

Fitted Curve Equation:
$Ln(T) = 0.94 Ln(X) + 2.56$

R^2:
0.91

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 487 (Total), 243 (Entry), 244 (Exit)
Fitted Curve: 521 (Total), 260 (Entry), 261 (Exit)

Add-ons to do more

Try OTISS Pro

ITETripGen **Web-based App**

Help | Scott Hesketh | Sign out

Graph Look Up

ITETripGen Web based App

Graph Look Up

Technical Support

Add Users

Comments

Query | Filter

DATA SOURCE:
Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

INDEPENDENT VARIABLE (IV):
Dwelling Units

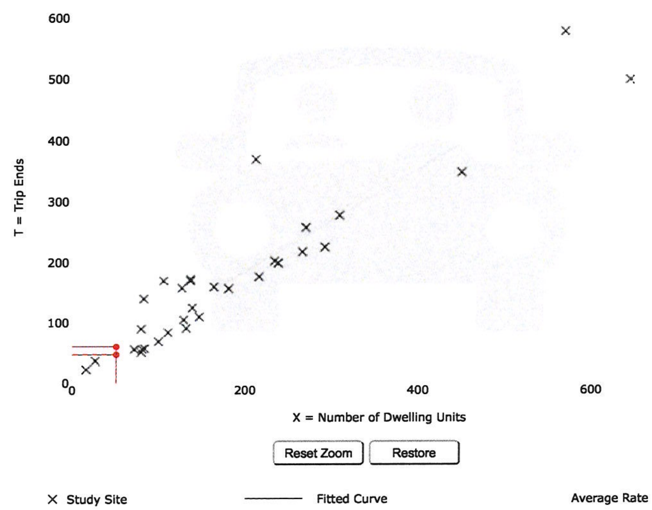
TIME PERIOD:
Saturday, Peak Hour of Generator

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
51 | Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
31

Avg. Num. of Dwelling Units:
188

Average Rate:
0.93

Range of Rates:
0.64 - 1.75

Standard Deviation:
0.26

Fitted Curve Equation:
$T = 0.84(X) + 17.99$

R^2:
0.87

Directional Distribution:
54% entering, 46% exiting

Calculated Trip Ends:
Average Rate: 47 (Total), 25 (Entry), 22 (Exit)
Fitted Curve: 61 (Total), 33 (Entry), 28 (Exit)

Additions to Remove

Try OTISS Pro

Graph Look Up

ITE TripGen Web-based App

Graph Look Up

Technical Support

Add Users

Comments

Query Filter

DATA SOURCE: Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE: 520

LAND USE GROUP: (500-599) Institutional

LAND USE : 520 - Elementary School

LAND USE SUBCATEGORY: All Sites

INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GFA

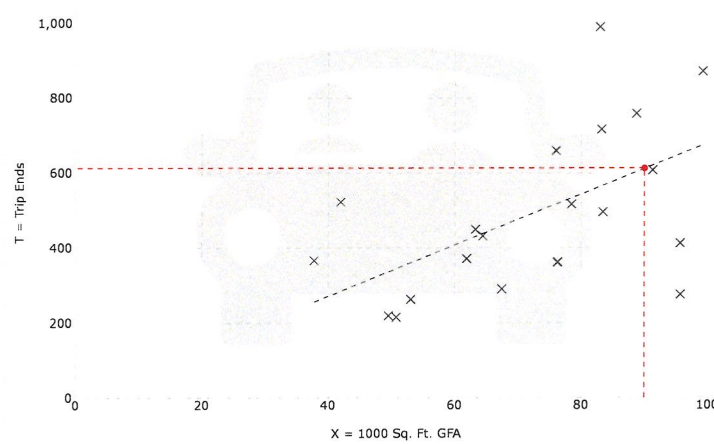
TIME PERIOD: Weekday, AM Peak Hour of Generator

SETTING/LOCATION: General Urban/Suburban

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 90.0 Calculate

Data Plot and Equation



Reset Zoom Restore

× Study Site --- Average Rate

Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Elementary School (520) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
AM Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
20

Avg. 1000 Sq. Ft. GFA:
72

Average Rate
6.80

Range of Rates:
2.88 - 12.45

Standard Deviation:
2.53

Fitted Curve Equation:
Not Given

R^2
****

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 612 (Total), 337 (Entry), 275 (Exit)

Add-ons to do more

Try OTISS Pro

Graph Load Up

ITETripGen Web-based App

Graph Look Up

Technical Support

Add Users

Comments

Query   Filter

DATA SOURCE: Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE: 520

LAND USE GROUP: (500-599) Institutional

LAND USE : 520 - Elementary School

LAND USE SUBCATEGORY: All Sites

INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GFA

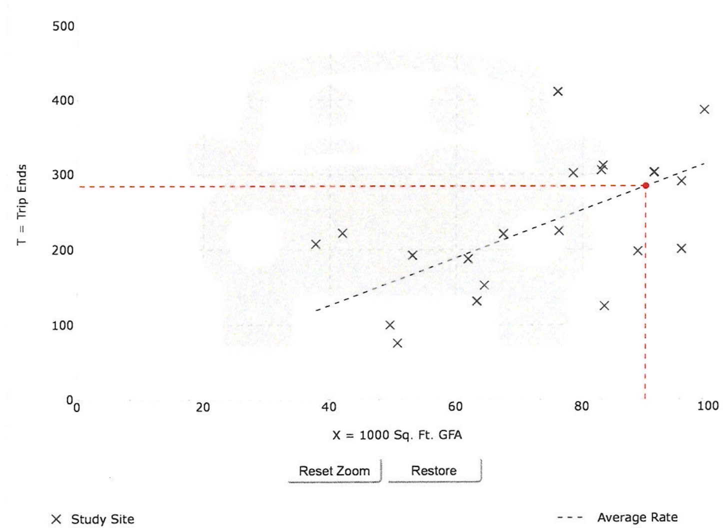
TIME PERIOD: Weekday, PM Peak Hour of Generator

SETTING/LOCATION: General Urban/Suburban

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 90.0   Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Elementary School (520) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
PM Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
20

Avg. 1000 Sq. Ft. GFA:
72

Average Rate:
3.16

Range of Rates:
1.50 - 5.50

Standard Deviation:
1.11

Fitted Curve Equation:
Not Given

R^2
****

Directional Distribution:
44% entering, 56% exiting

Calculated Trip Ends:
Average Rate: 284 (Total), 125 (Entry), 159 (Exit)

Add-ons to do more

Try OTISS Pro

Graph Look Up

ITETripGen Web-based App

Graph Look Up

Technical Support

Add Users

Comments

Query Filter

DATA SOURCE:
Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE:
520

LAND USE GROUP:
(500-599) Institutional

LAND USE :
520 - Elementary School

LAND USE SUBCATEGORY:
All Sites

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

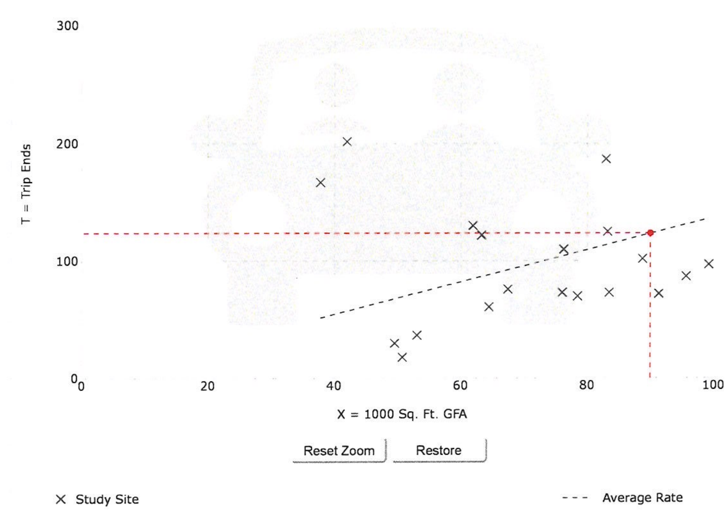
TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
90.0 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Elementary School (520) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
19

Avg. 1000 Sq. Ft. GFA
71

Average Rate
1.37

Range of Rates
0.35 - 4.81

Standard Deviation
0.97

Fitted Curve Equation:
Not Given

R^2
****

Directional Distribution:
45% entering, 55% exiting

Calculated Trip Ends:
Average Rate 123 (Total), 55 (Entry), 68 (Exit)

Add-ons to do more

Try OTISS Pro

Graph Look Up

ITETripGen Web-based App

Graph Look Up

Technical Support

Add Users

Comments

Query Filter

DATA SOURCE:
Trip Gen Manual, 10th Ed + Supplement

SEARCH BY LAND USE CODE:
520

LAND USE GROUP:
(500-599) Institutional

LAND USE :
520 - Elementary School

LAND USE SUBCATEGORY:
All Sites

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

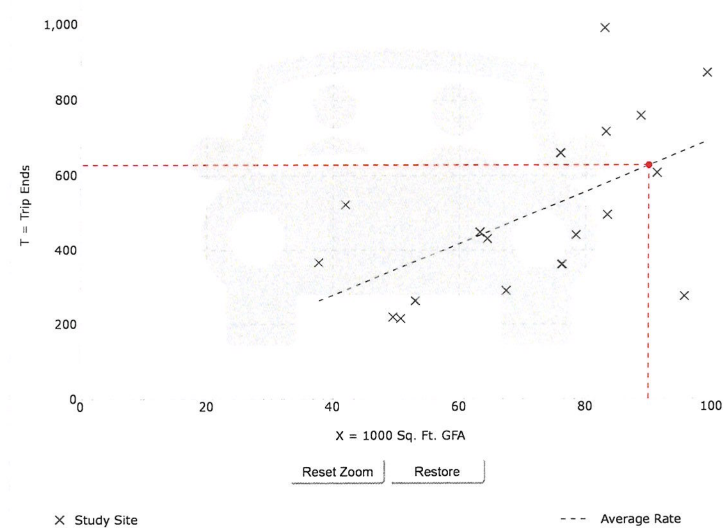
TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
90.0 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Elementary School (520) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
18

Avg. 1000 Sq. Ft. GFA:
71

Average Rate:
6.97

Range of Rates:
2.88 - 12.45

Standard Deviation:
2.60

Fitted Curve Equation:
Not Given

R^2
****

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 627 (Total), 345 (Entry), 282 (Exit)

Add-ons to do more

Try OTISS Pro

SYNCHRO Capacity Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	0	34	1	0	1	3	90	0	1	37	4
Future Volume (Veh/h)	71	0	34	1	0	1	3	90	0	1	37	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	284	0	136	1	0	1	4	120	0	1	49	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	182	182	52	318	184	120	54			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	182	182	52	318	184	120	54			120		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	63	100	87	100	100	100	100			100		
cM capacity (veh/h)	776	710	1016	549	708	931	1551			1468		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	420	2	124	55
Volume Left	284	1	4	1
Volume Right	136	1	0	5
cSH	840	691	1551	1468
Volume to Capacity	0.50	0.00	0.00	0.00
Queue Length 95th (ft)	71	0	0	0
Control Delay (s)	13.5	10.2	0.3	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	13.5	10.2	0.3	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	9.5		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	111	0	48	1	0	0	0	62	1	1	88	0
Future Volume (Veh/h)	111	0	48	1	0	0	0	62	1	1	88	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	444	0	192	1	0	0	0	83	1	1	117	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	202	203	117	394	202	84	117			84		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	202	203	117	394	202	84	117			84		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	41	100	79	100	100	100	100			100		
cM capacity (veh/h)	755	693	935	449	693	976	1471			1513		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	636	1	84	118
Volume Left	444	1	0	1
Volume Right	192	0	1	0
cSH	802	449	1471	1513
Volume to Capacity	0.79	0.00	0.00	0.00
Queue Length 95th (ft)	206	0	0	0
Control Delay (s)	24.3	13.0	0.0	0.1
Lane LOS	C	B		A
Approach Delay (s)	24.3	13.0	0.0	0.1
Approach LOS	C	B		

Intersection Summary			
Average Delay	18.5		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	48	0	20	1	0	1	22	70	1	1	115	33
Future Volume (Veh/h)	48	0	20	1	0	1	22	70	1	1	115	33
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	96	0	40	1	0	1	29	93	1	1	153	44
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	330	329	175	368	350	94	197			94		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330	329	175	368	350	94	197			94		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	95	100	100	100	98			100		
cM capacity (veh/h)	613	577	868	552	561	963	1376			1500		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	136	2	123	198
Volume Left	96	1	29	1
Volume Right	40	1	1	44
cSH	671	702	1376	1500
Volume to Capacity	0.20	0.00	0.02	0.00
Queue Length 95th (ft)	19	0	2	0
Control Delay (s)	11.7	10.1	1.9	0.0
Lane LOS	B	B	A	A
Approach Delay (s)	11.7	10.1	1.9	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	0	34	1	0	1	3	90	0	1	37	4
Future Volume (Veh/h)	71	0	34	1	0	1	3	90	0	1	37	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	284	0	136	1	0	1	4	120	0	1	49	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	182	182	52	318	184	120	54			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	182	182	52	318	184	120	54			120		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	63	100	87	100	100	100	100			100		
cM capacity (veh/h)	776	710	1016	549	708	931	1551			1468		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	420	2	124	55
Volume Left	284	1	4	1
Volume Right	136	1	0	5
cSH	840	691	1551	1468
Volume to Capacity	0.50	0.00	0.00	0.00
Queue Length 95th (ft)	71	0	0	0
Control Delay (s)	13.5	10.2	0.3	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	13.5	10.2	0.3	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	9.5		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	105	0	11	7	0	33
Future Volume (Veh/h)	105	0	11	7	0	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.75	0.50	0.75	0.75
Hourly flow rate (vph)	210	0	15	14	0	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			210		254	210
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			210		254	210
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	95
cM capacity (veh/h)			1361		727	830

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	210	29	44
Volume Left	0	15	0
Volume Right	0	0	44
cSH	1700	1361	830
Volume to Capacity	0.12	0.01	0.05
Queue Length 95th (ft)	0	1	4
Control Delay (s)	0.0	4.0	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	4.0	9.6
Approach LOS			A

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	0	51	1	0	0	2	62	1	1	88	8
Future Volume (Veh/h)	119	0	51	1	0	0	2	62	1	1	88	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	476	0	204	1	0	0	3	83	1	1	117	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	214	214	122	418	220	84	128			84		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214	214	122	418	220	84	128			84		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	36	100	78	100	100	100	100			100		
cM capacity (veh/h)	741	681	929	425	677	976	1458			1513		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	680	1	87	129
Volume Left	476	1	3	1
Volume Right	204	0	1	11
cSH	789	425	1458	1513
Volume to Capacity	0.86	0.00	0.00	0.00
Queue Length 95th (ft)	264	0	0	0
Control Delay (s)	30.8	13.5	0.3	0.1
Lane LOS	D	B	A	A
Approach Delay (s)	30.8	13.5	0.3	0.1
Approach LOS	D	B		

Intersection Summary			
Average Delay	23.4		
Intersection Capacity Utilization	21.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	159	0	10	0	0	11
Future Volume (Veh/h)	159	0	10	0	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.75	0.25	0.75	0.75
Hourly flow rate (vph)	636	0	13	0	0	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			636		662	636
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			636		662	636
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			947		421	478

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	636	13	15
Volume Left	0	13	0
Volume Right	0	0	15
cSH	1700	947	478
Volume to Capacity	0.37	0.01	0.03
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	8.9	12.8
Lane LOS		A	B
Approach Delay (s)	0.0	8.9	12.8
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (veh/h)	63	0	26	1	0	1	33	70	1	1	115	58
Future Volume (Veh/h)	63	0	26	1	0	1	33	70	1	1	115	58
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	126	0	52	1	0	1	44	93	1	1	153	77
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	376	376	192	427	414	94	230			94		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376	376	192	427	414	94	230			94		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	94	100	100	100	97			100		
cM capacity (veh/h)	566	537	850	492	511	963	1338			1500		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	178	2	138	231
Volume Left	126	1	44	1
Volume Right	52	1	1	77
cSH	627	651	1338	1500
Volume to Capacity	0.28	0.00	0.03	0.00
Queue Length 95th (ft)	29	0	3	0
Control Delay (s)	13.0	10.5	2.7	0.0
Lane LOS	B	B	A	A
Approach Delay (s)	13.0	10.5	2.7	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	68	0	36	55	0	21
Future Volume (Veh/h)	68	0	36	55	0	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.75	0.50	0.75	0.75
Hourly flow rate (vph)	136	0	48	110	0	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			136		342	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			136		342	136
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	97
cM capacity (veh/h)			1448		632	913

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	136	158	28
Volume Left	0	48	0
Volume Right	0	0	28
cSH	1700	1448	913
Volume to Capacity	0.08	0.03	0.03
Queue Length 95th (ft)	0	3	2
Control Delay (s)	0.0	2.5	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	2.5	9.1
Approach LOS			A

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

UCONN Crash Data

https://ctcrash.uconn.edu/QueryTool2.action?qid=120595

CrashId	DOT Case #	Town Name	Date Of Crash	Day	Time	Crash Severity	# of Veh.	Milemarker	Roadway Name	Intersecting Roadway	Dist.	Unit	Dir.	First Harmful Event	Manner of Crash	Location	Weather	Lighting	Road Surface
491295	2633242	Brooklyn	2/7/2018	Wednesday	16:17:00	Poss Injury	1	0.06	GORMAN RD	Rt. 205	2	Tenths of Mile	N	Embankment	NA	Roadside	Freezing Rain	Daylight	Slush
614836	3037337	Brooklyn	2/28/2019	Thursday	9:23:00	PDO	2	1.22	GORMAN RD	59 Gorman Rd.	20	Feet	S	Motor Vehicle in Operation	Angle	On Roadway	Clear	Daylight	Wet
619826	3042240	Brooklyn	3/16/2019	Saturday	0:36:00	PDO	1	0.73	GORMAN RD	SCHOOL ST				Other Post, Pole or Support	NA	Roadside	Rain	Dark-Lighte	Wet
636805	3064927	Brooklyn	5/18/2019	Saturday	7:01:00	PDO	1	1.5	GORMAN RD	PRINCE HILL RD				Guardrail Face	NA	Roadside	Clear	Daylight	Dry
731977	3152373	Brooklyn	1/2/2020	Thursday	8:45:00	PDO	3	0.98	GORMAN RD	Brooklyn Elementary School	50	Feet	N	Motor Vehicle in Operation	Front to rear	On Roadway	Clear	Daylight	Dry
837302	3257038	Brooklyn	10/30/2020	Friday	17:00:00	PDO	1	1.48	GORMAN RD	Prince Hill Rd	115	Feet	S	Guardrail Face	NA	On Roadway	Snow	Daylight	Wet

NORTHEASTERN CONNECTICUT COUNCIL OF GOVERNMENTS

ENGINEERING PLAN REVIEW
PERTAINING TO
PROPOSED MULTI-FAMILY DEVELOPMENT
(ASSESSOR'S MAP 38, LOT 22)
LOUISE BERRY DRIVE
BROOKLYN, CT

(July 22, 2020)

(Comments in black are the Regional Engineer's original July 22, 2020 review comments.)
(Comments regarding Killingly Engineering Associates' [KEA] response to Regional Engineer's July 22, 2020 comments and pertaining to their revised plans are in red)
(Comments in green are Regional Engineer's December 12, 2020 review of KEA's revised plans with revision date of December 7, 2020)
(Comments in blue are Regional Engineer's January 6, 2021 review comments of KEA's revised plans with revision date of January 4, 2021)
(Comments in purple are Regional Engineer's March 5, 2021 review comments of KEA's revised plans with revision date of February 10, 2021)

My comments are meant to serve both the Inland Wetlands and Watercourses Commission and the Planning and Zoning Commission, as they apply to each commission. Most recent Town of Brooklyn Zoning, Subdivision and Wetlands Regulations, and Public Improvement Specifications were researched for this review as well as the incorporation of sound engineering principles and judgment, which may not be specifically elaborated on in said regulations, into the overall design of the project.

Sheet 2 of 8 – Property Survey (revised plan, Sheet 2 of 9)

1. The soil scientist's signature block is missing.

   The signature block for the soil scientist has been added to the plan.

   No further comment is necessary.

Sheet 3 of 8 – Site Plan (revised plan, Sheet 3 of 9)

1. Type of curbing and their radii around the islands in front of the dwelling units is not noted.

   The revised plans now show the type of curbing and radii.

   No further comment is necessary.

2. Recommend sidewalk sidewalks be 5' wide with a 2' wide grass snow shelf between the curb and edge of sidewalk. The proposed sidewalk design will have them more impacted during winter snow removal operations. There is sufficient space to push the walks back and make them wider.

The revised plans now call for a 5’ wide sidewalk with 2’ snow shelf.

No further comment is necessary.

3. If school age children will be living here, it is recommended that sidewalks be installed along Louise Berry Drive opposite the school grounds.

   KEA states that no sidewalks are proposed for Louise Berry Drive. I still believe sidewalks should be constructed due to increased traffic on this road and the possibility of school age children living in the proposed condominium development.

   No further comment is necessary. **However, a decision on the practical need for this is up to the Commission**.

   The “green” comment still applies.

   The “green” comment still applies.

4. There is no indication on the plans of the number of bedrooms in each dwelling unit. The number of bedrooms can be used to calculate sewage flow.

   KEA states that each unit will have 2 bedrooms.

   No further comment is necessary.

5. There appears to be one (1) exterior parking space for each dwelling unit. Is there to be a parking garage in each unit to provide at least one (1) additional space?

   KEA states that each unit will have a garage for one (1) parking space.

   No further comment is necessary.

6. In front of Units 1-3, the plan shows that a “block retaining wall” is to be constructed opposite the units. Is this to be the Versa-Lok unreinforced retaining wall depicted on Sheet 8 of 8? If so, it should be labeled as such. Also, how are vehicles going to be prevented from driving over the top of the wall because there is no railing or fence shown to be installed to prevent this?

   The revised plans now indicate that the wall will be a Versa-Lok product and a guide rail has been added to the top of the wall.

   No further comment is necessary.

7. All units except Units 1-3 show curbing around a parking area perimeter and a lawn space adjacent to the unit driveways. Why has this exception been made?

   The revised plans now indicate a curbing around lawn spaces for Units 1-3.

   No further comment is necessary.

8. The guide rail symbol opposite the end of Unit 3 should be labeled.

The revised plans now include the label.

No further comment is necessary.

9. A 28,000 s.f. "recreation area" is to be located to the west of Units 47-51. What constitutes a "recreation area?" Furthermore, a significant portion of it (about 50%) is impacted by a proposed temporary sedimentation basin (see Sheet 5 of 8) and an access right-of-way in favor of the Town of Brooklyn. Will the "recreation area" be impacted by the right-of-way because the right-of-way cannot be encumbered in any way? This area, too, will be partially denuded of native vegetation due to construction of the temporary sedimentation basin and subsequent restoration of the land where it was located.

   KEA states that the recreation area is for passive recreation and that the temporary sedimentation basin after having served its purpose during construction will be removed and that area restored at the completion of the project. It is also stated that the access easement will not be impacted. However, the revised plans show a temporary soil stockpile where the previous plans showed the temporary sedimentation basin and due to the proposed grading it is hard to imagine that the access easement will not be impacted in some way, especially with the movement of heavy construction equipment. Additionally, the silt fence should be moved further away from the perimeter of the stockpile to allow for more efficient movement of heavy equipment, however, I believe this will require fencing installed across the easement causing some kind of impact. Has the Town of Brooklyn been notified of this and will that be allowed on a temporary basis?

   The "red" comment regarding the silt fence location around the stockpile has not been addressed on the plan.

   The "green" comment has been addressed, no further comment is necessary.

10. The steepest created slopes throughout the project should be clearly identified as 3H:1V (max.) so there is no question on how they should be graded.

   KEA states that slopes have been labeled in some areas. However, I recommend that every location where there is to be proposed reshaping of the land be labeled with a slope designation (H:V) so that the site contractor will have no question as to how to shape the slopes the way the designer intended them to be. Also, the revised plans include a note stating "*provide jute netting or turf reinforcement mat*," but only in one location. This note should be placed at every location where newly constructed slopes will be steeper than 3H:1V.

   The original comment has been addressed and no further comment is necessary.

Sheet 4 of 8 – Layout and Landscaping Plan (revised plan, Sheet 4 of 9)

11. There is a "Light Pole Detail" on this plan, however, there is no indication where the light poles are to be located within the project area or the routing of the electrical system needed to power them.

   Streetlight poles have been added to the revised plan. However, it still remains a question as to how the underground electrical service will be installed and where its originating source is located. Additionally, if there are to be ground mounted power transformers and telephone and CATV junction boxes/pedestals, they should be shown on the plan, too.

   The "red" comment has been addressed and no further comment is necessary.

12. A portion of the area west of Units 47-51 will be disturbed from the construction of a temporary sedimentation basin. A landscaping plan is needed for restoration of this area, too, but nothing has been shown on the plan.

    Revised plan Sheet 5 of 9 indicates that there will be a temporary stockpile, not a temporary sedimentation basin, and on Sheet 4 of 9 there is a note stating "*provide New England erosion control restoration mix in this area where temporary sedimentation basin will be utilized during construction*." However, this note should be revised to read "temporary stockpile."

    The "red" comment has not been addressed.

    The "green" comment has been addressed, no further comment is necessary.

13. It would seem appropriate to soften the view of the gravel maintenance access driveway, which is located adjacent to the stormwater basin, from the housing units with landscaping consisting of trees and shrubs.

    On revised plan Sheet 5 of 9, landscaping consisting of eight (8) Leatherleaf Viburnum has been added to provide a visual buffer to the stormwater basin for several of the closet dwelling units.

    No further comment is necessary.

Sheet 5 of 8 – Drainage and Utilities Plan (revised plan, Sheet 5 of 9)

1. Catch basin information is missing, i.e. type of catch basin, top of frame elevation, pipe invert elevations (in – out), roadway centerline stationing position and offset (RT or LT) from the centerline station.

   The requested catch basin data is now included in the plans and located on the new Road Profile plan, Sheet 6 of 9. Incidentally, the title of this sheet should be changed to "Road Profile," as it is not a "Drainage and Utilities Plan." Also, the profile for STA 8+50 thru 10+00 should be moved to the left and joined to the profile for STAs 4+50 – 8+00 at the appropriate elevation line.

   The "red" comment has not been addressed. Also, the catch basins are drawn incorrectly with 2' deep sumps and must be revised to indicate 4' deep sumps, and Note 3 under "Drainage Notes" needs to be corrected to state that all catch basin sumps shall be 4' deep.

   The profile for STA 8+50 thru 10+00 has not been joined to STA 4+50 thru 8+00 as requested. The "green" comment has been addressed.

2. Drainage system pipe information is missing, i.e. type of pipe material, diameter, length, and slope.

   The requested drainage pipe data is now included in the plans and located on the new Road Profile plan, Sheet 6 of 9.

   No further comment is necessary.

3. The type of pipe to be used for the 8" roof leaders has not been specified nor the minimum slope to the connection at a catch basin. Detectable warning tape should be used over the pipe if it is not made from a ferrous material.

On Sheet 5 of 9 a note has been included stating the roof leader size and pipe material. A minimum slope has not been noted and no construction detail has been included in the plan set showing trench width, pipe, minimum depth of bury, bedding material, detectable warning tape, etc. A detail should be included in the plan set describing this information.

The "red" comment has not been addressed.

The "red" comment has been addressed, **however, the "Roof Leader Pipe in Trench Detail" on Sheet 7 of 9 needs to be revised to show the correct size of the pipe, which is 8" NOT 6".**

The blue comment has been addressed and no further comment is necessary.

4. Sanitary sewer manhole information is missing, i.e. top of frame elevation and pipe invert elevations, roadway centerline stationing position and offset (RT or LT) from the centerline station.

   The requested sanitary sewer system data is now included in the plans and located on the new Road Profile plan, Sheet 6 of 9.

   No further comment is necessary.

5. Sanitary sewer system pipe information is missing, i.e. type of pipe material, diameter, length, and slope.

   The requested sanitary sewer system pipe data is now included in the plans and located on the new Road Profile plan, Sheet 6 of 9.

   No further comment is necessary.

6. Building sewer connections should have cleanouts shown exterior of the building footprint.

   KEA states that building sewer cleanouts will be provided, however, they are not shown on any plan exterior of the building units. Furthermore, the way building sewer connections (individual units) are to be connected to a sewer line manifold or trunk line need to be shown on plan Sheet 5 of 9.

   The "red" comment has not been addressed.

   The "red" comment has not been addressed.

   KEA's plan reflects what has been approved by Brooklyn WPCA. Therefore, no further comment is necessary.

7. How are Units 1, 2 & 3 connected to the sanitary sewer system? The nearest sanitary manhole (S1) is shown to be approximately 150' away. "Spaghetti" connections to this manhole should not be allowed and will require extending the sewer main to approximately STA 9+50.

   On plan Sheet 5 of 9, KEA has added an additional sanitary sewer manhole (S1) at STA 8+22.87 (8.12' LT). However, if the connection of each housing unit (Nos. 1 – 3) to the sewer main is to be as depicted in the "Sewer Connection Detail" shown on Detail Sheet 3 (Sheet 9 of 9), then the sewer main needs to be extended further up the road and an additional sewer manhole constructed at STA 9+35, more or less.

   The "red" comment has been addressed.

8. The proposed sanitary sewer collection system is shown to be connected to the existing sanitary sewer line in an easement located on town property. What is the purpose of having this easement? What does the sewer and water line serve? Are the lines mains or building services? Who will make the connections? Who will be responsible for maintaining the sewer and water lines after they are installed?

   It was understood that this is an existing easement. KEA did not answer 1) what is the purpose of the easement, 2) what does the sewer and water lines serve, 3) are the lines dedicated services or mains that anyone could connect to, 3) who will make the connections, and 4) who will be responsible for maintaining the lines to the condo development. One other important point is did anyone have to pay for the extension of the sewer and water lines from Vina Lane? If so, should that party receive some compensation for the condo tie-ins?

   The "red" comment has not been addressed.

   The "red" comment has not been addressed.

   KEA's plan reflects what has been approved by Brooklyn WPCA. Therefore, no further comment is necessary.

9. No information has been provided such as the elevations of the invert of the connections at the existing sanitary sewer manhole (what is the manhole made of—brick, cement block, precast concrete or ?), top of frame elevation, the size of the existing inflow and outflow lines, pipe material, slope, and direction of flow. Due to lack of information it is unclear if this is a sewer main or a service connection and whether or not the calculated sewage flow from the 51 dwelling units (number of bedrooms unknown) can be accommodated by the existing sewer line, whose flow and capacity should be evaluated back to its connection to a main trunk line and the analysis presented in a report. Have test holes been dug to find out whether or not there will be a conflict between the new sewer line (new) and the existing water line that is shown to be in the same easement?

   If the sanitary sewer manhole in the easement is not accessible, how did KEA know where to locate it on their plan? KEA needs to ask the Brooklyn WPCA for permission to excavate around the existing manhole to provide the particulars of this manhole, i.e. top of frame elevation, type of manhole (precast, brick or block), pipe inverts in/out, diameter and type of pipe, etc. and place this information on the plan. Additionally, the consultant needs to ask Connecticut Water for permission to locate the water line (vertically and horizontally), especially the 90° bend where the proposed sewer connection crosses it. This is important due to the fact that there should be a thrust block that should not be disturbed at this location. If the sewer line crosses this critical point then the water line must be exposed for at least two joints on either side of the bend and either friction clamps or other mechanical joint restraint devices be installed to prevent a blowout of the line. KEA needs to address this and just not leave it to Connecticut Water to do that. Information gleaned from test pits and examination of the infrastructure is to be noted on the site plan and profile plan.

   The "red" comment has not been addressed.

   The "red" comment has not been addressed regarding the existing sanitary sewer line and manhole.

   KEA's plan reflects what has been approved by Brooklyn WPCA. Therefore, no further comment is necessary.

10. The existing water line in the sewer easement needs to be identified by pipe material, size, static pressure, calculated from static pressure taken at the closest fire hydrant on Vina Lane or Route 205, at

the proposed connection and valve/fittings/thrust block configuration to make the connection. Is this considered a water main or a service?

This information is critical to this development and should have been obtained prior to plan submission. When was Connecticut Water contacted to provide this information? The information is needed in order to complete the engineering review of this development.

The "red" comment has not been addressed.

The original comment regarding static water pressure has not been addressed.

KEA's plan reflects what has been approved by Connecticut Water. Therefore, no further comment is necessary.

11. The "sewer easement in favor of the Town of Brooklyn" also contains a water line. Does the recorded sewer easement state that a water line is also included in said easement? If not, will there be an easement for the water line?

    KEA did not provide an answer to this request. This information is needed in order to complete the engineering review of this development.

    The "red" comment has not been addressed.

    The original comment has not been addressed.

    KEA's plan reflects what has been approved by Brooklyn WPCA. Therefore, no further comment is necessary.

12. The water system needs additional information, i.e. type of pipe (material and joint type—for example, bituminous coated Class 52, cement mortar lined, mechanical joint), RSV gate valves (open right or left?), tapping sleeve and valve, gate valve boxes (sliding type), corporations, curbstops, blowoff assembly, fire hydrants, thrust blocks (with dimensions for 150 psi thrust), description of fittings and whether mechanical joint or push-on, water services to buildings, megalugs, friction clamps, etc. How is the connection to the existing water line to be made and is the existing water line capable of serving it present use and the addition of the 51 single-family residential condominium units? How this was determined should be documented in writing.

    KEA stated that when they receive this kind of information from Connecticut Water they will update their plans with it. When was this information requested and when will it be received? This information is needed in order to complete the engineering review of this development.

    The original comment has been addressed.

13. Due to the type of building structures and their close proximity to one another, has the Fire Marshal been contacted in writing to determine whether or not a separate fire service will be required for each multi-housing building or if private fire hydrants will be required? Has a hydrant fire flow test been conducted for evaluation by the Fire Marshal?

    KEA states that fire hydrants will be installed required by code. What code? They also state that they will determine whether the units will have a built in fire suppression system (sprinklers) or firewall separation. I thought the Brooklyn Fire Marshal was the expert who makes this kind of decision. The Fire Marshal should submit a written review of the plans with recommendations for the file.

The original comment has not been addressed.

The original comment has not been addressed.

The original comment still has not been addressed.

14. I calculate, by physics, that the static pressure drop of the water service from the connection in the easement on Town of Brooklyn property (elev. = 238) to the top end of the system (elev. = 312) to be 32 pounds per square inch (there is a 1 psi loss for every 2.31 feet of elevation change). If it is found that the static pressure at the connection is less than adequate, a pump station would become necessary for the domestic supply and the fire supply to overcome the deficiency in water pressure—this should be found out now rather than later. Also, the engineer must take into account additional pressure friction losses due to reduced pressure zone backflow preventers, which is typically a 12 pound per square inch loss, thus making the potential pressure loss close to 45 pounds per square inch. Water meters, service piping, bends and isolation valves also introduce their own friction losses, depending on state of flow. As can be seen from this, a thorough analysis of the water system is necessary to determine if there will be safe and adequate water delivery at acceptable operating pressure to all housing units, all the way up to the intersection of Louise Berry Drive. This is especially important for firefighting where hydrants may be expected to flow at approximately 1,000-1,500 gallons per minute under residual pressure or meeting this rate via assistance with a pumper truck, if the supply main has the delivery capacity for that. The complete analysis of the water system should be presented for review in report form as soon as possible to see if it will be adequate.

    KEA did not answer this question. The line may be looped, as they stated, however, this is a dead-end line that functions according to the laws of physics. The requested information is needed to complete the engineering review for this development.

    The original comment has not been addressed.

    The original comment has not been addressed.

    KEA's plan reflects what has been approved by Connecticut Water. Therefore, no further comment is necessary.

15. How is water consumption metering to be accomplished along with backflow prevention? Will there be a "Hotbox®" or similar all-weather environmentally controlled enclosure (needs electricity) protecting a master meter and backflow device or will units be individually metered with their own backflow preventers? If fire hydrants are installed in the development, how will Connecticut Water handle billing that if a master meter at the connection to the existing main is not installed?

    KEA is correct, this is not a wetlands issue – it is an engineering issue that needs to be addressed to provide adequate and safe water supply to this development. Additionally, future condo association members do not need any surprises on the cost of maintenance and how they will be billed for water consumption. KEA needs to provide the requested information.

    The original comment has not been addressed.

    The original comment has not been addressed.

KEA's plan reflects what has been approved by Connecticut Water. Therefore, no further comment is necessary.

16. The water system needed for a development of this scope needs to be designed by a professional engineer. It is not as simple as connecting a single house to a water main. The system design should be accompanied by numerous construction details in the plan set in order for a contractor and construction inspector is sure the system is being installed properly.

    KEA stated that when they receive this kind of information from Connecticut Water they didn't say they will update their plans with it. When was this information requested and when will it be received? This information is needed on the plans in order to complete the engineering review of this development.

    The original comment has not been addressed.

    Connecticut Water has supplied additional design information. <u>However, the plans do not reflect all of the changes made by the water company. This needs correcting.</u>

    KEA's plan reflects what has been approved by Connecticut Water. Therefore, no further comment is necessary.

17. The water main installation is shown following a curved course in some places. Upon closer examination, it may be found that the radius of the curve is greater than the maximum pipe deflection (by size) recommended by American Water Works Association (AWWA) standards and, in fact, bends (fittings with thrust blocks) may have to be utilized in the design to route it around the curve.

    The revised plans now show bends in the proposed water line. However, no details have been included in the plans for construction of thrust blocks for various types of water main fittings (tees, wyes, bends, end caps, etc.) for, say, 150 psi line pressure.

    The "red" comment has not been addressed.

    Connecticut Water has addressed this in their comments. No further comment is necessary.

18. For improved quality of water for Units 1, 2 & 3, the proposed water main should be extended to approximately STA 9+50 and a blowoff assembly, friction clamp and thrust block installed there.

    KEA's revised plan now shows the full extent of the existing water main in Louise Berry Drive and the condominium development is now connected to it. Also, see Comment No. 14 above.

    The water main has been extended, however, Comment 14 has not been addressed.

    Connecticut Water has revised the path of the water main, <u>however, the plan does not reflect this. Comment 14 has not been addressed</u>.

    KEA's plan reflects what has been approved by Connecticut Water. Therefore, no further comment is necessary.

19. The drainage outlet from the stormwater basin will direct water onto the Baker property. Will this require a drainage easement on the Baker property in favor of the condominium association to allow this flow? It is unknown as to what volume of water will discharge in more or less a point source to the receiving wetlands.

KEA states that the post-development drainage pattern to the wetlands is unchanged. This is not true since the pre-development (existing) drainage pattern is that of sheet flow from the entire property from Louise Berry Drive, ultimately flowing into the wetland across the perimeter of the wetland located on the subject property. In post-development, the runoff from the pre-development area will be collected in an engineered drainage system and a swale, all of which will empty into a stormwater retention basin that will point discharge into a discreet location in the wetland practically on the adjacent Baker property. I recommend that the configuration of the proposed drainage design be revisited to determine whether an alternate drainage system discharging stormwater runoff to the wetland at several points on the subject property, rather than one, will provide a greater benefit in maintaining the health of that portion of the wetland system.

The original comment has not been addressed.

The original comment has not been addressed.

The original comment remains unanswered.

20. It is recommended that the riprap outfall at the terminus of the stormwater basin outlet pipe be constructed as a plunge pool. This will further reduce discharge velocity and provide additional sediment transport reduction.

    KEA's drainage report, which was not available initially, indicates the discharge from the basin for the 100-year design storm will have a low velocity at less than 3 fps. Accordingly, a plunge pool is unnecessary.

    The original comment has been addressed.

21. The level spreader at the terminus of the stormwater basin discharge pipe is not labeled as such and its minimum length should be shown. Also, there needs to be an erosion and sediment control system installed below the disturbance caused by constructing the discharge pipeline and the level spreader.

    The level spreader has been dimensioned on the plan and additional erosion and sediment control system has been shown downstream of the level spreader.

    The original comment has been addressed.

22. It is recommended that an additional erosion and sediment control system be installed along the north side of the main road from the cul-de-sac turnaround continuously, save for driveway openings, to opposite centerline STA 8+00.

    Additional erosion and sediment control (E&S) has been added to the plan. However, the E&S to the west of the stockpile shown on Sheet 5 of 9 should be moved to a line that is 20' from the west boundary of the stockpile to allow for movement of heavy equipment. As shown, the E&S line is too restrictive for that kind of maneuvering.

    The "red" comment regarding the stockpile has not been addressed.

    The requested E&S control system has not been added along the north side of the main road from the cul-de-sac turnaround to opposite centerline STA 8+00. This is to lessen sediment loading in catch basins in the road down gradient from the regrading activity during construction.

The blue comment has been answered and no further comment is warranted.

23. As shown on the plan, the temporary sedimentation basin will be constructed in an area where there is a six (6) foot difference in elevation across its width (west to east). According to the "Temporary Sediment Trap Embankment Cross Section" located on Sheet 7 of 8, a 3' (max.) deep level bottom excavation, starting on the west side of the basin will require about an 8' deep excavation on the east side of the basin. If this is not the way the basin is to be constructed and instead will be a combination of berm construction on the low (west side) and 3' deep excavation on the east side, that should be shown in the detail on Sheet 7 of 8. In any case, no deep test holes have been dug here to show where groundwater may lie or where an average seasonal high water table may exist, which would be evidenced by soil mottles, to see if there would be an impact on the basin. Constructing the basin with a earthen berm should be shown on the plans because of the large area of tree removal that will occur. How would accumulated water be managed for this basin? What would be the likelihood of an embankment failure if not built with an emergency spillway protected with at least riprap armoring? Furthermore, there is no sediment control system (silt fence or hay bales) surrounding the proposed temporary sedimentation basin, because any sediment laden water that rises to the point where it would flow through the stone dike, the dike will not necessarily trap fine particles of sediment with much efficiency. Also, the aforementioned sediment trap detail incorporates a weir of unknown length at the crest of the stone dike. An explanation of how the weir will function, knowing the pervious stone dike will allow the passage of water, is needed. Drainage calculations are also needed.

    This comment is moot because this temporary sedimentation basin was eliminated on the revised plan and a stockpile location is now in its place.

    The original comment has been deemed moot with the removal of the proposed temporary sedimentation basin.

24. The "rain garden" south of Unit 7 is a nice feature, especially for a single-family home site, however, for this project, why aren't more rain gardens proposed? What is to be planted in the rain garden? If this is the only one to be constructed and because of its location behind a building it will be hidden from most people's view and possibly not taken care of for very long – keep in mind, it is on "common land."

    The rain garden has been eliminated in the revised plans. However, the consultant has to remove the note that reads "provide rain garden for roof drainage."

    The "red" comment has been addressed.

Sheet 6 of 8 – Detail Sheet (revised plan, Sheet 7 of 9)

1. Note 9 under "Construction Notes/General Provisions" should be more specific and state that the materials shall be disposed of off the development site.

    KEA stated in its response that the note was modified to state what materials shall be removed from the site. It is true that they did modify the note in the revised plan to state the type of materials that should be removed. However, they did not state that the materials should be removed to an approved offsite disposal area. Offsite disposal language needs to be included in the note.

    The "red" comment has not been addressed.

    This comment has been addressed.

2. In Note 7 under "Development Schedule/Sequence of Operations" it is stated that topsoil stripped from driveway locations will be stockpiled in locations shown on the plans. However, none of the plans show any stockpile locations. Stockpile locations should be shown on the plans.

   The revised plan now shows a stockpile area to the west of Unit Nos. 47 – 51. Also, there is only one (1) stockpile location shown on the plan so the word "locations" in Note 7 should be changed to "the location."

   The "red" comment has been addressed.

3. In Note 8 under "Development Schedule/Sequence of Operations" it is stated that utility companies are to be contacted to coordinate connections to the water and sewer mains. If it is determined that the existing water and sewer mains are privately owned, the utility companies may not be the entity to contact for the proposed connections. An explanation of who will make the connections needs to be clarified.

   KEA states that Connecticut Water will be the owner of the new water main serving the development. If this is the case, since the development's road will be privately owned and maintained by a condominium association or similar entity, it is likely an easement in favor of Connecticut Water will be required in order to maintain/repair/improve the utilities water infrastructure. It is incumbent upon the Applicant's consultant to present proof in the form of a written memorandum of understanding that Connecticut Water is willing to do this. The memorandum should also address particulars concerning the water services (domestic and fire), meters, meter pits and fire hydrants.

   KEA also stated in their response that the sanitary sewer main will be owned and maintained by the Condominium Association. Therefore, an easement is not necessary for them to do work on what they will own.

   KEA did not explain who will make connections to the existing water and sewer lines.

   The "red" comments have not been addressed.

   In the "red" comment the question of requiring a utility easement over the access road, driveways and other portions of "common space" has not been addressed.

   The blue comment has been answered and no further comment is warranted.

4. In Note 9 under "Development Schedule/Sequence of Operations," it is stated that the stormwater basin will be used as a temporary sedimentation basin and that drainage structures and pipe are to be installed with inlet protection to catch basins. In light of this, an explanation is needed on how sediment laden water will be prevented from discharging through the stormwater basin outlet structure and into the wetlands.

   KEA states that the stormwater retention basin forebay will also serve as a temporary sediment trap during construction with the utilization of a crushed stone berm with a low-level outlet encased in crushed stone and filter fabric to discharge accumulated water into the wetland, to be used during site construction. A detail of the low-level outlet as described by KEA must be shown as a construction detail in order to be sure it is constructed as described, because I am not sure how this would be configured without such a detail. Additionally, there is no sediment transport preventative for runoff from the swale flowing into the stormwater retention basin area during construction. This must be addressed, too, as it does not flow into the basin's forebay. A complete lateral cross-section of the entire retention basin when used as a temporary sediment trap and then used as a retention basin must be detailed on the plan to provide more understanding of its construction and inspection after it is constructed. The partial cross-section depicted on the plan is unsatisfactory and I believe it was only pertinent to the temporary sediment trap that was eliminated and converted to a stockpile area to the west of Unit Nos 47 – 51.

Recommend installing a silt sock arrangement rather than a crushed stone berm when the stormwater retention basin is first used as a temporary sedimentation basin. The crushed stone berm with filter fabric is difficult to construct and will not prevent sediment transport as desired. The silt sock is much more effective in preventing silt transport.

The "red" comments have not been addressed.

The "red" comment has not been addressed.

The red comments have been answered and no further comment is warranted.

5. In Note 15 "Development Schedule/Sequence of Operations" it is stated that utilities will be installed to the edge of the right-of-way. This note should be deleted as there is no right-of-way.

   KEA stated in their response to my previous comments that they modified this note, but that is not true. The note is still present and must be eliminated because there is no defined road right-of-way.

   The original comment has been addressed.

6. In the "Development Schedule/Sequence of Operations" there is no mention of constructing a temporary sedimentation basin that is shown on Sheet 5 of 8 to the west of Units 47-51.

   KEA does not need a note for this as there is no longer a need for a temporary sedimentation basin at this location.

   The original comment has been deemed moot with the removal of the proposed temporary sedimentation basin.

Sheet 7 of 8 – Detail Sheet 2 (revised plan, Sheet 8 of 9)

1. A riprap "Plunge Pool" detail should be added to this sheet for the stormwater basin outlet discharging to the level spreader. The detail should be designed in accordance with the CT DOT drainage design specs handbook.

   KEA's drainage calculations received after the initial plan review indicates a 100-year design storm flow having low velocity from the retention basin outlet piper. Therefore, a plunge pool is not deemed necessary.
   The original comment has been addressed.

2. A grass swale and riprap swale detail should be added to this sheet.

   KEA has added the requested swale detail to the revised plan.
   The original comment has been addressed.

3. A cross section of the stormwater basin through the stormwater basin outlet structure should be provided to show the different elevations of stored water for the various design storms, 5- thru 100-year

frequency. The "Stormwater Basin Outlet Structure Detail" and basin itself may have to be modified for this range of design storms.

KEA has not added the full stormwater retention basin cross-section as requested. A full cross-section is required with all basin associated construction details and elevations for each design storm water level, including the emergency spillway, outlet structure and basin freeboard above the spillway elevation.

The original comment has not been addressed.

The "red" and original comments have not been addressed.

The blue comment has been answered and no further comment is warranted.

4. There are no deep test pits in the area of the proposed stormwater basin to determine the level of the average high water level (soil mottles), if there is any groundwater present at shallow (<5') depths and the percolation rate of the soil.

   KEA states in their response that deep test pits will be performed prior to plan submission to the Brooklyn Planning and Zoning Commission. This path is fraught with danger because any major changes to the design of the basin caused by information gleaned from test pit data will cause the need for another review by the Brooklyn Inland Wetlands and Watercourses Commission. Again, this is a basic task that should have been undertaken prior to the design and determination of the location of the retention basin.

   The original comment has been addressed. Three (3) test pits have been dug in the area of the proposed stormwater detention basin showing no visible groundwater within 41" (mottles at this depth) below the existing ground surface.

5. The "Flared End Section" detail and table is for a precast concrete end section. The material and size of drainage pipe is not labeled anywhere on the plans. However, if the pipe used in the engineered drainage system is not Class III precast concrete pipe, and, for example, will be high density polyethylene (HDPE) pipe, it is highly unusual not to use a flared end section manufactured with the same material as the pipe. This needs to be explained or corrected.

   KEA states in their response that they corrected the flared end detail for HDPE pipe. This is not true. The entire detail they continue to show is not for HDPE pipe but, rather, for reinforced concrete pipe. The detail still needs to be corrected.

   The "red" comment has not been addressed.

   The "red" comment has not been addressed.

   The red comment remains unanswered.

6. In the "Type 'C' Catch Basin Detail" the sump below the lowest pipe invert is called out as 2'-0" min. It is recommended that the sump be specified as 4'-0".
   As stated by KEA, the catch basin detail on this plan has been modified to show a 4'-0" sump. However, the elevations of the catch basin on the new Road Profile plan (Sheet 6 of 9) reflect elevations of catch basins with 2'-0" sumps. This needs to be corrected.

The "red" comment has not been addressed (see Comment 1 for Sheet 5 of 8).

This comment has been addressed.

7. In Note 2 under "Notes" in the "Turf Reinforcement Mat Installation" detail, it states that the turf reinforcement mat shall be North American Green P-300® or approved equivalent. This particular mat is not biodegradable. A biodegradable mat would be a more preferable choice.

   KEA states that the turf reinforcement mat selection has been modified to a biodegradable product. The revised plan still indicates the use of North American Green P-300. This must be changed to a biodegradable product, many of which North American Green manufactures. See Note 2 under "Notes" above the "Turf Reinforcement Mat Installation" detail title.

   The "red" comment has not been addressed.

   The "red" comment has not been addressed in the "Turf Reinforcement Mat Installation" detail on Sheet 7 of 9. This detail should be removed in its entirety because there is another "Turf Reinforcement Mat Installation" detail on Sheet 8 of 9 that specifies a biodegradable product, North American Green SC-150BN.

   The blue comment has been answered and no further comment is warranted.

8. The Neenah R-3705 (product ID is incomplete and must be further specified by pipe outlet size) in the "Hooded Catch Basin Detail" appears to be a high maintenance item, according to what appears in the manufacturer's catalog cut. Furthermore, this product is manufactured using cast iron, which is very heavy. If it is installed without any support within the catch basin, special care must be exercised when anchoring this item in a cored precast concrete wall, if it is not cast in place at the precaster's facility, to prevent displacement (drooping) over time. Also, the sump is shown as 2'-0" min. and it is recommended that the sump be no less than 4'-0" deep.

   KEA states the hood has been more clearly specified. That is all well and good, however, for an 18" pipe, the hood shown on the detail is not anywhere representative of what a Neenah R-3701-18 Catch Basin Trap looks like and how it is attached to a catch basin. The detail must be corrected to show the proper mounting of the Neenah product, if it is used. I believe it will be highly problematic installing this device correctly which may lead to earlier than expected maintenance problems, which could lead to unwanted substances being discharged into the wetland. Another type of device with a much less complicated mounting should be used. The catch basin sump dimension was changed to 4'-0" on the revised plan.

   The "red" comment has not been addressed for the Catch Basin Trap.

   The Neenah R-3701-18 designation has been removed from the detail and no other product identification number has been specified. A check of the Neenah castings catalog does not show any 18" diameter hood with the profile depicted. It is unclear what this hood will consist of or how it should be installed since there isn't any detail or other information describing this item on the plan. A specification and detail for this is required in order to evaluate its effectiveness.

   The blue comment has been answered and no further comment is warranted.

9. It is unclear where the "Hooded Catch Basin Detail" is to be applied. Is this to be used on every catch basin?

This has been clarified by KEA as only being used on the catch basin preceding discharge into the stormwater retention basin.

The "red" comment has been addressed. **However, it would be most beneficial that every catch basin in the proposed development utilize this environmental safeguard.**

The "green" comment still applies.

This recommendation on constructing every catch basin with a "hood" still applies to provide enhanced protection to the wetlands from runoff collected from the paved surfaces.

Sheet 8 of 8 – Detail Sheet 3 (revised plan, Sheet 9 of 9)

1. In the "Slip Form Concrete Curbing" detail the curbing should be identified as "Bituminous Concrete Curbing" and it would be preferable to have the curbing placed on the binder course for improved resistance to displacement. Placing it on the wearing course makes it more vulnerable to severe damage by a snow plow. In my opinion an even better treatment with respect to snow plows and ease of construction would be to utilize a 12" wide Cape Cod Berm because, experience proves when a snow plow impacts it the plow blade will tend to ride up and over the berm, thus causing less damage and displacement.

   In the revised plan KEA has eliminated the "Slip Form Concrete Curbing" detail and replaced it with a "Cape Cod Curbing" detail, which is satisfactory.

   The "red" comment has been addressed.

2. The type of brick forming the channel and the table is not specified in the "Typical Sanitary Manhole Cross Section" detail. Additionally, the type of frame and cover is not specified (size, weight, vent hole, no vent holes, locking, etc.)

   KEA has now specified an acceptable type of brick in the manhole detail. However, information on the frame and cover has not been specified as requested. The frame and cover should be that which is acceptable to the Town of Killingly WPCA and should at least be noted as such in the detail. Incidentally, it is not known whether or not the overall manhole design or other sewer details is acceptable to the WPCA. Has that approval been given in writing by the WPCA?

   The "red" comment has not been addressed.

   The original comment regarding the specific manhole frame and cover has not been addressed.

   KEA's plan reflects what has been approved by Brooklyn WPCA. Therefore, no further comment is necessary.

3. The sanitary "Sanitary Sewer Pipe in Trench Detail" is missing a dimension for the depth of sand to be placed in a level plane above the crown of the pipe, the width of the trench, and detectable warning tape placed over non-ferrous pipe.

   The detail has been modified to show the additional information that was requested.

   The "red" comment has been addressed.

4. In the “Sewer Connection at Manhole” there is no information on how the penetration of existing manhole wall is to be properly sealed around the “residential sewer lateral” to prevent exfiltration/infiltration, i.e. Core ‘N Seal, Link Seal, cement mortar, etc. Additionally, the size of the proposed sewer connection and type of pipe has not been specified in the detail.

   The detail has been modified to indicate the type of seal where the pipe will penetrate the manhole and the pipe type/size has been added to the detail.

   The “red” comment has been addressed.

5. In the “Wood Guide Rail” detail, the lag bolts should be countersunk to minimize a snag point to pedestrian traffic. Also, for best longevity of the guide rail, the number of pounds per square foot of preservative retention and species of wood (Southern Yellow Pine?) should be specified.

   The detail has been modified with the additional information that was requested except for the species of wood. The APWA Category UC4C is satisfactory. However, species of wood and type of wood preservative compound must be specified in the detail.

   The “red” comment has not been addressed.

   The “red” comment has been addressed.

6. There is no indication on the plans where a wood guide rail is to be installed.

   This has been clarified on the revised plans.

   The original comment has been addressed.

7. For the “Speed Limit Sign Detail,” due to the numerous parking spaces proposed along the main access drive, it seems more reasonable that the speed limit be posted at no more than 15 miles per hour.

   The detail has been modified on the plan to reflect a 15 mph speed limit.

   The original comment has been addressed.

8. The “Sign Detail” for “No Outlet” should have the CT DOT “W14-2 (41-4605)” designation and spell out the manufacturer’s product number, “Seton #44851,” if that is the desired product to be installed.

   The detail has been modified on the plan to reflect a 15 mph speed limit.

   The original comment has been addressed.

9. The “Stop Sign” detail should be called out by the CT DOT designation “R1-1 (31-0552)” and measure 30” x 30”.
   The detail has been modified on the plan to reflect a 15 mph speed limit.

   The original comment has been addressed.

10. The “Typical Section – Unreinforced Retaining Wall” detail should include the additional information:

- The batter of the wall or the step back of each ascending row of blocks. Also, in the drawing it is unclear if there is to be deformed rebar included with each course.
- The type of the 4” diameter drain pipe behind the wall is not specified, i.e. Schedule 40, SDR 35, etc., and if it is to be perforated (holes up or down?). Should it be wrapped with filter cloth?
- The composition of the “drainage aggregate” should be stated by “percent passing” or with a CT DOT material specification.
- The minimum depth of the “drainage aggregate” above the pipe.
- The depth below finish grade of the top of the “granular leveling pad” and its composition (structural fill).

Is it necessary to utilize a filter fabric at the rear of the Versa-Lok wall to minimize migration of fine aggregate through the dry joints in the wall?

The detail has been modified on the plan to incorporate additional information requested in the bulleted comments. KEA stated that the detail is what is recommended by Versa-Lok for an unreinforced wall and no filter fabric is needed along the rear of the segmented wall units.

The original comment has been addressed.

11. In the “Roadway Cross Section” it is noted that a 50’ wide right-of-way is in this project. Since there is no right-of-way lines associated with the road in this project, that designation should be removed. Additionally, it is believed that the sidewalk should be 5’ wide with a 2’ wide grassed snow shelf, not 4’ wide snug to the curb as shown and specified as Portland cement concrete not just concrete. Another concern is that the grade of bituminous concrete to be used in the roadway base course and surface course is not specified. Also, the inclusion of a 6” curb — a 12” wide Cape Cod Berm would be more maintenance friendly and have a more pleasing aesthetic appearance after several snowplow impacts.

    The cross-section detail has been modified to show it without a right-of-way.

    The original comment has been addressed.

12. In the “Concrete Sidewalk Detail” the width of the sidewalk is shown to be 4’-0” wide and 4” thick. It is recommended that these dimensions be changed to 5’-0” and 5”, respectively, in accordance with the Brooklyn Public Improvement Specifications. It is also recommended that the sidewalk material be called out as “Portland cement concrete” with a 2’-0” (min.) snow shelf depicted at the edge of pavement.

    The sidewalk detail has been modified to show it 5’-0” wide with a 2’-0” snow shelf. The thickness was not increased to 5”.

    The sidewalk thickness needs to be 5” in accordance with the requirements of the Brooklyn Public Improvement Specifications.

    The “green” comment has not been addressed and the concrete thickness needs to be corrected.

    The green comment remains unaddressed. A 5” thick sidewalk needs to be specified to meet the BPIS.

General Comments

1. The scale of the plans at 1”= 40’ appears to be inadequate in order to include numerous notes without cluttering the drawing. A better scale would be 1” = 20’ for viewing the information and avoiding a lot of clutter.

   The 40-scale plans are acceptable by town regulation. However, 20-scale would provide a less crowded view of the plans and less likely for the observer to overlook a detail.

   The original comment has been addressed, **however, a 20-scale plan would be less crowded and, therefore, it would be less likely miss seeing some important information presented therein.**

   The “green” comment remains.

   The plan scale is acceptable as presented and no further comment is necessary.

2. Detailed drainage calculations for the 5- thru 100-year design storms have not been submitted for review with the plans. The calculations are necessary to evaluate the engineered drainage system and any impact to the receiving wetlands. A gutter analysis should be included in the report evaluating the effectiveness of the catch basin grates in catching and treating gutter flow for spread and grate blowby.

   Drainage calculations have since been submitted for review. However, they have not been fully reviewed at this time.

   Drainage calculations with revisions thereto have since been reviewed and found to be satisfactory.

3. Due to its steep slope (10%±), length, width and critical role in providing access to the residential units, a separate plan and profile of the main access road will be required (scale: Horiz. 1” = 20’ and Vert. 1”= 5’) for evaluation and demonstrate its relationship to connected parking lots and elevations of adjacent residential units with stepped construction, and to see how well their parking spaces integrate with the design. Underground utilities (drainage, sewer, water, and gas) with appropriate inverts and frame elevations, and vertical geometry (PVC, PVT, PVI, Tangents, slopes, side parking intersections by station, etc.), should be included in the profile. This important information was not included in the plan set under review. This needs to be treated like a road project in order to be constructed properly.

   As requested, KEA has added a detailed Road Profile plan (Sheet 6 of 9) to the plan set. This plan depicts roadway slope; vertical curves; existing and proposed elevations; drainage, water and sanitary sewer lines; at a scale of Horiz: 1” = 40’, Vert: 1” = 4’, which is a standard 10:1 vertical exaggeration. The title block of this plan is incorrect and needs correcting.

   The “red” comment has not been addressed with respect to the title of the plan.

   The title has not been corrected to show the intersection of the centerlines of the condominium unit’s access lanes to the parking areas. The intersections need to be shown on the Profile Plan to verify the grading shown on the Site Plan.

   This comment has been addressed and no further comment is necessary.

4. The proposed site design is very tight. Parking may become an issue for owners who have guests and no place to park them except along edges of some “off-street” (the main road is referred to for clarity as a “street”) parking lots or along the “street.” This has the potential of introducing a safety hazard,

especially for any responding emergency service vehicles, and certainly an inconvenience for some residents—this is especially true for residents of Units 40-44 and 47-51.

KEA is willing to discuss additional parking with town staff. I still feel that because the site design is so compact. The way housing units are situated along most of the length of one side of the the main roadway would force overflow parking to park on the opposite side of the road. This has a great potential for creating an undesirable and unsafe condition by causing traffic congestion and sight distance obstruction for vehicles exiting the off-street parking areas. For these reasons additional parking is warranted for the safety and convenience of all the residents, visitors and operation of large commercial vehicles.

The "red" comment has not been addressed. The revised plans do not show any additional overflow parking.

The "green" comment has not been addressed. The plans do not show any delineation of additional parking and, if on the main access roadway, parking there must demonstrate sufficient clearances for safe two-way vehicle passage.

The blue comment remain unaddressed.

5. It should be noted that a large area of wetlands runs across the length of the southern portion of the property to be developed. Presently, the existing topography shows that this wetland receives water from a good portion of the land (acreage) along a portion of land at the northern boundary of the property and possibly beyond, from the school property. The proposed site development with its buildings and street will block a good portion of this flow from the wetlands-at-large and collect it in a drainage system that will only feed the wetlands at the sole discharge of the stormwater basin outlet. I am not sure if this impact has been studied by a wetlands biologist—not a soil scientist—to see if this is something to be concerned about and how it may affect the ecology of the area. However, runoff starvation of the wetland may be reduced if the drainage system were redesigned and broken up into segments with collected runoff discharged from various locations along the road, toward the wetland across "common land." This may also reduce the amount of pipe shown in the current design and reduce the size of the stormwater retention basin.

   I have reviewed the soil scientist's wetlands report. I am concerned that the report makes statements and conclusions by the soil scientist about impacts to hydrology and water quality, unless the he has the credentials to do this, of which I am not aware of. I believe a certified hydrologist should be doing this. Furthermore, the report states that the "*potential long-term impacts to the upland habitat from the project would include the loss of a significant portion of upland review area serving as riparian zones and upland wildlife habitat adjacent to the wetlands and brook corridor. This intrusion will force wildlife into the vegetated corridor in and around the wetlands and brook, during and after the construction timeframe, and into other areas where the uplands are not disturbed*." Then, after making these statements a conclusion is reached stating "*the existing wetlands and watercourses will still have the ability to provide the same wetland functions and values they currently provide*." How can this be? Is it wise to eliminate upland review area to cause such a significant loss of area to the detriment of the riparian zone and wildlife habitat?

   Also, the wetlands report states that two watercourses were located on the property. However, the watercourses are not shown on the plans and they require a 175' regulated wetland area, which is not shown.

The plans now show the 125' and 175' upland review areas (UVA). This delineation was not shown on the previous plan submission. The added delineation brings home the impact on the wetlands due to the enormous area of disturbance within the UVA. It is stated in the soil scientist's wetlands report that "this is a significant loss." Being so, it is my opinion that a biologist needs to be consulted to further evaluate the wisdom of modifying such a significant portion of the UVA as depicted on the plan, especially considering it being more than just a case of land disturbance (loss of native growth and slope modification), but also by introducing human habitation (noise, light, temperature change, etc.) much closer to the actual wetlands. This proposed impact needs further study and evaluation.

My "green" comment opinion still holds true and needs to be addressed. The elimination of such a large area of uplands area to the wetland is something I am really concerned about that could be to the detriment of the wetlands (wildlife habitat, flora supporting wildlife, surface water recharge for the wetland, impact of temperature change, etc.).

The blue comment remains a concern.

6. It is unclear whether or not the Applicant's engineer has calculated the amount of sewage that may be produced by 51 units (number of bedrooms unknown at this time) and if the Brooklyn Water Pollution Control Authority has been contacted about this and approved a connection.

   According to KEA, they have not formally discussed sewage disposal with the Town of Killingly WPCA. This should be done before filing an application and plan submission with a commission to try and avoid changes to the scope of the project after the submission is made.
   The "red" comment has not been addressed.

   The "red" comment has not been addressed.

   KEA's plan reflects what has been approved by Brooklyn WPCA. Therefore, no further comment is necessary.

7. After all is said and done, the drainage system, sanitary sewer system, water system and access roads cannot be constructed, without a lot of guess work, using these plans. The lack of information relegates them to "schematic plan" status.

   Much of the missing water, sanitary sewer and drainage system is now included in the revised plans. What is left to include in a subsequent plan revision is information that KEA expects to receive from Connecticut Water, Town of Brooklyn WPCA and the Brooklyn Fire Marshal. Without this additional information, the plans are considered incomplete. Additionally, the soil scientist's wetland report contains conclusions that may only be made by an engineer or hydrogeologist. If this is found to be true, then the plans are incomplete until opinions on water quality and are received from one of these professionals.

   The "red" comment remains unaddressed.

   The "red" comment has not been addressed satisfactorily.

   KEA's plan reflects what has been approved by Brooklyn WPCA and Connecticut Water Company. **However, information is still lacking regarding the Fire Marshal's input and the soil scientist's wetland report not including opinions of an engineer or a hydrogeologist.**

8. If this is to be a condominium as stated in the Applicant's application, when will the paperwork on the bylaws of the condominium association be drafted and finalized? How will this be coordinated with any approval this project may receive from the Planning and Zoning Commission?

   KEA provided an acceptable response to these questions.

   The "red" comment has been addressed.

9. Who will track the surveying of the interior of each condominium unit to ensure that they are filed with the appropriate office (Town Clerk Land Evidence Records and Building Official)? How may this affect issuing a Certificate of Occupancy for any individual unit?

   KEA has addressed the first question but not the one pertaining to the Certificate of Occupancy (unit by unit?).

   The "red" comment pertaining to the Certificate of Occupancy has not been addressed.

   The "red" comment has not been addressed.

   This comment has been address and no further comment is necessary.

10. In a condominium development there is common space that is governed by the Condominium Association, with each owner having a vote in decision making. Should the land around the buildings be labeled on the plans as "common space?" Any common space within the buildings would be surveyed and noted as such in land evidence records. However, this may be unlikely according to the building footprints shown on the plans.

    KEA provided a response to this question. However, there is nothing in the plans that says this is a condominium project. If this is a condominium project, then a reference to "condominiums" should be clearly stated in the plans.

    The "red" comment has not been addressed.

    The "red" comment has been addressed. The Title Sheet plan now includes the word "condominium."

11. A typical floor plan and building rendering would be helpful in visualizing the Applicant's project.

    A typical floor plan should be included in the plan set being reviewed. This should be included in the next plan review.

    The "red" comment has not been addressed.

    The "red" comment has not been addressed. It needs to be shown whether or not there is a full-basement under each unit and a typical profile drawing showing the elevations of water and sewer connections entering/exiting each unit and the elevations of foundation drains.

    The blue comment remains unaddressed..

12. Who will be the responsible party for maintenance and repair of the water main and sewer main and any extensions or modifications to the same?

KEA has stated that Connecticut Water will assume ownership of the water main and be responsible for its maintenance. However, the Condominium Association will be responsible for ownership and maintenance of the sanitary sewer line.

The "red" comment has not been addressed with respect to the sanitary sewer line.

The "red" comment has not been addressed with respect to the sanitary sewer system.

13. All references in the plan set to State of Connecticut Department of Transportation Form 817 or any other previous Form should be updated to read the current Form 818.

    The revised plans continue to refer to Form 817. This should be changed to Form 818.

    The "red" comment has not been addressed.

    The "red" comment has been addressed.

THE FOLLOWING ARE THE REGIONAL ENGINEER'S COMMENTS DATED OCTOBER 5, 2020, PERTAINING TO KEA'S REVISED PLANS OF AUGUST 24, 2020 WITH ADDITIONAL COMMENTS OF JANUARY 6, 2021 and MARCH 5, 2021

1. A note should added to "Construction Notes/General Provisions" that states upon completion of construction, accumulated sediment and other deleterious material shall be thoroughly removed from all catch basins, manholes, pipes and swales and disposed of off-site. Additionally, the stormwater retention basin bottom and appurtenant structures shall be cleaned and restored to "like new" condition.

   This comment has been addressed.

2. Plan sets submitted to Inland Wetlands and Watercourses Commission and Planning and Zoning Commission shall be identical in content.

   This must be verified by town staff.

3. Plans shall be considered incomplete until all staff comments are addressed.

   This comment remains in force.

   This comment remains in force.

   This comment remains in force.

4. A minimum of three (3) deep test pits are to be dug in the area of the proposed stormwater detention basin and shall be witnessed by Brooklyn Wetlands Enforcement Officer during the time they are dug.

   This comment has been addressed **but it is unknown if the Brooklyn WEO witnessed the test pits when they were dug.**

   This comment remains in force.

This comment remains in force.

5. There should be a note on the plans that the Condominium Association shall be responsible for maintenance of the entire drainage system, including the Stormwater Detention Basin.

   This comment has not been addressed.

   A note on the Site Development Plan, which will be recorded in the Land Evidence Office, needs to indicate that the drainage system, including the Stormwater Detention Basin, is to be owned, maintained and repaired by the Condominium Association at this location. In addition to this, the same applies to the sanitary sewer collection system unless it will be owned, maintained and repaired by the Brooklyn WPCA.

   This comment has been addressed.

6. **Construction drawings, including cross sections with elevations, and operational details (written narrative) of the proposed site construction sedimentation basin are missing from the plans.**

   This comment has been addressed.

7. **A note stating that sedimentation basins require a Connecticut Department of Energy and Environmental Protection (DEEP) "General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities" needs to be included in notes on Sheet 7 of 9 under "REFERENCE IS MADE TO:", under the heading "EROSION AND SEDIMENTATION CONTROL PLAN." The note shall read "3. Prior to commencement of any site construction, the Developer/Owner of this project shall inform the Land Use Department of the Town of Brooklyn that an application for a Connecticut Department of Energy and Environmental Protection 'General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities' has been applied for and, upon DEEP approval of said permit, shall deliver a copy of the approved permit to the Land Office Department of the Town of Brooklyn."**

   This comment has not been addressed.

8. **As-built plans are required for all aboveground and underground utilities, i.e. drainage pipes/structures, sanitary sewer pipes/structures, electric transformers/conduits, telephone pedestals/conduits, cable television/internet structures/conduits, etc.**

   This comment has not been addressed.

9. **Any handicap parking space shall meet ADA standards, especially that grading shall not exceed 1:50 slope (2%) and ramps be installed where curbing is installed.**

   This comment has been addressed.

As a general comment, much of the information for the design of this project has been coming in piecemeal over the last several months and should have been researched by the consultant prior to any submission of plans to the Commission. This has resulted in consuming too much valuable staff time, especially in these COVID-19 times, because every time a revised submission is made all plans have to be reviewed all over again to verify the changes made per the staff review comments and to make sure there were no changes made which were not requested. As of now, the plans have been revised four times, over

too many months, making the total number of reviews to date five (5). With the comments in this report there will be another set of revised plans to review. As of now the plans remain incomplete.

Several comments remain unaddressed.

By: ____
Syl Pauley, Jr., P.E., NECCOG Regional Engineer

PROPOSED MULTI-FAMILY CONDOMINIUM DEVELOPMENT

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

PREPARED FOR:

SHANE POLLOCK

TABLE OF ZONING REQUIREMENTS		
ZONE = R-30*		
	REQUIRED	PROVIDED
Lot Area	30,000 s.f.	13.497 Acres
Front Yard Setback	50'	53.4'
Side Yard Setback	30'	48'
Rear Yard Setback	50'	257'
Building Height	35' Max.	<35'
Lot Frontage	110'	948'
Building Separation	40' min	40'-115'

DENSITY: 1 unit per every 5,000 s.f.
13.497 ac = 587,929 s/f – 117 units max
51 units proposed

PARKING: 2 spaces per unit required – 102 required
2 garage spaces + 1 drive per unit proposed
+ 2 additional spaces – 155 spaces provided

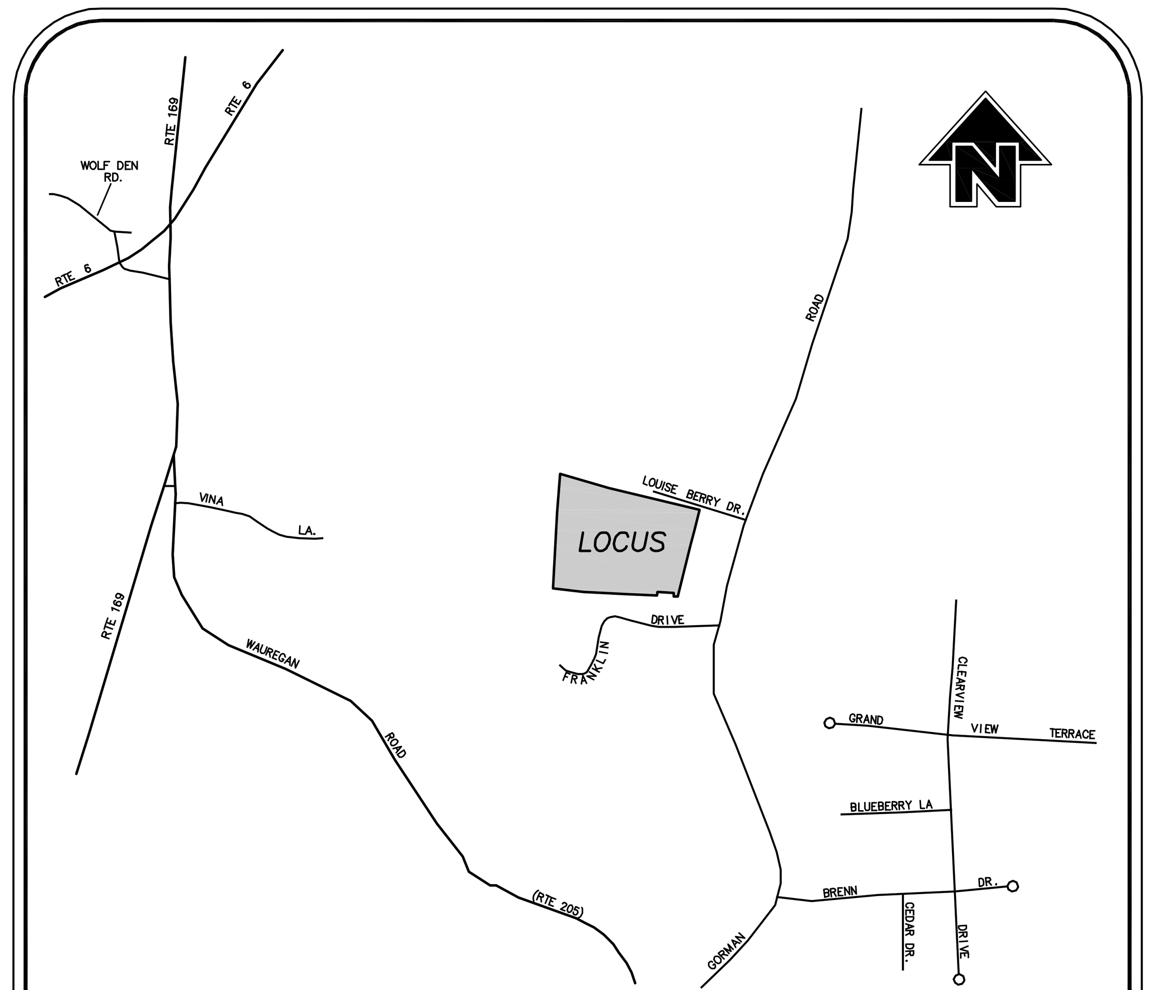
*Multi-family development in accordance with Section 6.E.
ZONE = RA*

GENERAL NOTES:

1. Ownership of the stormwater basin and drainage system shall be the Homeowner's Association. The Town of Brooklyn will not assume responsibility as such.
2. There shall be no parking along the main access roadway or side drives. Appropriate signage shall be installed accordingly.
3. The only work allowed prior to installing the perimeter sediment controls shall be clearing vegetation. No grubbing shall be allowed until the perimeter sediment controls have been installed as per plan. Call (860) 779-3411. ext. 31, for an inspection of the perimeter sediment controls. The perimeter sediment controls must be approved in writing by the IWWC Agent or a Commission member prior to commencing any other work.
4. The temporary sediment basin and swale must be at least temporarily stabilized prior to discharging any stormwater into them. Call (860) 779-3411. ext. 31, for an inspection of the temporary sediment basin and swale. The temporary stabilization of the temporary sediment basin and swale must be approved in writing by the IWWC Agent or a Commission member prior to discharging any stormwater into them.
5. Detention basin side slopes and bottom shall be mowed annually by 6/30 and 10/1 for the life of the basin, in perpetuity.
6. The Homeowner's Association shall be responsible for maintenance of the stormwater basin and its outlets in perpetuity.
7. The construction of the temporary sediment basin and swale shall begin between April 14 and September 1 to allow for vegetation to become at east temporarily established in the basin prior to discharging stormwater into the temporary sediment basin and swale. The basin and swale should be substantially completed by September 1. Construction of the temporary sediment basin and swale shall not commence between September 2 and April 13 in accordance with the provisions od Section 11.1 of the Brooklyn IWWC Regulations.

LEGEND

- IRON PIN TO BE SET
- IRON PIN FOUND
- DH DRILL HOLE FOUND
- CB CATCH BASIN
- UTILITY POLE
- SMH SAITARY SEWER MANHOLE
- 100 EXISTING CONTOURS
- 100 PROPOSED CONTOURS
- INLAND WETLANDS FLAG
- BUILDING SETBACK LINE
- S EXISTING SANITARY SEWER LINE
- W EXISTING WATER LINE
- STONE WALL
- STONE WALL REMAINS
- SILT FENCE
- 175' WATERCOURSE SETBACK
- 125' UPLAND REVIEW



LOCATION MAP
SCALE: 1" = 1000'

INDEX TO DRAWINGS

TITLE	SHEET No.
COVER SHEET	1 OF 11
PROPERTY SURVEY	2 OF 11
EASEMENT MAP	3 OF 11
SITE PLAN	4 OF 11
LAYOUT & LANDSCAPING PLAN	5 OF 11
EROSION CONTROL AND UTILITIES PLAN	6 OF 11
ROAD PROFILE	7 OF 11
DETAIL SHEET 1	8 OF 11
DETAIL SHEET 2	9 OF 11
DETAIL SHEET 3	10 OF 11
DETAIL SHEET 4	11 OF 11

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

APPROVED BY THE BROOKLYN
PLANNING AND ZONING COMMISSION

FINAL APPROVAL DATE__________

CHAIRMAN__________ DATE:______

EXPIRATION DATE:__________

Per Sec. 8.26c of the Connecticut General Statutes, as amended, approval automatically expires ________ if all public improvements required by this plan are not completed by that date.

ENDORSED BY THE BROOKLYN INLAND
WETLANDS COMMISSION

CHAIRMAN DATE

PREPARED BY:

REVISIONS	
DATE	DESCRIPTION
8/24/2020	PER TOWN REVIEW
11/13/2020	TOWN & ENGINEERING REVIEW
12/07/2020	ADDED TEST HOLE DATA
01/04/2021	TOWN & ENGINEERING REVIEW
01/27/2021	PER BWPCA REVIEW
02/10/2021	EASE. ADDED/ZONE/CT WATER COMMENTS
03/30/2021	TOWN & ENGINEERING REVIEW
04/20/2021	IWWC APPROVAL CONDITIONS

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

April 23, 2020

NORMAND THIBEAULT, JR., P.E. No. 22834 DATE

SHEET 1 OF 11
JOB NO: 20014

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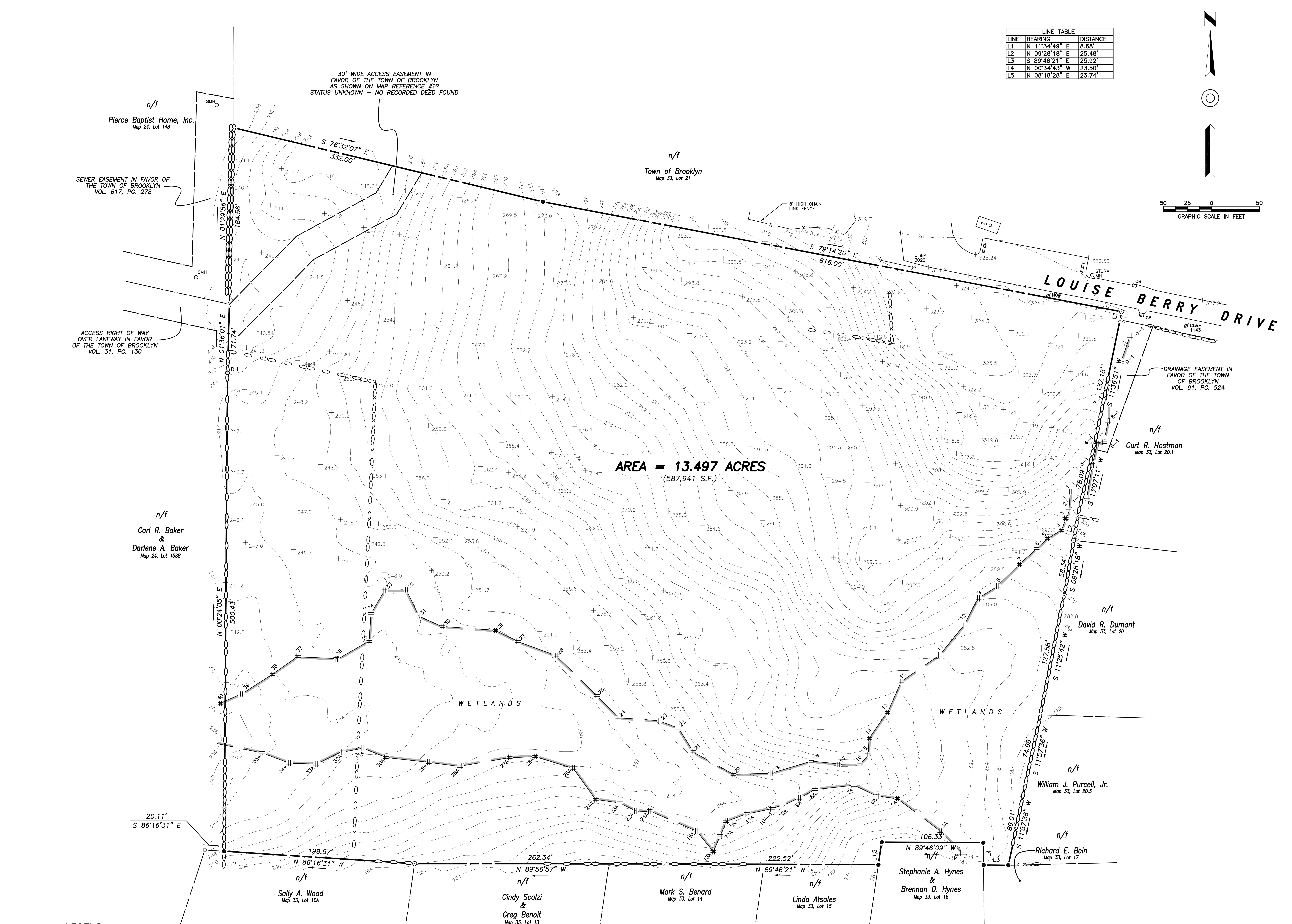

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 11°34'49" E	8.68'
L2	N 09°28'18" E	25.48'
L3	S 89°46'21" E	25.92'
L4	N 00°34'43" W	23.50'
L5	N 08°18'28" E	23.74'

NOTES:

1. This survey has been prepared pursuant to the Regulations of Connecticut State Agencies Sections 20–300b–1 through 20–300b–20 and the "Standards for Surveys and Maps in the State of Connecticut" as adopted by the Connecticut Association of Land Surveyors, Inc. on September 26, 1996;
   - This survey conforms to a Class "A–2" horizontal accuracy.
   - Topographic features conform to a Class "T–2", "V–2" vertical
   - Survey Type: Property Survey
   - Boundary Determination Category: Resurvey.
2. Zone = R–30.
3. Owner of record: Shane J. Pollock & Erin F. Mancuso
   101 Mackin Drive
   Griswold, CT 06351
   See Volume 659, Page 151
4. Parcel is shown as Lot 19 on Assessors Map 33.
5. North orientation is based on North American Datum of 1982 (NAD 82) and is taken from GPS observations.
6. Elevations shown are based on an North American Vertical Datum of 1988 (NAVD 88). Contours taken from actual field survey. Contour interval = 2'.
7. Parcel lies within Flood Hazard Zone 'C' (areas of minimal flooding) as shown on FIRM Map # 090164 Panel 0005A Effective Date: Jan. 3, 1985.
8. Wetlands shown were delineated in the field by Joseph Theroux, Certified Soil Scientist, in 2019.

MAP REFERENCES:

1. "Plan of site for new school in the Town of Brooklyn, Conn. – Scale: 1" = 100' Date: June 9, 1952 – Prepared by: William W. Pike, Surveyor." On file in the Brooklyn land records.
2. "Layout of Franklin Drive in the Town of Brooklyn, Conn. – Scale: 1" = 100' – Date: Oct. 15, 1959 – Prepared by: William W. Pike, Surveyor." On file in the Brooklyn land records.
3. "Subdivision Plan – property of Kurt R. & Lempi E. Hostman – Gorman Road – Brooklyn, CT – Date: Aug. 1987 – Revised to: Jan. 21, 1988 – Scale: 1" = 40' Prepared by: Louis J. Soja, Jr." On file in the Brooklyn land records.
4. "Property Survey and inland wetland field location – Pierce Memorial Baptist Home Inc. – Route 169 – Brooklyn, Connecticut – Date: Mar. 6, 1989 – Revised to: 7/25/1989 – Scale: 1" = 50' – Sheet 6 of 6 – Prepared by: Hallisey & Herbert, Civil Engineers & Surveyors." On File in the Brooklyn Land Records.
5. "Easement Plan prepared for Town of Brooklyn – Brooklyn Elementary School & Brooklyn Junior High School – Route 205 (Wauregan Road) – Brooklyn, Connecticut Date: 4/5/1999 – Scale: 1" = 40' – Sheet 2 of 2. Prepared by: KWP Associates." On File in the Brooklyn land records.
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8. "Perimeter Survey prepared for Eggs Inc. – Gorman Road / Franklin Drive / Wauregan Road – Brooklyn, Connecticut – Date: Oct. 2014 – Scale: 1" = 125' – Sheet 1 of 1 – Prepared by Archer Surveying, LLC." On file in the Brooklyn land records.
9. "Boundary Line Agreement prepared for Brooklyn Center Complex, BLB, LLC and Vina Land, LLC – Wauregan Road & Vina Lane – Brooklyn, Connecticut – Date: December 11, 2019 – Scale: 1" = 125' – Sheet 1 of 1 – Prepared by Archer Surveying, LLC." Not on file.

DATE	DESCRIPTION
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

PROPERTY SURVEY
PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 50'	DESIGN: NET
SHEET: 2 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

LEGEND

- IRON PIN TO BE SET
- IRON PIN FOUND
- DRILL HOLE FOUND
- UTILITY POLE
- CATCH BASIN
- SANITARY MANHOLE
- EXISTING CONTOURS
- INLAND WETLANDS FLAG
- STONE WALL
- STONE WALL REMAINS

I HAVE REVIEWED THE FLAGGED INLAND WETLANDS LOCATION SHOWN ON THIS PLAN AND THEY APPEAR TO BE SUBSTANTIALLY CORRECT.

Certified Soil Scientist Date

TO MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON,

GREG A. GLAUDE, L.S. LIC. NO. 70191 DATE

NO CERTIFICATION IS EXPRESSED OR IMPLIED UNLESS THIS MAP BEARS THE ORIGINAL SEAL AND SIGNATURE OF THE LAND SURVEYOR.

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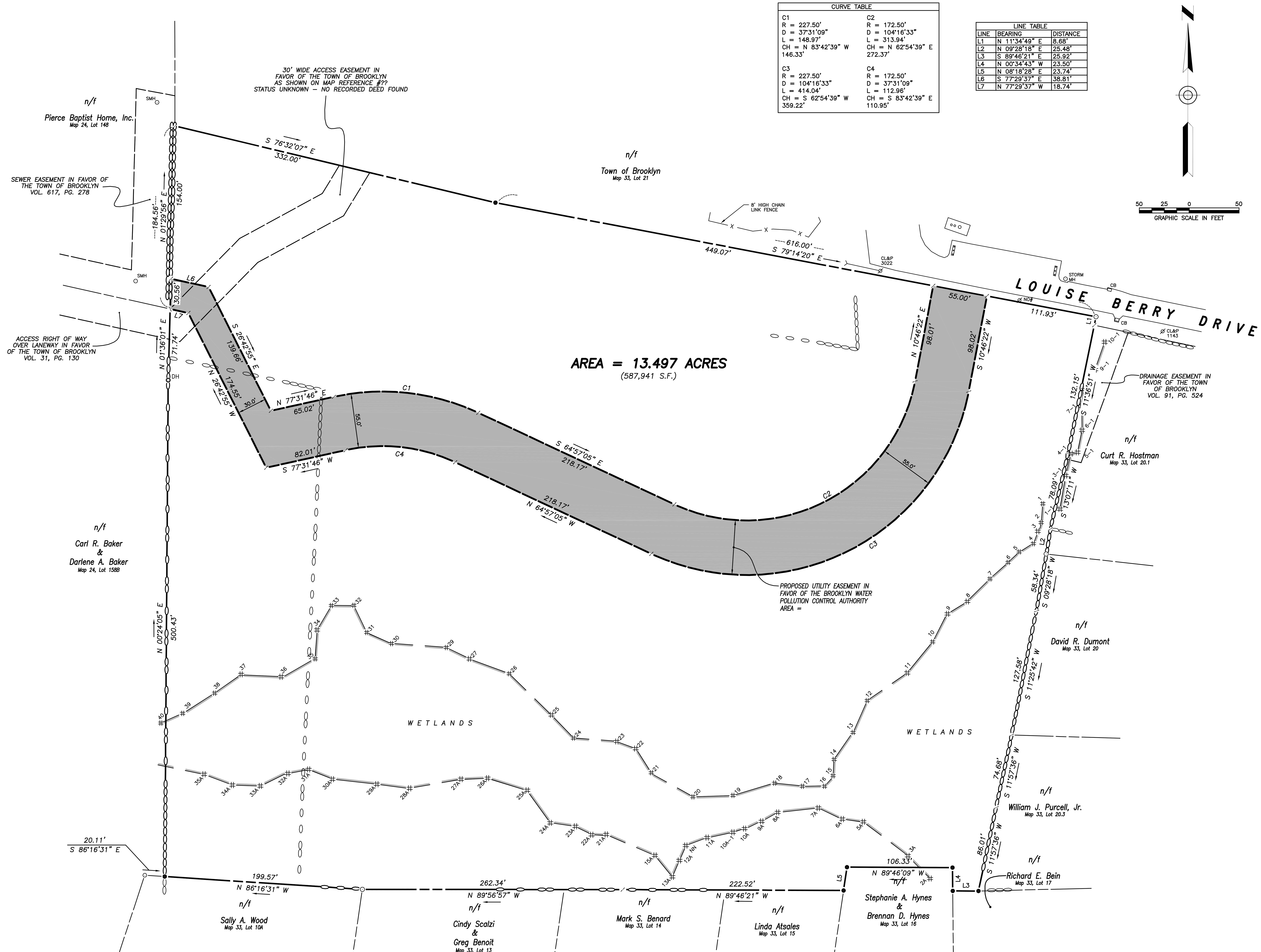

CURVE TABLE	
C1 R = 227.50' D = 37°31'09" L = 148.97' CH = N 83°42'39" W 146.33'	C2 R = 172.50' D = 104°16'33" L = 313.94' CH = N 62°54'39" E 272.37'
C3 R = 227.50' D = 104°16'33" L = 414.04' CH = S 62°54'39" W 359.22'	C4 R = 172.50' D = 37°31'09" L = 112.96' CH = S 83°42'39" E 110.95'

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 11°34'49" E	8.68'
L2	N 09°28'18" E	25.48'
L3	S 89°46'21" E	25.92'
L4	N 00°34'43" W	23.50'
L5	N 08°18'28" E	23.74'
L6	S 77°29'37" E	38.81'
L7	N 77°29'37" W	18.74'

NOTES:

1. This survey has been prepared pursuant to the Regulations of Connecticut State Agencies Sections 20–300b–1 through 20–300b–20 and the "Standards for Surveys and Maps in the State of Connecticut" as adopted by the Connecticut Association of Land Surveyors, Inc. on September 26, 1996;
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   - Survey Type: Easement Map.
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2. Zone = R–30.
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DATE	DESCRIPTION
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03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

LEGEND

- IRON PIN TO BE SET
- IRON PIN FOUND
- DH DRILL HOLE FOUND
- UTILITY POLE
- CB CATCH BASIN
- SMH SANITARY MANHOLE
- INLAND WETLANDS FLAG
- STONE WALL
- STONE WALL REMAINS

TO MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON,

GREG A. GLAUDE, L.S. LIC. NO. 70191 DATE

NO CERTIFICATION IS EXPRESSED OR IMPLIED UNLESS THIS MAP BEARS THE ORIGINAL SEAL AND SIGNATURE OF THE LAND SURVEYOR.

EASEMENT AMP

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE

BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 50'	DESIGN: NET
SHEET: 3 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

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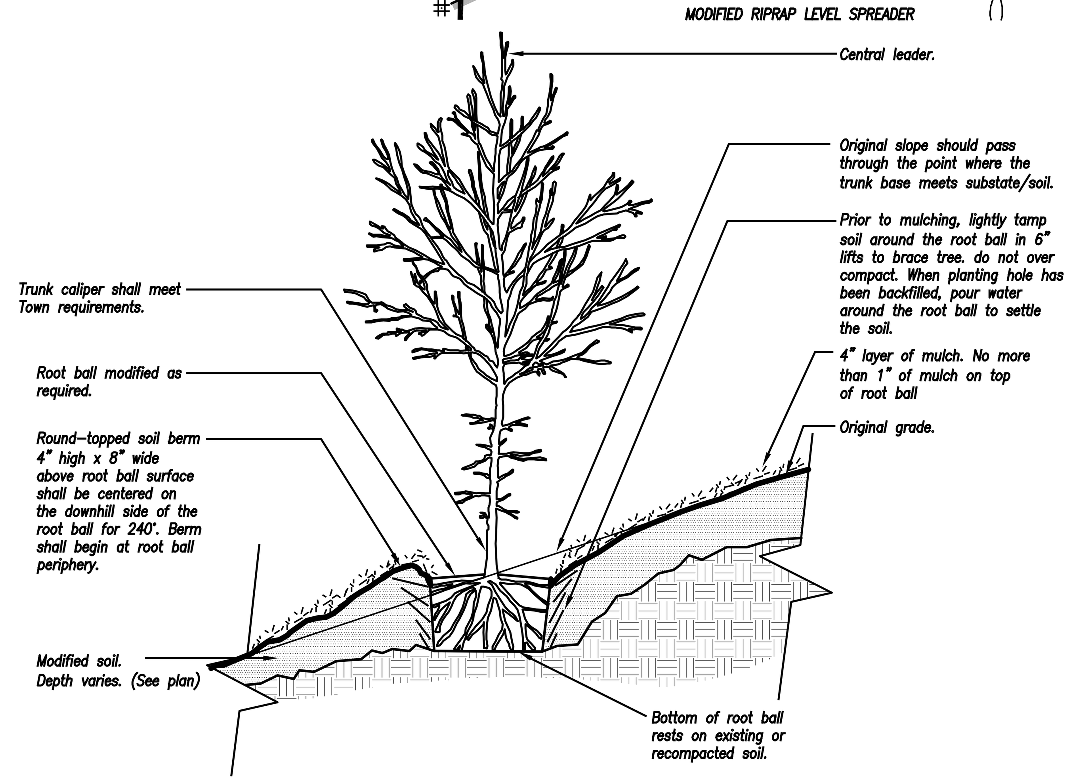
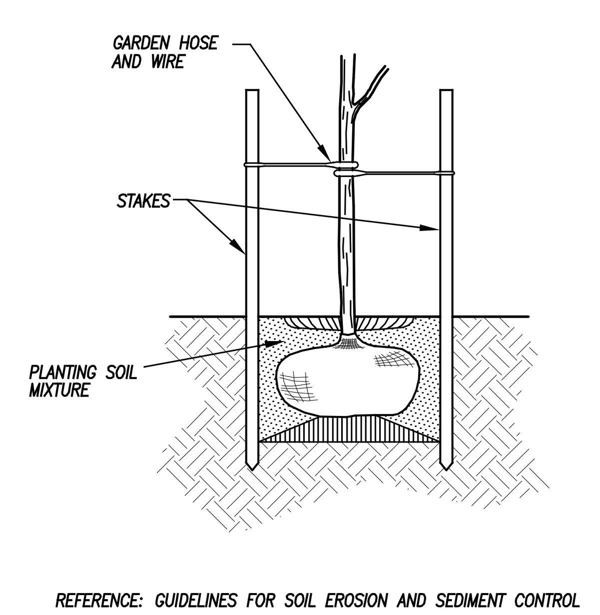
NOTE: SEE SHEET 6 FOR EROSION AND SEDIMENTATION CONTROLS
LOUISE BERRY DRIVE
PROPOSED ROAD
AREA = 13.497 ACRES
(587,941 S.F.)
WETLANDS
GRAPHIC SCALE IN FEET
LEGEND
IRON PIN TO BE SET
IRON PIN FOUND
DRILL HOLE FOUND
CATCH BASIN
UTILITY POLE
SAITARY SEWER MANHOLE
EXISTING CONTOURS
PROPOSED CONTOURS
INLAND WETLANDS FLAG
BUILDING SETBACK LINE
EXISTING SANITARY SEWER LINE
EXISTING WATER LINE
STONE WALL
STONE WALL REMAINS
SILT FENCE
175' WATERCOURSE SETBACK
125' UPLAND REVIEW
n/f Pierce Baptist Home, Inc. Map 24, Lot 148
n/f Town of Brooklyn Map 33, Lot 21
n/f Carl R. Baker & Darlene A. Baker Map 24, Lot 158B
n/f Curt R. Hostman Map 33, Lot 20.1
n/f David R. Dumont Map 33, Lot 20
n/f William J. Purcell, Jr. Map 33, Lot 20.3
n/f Richard E. Bein Map 33, Lot 17
n/f Stephanie A. Hynes & Brennan D. Hynes Map 33, Lot 16
n/f Linda Atsales Map 33, Lot 15
n/f Mark S. Benard Map 33, Lot 14
n/f Cindy Scalzi & Greg Benoit Map 33, Lot 13
n/f Sally A. Wood Map 33, Lot 10A
30' WIDE ACCESS EASEMENT IN FAVOR OF THE TOWN OF BROOKLYN AS SHOWN ON MAP REFERENCE #?? STATUS UNKNOWN – NO RECORDED DEED FOUND
SEWER EASEMENT IN FAVOR OF THE TOWN OF BROOKLYN VOL. 617, PG. 278
ACCESS RIGHT OF WAY OVER LANEWAY IN FAVOR OF THE TOWN OF BROOKLYN VOL. 31, PG. 130
28,000 S.F. RECREATION AREA
DRAINAGE EASEMENT IN FAVOR OF THE TOWN OF BROOKLYN VOL. 91, PG. 524
BLOCK RETAINING WALL 1 TOP = 318.0 BOTTOM = 314.0
BLOCK RETAINING WALL 2 TOP = 313.50 BOTTOM = 310.00
PROPOSED UTILITY EASEMENT IN FAVOR OF THE BROOKLYN WATER POLLUTION CONTROL AUTHORITY
ACCESSIBLE UNITS
STORMWATER BASIN
SEDIMENT FOREBAY
GRAVEL MAINTENANCE ACCESS
GRASSED SWALE
MODIFIED RIPRAP SWALE
MODIFIED RIPRAP LEVEL SPREADER BTTM = 241.00
PROPOSED CLEARING LIMITS
BITUMINOUS CONCRETE CURBING
PAVED APRON
CONCRETE SIDEWALK
5' CONCRETE SIDEWALK
WOOD GUIDE RAIL
HYDRANT
8' HIGH CHAIN LINK FENCE
EXISTING WATER LINE
EXISTING SANITARY SEWER LINE
04/20/2021 IWWC APPROVAL CONDITIONS
03/30/2021 PER TOWN & ENGINEERING REVIEW
02/10/2021 EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021 PER BWPCA REVIEW
01/04/2021 PER TOWN & ENGINEERING REVIEW
DATE DESCRIPTION
REVISIONS
SITE PLAN
PREPARED FOR
SHANE POLLOCK
LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT
Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com
NORMAND E. THIBEAULT, JR., P.E.
LIC #PEN 0022834
DATE
DATE: 4/23/2020
SCALE: 1" = 40'
SHEET: 4 OF 11
DWG. No: CLIENT FILE
DRAWN: DNE
DESIGN: NET
CHK BY: ---
JOB No: 20014

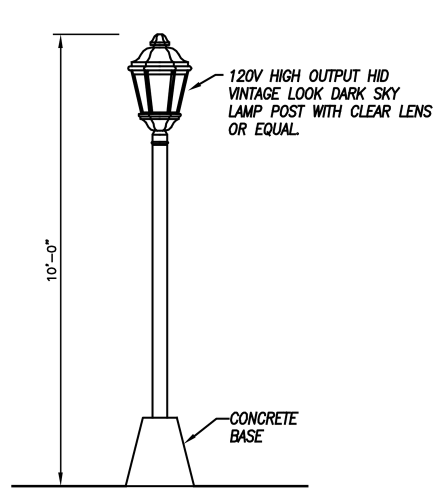
AREA = 13.497 ACRES
(587,941 S.F.)



TREE ON SLOPE DETAIL
NOT TO SCALE



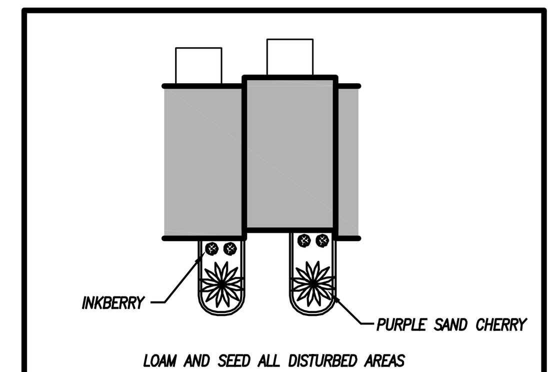
PLANTING CROSS SECTION FOR TREES UNDER 20'
NOT TO SCALE



LIGHT POLE DETAIL
NOT TO SCALE

LANDSCAPE SCHEDULE		
BOTANICAL NAME	COMMON NAME	SIZE
Cornus kousa	Korean Flowering Dogwood Pink	2.5" cal.
Cornus kousa chinensis	Korean Flowering Dogwood White	2.5" cal.
Ilex glabra	Inkberry 'Shamrock'	1 gal.
Prunus x cistena	Purple Sand Cherry	1 gal.
Viburnum rhytidophyllum	Leatherleaf Viburnum	4'

NOTE: Alternate pink & white dogwood trees along street



TYPICAL UNIT LANDSCAPING DETAIL

NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

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REVISIONS

LAYOUT & LANDSCAPING PLAN
PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

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DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 40'	DESIGN: NET
SHEET: 5 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

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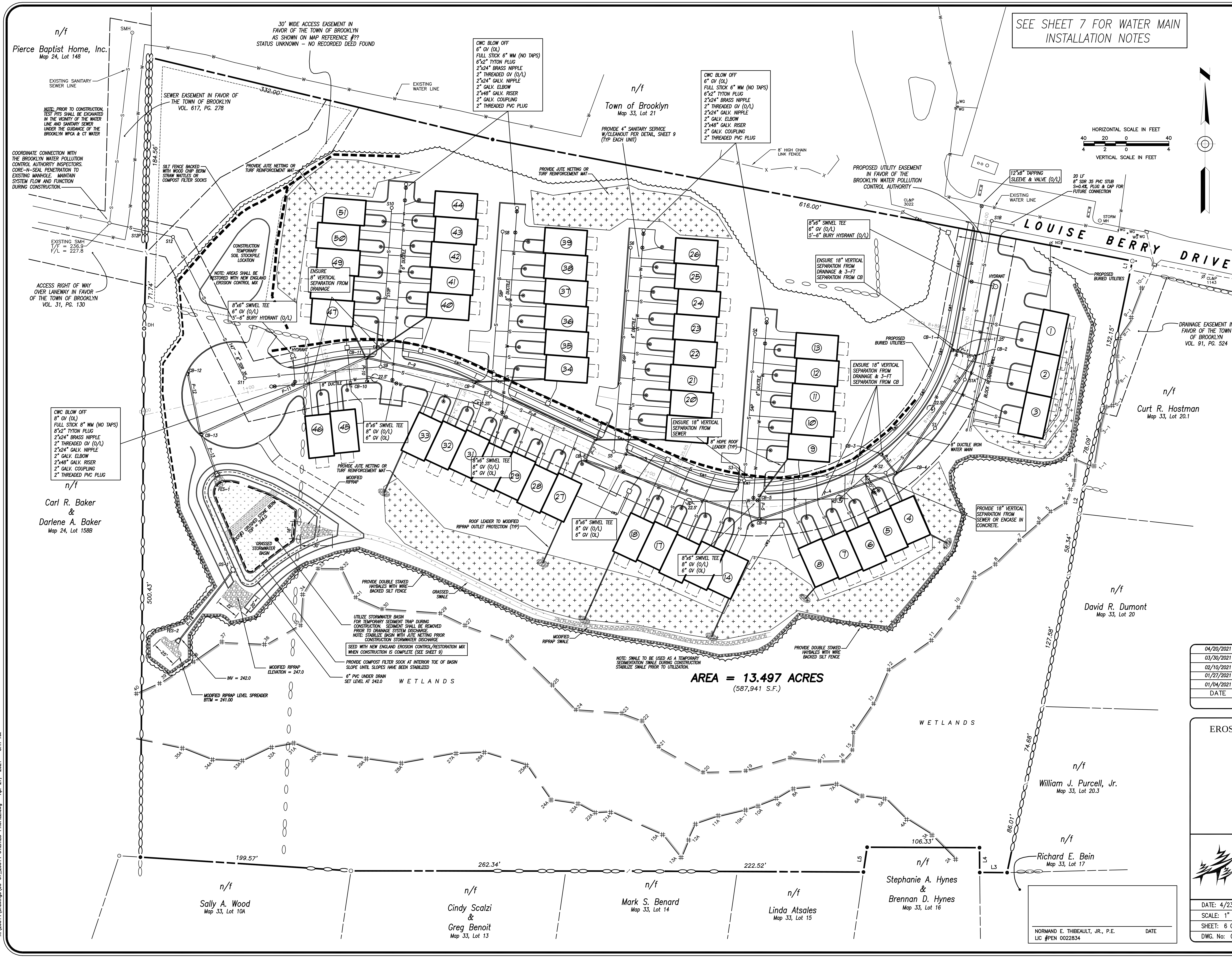


NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

DRAINAGE GENERAL NOTES:

1. ALL DRAINAGE PIPE SHALL BE CORRUGATED HIGH DENDITY POLYETHYLENE (HDPE), SMOOTH INTERIOR AS MANUFACTURED BY ADVANCED DRAINAGE SOLUTIONS OR APPROVED EQUAL.
2. CATCH BASIN TOPS SHALL BE TYPE "C" UNLESS OTHERWISE NOTED.
3. ALL BASINS SHALL BE INSTALLED WITH 4' SUMPS.
4. PROVIDE 4' SUMP AND HOODED OUTLET AT TERMINATION CATCH BASIN PRIOR TO DISCHARGE INTO STORMWATER BASIN.

SANITARY SEWER GENERAL NOTES:

1. ALL SANITARY SEWER MAINS SHALL BE 8" SDR 35 PVC.
2. SANITARY SEWER LATERALS TO RESIDENCES SHALL BE 4" SDR 35 PVC. AND SHALL BE INSTALLED WITH A MINIMUM 42" OF COVER AND A SLOPE OF 2%.
3. LATERALS SHALL NOT BE INSTALLED DIRECTLY TO OR WITHIN 5' OF A SANITARY MANHOLE.
4. SANITARY SEWER SYSTEM CONSTRUCTION IS SUBJECT TO INSPECTION AND APPROVAL BY THE BROOKLYN WPCA. THE CONTRACTOR SHALL SCHEDULE A PRE CONSTRUCTION MEETING WITH THE BROOKLYN WPCA AND NOTIFY THE BROOKLYN WPCA A MINIMUM OF 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION.
5. AS-BUILT DRAWINGS SHALL BE SUBMITTED AND APPROVED PRIOR TO PROJECT ACCEPTANCE.

WATER MAIN & SERVICES:

1. ALL WATER PIPE SHALL BE CLASS 52 DUCTILE IRON PIPE IN ACCORDANCE WITH CT WATER REQUIREMENTS.
2. TAPS INTO EXISTING MAINS SHALL BE UNDER THE SUPERVISION OF CT WATER REPRESENTATIVES.
3. WATER SERVICE CONNECTIONS TO THE WATER MAIN SHALL BE PER CT WATER REQUIREMENTS. SERVICES FROM SHUT OFF VALVES TO RESIDENCES SHALL BE 1" HDPE.
4. HYDRANT REQUIREMENTS AND LOCATIONS SHALL BE DETERMINED BY THE TOWN OF BROOKLYN FIRE MARSHAL.

TOWN OF BROOKLYN WATER POLLUTION CONTROL AUTHORITY (BWPCA) NOTES:

1. PRIOR TO ANY WORK BEING CONDUCTED SANITARY SEWER, CONTRACTOR SHALL CONTACT ALAN CARPENTER, P.E., REPRESENTATIVE FOR THE BROOKLYN WPCA
PHONE: 860-208-3394 OR 508-659-7020
EMAIL AT ACARPENTER@CPHCORP.COM
2. THE MAIN TRUNK LINE THROUGH THE SITE BE DEDICATED TO THE BWPCA UNDER A 30 FOOT WIDE EASEMENT (15 FEET EACH SIDE OF THE LINE) FOR OWNERSHIP, CONTROL AND MAINTENANCE RESPONSIBILITY. THE PERMANENT EASEMENT OVER THE MAIN TRUNK LINE WILL NEED TO BE CREATED, APPROVED BY BWPCA AND RECORDED IN THE TOWN OF BROOKLYN LAND RECORDS PRIOR TO ANY CONNECTIONS TO THE SYSTEM.
3. THE EASTERN TERMINUS MANHOLE IN LOUISE BERRY DRIVE BE A MINIMUM OF 8 FEET DEEP FROM TOP OF FRAME TO INVERT AND AN 8 INCH SDR 35 STUB BE INSTALLED A MINIMUM OF 1 PIPE LENGTH (20 FEET) AT 0.4 FT/FT SLOPE AND CAPPED IN THE EAST FACING INVERT.
4. THE ENTIRE SYSTEM BE CONSTRUCTED/INSTALLED IN ACCORDANCE WITH THE TOWN OF BROOKLYN WPCA CONSTRUCTION STANDARDS BY THE DEVELOPER. THE SYSTEM TO BE INSPECTED BY BWPCA REPRESENTATIVES DURING CONSTRUCTION, TESTED BY THE DEVELOPER AND CERTIFIED BY HIS ENGINEER AND 'CLEARED FOR USE' BY BWPCA REPRESENTATIVES BEFORE THE SYSTEM CAN BE USED.
5. UNLESS PROVIDED WITH DOCUMENTED PROOF OF ANTICIPATED USAGE, THE BWPCA IS CALCULATING THE ANTICIPATED USAGE AT 22,950 GALLONS PER DAY. (51 UNITS X 450 GPD/PER UNIT).
6. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION OF THE SEWER SYSTEM, THE BWPCA REQUIRES A PRE-CONSTRUCTION MEETING BE SCHEDULED BY THE DEVELOPER, TO INCLUDE AT A MINIMUM, AN INVITE TO THE BWPCA 72 HOURS MINIMUM IN ADVANCE OF THE MEETING AND ATTENDANCE BY THE DEVELOPER, HIS ENGINEER, THE GENERAL CONTRACTOR AND UTILITY CONTRACTOR (IF DIFFERENT ENTITIES).
7. IT IS UNDERSTOOD THAT ALL COSTS RELATING TO THE CREATION OF THIS UTILITY EXTENSION, AND THE LEGAL CONTROL AND DOCUMENTATION OF IT SHALL BE BORNE ENTIRELY BY THE DEVELOPER.
8. IT IS EXPECTED THAT CONNECTION FEES PER UNIT, BE PAID PRIOR TO THE ISSUANCE OF A BUILDING PERMIT AND THE ONLY GUARANTEE OF SYSTEM CAPACITY AVAILABILITY IS RECEIPT OF THE CONNECTION FEES BY THE BWPCA.

GENERAL NOTES:

1. Ownership of the stormwater basin and drainage system shall be the Homeowner's Association. The Town of Brooklyn will not assume responsibility as such.
2. There shall be no parking along the main access roadway or side drives. Appropriate signage shall be installed accordingly.

DATE	DESCRIPTION
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

EROSION CONTROL AND UTILITIES PLAN

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 40'	DESIGN: NET
SHEET: 6 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

DRAINAGE PIPE SCHEDULE

LABEL	LENGTH	SLOPE	DIAMETER	MATERIAL
P1	20'	2.0%	12"	HDPE
P2	128.7'	9.75%	15"	HDPE
P3	20'	2.0%	12"	HDPE
P4	131.1'	9.35%	15"	HDPE
P5	20'	2.0%	12"	HDPE
P6	168.9'	8.23%	15"	HDPE
P7	20'	2.0%	15"	HDPE
P8	128.2	2.96%	15"	HDPE
P9	20'	2.0%	15"	HDPE
P10	20'	1.0%	12"	HDPE
P11	172'	4.6%	18"	HDPE
P12	58'	1.1%	15"	HDPE
P13	36'	2.77%	18"	RCP
P14	80'	0.63%	15"	RCP

SANITARY STRUCTURE SCHEDULE

LABEL	T.F.	F/Lout
S4	296.50	292.50
S6	289.20	285.20
S8	277.50	273.50
S10	267.80	263.80
S12	240.00	231.40

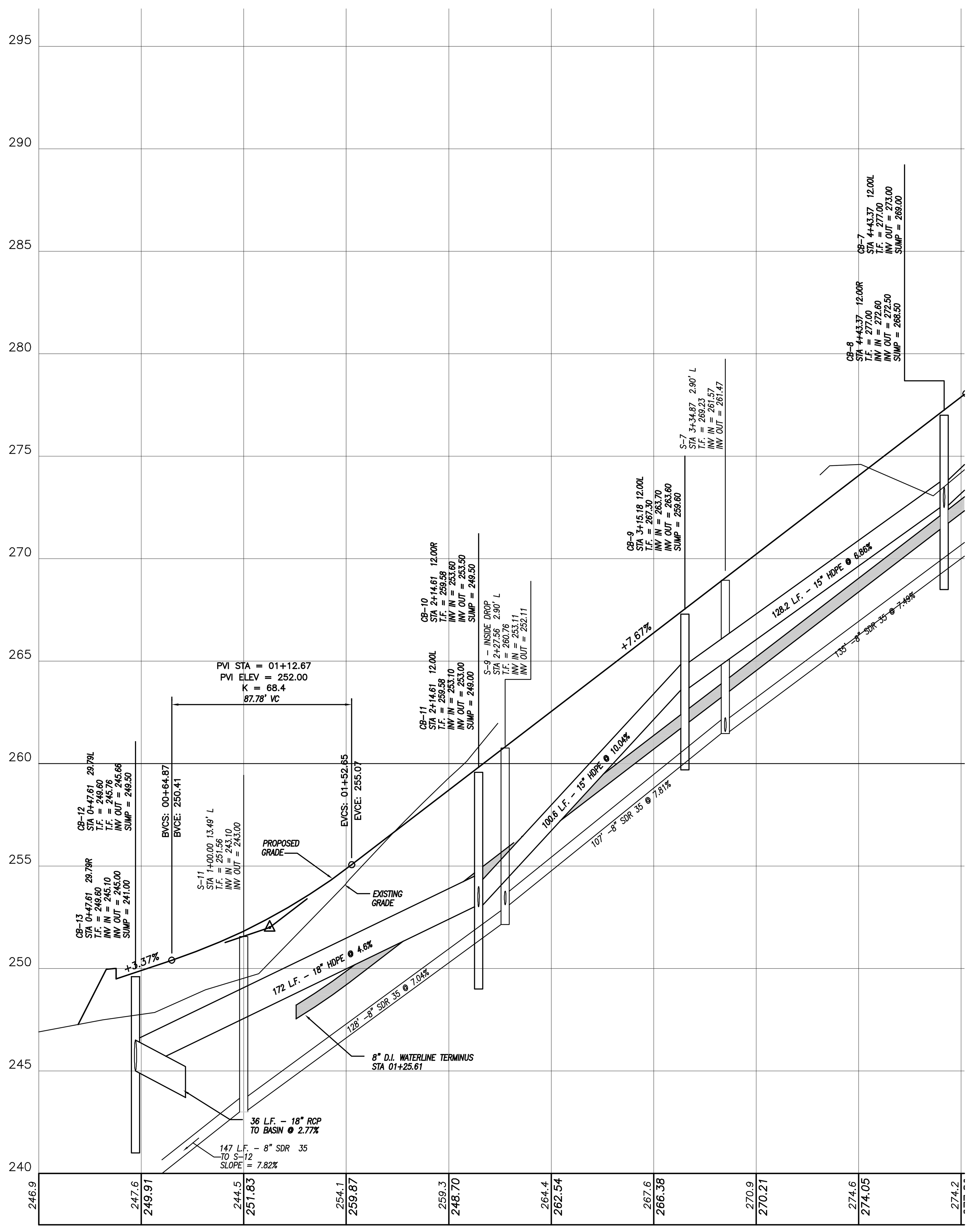
SANITARY PIPE SCHEDULE

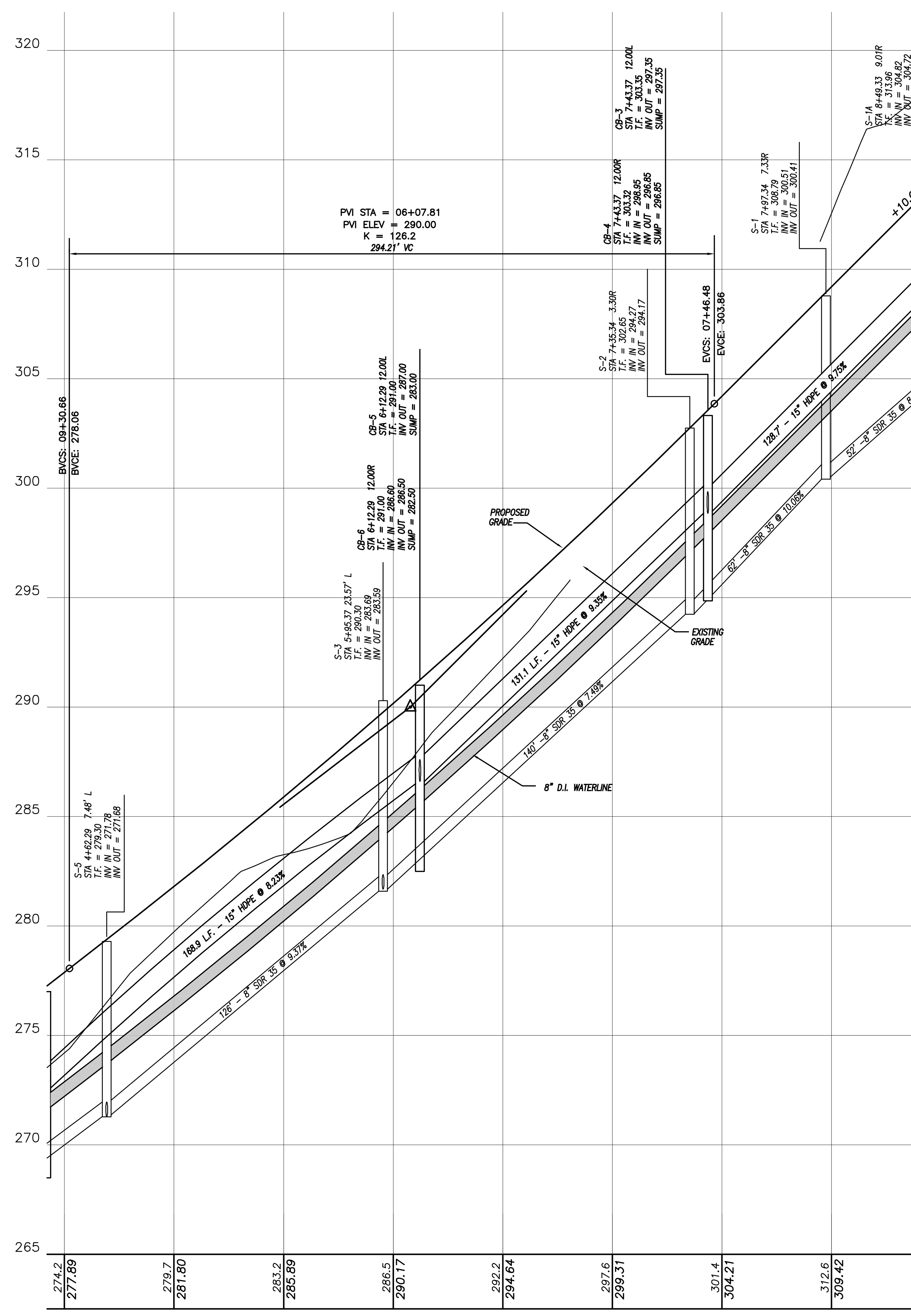
LABEL	LENGTH	SLOPE
S4P	137'	5.68%
S6P	190'	6.42%
S8P	154'	7.06%
S10P	148'	5.07%
S12P	60'	6.00%

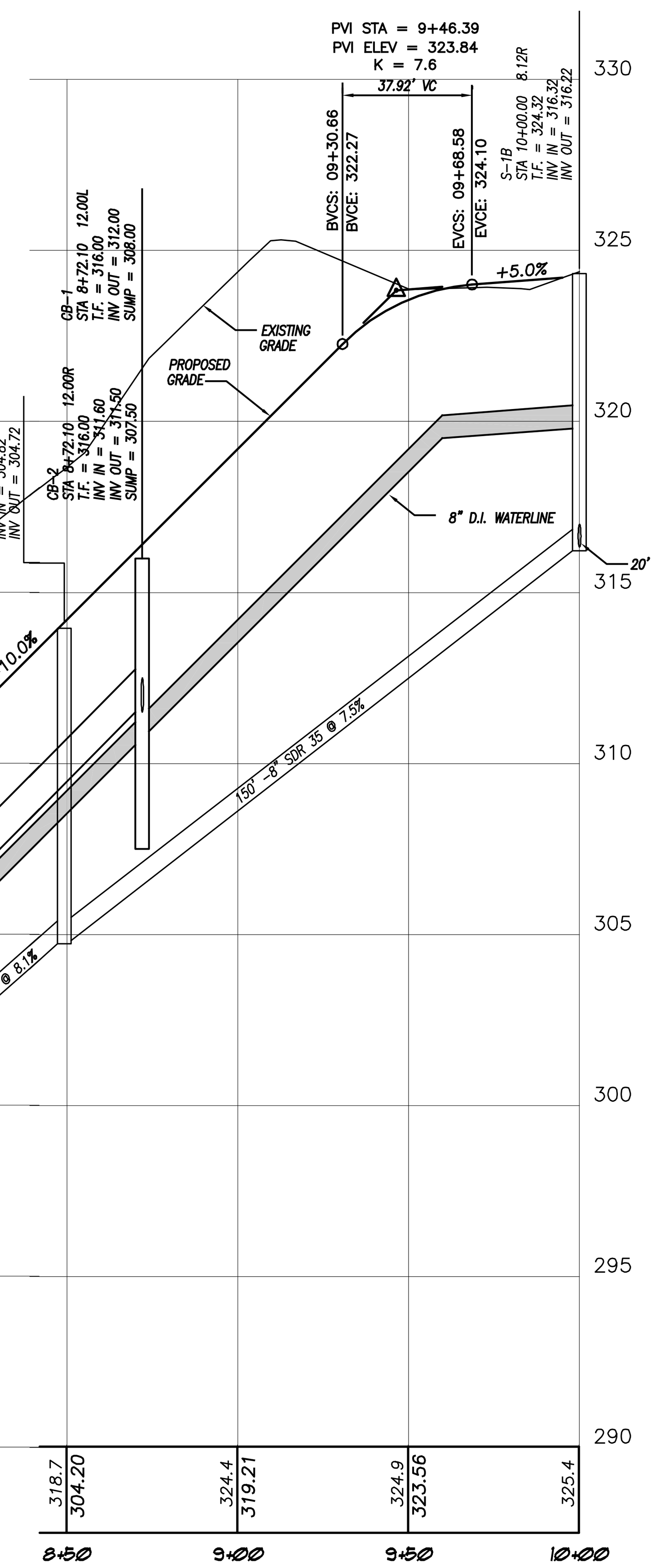
FLARED END SECTIONS

FES-1	INV = 244.00	18" RCP
FES-2	INV = 242.00	15" RCP

OUTLET STRUCTURE (OS-1)







WATER MAIN INSTALLATION NOTES:

1. PROJECT MUST BE BUILT TO CONNECTICUT WATER COMPANY SPECIFICATIONS.

2. CLASS 52 DUCTILE IRON PIPE REQUIRED.

3. COPPER AND/OR DUCTILE IRON SERVICE LATERAL MATERIAL REQUIRED.

4. GATE VALVES OPEN LEFT.

5. FIRE HYDRANTS OPEN LEFT. HYDRANTS ARE 5.5' BURY DEPTH. CT WATER COMPANY WILL FURNISH MATERIALS INCLUDING TEE, VALVE, PIPE, HYDRANT AND ACCESSORIES. FIRE HYDRANTS TO BE INSTALLED WITH FACE OF HYDRANT 3-FEET OFF FACE OF CURB. HYDRANTS ARE NOT TO BE INSTALLED IN SIDEWALKS. WHERE 3-FEET CANNOT BE OBTAINED, INSTALL HYDRANT BEHIND SIDEWALK UNLESS OTHERWISE NOTED OR AS DIRECTED BY A CT WATER COMPANY PROJECT MANAGER. 10-FEET HORIZONTAL SEPARATION REQUIRED BETWEEN HYDRANTS, SEWER MANHOLES AND STORM DRAINS. ***FIRE HYDRANTS TO BE INSTALLED WITH FINISH GRADE AT THE BURY LINE CAST INTO THE LOWER BARREL. CONTRACTOR IS RESPONSIBLE FOR ADJUSTMENTS OF WATER MAIN AND LATERAL ELEVATION TO ACHIEVE PROPER BURY DEPTH. ANY COSTS RELATED TO ADJUSTMENTS REQUIRED BY CT WATER COMPANY WILL BE THE RESPONSIBILITY OF THE INSTALLATION CONTRACTOR AND/OR APPLICANT OF RECORD.

6. ALL WATER MAIN PIPING AND APPURTENANCES MUST BE POLYETHYLENE ENCASED IN ACCORDANCE WITH AWWA ANSI-AWWA C105/A21.5-99(10). POLYETHYLENE ENCASEMENT SHALL BE V-BIO ENHANCED POLYETHYLENE ENCASEMENT ONLY AND CONSIST OF THREE CO-EXTRUDED LAYERS OF LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) FILM THAT ARE FUSED INTO ONE.

7. MEGALUG RESTRAINTS REQUIRED ON ALL FITTINGS, BENDS, OFFSETS, TEES, GATE VALVES AND HYDRANTS.

8. FIELD LOK (U.S. PIPE) OR SURE STOP 350 (MCWANE) RESTRAINING GASKETS ARE REQUIRED 2 PIPE JOINTS BEFORE AND AFTER EACH FITTING AND ON THE LAST 3 PIPE LENGTHS ON DEAD ENDS.

9. THRUST BLOCKING IS REQUIRED ON ALL BENDS, TEES, OFFSETS, HYDRANTS AND DEAD ENDS.

10. ALL WATER MAINS SHALL BE INSTALLED TO A DEPTH OF 4-FEET OF COVER BASED ON THE ROADWAY GRADE, EXCEPT AS NOTED.

11. 3-FT MINIMUM HORIZONTAL SEPARATION REQUIRED BETWEEN WATER AND ANY OTHER UTILITY/UNDERGROUND STRUCTURE. 10-FT MINIMUM HORIZONTAL SEPARATION REQUIRED BETWEEN WATER AND SEWER/SEPTIC ("SEWER")*** SLEEVE REQUIRED WHERE WATER CROSSES SEWER IF WATER IS BELOW SEPTIC AND/OR WHEN 18" VERTICAL SEPARATION CANNOT BE ACHIEVED WHEN WATER IS ABOVE SEWER. 4-FEET MINIMUM HORIZONTAL SEPARATION REQUIRED BETWEEN WATER MAIN AND DRAINAGE WHEN AT LIKE ELEVATIONS.

12. WATER MAINS TO BE DEFLECTED UNDER ALL STORM DRAINS UNLESS OTHERWISE NOTED OR AS DIRECTED BY A CT WATER COMPANY PROJECT MANAGER. A VERTICAL CLEARANCE OF 18" TO BE MAINTAINED BETWEEN STORM DRAIN AND WATER MAINS. THE CONTRACTOR IS RESPONSIBLE FOR PROPER COMPACTION AROUND AND UNDER EXISTING DRAINAGE FACILITIES WHICH MAY INCLUDE REMOVAL AND RESETTING TO PROPER GRADE.

13. ANGLE OF BENDS TO BE FIELD DETERMINED.

14. MAXIMUM ALLOWABLE DEFLECTION PER FULL LENGTH PUSH-ON JOINT FOR 4" TO 12" IS FIVE (5) DEGREES AND THREE (3) DEGREES FOR 14" AND GREATER DUCTILE IRON PIPE.

15. EXISTING SERVICES TO SITE THAT WILL NO LONGER BE USED MUST BE TERMINATED AT THE WATER MAIN BY EXPOSING AND SHUTTING OFF THE CORPORATION VALVE. THE LINE MUST BE SEVERED IMMEDIATELY AFTER THE CORPORATION VALVE. SAID SERVICES MUST BE SHOWN ON PLANS.

16. WHERE A WATER SUPPLY WELL FOR ANY PURPOSE EXISTS OR IS APPROVED WITHIN THE LIMITS OF THIS PROJECT, ALL SERVICE LINES CONNECTED TO THE PUBLIC WATER SUPPLY REQUIRE A REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER (RPD), AND MUST MEET THE REQUIREMENTS OF SEC.19A-209A OF THE CONNECTICUT GENERAL STATUTES ("CGS"), AND SEC. 19-13-B38A OF THE PUBLIC HEALTH CODE.

17. WHERE AN AIR RELIEF IS REQUIRED, CT WATER COMPANY WILL PERFORM TAP AND INSTALL WHILE THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR THE EXCAVATION AND RESTORATION UNLESS OTHERWISE NOTED. LABOR AND MATERIALS FOR THE INSTALLATION(S) WILL BE CHARGED TO THE PROJECT.

18. WHEN THE INSTALLATION OF UNDERGROUND INFRASTRUCTURE DEVIATES FROM THE CT WATER COMPANY APPROVED PLANS(S), THE APPLICANT, AT HIS/HER COST, WILL BE HELD LIABLE FOR THE RELOCATION OF INFRASTRUCTURE AS REQUIRED TO THE SATISFACTION OF THE CT WATER COMPANY. FAILURE TO CORRECT ANY DEVIATION DEEMED UNACCEPTABLE TO THE CT WATER COMPANY WILL RESULT IN LITIGATION.

HORIZONTAL SCALE IN FEET
40 20 0 40
4 2 0 4
VERTICAL SCALE IN FEET

LEGEND

- IRON PIN TO BE SET
- IRON PIN FOUND
- DRILL HOLE FOUND
- UTILITY POLE
- CATCH BASIN
- SANITARY MANHOLE
- EXISTING CONTOURS
- INLAND WETLANDS FLAG
- STONE WALL
- STONE WALL REMAINS

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REVISIONS

ROAD PROFILE

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 40'	DESIGN: NET
SHEET: 7 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

EROSION AND SEDIMENT CONTROL PLAN:

REFERENCE IS MADE TO:

1. Connecticut Guidelines for Soil Erosion and Sediment Control 2002 (2002 Guidelines).
2. U.S.D.A. N.R.C.S. Web Soil Survey.

The project will require registration under the "GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS ASSOCIATED WITH CONSTRUCTION ACTIVITIES" with the CTDEEP. 60 days prior to any activity on site, the developer or his representative shall submit the registration to the CTDEEP. The Town of Brooklyn shall be given a copy of the registration approval.

DEVELOPMENT CONTROL PLAN:

1. Development of the site will be performed by the Contractor, who will be responsible for the installation and maintenance of erosion and sediment control measures required throughout construction.
2. The sedimentation control mechanisms shall remain in place from start of construction until permanent vegetation has been established. The representative for the Town of Brooklyn will be notified when sediment and erosion control structures are initially in place. Any additional soil & erosion control measures requested by the Town or its agent, shall be installed immediately. Once the proposed development, seeding and planting have been completed, the representative shall again be notified to inspect the site. The control measures will not be removed until this inspection is complete.
3. All stripping is to be confined to the immediate construction area. Topsoil shall be stockpiled so that slopes do not exceed 2 to 1. A hay bale sediment barrier is to surround each stockpile and a temporary vegetative cover shall be provided.
4. Dust control will be accomplished by spraying with water. The application of calcium chloride is not permitted adjacent to wetland resource areas or within 100' of these areas.
5. The proposed planting schedule is to be adhered to during the planting of disturbed areas throughout the proposed construction site.
6. Final stabilization of the site is to follow the procedures outlined in "Permanent Vegetative Cover". If necessary a temporary vegetative cover is to be provided until a permanent cover can be applied.

SILT FENCE INSTALLATION AND MAINTENANCE:

1. Dig a 6" deep trench on the uphill side of the barrier location.
2. Position the posts on the downhill side of the barrier and drive the posts 1.5 feet into the ground.
3. Lay the bottom 6" of the fabric in the trench to prevent undermining and backfill.
4. Inspect and repair barrier after heavy rainfall.
5. Inspections will be made at least once per week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater to determine maintenance needs.
6. Sediment deposits are to be removed when they reach a height of 1 foot behind the barrier or half the height of the barrier and are to be deposited in an area which is not regulated by the inland wetlands commission.
7. Replace or repair the fence within 24 hours of observed failure. Failure of the fence has occurred when sediment fails to be retained by the fence because:
   - the fence has been overtopped, undercut or bypassed by runoff water,
   - the fence has been moved out of position (knocked over), or
   - the geotextile has decomposed or been damaged.

HAY BALE INSTALLATION AND MAINTENANCE:

1. Bales shall be placed as shown on the plans with the ends of the bales tightly abutting each other.
2. Each bale shall be securely anchored with at least 2 stakes and gaps between bales shall be wedged with straw to prevent water from passing between the bales.
3. Inspect bales at least once per week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs.
4. Remove sediment behind the bales when it reaches half the height of the bale and deposit in an area which is not regulated by the Inland Wetlands Commission.
5. Replace or repair the barrier within 24 hours of observed failure. Failure of the barrier has occurred when sediment fails to be retained by the barrier because:
   - the barrier has been overtopped, undercut or bypassed by runoff water,
   - the barrier has been moved out of position, or
   - the hay bales have deteriorated or been damaged.

TEMPORARY VEGETATIVE COVER:

SEED SELECTION

Grass species shall be appropriate for the season and site conditions. Appropriate species are outlined in Figure TS-2 in the 2002 Guidelines.

TIMING CONSIDERATIONS

Seed with a temporary seed mixture within 7 days after the suspension of grading work in disturbed areas where the suspension of work is expected to be more than 30 days but less than 1 year.

SITE PREPARATION

Install needed erosion control measures such as diversions, grade stabilization structures, sediment basins and grassed waterways.

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application, and mulch anchoring.

SEEDBED PREPARATION

Loosen the soil to a depth of 3-4 inches with a slightly roughened surface. If the area has been recently loosened or disturbed, no further roughening is required. Soil preparation can be accomplished by tracking with a bulldozer, discing, harrowing, raking or dragging with a section of chain link fence. Avoid excessive compaction of the surface by equipment traveling back and forth over the surface. If the slope is tracked, the cleat marks shall be perpendicular to the anticipated direction of the flow of surface water.

If soil testing is not practical or feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10-10-10 or equivalent. Additionally, lime may be applied using rates given in Figure TS-1 in the 2002 Guidelines.

SEEDING

Apply seed uniformly by hand cyclone seeder, drill, cultipacker type seeder or hydroseeder at a minimum rate for the selected species. Increase seeding rates by 10% when hydroseeding.

MULCHING

Temporary seedings made during optimum seeding dates shall be mulched according to the recommendations in the 2002 Guidelines. When seeding outside of the recommended dates, increase the application of mulch to provide 95%-100% coverage.

MAINTENANCE

Inspect seeded area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for seed and mulch movement and rill erosion.

Where seed has moved or where soil erosion has occurred, determine the cause of the failure. Repair eroded areas and install additional controls if required to prevent reoccurrence of erosion.

Continue inspections until the grasses are firmly established. Grasses shall not be considered established until a ground cover is achieved which is mature enough to control soil erosion and to survive severe weather conditions (approximately 80% vegetative cover).

PERMANENT VEGETATIVE COVER:

Refer to Permanent Seeding Measure in the 2002 Guidelines for specific applications and details related to the installation and maintenance of a permanent vegetative cover. In general, the following sequence of operations shall apply:

1. Topsoil will be replaced once the excavation and grading has been completed. Topsoil will be spread at a minimum compacted depth of 4".
2. Once the topsoil has been spread, all stones 2" or larger in any dimension will be removed as well as debris.
3. Apply agricultural ground limestone at a rate of 2 tons per acre or 100 lbs. per 1000 s.f. Apply 10-10-10 fertilizer or equivalent at a rate of 300 lbs. per acre or 7.5 lbs. per 1000 s.f. Work lime and fertilizer into the soil to a depth of 4".
4. Inspect seedbed before seeding. If traffic has compacted the soil, retill compacted areas.
5. Apply the chosen grass seed mix. The recommended seeding dates are: April 1 to June 15 & August 15 - October 1.
6. Following seeding, firm seedbed with a roller. Mulch immediately following seeding. If a permanent vegetative stand cannot be established by September 30, apply a temporary cover on the topsoil such as netting, mat or organic mulch.

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DEVELOPMENT SCHEDULE/SEQUENCE OF OPERATIONS:

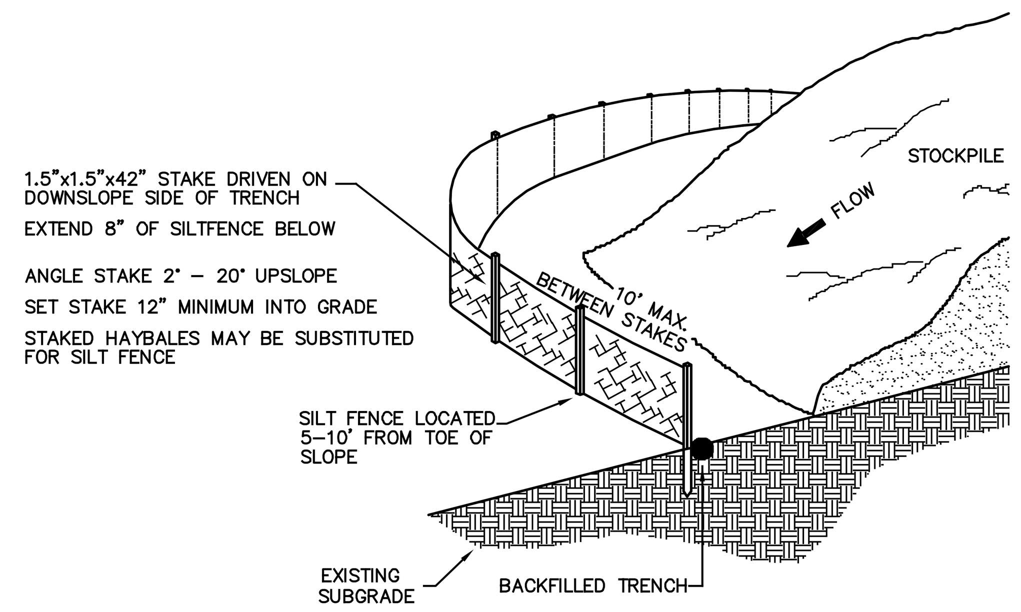
1. Flag the limits of disturbance and schedule pre-construction meeting with Town of Brooklyn wetlands Agent.
2. The only work that shall be permitted prior to installation of perimeter erosion controls shall be clearing of vegetation. No grubbing shall be conducted until the perimeter erosion and sediment controls have been installed per the plan and inspected by the Town of Brooklyn Agent. Written approval for installation of the erosion and sedimentation controls shall be obtained from the Town of Brooklyn IWWC Agent prior to commencing with any other work.
3. Contact utility companies for scheduling installation of utilities and connections
4. Install the anti-tracking construction entrance.
5. Cut trees within the defined clearing limits and remove the cut wood.
6. Install perimeter erosion and sedimentation controls in accordance with the site development plan.
7. Chip brush and slash, stockpile chips for use on site or remove off site.
8. Box out driveway and stockpile topsoil in locations shown on the plans. Install erosion controls around stockpile and apply temporary seeding.
9. Contact utility companies (CT Water and the Brooklyn WPCA) to coordinate water main and sanitary sewer connections. Install water and sanitary sewer lines beginning from the lowest elevation.
10. Excavate stormwater basin to be utilized as a temporary sedimentation basin during construction. Install drainage structures and pipe and provide inlet protection at catch basins.
11. Install and compact processed gravel for roadway base.
12. Remove tree stumps and dispose of at an approved disposal site. Alternatively, stumps may be chipped in place. No stumps shall be buried on site.
13. Strip and stockpile topsoil that is within the footprint of the site. Surround stockpile with silt fence or staked haybales, and apply temporary seeding in accordance with recommended mixtures. Divert runoff around the perimeter of the stockpile.
14. Make all required cuts and fills. Establish the subgrade for the driveway as required and install additional erosion controls as necessary and as shown on the plans.
15. Inspect perimeter erosion and sedimentation controls weekly and after rain events in excess of 0.5". Repair any damaged controls and provide additional erosion control devices as necessary to address areas of concentrated runoff that may develop as a result of the construction activities. The contractor shall review discharge conditions with the design engineer or the Town of Brooklyn prior to installing additional erosion controls. Apply water as necessary for dust control.
16. Install utilities to in the locations shown on the plans.
17. Prepare sub-base for roadway for final grading.
18. Excavate for building footings, stockpile soil and pour footings & slab. Begin phased building construction.
19. Place topsoil where required and install any proposed landscaping upon completion of each building.
20. Install first course of pavement to each building as they are completed and required landscaping.
21. When the remainder of the site work is near completion, sweep all paved areas for the final course of paving. Inspect erosion controls and remove any accumulated sediment.
22. Install final course of pavement upon the completion of the final structure.
23. Fine grade, rake, seed and mulch to within 2' of the pavement.
24. Remove and dispose of all silt fence and hay bales after the site has been stabilized to the satisfaction of the Town of Brooklyn.

RESPONSIBLE PARTY FOR E&S MAINTENANCE:

Shane Pollock
101 Mackin Drive
Griswold, CT 06351
(860) 888-3129

CONSTRUCTION NOTES/GENERAL PROVISIONS

1. The locations of existing utilities are based upon visible field observations, record mapping and interviews with the property owner and abutting property owners. They are is shown for informational purposes only. Contractor shall coordinate exploratory test hole excavation with the Engineer if necessary to verify and/or determine actual locations of some utilities & structures. It is the responsibility of the contractor to verify the location and elevation of all utilities. Contact "CALL BEFORE YOU DIG" at 1-800-922-4455, and obtain all applicable permits, prior to any excavation around utilities.
2. All existing site features not scheduled to remain shall be removed and disposed of in a proper manner, by the contractor.
3. All Materials and methods of construction shall conform to "State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 818", and supplements thereto.
4. The Contractor shall obtain copies of all regulatory agency permits from the Owner prior to any site disturbance.
5. Unless otherwise noted on the plans, the contractor shall use the geometry provided on the construction plans. Benchmark information shall be provided to the contractor by the Owner or the Owner's surveyor. Any discrepancies between field measurements and construction plan information shall be brought to the attention of the Engineer or Surveyor immediately.
6. The Contractor shall not revise elevations or locations of items shown on the plans without written consent of the project Engineer or Surveyor.
7. The Contractor shall protect benchmarks, property corners, and other survey monuments from damage or displacement. If a marker needs to be removed, it shall be referenced by a licensed land surveyor and replaced as necessary by the same.
8. The Contractor shall be responsible for preparing and compacting base for proposed pavement. Owner shall provide general fill to establish subgrade - contractor shall spread and compact. Contractor shall provide, spread and compact required processed aggregate
9. The entire project site shall be thoroughly cleaned at the completion of the work. Clean all installed paved areas, accumulated silt and sediment shall be removed from the stormwater system, silt fence removed and disposed of, excess construction materials removed, plus all adjacent areas affected by the construction activities as directed by the Owner or the jurisdictional Agency. Any material removed from the site shall be relocated to an approved off-site disposal area.
10. Upon completion of construction, accumulated sediment and other deleterious materials shall be thoroughly removed catch basins, manholes, pipes and swales and disposed of off site. Additionally, the stormwater detention basin bottom and structures shall be cleaned and restored to "like new" condition.



SILT FENCE @ TOE OF SLOPE APPLICATION

NOT TO SCALE

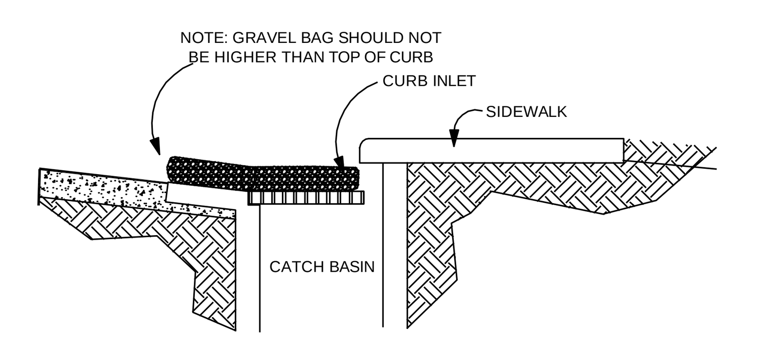
DEEP TEST HOLE EVALUATION - November 25, 2020
Normand Thibeault, Jr., P.E., Killingly Engineering Associates

TEST PIT	DEPTH	PROFILE
1	0"- 10"	Topsoil
	10"- 18"	Orange-brown fine sandy loam
	18"- 44"	Gray fine silty sand w/rocks
	44"- 72"	Gray rocky gravel - compact
	Ledge	N/A
	GWT	N/A
	Mottling	44"
2	0"- 9"	Topsoil
	9"- 21"	Orange-brown fine sandy loam
	21"- 41"	Gray fine silty sand/rocks
	41"- 74"	Gray rocky sandy gravel - compact
	Ledge	N/A
	GWT	N/A
	Mottling	41"
3	0"- 10"	Topsoil
	10"- 24"	Orange-brown fine sandy loam
	24"- 41"	Gray fine silty sand/rocks
	41"- 71"	Hardpan
	Ledge	N/A
	GWT	N/A
	Mottling	41"

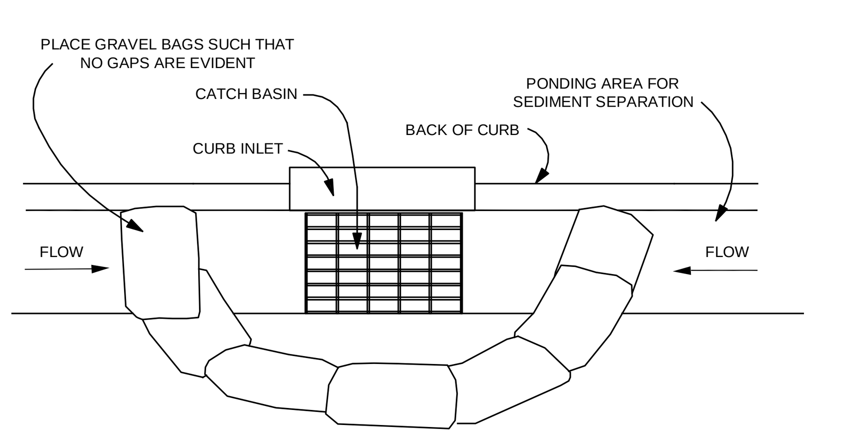
PERCOLATION TEST RESULT - November 27, 2020
Killingly Engineering Associates - Normand Thibeault, P.E.

Depth = 24" Rate = 6.7 min./in.

Time	Reading
1:30	4.5"
1:35	7.5"
1:40	11"
1:45	12.5"
1:50	14"
2:00	15.5"
2:05	16.75"
2:10	17.5"
2:15	18.25"
2:20	19"



SECTION VIEW

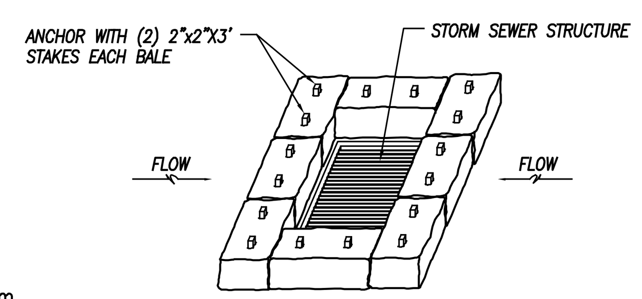


PLAN VIEW

NOTES:

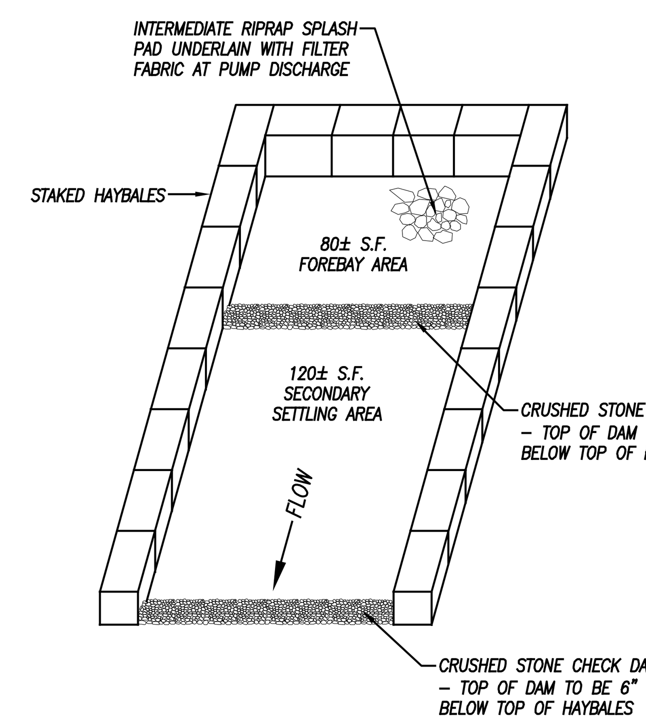
1. PLACE GRAVEL BAG BARRIER ON GENTLY SLOPING STREET, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNNOFF.
2. USE SAND BAGS OF WOVEN GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH ½ INCH (OR SMALLER) GRAVEL. BAGS MUST BE LAYERED SUCH THAT NO GAPS ARE EVIDENT.
3. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT, SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.
4. WHEN INSTALLING CURB INLET PROTECTION DEVICES, **NEVER** BLOCK THE CURB INLET.

STANDARD GRAVEL BAG CURB INLET PROTECTION



HAYBALE INSTALLATION AT CATCH BASIN

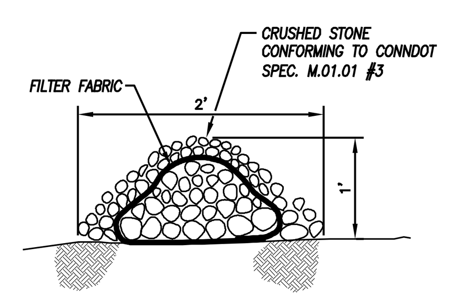
NOT TO SCALE



PUMPING OUTLET BASIN

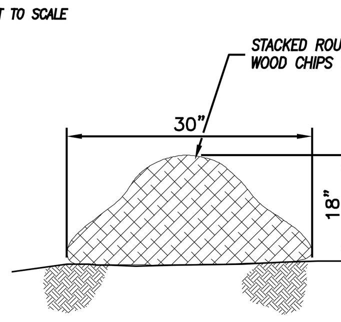
NOT TO SCALE

NOTES:
1.) TO BE USED IN THE EVENT THAT DEWATERING IS REQUIRED
2.) LOCATE BASINS OUTSIDE OF WETLANDS UPLAND REVIEW AREAS



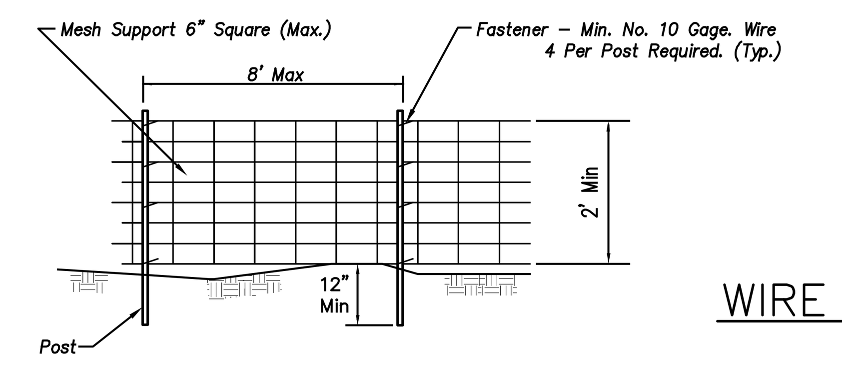
STONE CHECK DAM

NOT TO SCALE



WOOD CHIP BERM

NOT TO SCALE

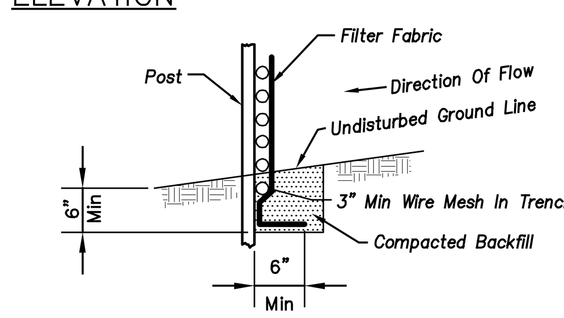


ELEVATION

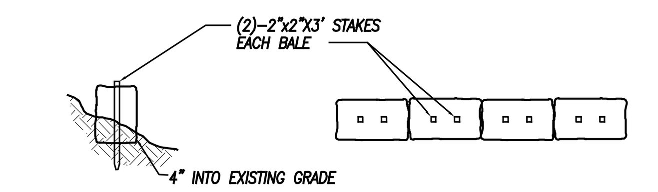
NOTES:

1. Wires of mesh support shall be min. gage no. 12.
2. Temporary sediment fence shall be installed prior to any grading work in the area to be protected. They shall be maintained throughout the construction period and removed in conjunction with the final grading and site stabilization.
3. Filter fabric shall meet the requirements of material specification 592 Geotextile Table 1 or 2, Class I with equivalent opening size of at least 30 for nonwoven and 50 for woven.
4. Fence posts shall be either wood post with a minimum cross-sectional area of 3.0 sq. in. or a standard steel post.

WIRE BACKED SILT FENCE

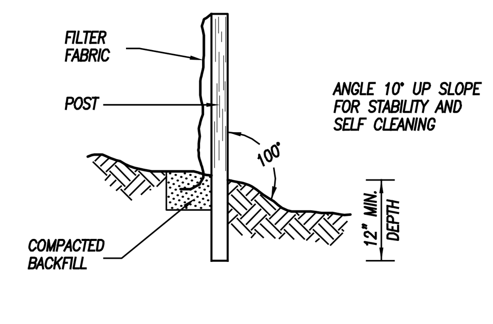


FABRIC ANCHOR DETAIL



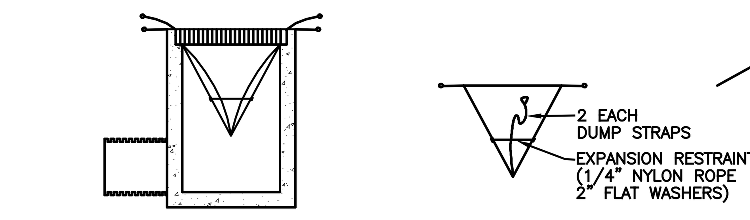
HAYBALE BARRIER

NOT TO SCALE



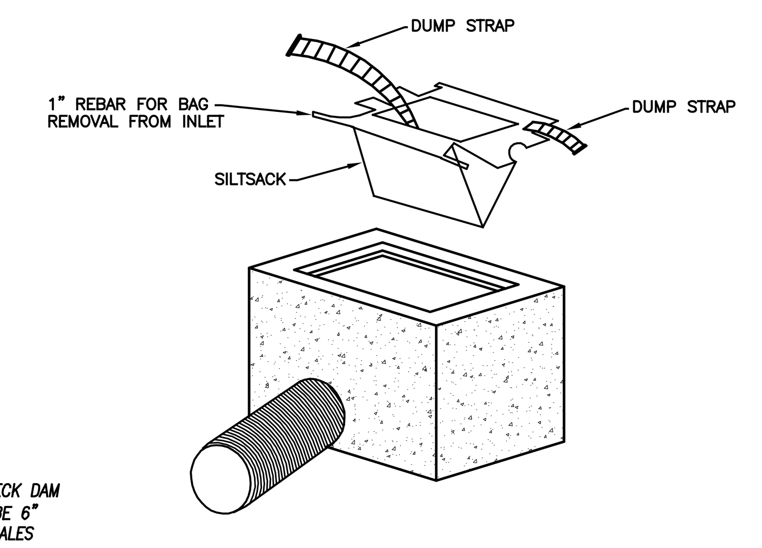
SILT FENCE

NOT TO SCALE



INSTALLATION DETAIL

BAG DETAIL

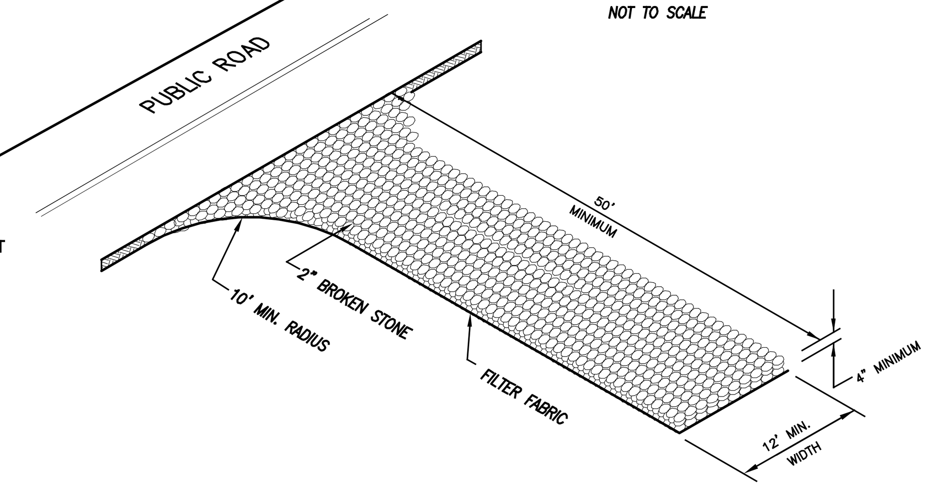


INLET SEDIMENT CONTROL DEVICE

NOT TO SCALE

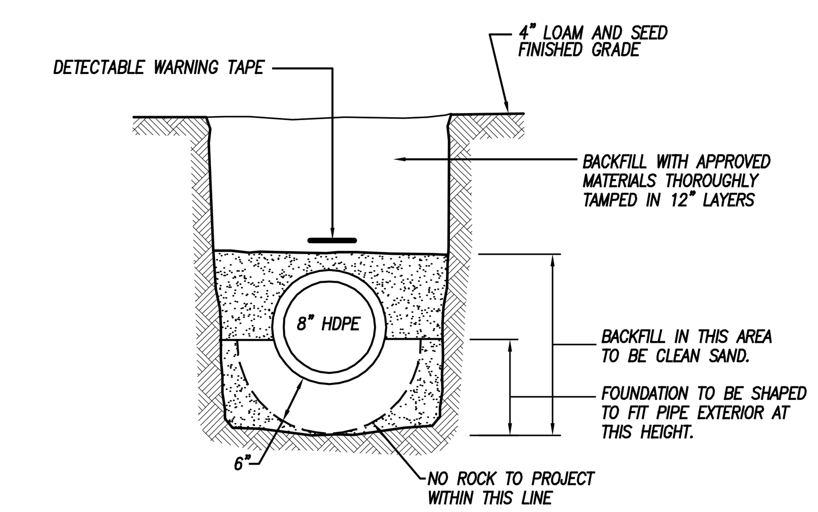
INSTALLATION & MAINTENANCE

1. Install as directed by manufacturer.
2. Inspect the catch basin sediment device at least once a week (preferably twice) and after rainfall events of 0.5" or greater.
3. Remove sediment when the siltsack is 1/2 full. Sediment shall be deposited in an area which is not regulated by the Inland Wetlands Commission.
4. Replace or repair within 24-hours of observed failure. Failure may include:
   - Overtopping, or bypassed by runoff water.
   - The geotextile has decomposed or has been damaged.



CONSTRUCTION ENTRANCE

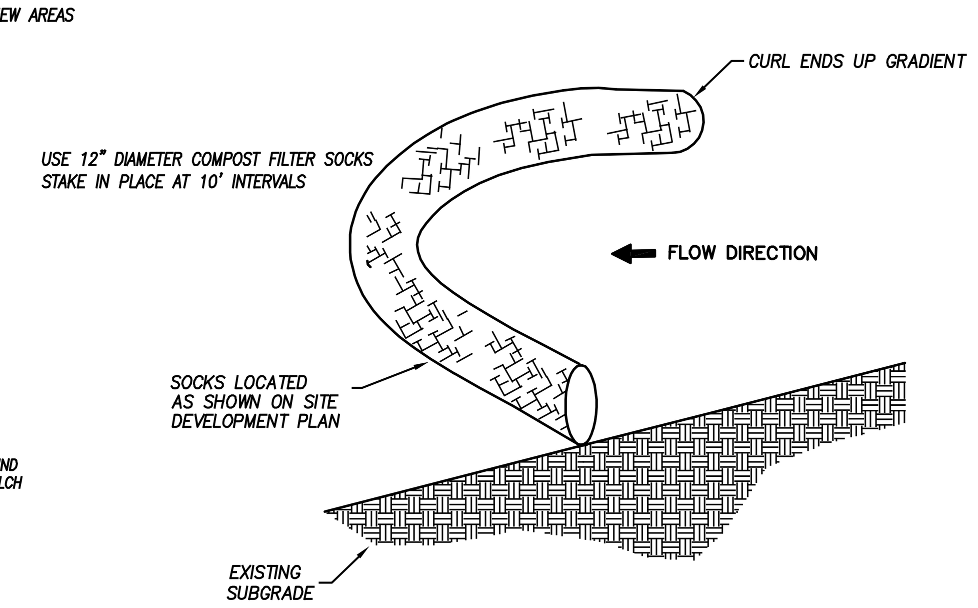
NOT TO SCALE



ROOF LEADER PIPE IN TRENCH DETAIL

NOT TO SCALE

NOTE: MINIMUM SLOPE OF ROOF LEADERS SHALL BE 2%



COMPOST FILTER SOCK APPLICATION

NOT TO SCALE

NOTES:

- MAY BE USED AS A STRUCTURAL BACKING FOR SILT FENCE
- WHEN USED SINGLY, REMOVE SEDIMENT WHEN HALF THE HEIGHT OF THE SOCK HAS BEEN REACHED
- PROVIDE SOCK AS MANUFACTURED BY "FILTREXX" OR ENGINEER APPROVED EQUAL.

NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

DATE	DESCRIPTION
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

DETAIL SHEET

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
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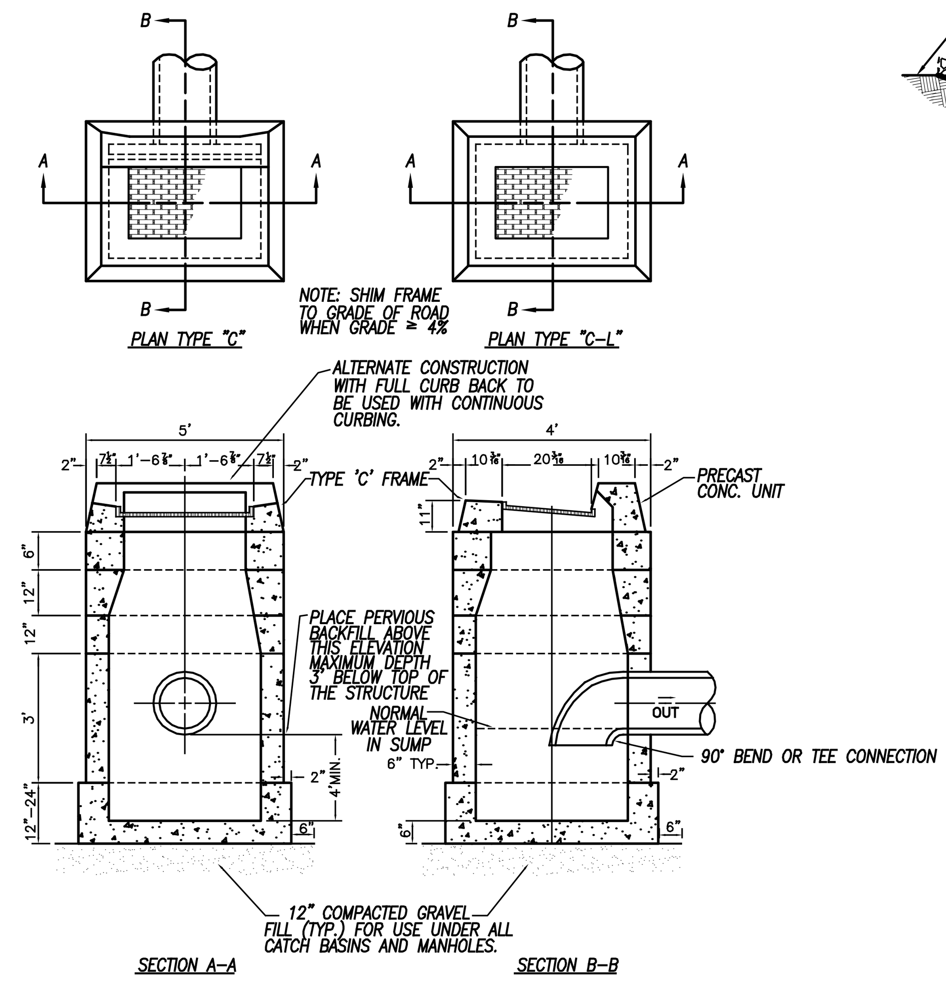
www.killinglyengineering.com

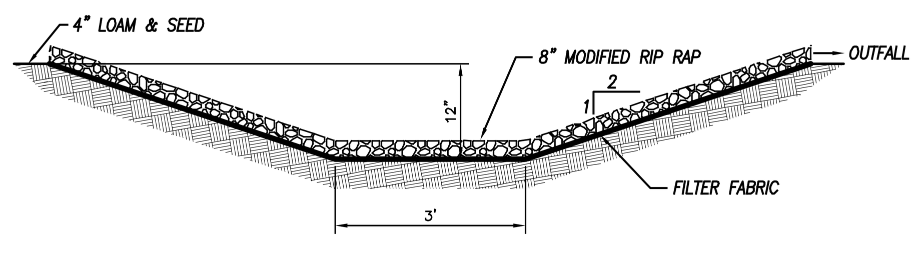
DATE: 4/23/2020	DRAWN: DNE
SCALE: NOT TO SCALE	DESIGN: NET
SHEET: 8 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014



HOODED CATCH BASIN DETAIL

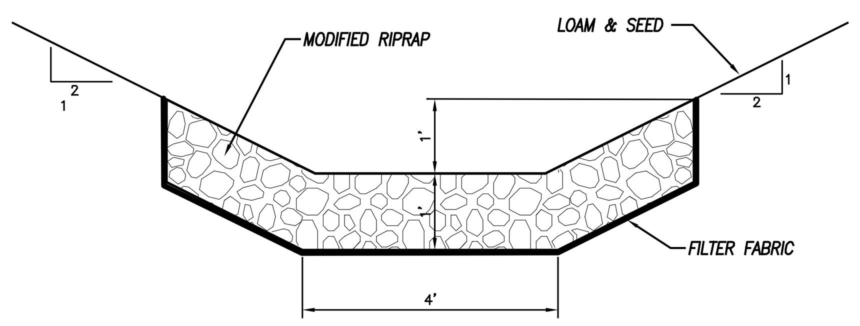
NOT TO SCALE

NOTES:
- TO BE INSTALLED AT FINAL CATCH BASIN WITH OUTLET TO STORMWATER BASIN.
- A CATCH BASIN HOOD MAY BE SUBSTITUTED WITH THE PRE-APPROVAL OF THE TOWN ENGINEER



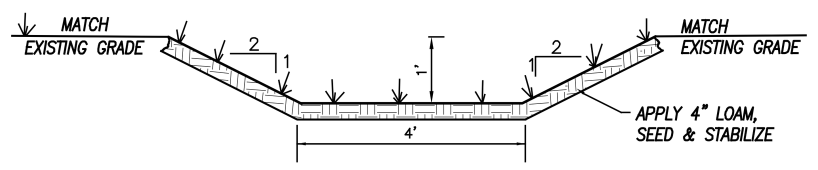
SECTION THROUGH LEVEL SPREADER

NOT TO SCALE



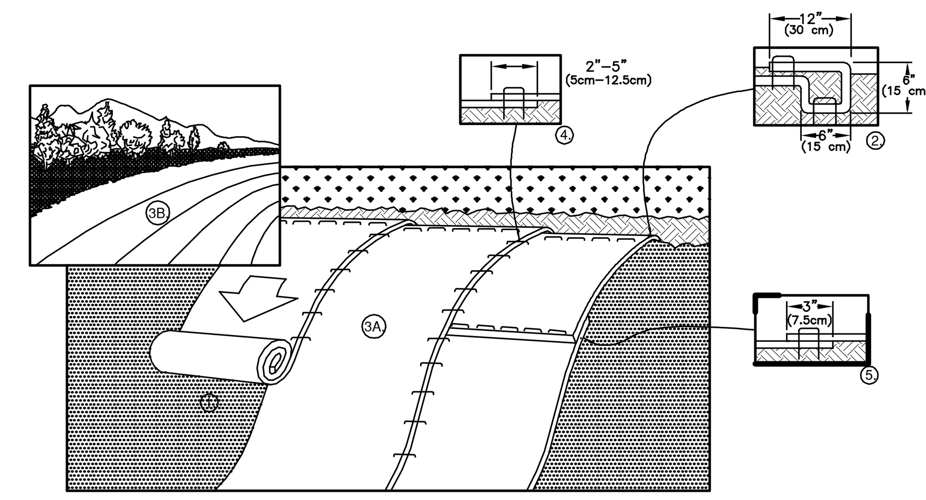
MODIFIED RIPRAP SWALE

NOT TO SCALE



GRASS LINED SWALE

NOT TO SCALE



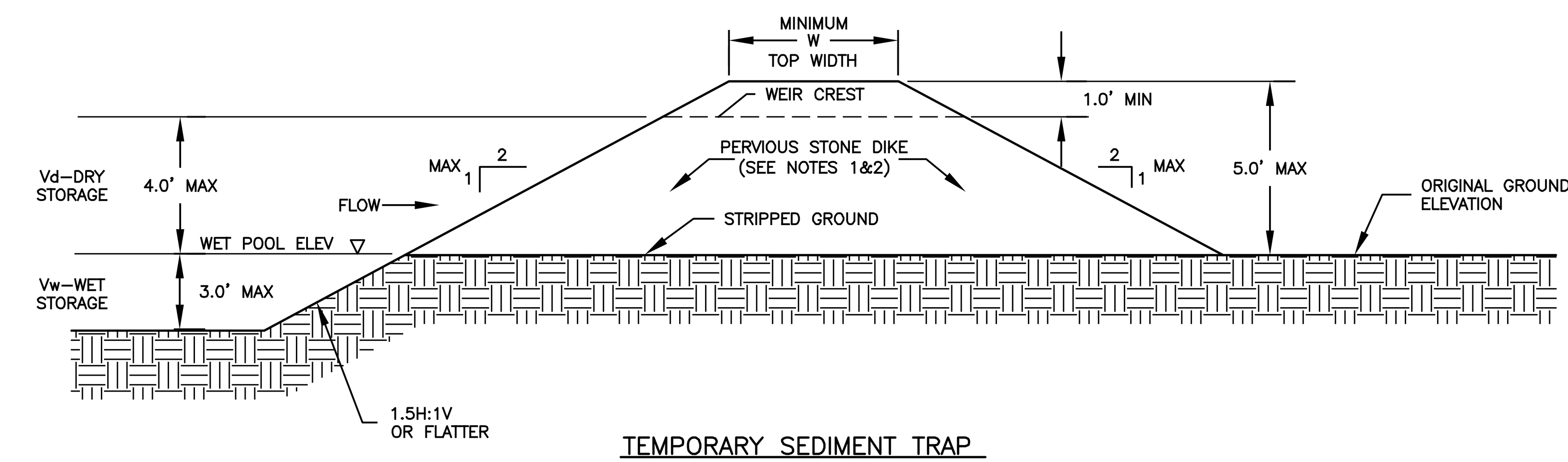
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5cm-12.5cm) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH™ ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5cm) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30cm) APART ACROSS ENTIRE BLANKET WIDTH.

NOTES:

1. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.
2. TURF REINFORCEMENT MAT SHALL BE NORTH AMERICAN GREEN BIOMAT SC-150BN OR APPROVED BIODEGRADABLE EQUIVALENT.

TURF REINFORCEMENT MAT INSTALLATION

NOT TO SCALE



TOP WIDTH VS. HEIGHT

H = HEIGHT OF EMBANKMENT
W= TOP WIDTH OF EMBANKMENT

H(ft)	W(ft)
1.5	2.0
2.0	2.0
2.5	2.5
3.0	2.5
3.5	3.0
4.0	3.0
4.5	4.0
5.0	4.5

TEMPORARY SEDIMENT TRAP EMBANKMENT CROSS SECTION

NOT TO SCALE

NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL AND EROSION CONTROL, SECTIONS 5-11-25 THRU 5-11-29.
2. PERVIOUS STONE DIKE SHALL BE CONSTRUCTED OF MODIFIED RIPRAP (CTDOT M.12.02) WITH #3 STONE ON FACE (CTDOT M.01.01).
3. NON-OVERFLOW PORTIONS AND ABUTMENTS OF TEMPORARY SEDIMENT TRAPS MAY BE CONSTRUCTED OF ENGINEER APPROVED BACKFILL COMPACTED IN 9" LAYERS. USE ONLY MATERIAL FOR THE EMBANKMENT THAT IS FREE FROM EXCESSIVE ORGANICS, DEBRIS, ROCKS OVER 6" IN DIAMETER OR OTHER UNSUITABLE MATERIALS.
4. IF, IN THE JUDGEMENT OF THE ENGINEER, MATERIALS FROM ON-SITE EXCAVATION ACTIVITIES ARE NOT SUITABLE FOR CONSTRUCTION OF SEDIMENT TRAP EMBANKMENTS, MATERIALS SHALL BE IMPORTED TO THE SITE.
5. EARTHEN EMBANKMENTS SHALL BE STABILIZED WITH TEMPORARY SEEDING, PERMENANT SEEDING OR STONE SLOPE PROTECTION IMMEDIATELY AFTER INSTALLATION.
6. TEMPORARY SEDIMENT TRAP(S) SHALL BE INSPECTED AT LEAST ONCE PER WEEK AND WITHIN 24 HOURS OF THE END OF A STORM OF 0.5 INCHES OF RAINFALL OR GREATER. REMOVE ACCUMULATED SEDIMENT WHEN ONE HALF OF THE MINIMUM WET STORAGE VOLUME HAS BEEN FILLED. DISPOSE OF REMOVED SEDIMENT IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

SEED MIX REQUIREMENTS:

AREA	SPECIES	SEEDING RATE (lbs/acre)
Mowed & maintained banks	Creeping Red Fescue (Pennlawn, Wintergreen)	20
	Bird's-foot Trefoil (Empire, Viking) with innoculant	8
	Tall Fescue (Kentucky 31)	20
	TOTAL	48
Unmowed banks & slopes	Tall Fescue (Kentucky 31)	20
	Flatpea (Lathco) with inoculant	30
	TOTAL	50
Diversions & channels	Creeping Red Fescue (Pennlawn, Wintergreen)	20
	Redtop (Sreeker, Common)	2
	Tall Fescue (Kentucky 31)	20
	TOTAL	42
Lawns & high maintenance areas	Turf type Tall Fescue	TOTAL 150

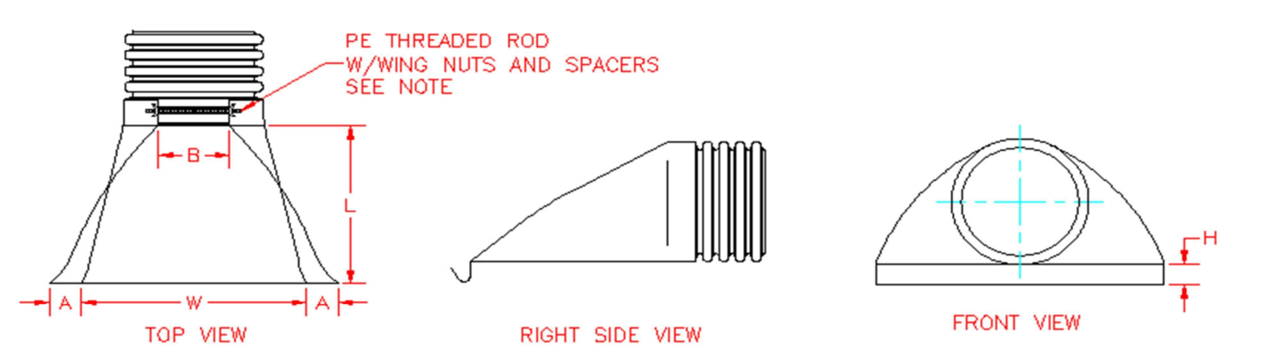
***Alternative seed mixes may be used. Alternative seed mix selections shall be in accordance with Figures PS-2 and PS-3 in the 2002 Guidelines for Soil Erosion and Sediment Control or as specified by and coordinated with the landscape designer.

New England Erosion Control/Restoration Mix For Detention Basins and Moist Sites

The New England Erosion Control/Restoration Mix for Detention Basins and Moist Sites contains a selection of native grasses and wildflowers designed to colonize generally moist, recently disturbed sites where quick growth of vegetation is desired to stabilize the soil surface. It is an appropriate seed mix for ecologically sensitive restorations that require stabilization as well as long-term establishment of native vegetation. This mix is particularly appropriate for detention basins that do not hold standing water for extended periods. Many of the plants in this mix can tolerate infrequent inundation, but not constant flooding. The mix may be applied by hand, by mechanical spreader, or by hydro-seeder. After sowing, lightly rake, roll or cultipack to insure good seed to soil contact. Best results are obtained with a Spring or late Summer seeding. Late Fall and Winter dormant seeding requires an increase in the application rate. A light mulching of clean, weed-free straw is recommended.

SPECIES: Riverbank Wild Rye (Elymus riparius), Creeping Red Fescue (Festuca rubra), Little Bluestem (Schizachyrium scoparium), Big Bluestem (Andropogon gerardii), Switch Grass (Panicum virgatum), Upland Bentgrass (Agrostis perennans), Nodding Bur Marigold (Bidens cernua), Hollow-Stem Joe Pye Weed (Eupatorium fistulosum/Eutrochium fistulosum), New England Aster (Aster novae-angliae), Boneset (Eupatorium perfoliatum), Blue Vervain (Verbena hastata), Soft Rush (Juncus effusus), Wool Grass (Scirpus cyperinus).</P>

FLARED END SECTIONS



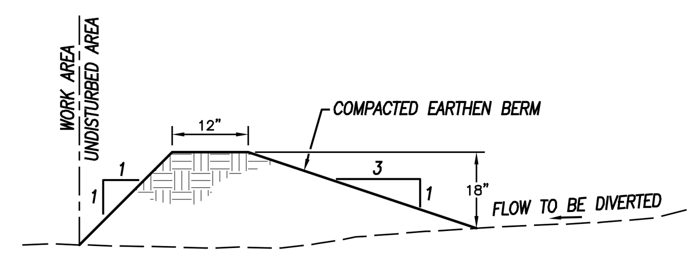
PART #	PIPE SIZE	A	B(MAX)	H	L	W
1015NP	10 in (250 mm)	3.8 in (95 mm)	10.0 in (254 mm)	6.5 in (165 mm)	28.0 in (711 mm)	34.5 in (876 mm)
1215NP	12 & 15 (300 & 375mm)	6.5 in (165 mm)	10.0 in (254 mm)	6.5 in (165 mm)	25.0 in (635 mm)	29.0 in (737 mm)
1810NP	18 in (450 mm)	7.5 in (191 mm)	15.0 in (381 mm)	6.5 in (165 mm)	32.0 in (813 mm)	35.0 in (889 mm)
2410NP	24 in (600 mm)	7.5 in (191 mm)	18.0 in (457 mm)	6.5 in (165 mm)	36.0 in (914 mm)	45.0 in (1143 mm)
3015NP	30 in (750 mm)	7.5 in (191 mm)	12.0 in (305 mm)	8.6 in (218 mm)	58.0 in (1473 mm)	63.0 in (1600 mm)
3615NP	36 in (900 mm)	7.5 in (191 mm)	25.0 in (635 mm)	8.6 in (218 mm)	58.0 in (1473 mm)	63.0 in (1600 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

DRAWING #	6070
DRAWN BY	JCB 01.17.07
APPROVED BY	JCB 06.28.07
REVISIONS	TJR 6/7/2016

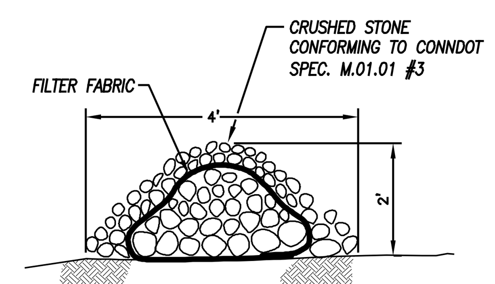
ADVANCED DRAINAGE SYSTEMS, INC.

FLARED END SECTION



TEMPORARY DIVERSION

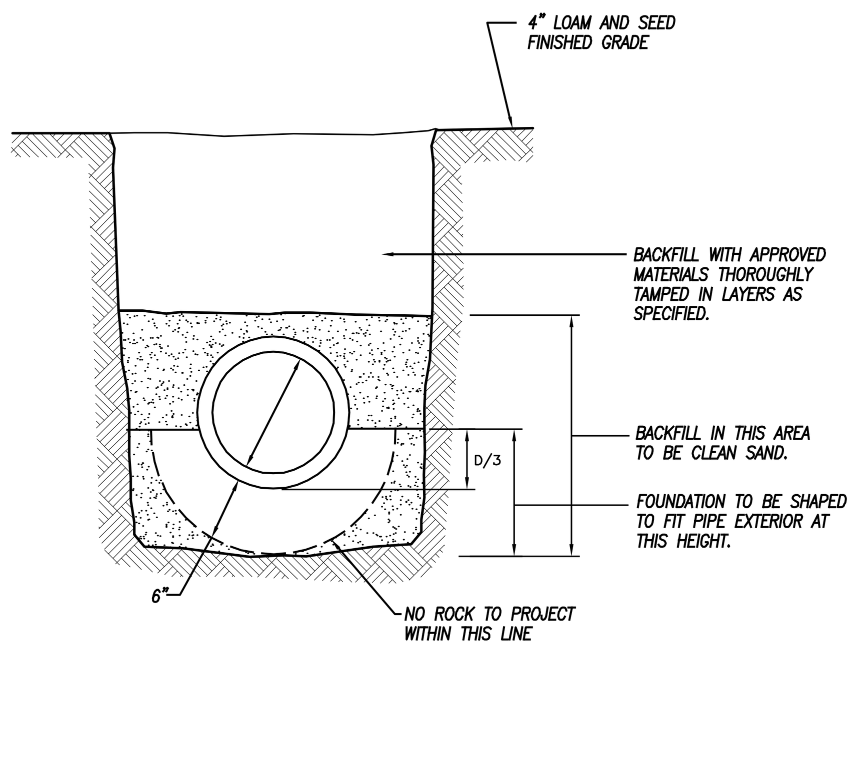
NOT TO SCALE



STONE BERM

NOT TO SCALE

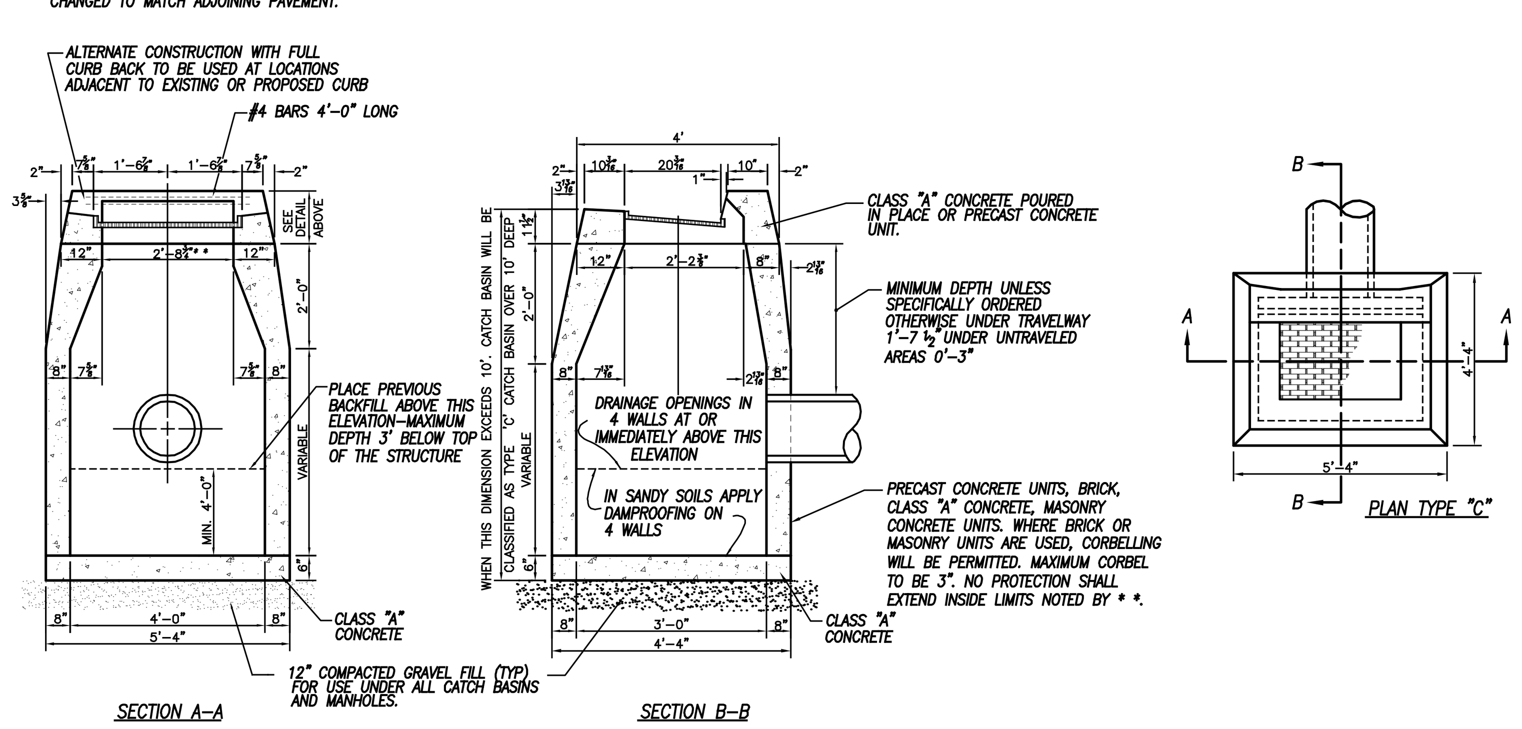
NOTE: TO BE UTILIZED IN STORMWATER BASIN



STORM DRAIN PIPE IN TRENCH DETAIL

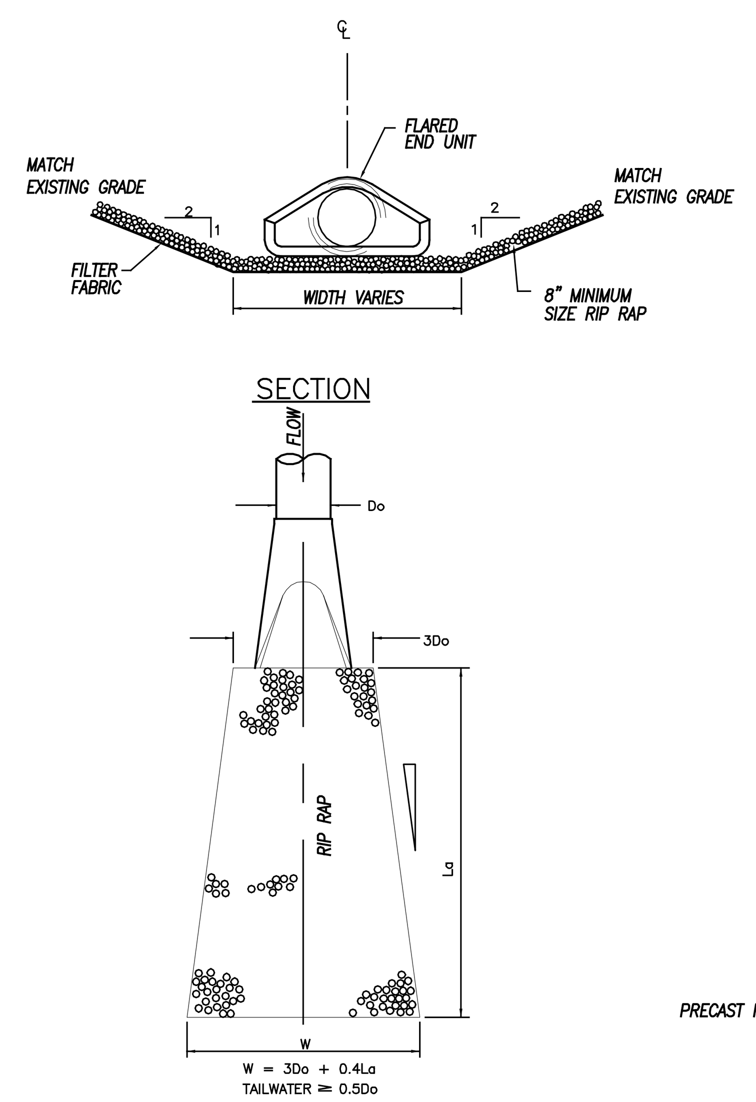
NOT TO SCALE

NOTE: WHEN CATCH BASIN IS SET IN CONCRETE PAVEMENT THE 1/2" SLOPE ON THE TOP SURFACE SHALL BE CHANGED TO MATCH ADJOINING PAVEMENT.



TYPE 'C' CATCH BASIN DETAIL

NOT TO SCALE



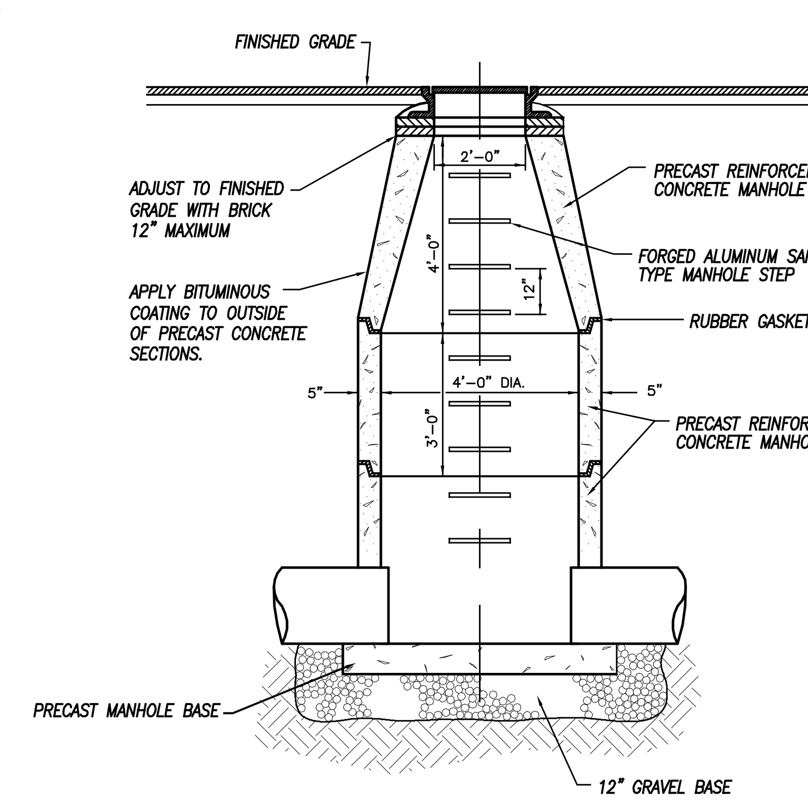
SECTION

PLAN

W = 3Do + 0.4La
TAILWATER ≤ 0.5Do

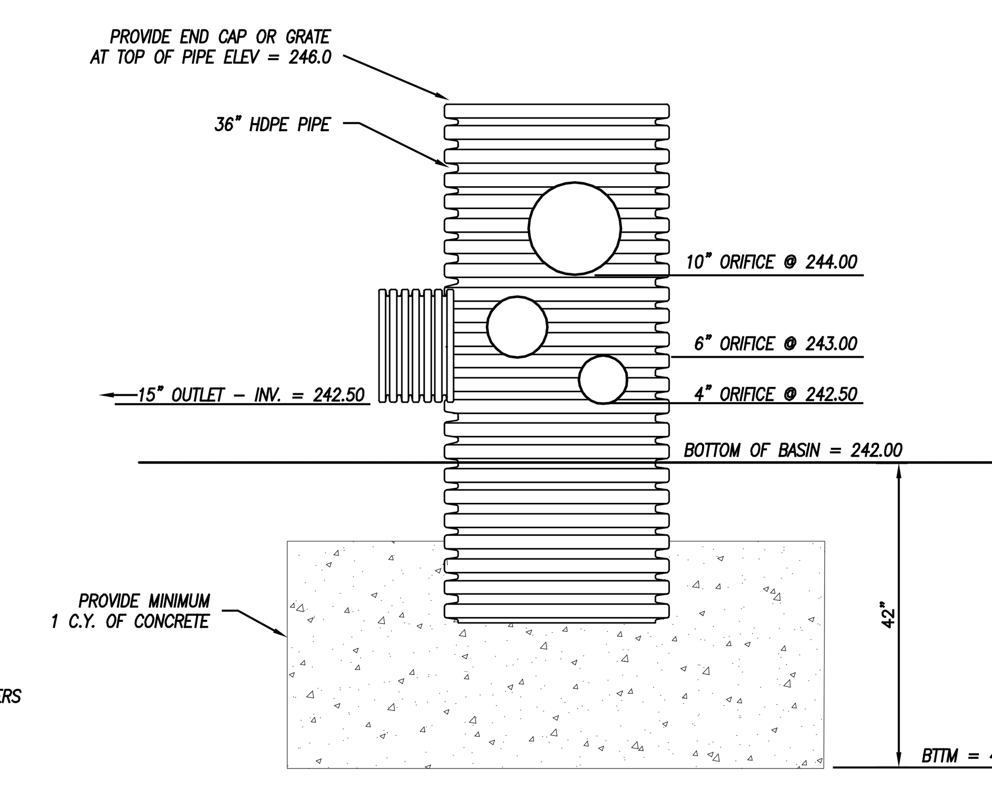
RIP RAP OUTFALL

NOT TO SCALE



TYPICAL MANHOLE CROSS SECTION

NOT TO SCALE



STORMWATER BASIN OUTLET STRUCTURE DETAIL

NOT TO SCALE

NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

DATE	DESCRIPTION
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

DETAIL SHEET 2

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

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DATE: 4/23/2020	DRAWN: DNE
SCALE: NOT TO SCALE	DESIGN: NET
SHEET: 9 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

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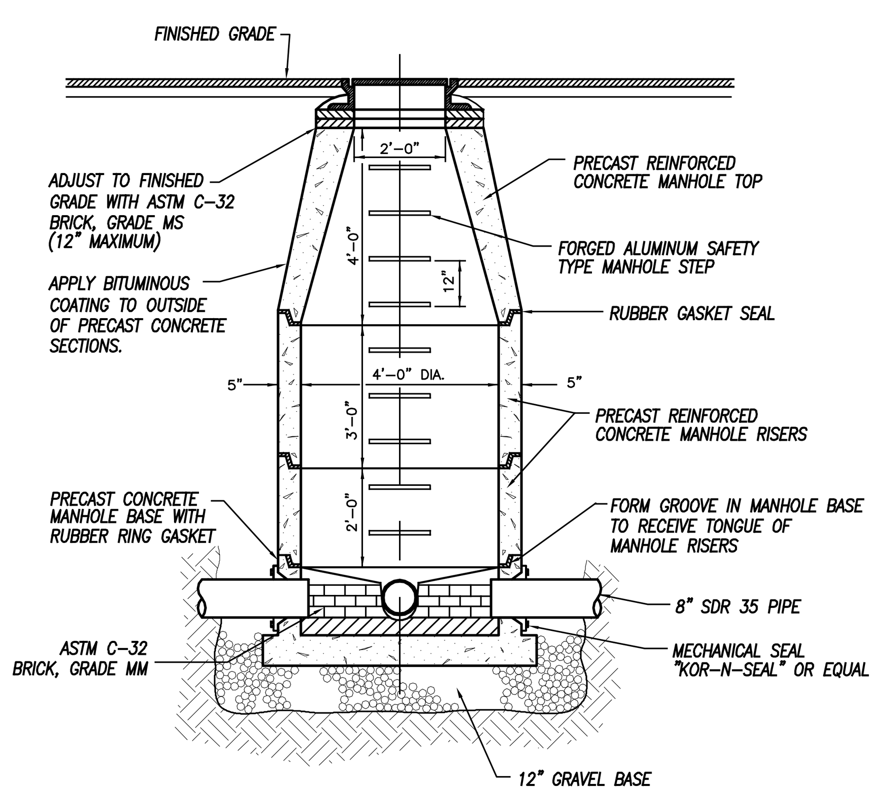
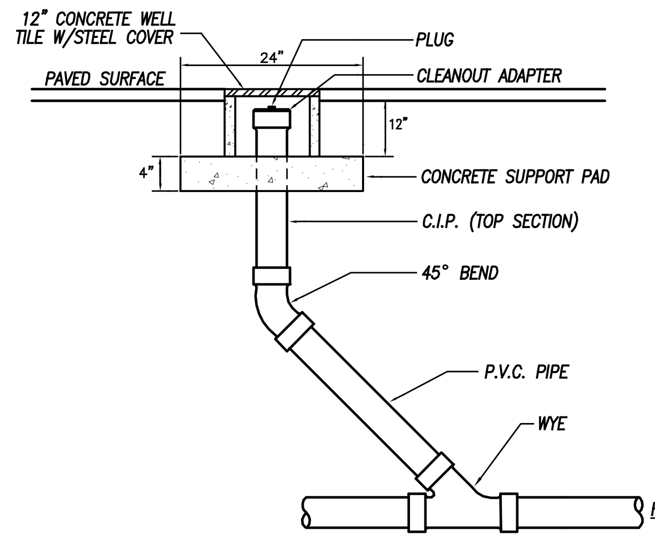
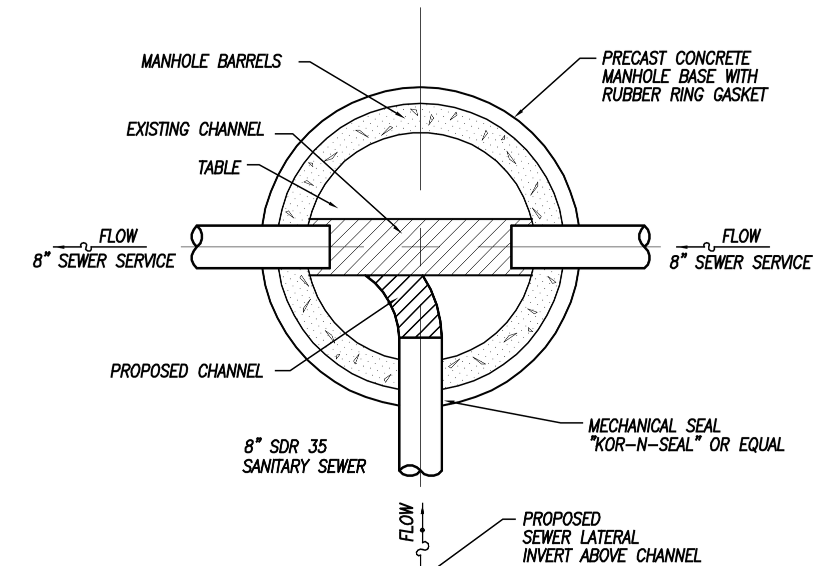


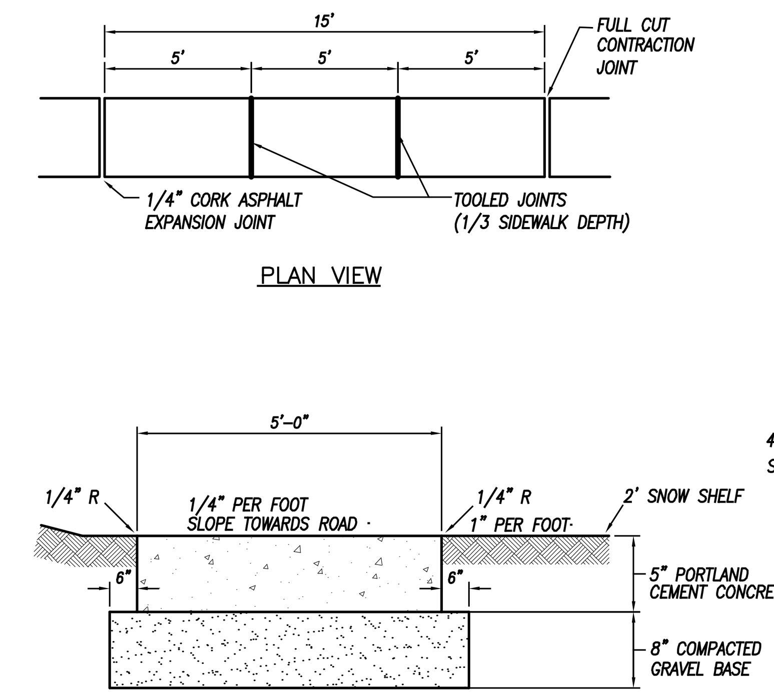
TYPICAL SANITARY MANHOLE CROSS SECTION
NOT TO SCALE



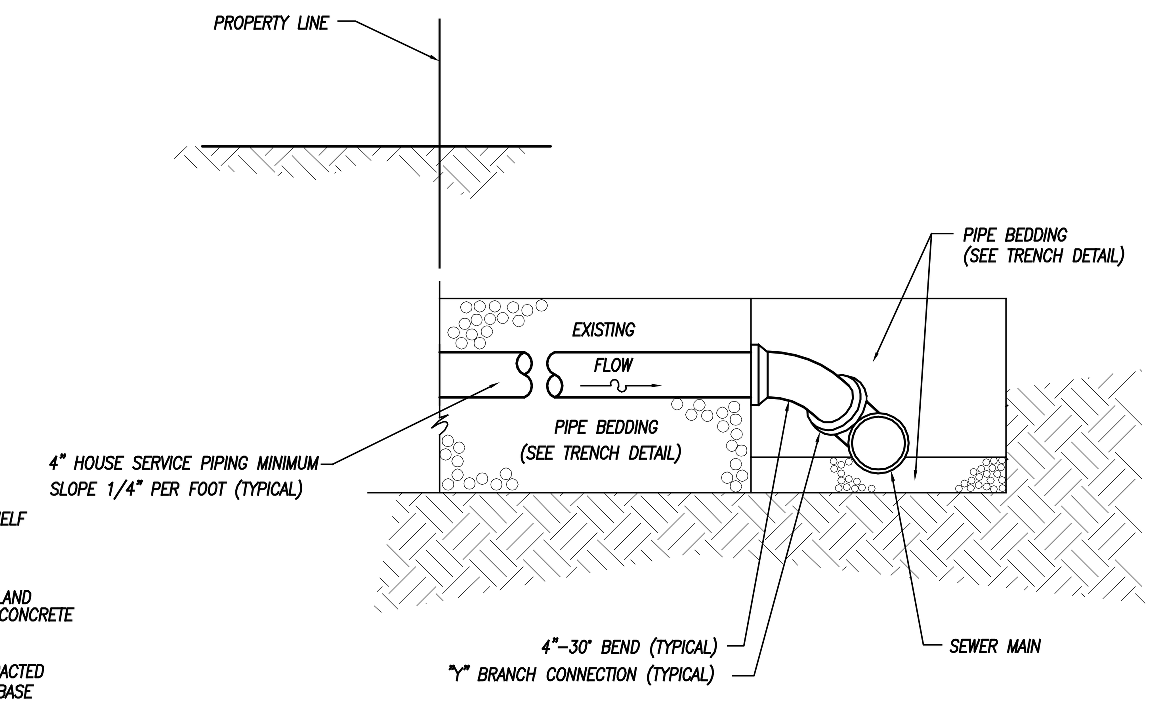
SANITARY CLEANOUT DETAIL
NOT TO SCALE



SEWER CONNECTION AT MANHOLE
NOT TO SCALE



CONCRETE SIDEWALK DETAIL
NOT TO SCALE



SEWER CONNECTION DETAIL
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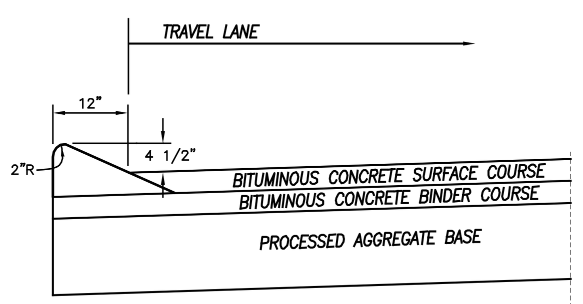
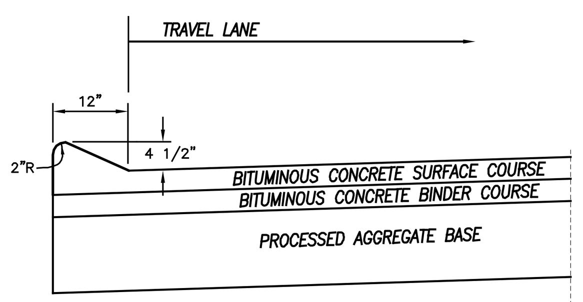
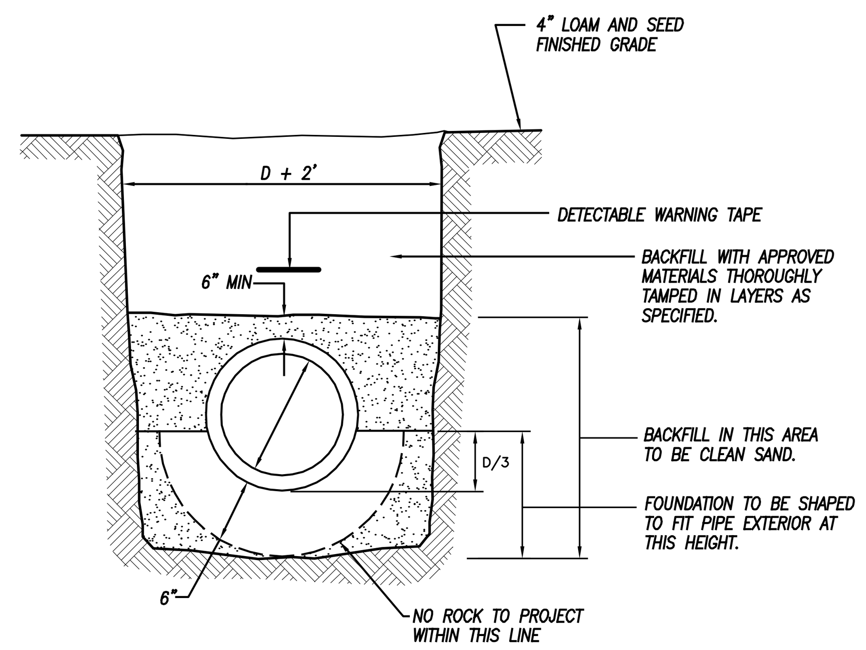


ALTERNATE 1 – CURB ON BINDER

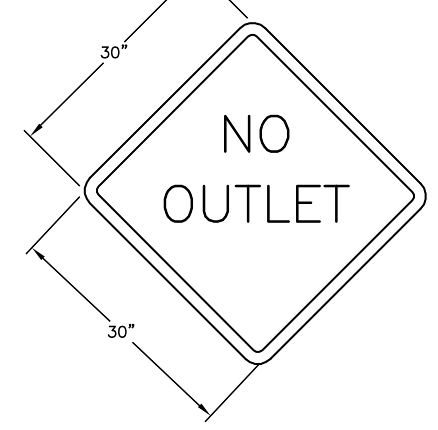


ALTERNATE 2 – MONOLITHIC CONSTRUCTION

CAPE COD CURBING
NOT TO SCALE

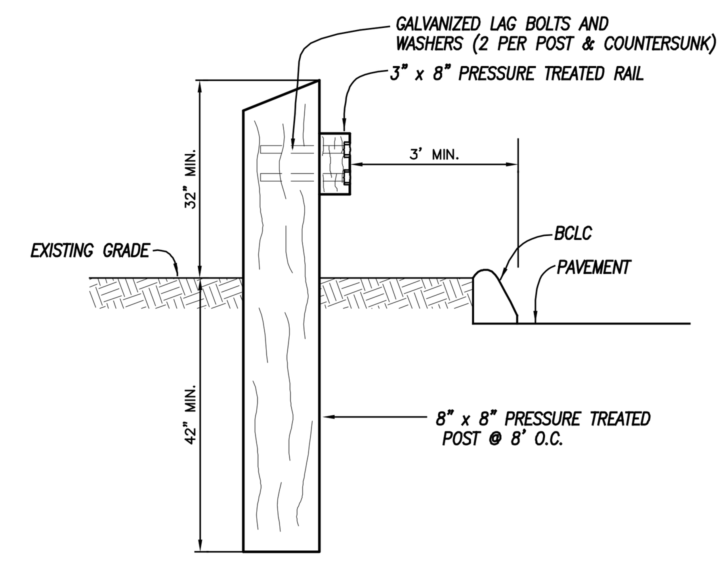


SANITARY SEWER PIPE IN TRENCH DETAIL
NOT TO SCALE



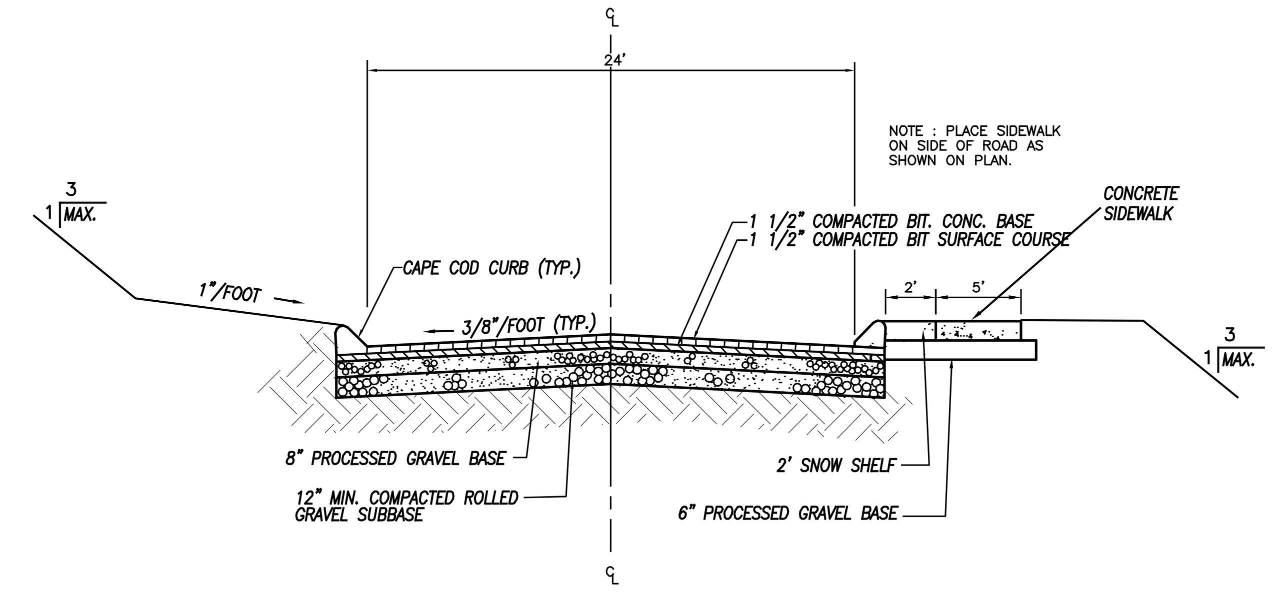
NO OUTLET SIGN DETAIL
NOT TO SCALE

CTDOT W14-2 (41-4605)
SETON #44851

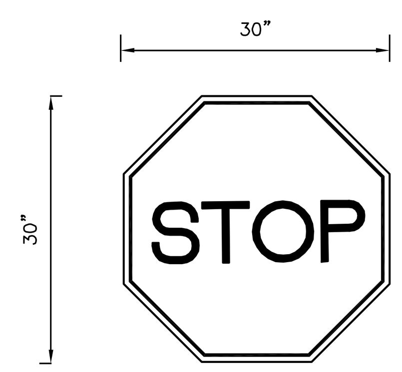


WOOD GUIDE RAIL
NOT TO SCALE

1. WOOD POST COMPONENTS SHALL BE SPRUCE OR HEMLOCK, GRADE #2 PRIME OR BETTER
2. POST SHALL BE CERTIFIED 0.6 CCF PRESERVATIVE RETENTION RATE, AWPA CATEGORY UC4C
3. PRESERVATIVE SHALL BE WATER BASED AN CONSIST OF COPPER AZOLE TYPE B OR C



ROADWAY CROSS SECTION
NOT TO SCALE

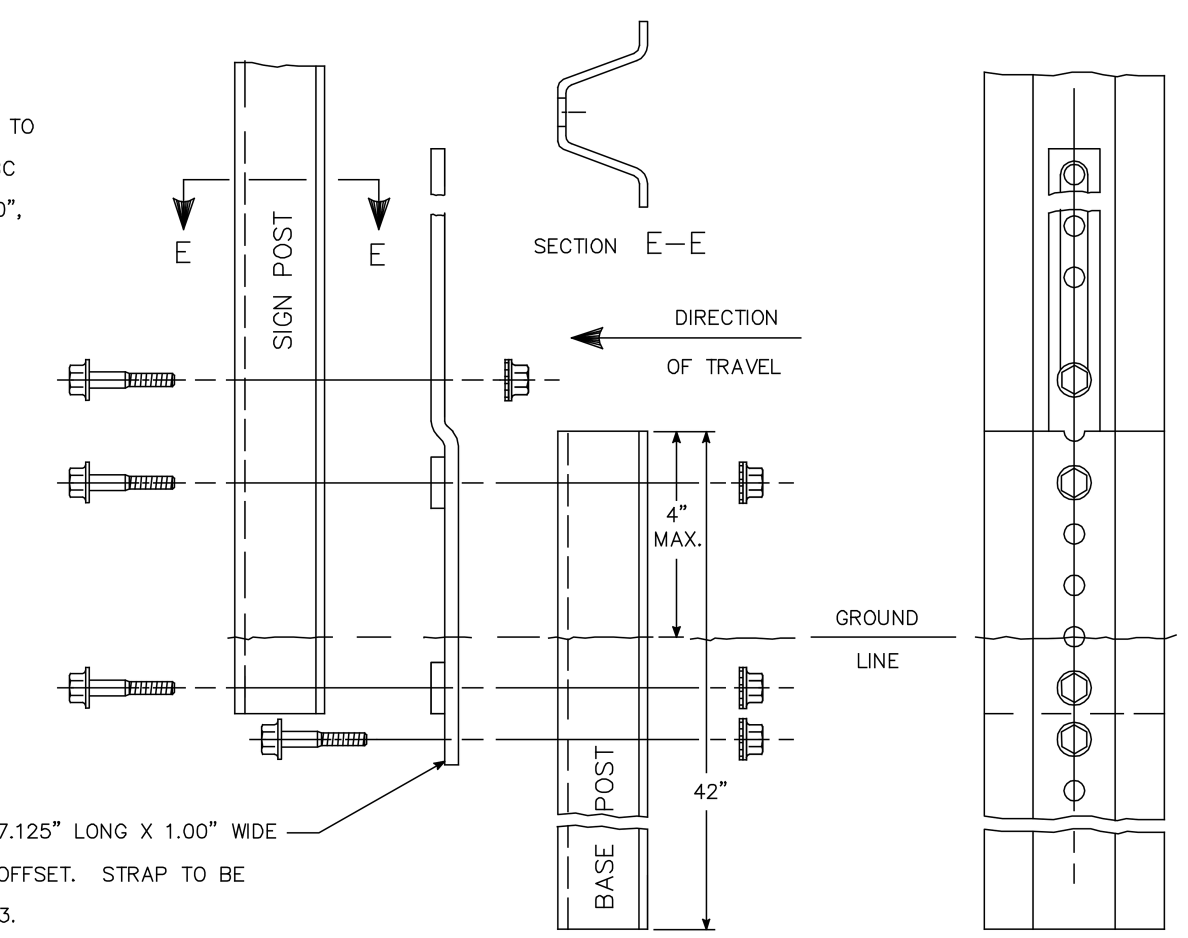


CTDOT R1-1 (31-0552)
STOP SIGN
NOT TO SCALE

BOLTS – HEX HEAD,INTEGRAL FLANGE CONFORMING TO ASTM A354. –18 UNC X 1.75", GRADE BC FOR 3.00 LBS./FT. POSTS –18 UNC X 2.0", GRADE BD FOR 4.00 LB./FT. POSTS.

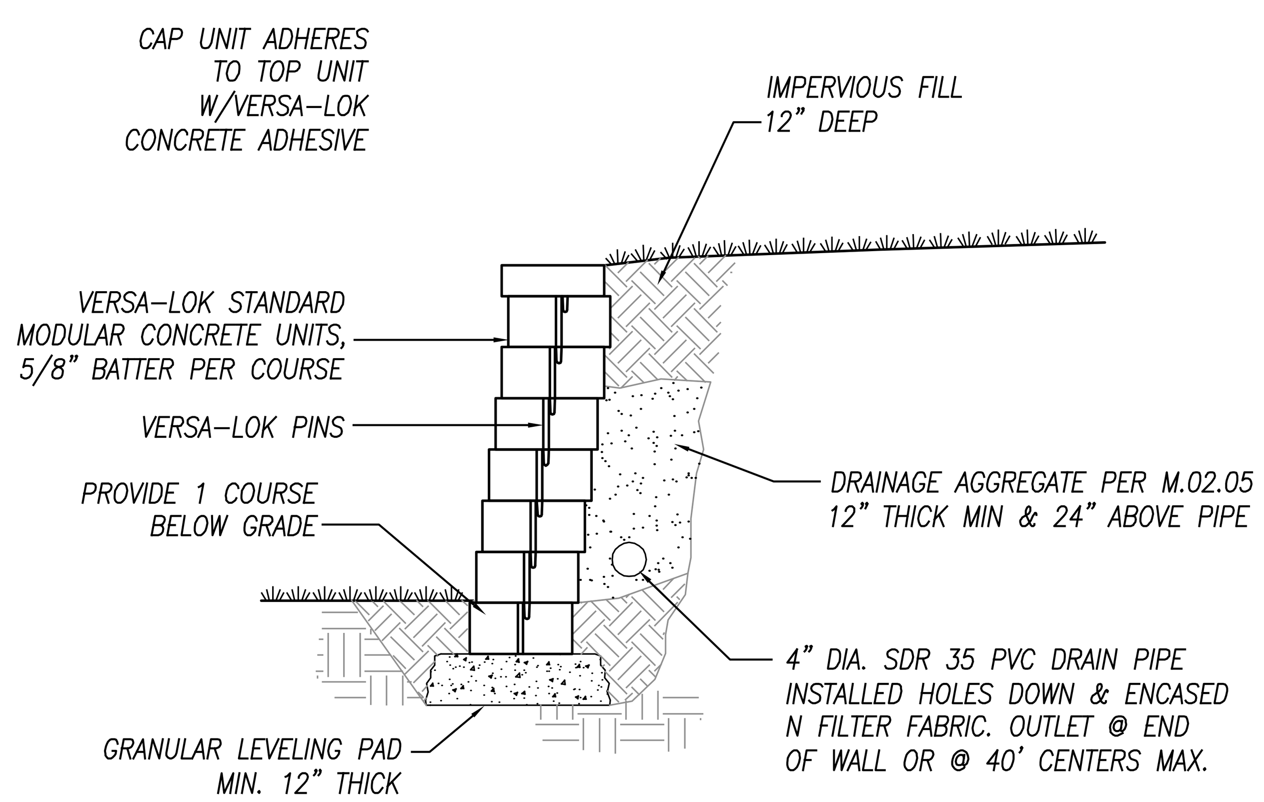
NUTS –18 UNC HEX HEAD, INTEGRAL FLANGE CONFORMING TO ASTM A563, GRADE DH.

LOCKWASHERS – HEAVY DUTY EXTERNAL TYPE.

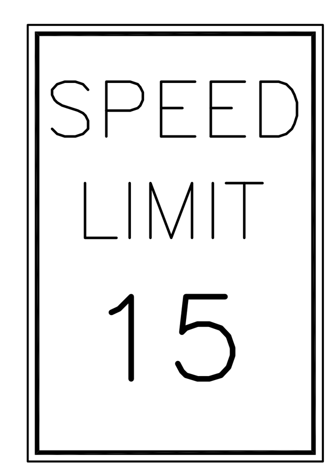


RETAINER–SPACER STRAP 17.125" LONG X 1.00" WIDE X .375" THICK WITH .375" OFFSET. STRAP TO BE GALVANIZED TO ASTM A 123.

BREAKAWAY TYPE I INSTALLATION – FOR 3 & 4 LB. POSTS



TYPICAL SECTION–UNREINFORCED RETAINING WALL
VERSA-LOK OR APPROVED EQUAL



31-5505
SPEED LIMIT SIGN DETAIL
NOT TO SCALE

NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

DATE	DESCRIPTION
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

DETAIL SHEET 3
PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: DNE
SCALE: NOT TO SCALE	DESIGN: NET
SHEET: 10 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

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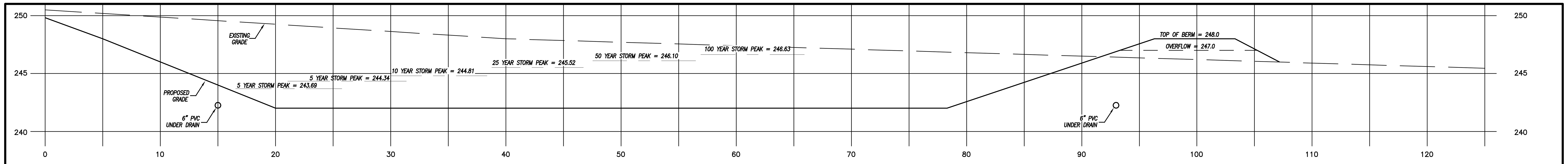
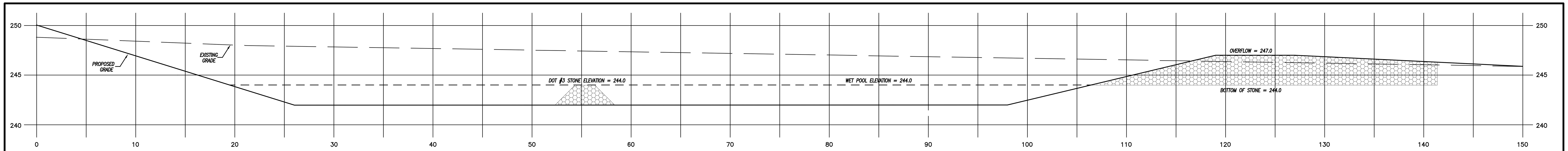
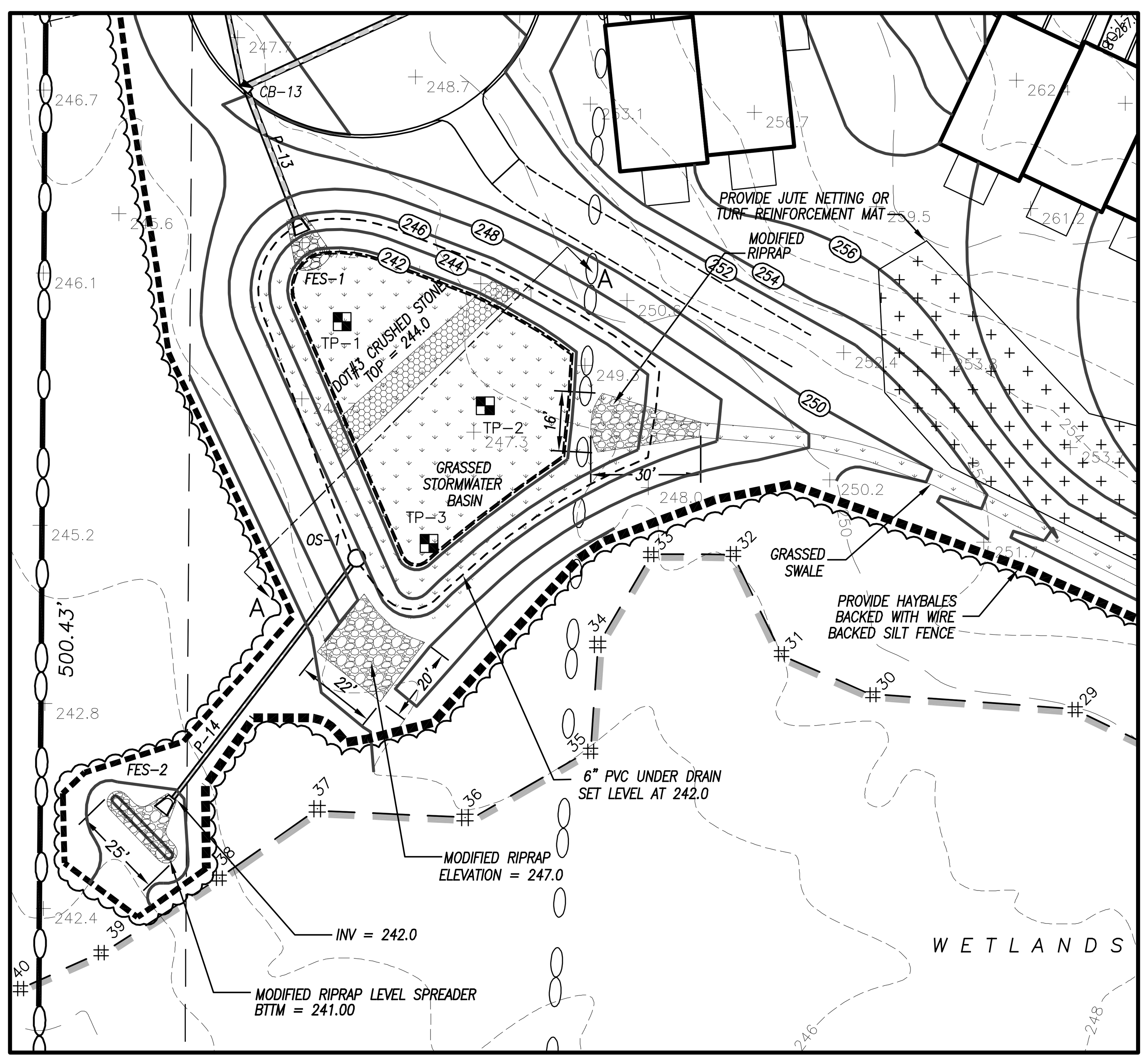


CROSS SECTION "A–A"
STORMWATER BASIN
SCALE: 1" = 5'

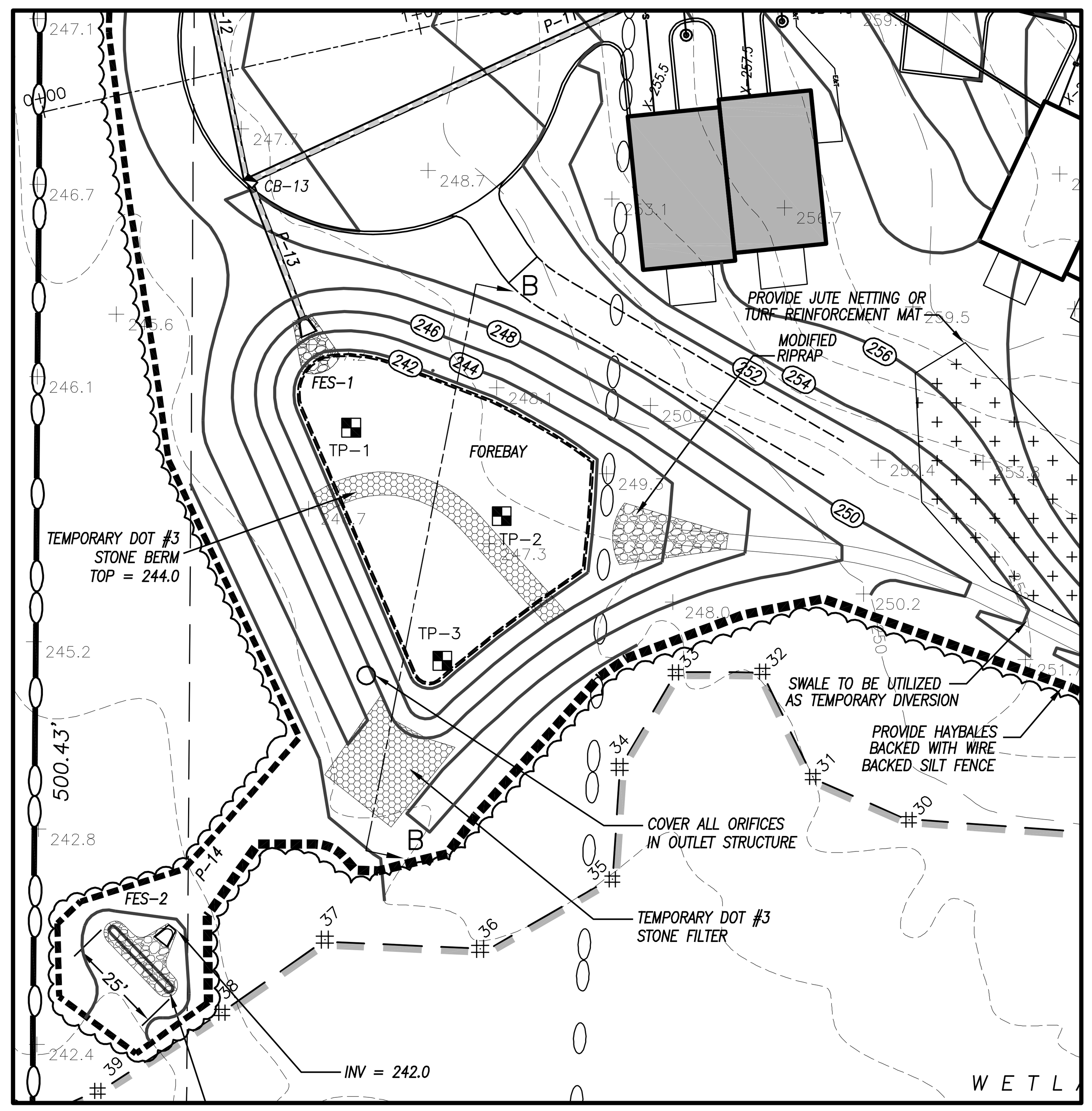


CROSS SECTION "B–B"
TEMPORARY SEDIMENT TRAP
SCALE: 1" = 5'

NOTE: THE CONDOMINIUM ASSOCIATION SHALL BE RESPOSIBLE FOR THE MAINTENANCE OF THE ENTIRE STORMWATER SYSTEM



STORMWATER BASIN DETAIL
SCALE: 1"=30'



TEMPORARY SEDIMENT TRAP DETAIL
SCALE: 1"=30'

TEMPORARY SEDIMENT TRAP CONSTRUCTION NOTES:

Construction of the temporary sediment trap and diversion swale shall begin between April 14 and September 1 to allow for vegetation to become at least temporarily established in the basin prior to discharge of stormwater to the swale and trap. Construction of the temporary sediment trap and diversion swale shall not commence between September 2 and April 13 in accordance with the provisions of Section 11.1 of the Brooklyn Inland Wetlands and watercourses regulations.

NORMAND E. THIBEAULT, JR., P.E. DATE
LIC #PEN 0022834

STORMWATER BASIN CONSTRUCTION NOTES:

1. Detention basin embankments shall be constructed of silty sand and/or clayey sand materials. On–site borrow material may be used if suitable deposits are found. Embankment fill shall contain at least 15% by weight of material passing the #200 sieve and not more than 50% passing the #200 sieve.
2. Embankment fill shall have no stones larger than 6" in their greatest dimension. No stones larger than 3" in their greatest dimension shall be allowed within 2 feet of structures or pipes.
3. All fill material shall be free of topsoil, roots, stumps, organics, frozen material and other deleterious matter.
4. All embankment material shall be compacted to 95% minimum relative compaction as determined by ASTM D1557 – Modified Proctor. The maximum loose lift thickness of embankment fill shall be 12".
5. Sufficient dewatering equipment shall be provided to dewater excavations for proposed embankments, cutoff trenches and other construction.
6. All topsoil, organics, roots and other deleterious matter shall be removed from the existing ground surface prior to construction of the proposed embankments.
7. All embankments and disturbed areas of the detention basin shall be permanently stabilized with 4" of loam, seed and mulch. Suitable hydroseeding equipment may be used for application of seed, mulch and/or fertilizer. The following seed mix shall be used in these areas:

Variety	Lbs/Acre
Creeping Red Fescue	20
Redtop	2
Crown Vetch	15
TOTAL	37

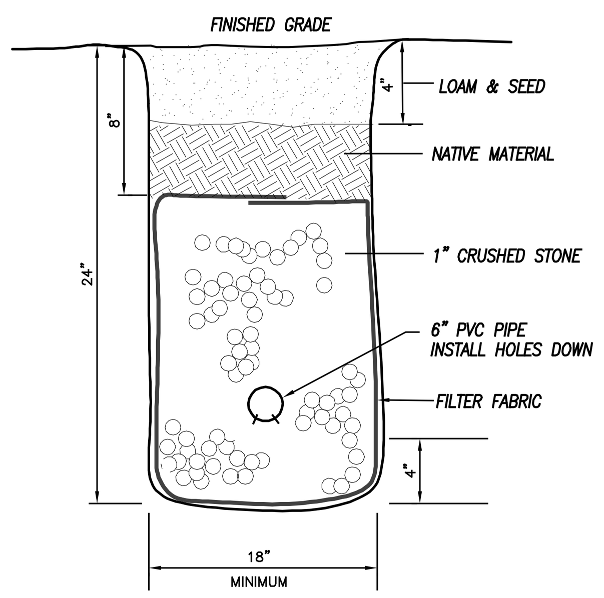
DETENTION BASIN OPERATION AND MAINTENANCE NOTES:

1. The contractor shall be responsible for all basin maintenance and inspections prior to acceptance of the roadway by the Condominium Association.
2. During the first year of operation, the basin shall be inspected on a monthley basis or within 24 hours after a rainfall event of 0.5" or greater. Any erosion of embankments or outlet areas shall be repaired promptly. Any debris shall be removed from trash racks and disposed of. Sedimentation that would interfere with proper operation of the basin shall be removed and disposed of and the area restored and stabilized as required.
3. The Condominium Association shall be responsible for maintenance of the stormwater basin and it's outlets in perpetuity. After the basin has been in operation for one year, inspections shall be performed quarterly or within 24 hours after a storm event of 2.0" or greater. Quarterly inspections shall include the following items:

– Noxious weeds shall be removed. Detention basin side slopes and bottom shall be mowed annually by 6/30 and 10/1 for the life of the basin, in perpetuity. Inspect embankments for any woody growth. All trees, vines and other woody plants shall be removed and voids left from their removal shall be repaired.
– Inspect embankments for animal burrows. All burrows and voids shall be repaired immediately.
– Accumulated sediment shall be removed from the basin forebay and other areas to restore original design grades. Disturbed areas shall be restabilized as required after removal of sediment.
– Inlets and outlets shall be inspected for scour damage and erosion and repaired as required.
– Outlet structures shall be cleaned of accumulated sediment.
– Any evidence of piping or seepage at the toe of embankments or around inlet/outlet structures shall be investigated by a qualified professional engineer and reported to the Town. Required repairs to maintain the proper function or repair potential structural deficiencies in the basin shall be implemented within one month of the discovery of the problem or at the discretion of the responsible professional engineer performing the invesitigation or designing such repairs. The engineer shall certify that all repairs are performed to his/her satisfaction and shall provide such certification to the Town.

STORMWATER SYSTEM OPERATION AND MAINTENANCE NOTES:

- Provide annual street sweeping, preferably after final snow melt to alleviate sediment buildup in catch basin sumps and to insure efficient TSS removal from stormwater.
- Remove sediment from catch basin sumps when sediment reaches half the depth of the sump (2').
- Inspect catch basins for trash and debris bi–annually. Remove accumulated sediment and debris from pipe inlets and outlets to prevent clogging.
- Remove accumulated trash and leaves from catch basin grates to insure adequate grate inflow capacities.



CURTAIN DRAIN DETAIL
NOT TO SCALE

DATE	DESCRIPTION
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW
01/04/2021	PER TOWN & ENGINEERING REVIEW

REVISIONS

DETAIL SHEET 4
PREPARED FOR
SHANE POLLOCK
LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

Killingly Engineering Associates
Civil Engineering & Surveying
114 Westcott Road
P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: DNE
SCALE: NOT TO SCALE	DESIGN: NET
SHEET: 11 OF 11	CHK BY: ---
DWG. No: CLIENT FILE	JOB No: 20014

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Jana Roberson

From: Greg Glaude <gglaude@killinglyea.com>
Sent: Thursday, September 16, 2021 1:03 PM
To: Jana Roberson; nthibeault@killinglyea.com
Subject: RE: Pollock / Louise Berry Drive 51-Unit Condominium Project - FRONTAGE
Attachments: 2021.09.16 Planner Comments.pdf

Hi Jana,

Attached you will find the revised survey plan addressing your comments. Here are my responses:

1. Road frontage was calculated using the CDOT 2020 Town Road report that designates 0.12 miles for Louise Berry Drive. That converts to 634' which has been plotted and shown on the map. Based on this calculation the parcel will have 243.74' of frontage. That has been added to the survey plan and revised in the zoning table on the cover sheet.
2. Trail Easement. You are correct in noting that Vol 31, Page 130 reserved an easement along the laneway to the 23.25 acre school lot. That easement is noted on our map and labeled just west of the subject parcel. Historic photos show that the laneway sort of ended near the westerly property line. Although it is clear that it was intended to run to the school property. That being said, I believe that the KWP plan from 2001 (map reference 6) was and attempt to create a 30' access easement over the traveled foot path to the school property. My research shows that those plans were recorded, however there appears to be no new deed recorded. The 2001 plans clearly label the 30' wide easement as "proposed". I recommend that as part of the conditions of approval, that the applicant should record this deed to the Town to clarify the easement location.

Please contact me if you have any further questions.

Greg A. Glaude, L.S.
Killingly Engineering Associates
Civil Engineering & Surveying

www.killinglyengineering.com
Mailing address:
P.O. Box 421
Killingly, CT 06241

Office address:
114 Westcott Road
Killingly, CT 06239
Phone: 860-779-7299
Cell: 860-617-9998
email: gglaude@killinglyea.com

From: Jana Roberson <J.Roberson@Brooklynct.org>
Sent: Tuesday, August 31, 2021 12:07 PM
To: nthibeault@killinglyea.com; gglaude@killinglyea.com
Subject: RE: Pollock / Louise Berry Drive 51-Unit Condominium Project - FRONTAGE

PROPOSED MULTI-FAMILY CONDOMINIUM DEVELOPMENT

LOUISE BERRY DRIVE
BROOKLYN, CONNECTICUT

PREPARED FOR:

SHANE POLLOCK

TABLE OF ZONING REQUIREMENTS

ZONE = R-30*

	REQUIRED	PROVIDED
Lot Area	30,000 s.f.	13.497 Acres
Front Yard Setback	50'	53.4'
Side Yard Setback	30'	48'
Rear Yard Setback	50'	257'
Building Height	35' Max.	<35'
Lot Frontage	110'	243.74'
Building Separation	40' min	40'-115'

DENSITY: 1 unit per every 5,000 s.f.
13.497 ac = 587,929 s/f - 117 units max
51 units proposed

PARKING: 2 spaces per unit required - 102 required
2 garage spaces + 1 drive per unit proposed
+ 2 additional spaces - 155 spaces provided

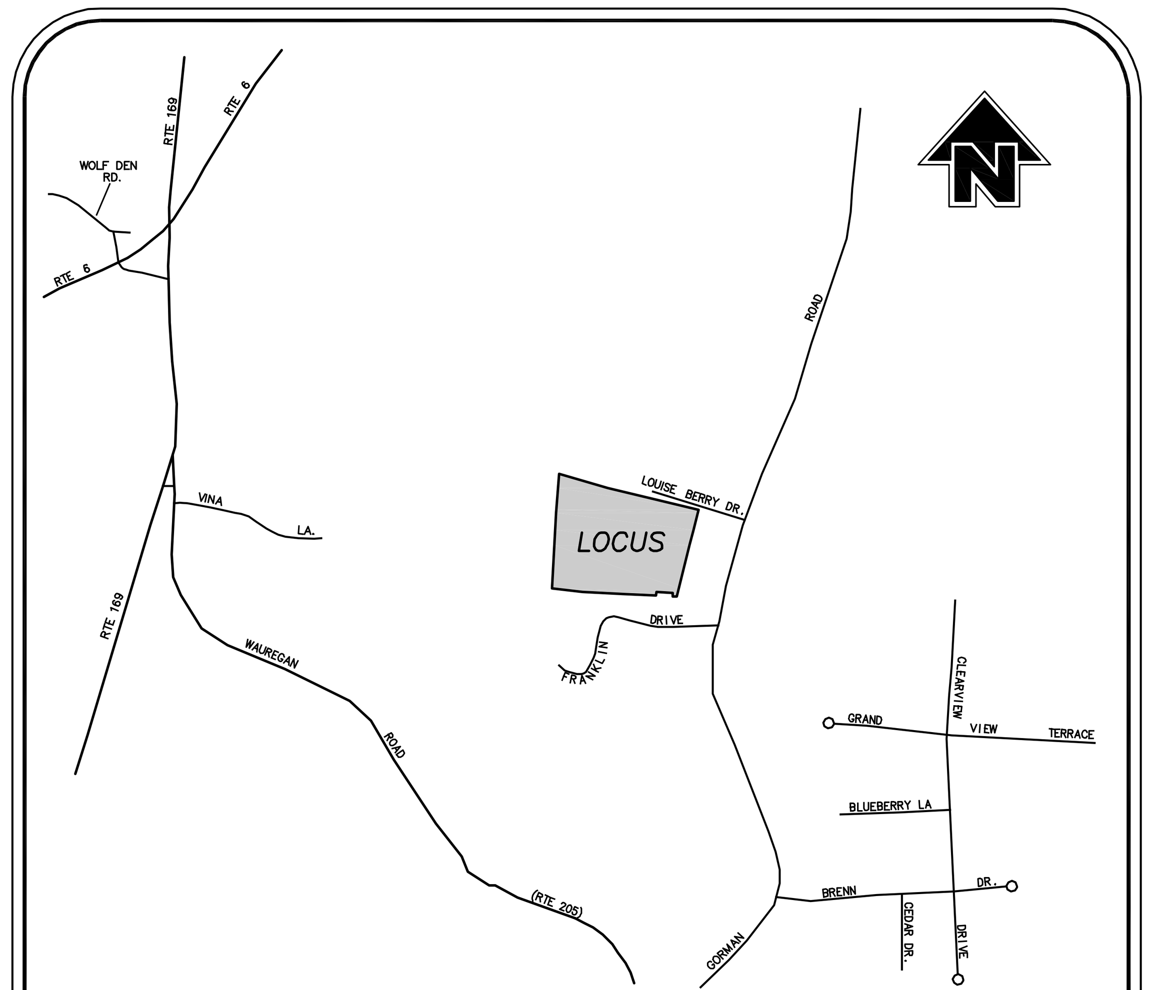
*Multi-family development in accordance with Section 6.E.
ZONE = RA*

GENERAL NOTES:

1. Ownership of the stormwater basin and drainage system shall be the Homeowner's Association. The Town of Brooklyn will not assume responsibility as such.
2. There shall be no parking along the main access roadway or side drives. Appropriate signage shall be installed accordingly.
3. The only work allowed prior to installing the perimeter sediment controls shall be clearing vegetation. No grubbing shall be allowed until the perimeter sediment controls have been installed as per plan. Call (860) 779-3411. ext. 31, for an inspection of the perimeter sediment controls. The perimeter sediment controls must be approved in writing by the IWWC Agent or a Commission member prior to commencing any other work.
4. The temporary sediment basin and swale must be at least temporarily stabilized prior to discharging any stormwater into them. Call (860) 779-3411. ext. 31, for an inspection of the temporary sediment basin and swale. The temporary stabilization of the temporary sediment basin and swale must be approved in writing by the IWWC Agent or a Commission member prior to discharging any stormwater into them.
5. Detention basin side slopes and bottom shall be mowed annually by 6/30 and 10/1 for the life of the basin, in perpetuity.
6. The Homeowner's Association shall be responsible for maintenance of the stormwater basin and its outlets in perpetuity.
7. The construction of the temporary sediment basin and swale shall begin between April 14 and September 1 to allow for vegetation to become at east temporarily established in the basin prior to discharging stormwater into the temporary sediment basin and swale. The basin and swale should be substantially completed by September 1. Construction of the temporary sediment basin and swale shall not commence between September 2 and April 13 in accordance with the provisions od Section 11.1 of the Brooklyn IWWC Regulations.

LEGEND

- IRON PIN TO BE SET
- IRON PIN FOUND
- DH DRILL HOLE FOUND
- CB CATCH BASIN
- UTILITY POLE
- SMH SAITARY SEWER MANHOLE
- 100 EXISTING CONTOURS
- 100 PROPOSED CONTOURS
- INLAND WETLANDS FLAG
- BUILDING SETBACK LINE
- S EXISTING SANITARY SEWER LINE
- W EXISTING WATER LINE
- STONE WALL
- STONE WALL REMAINS
- SILT FENCE
- 175' WATERCOURSE SETBACK
- 125' UPLAND REVIEW



LOCATION MAP
SCALE: 1" = 1000'

INDEX TO DRAWINGS

TITLE	SHEET No.
COVER SHEET	1 OF 11
PROPERTY SURVEY	2 OF 11
EASEMENT MAP	3 OF 11
SITE PLAN	4 OF 11
LAYOUT & LANDSCAPING PLAN	5 OF 11
EROSION CONTROL AND UTILITIES PLAN	6 OF 11
ROAD PROFILE	7 OF 11
DETAIL SHEET 1	8 OF 11
DETAIL SHEET 2	9 OF 11
DETAIL SHEET 3	10 OF 11
DETAIL SHEET 4	11 OF 11

PREPARED BY:

REVISIONS

DATE	DESCRIPTION
8/24/2020	PER TOWN REVIEW
11/13/2020	TOWN & ENGINEERING REVIEW
12/07/2020	ADDED TEST HOLE DATA
01/04/2021	TOWN & ENGINEERING REVIEW
01/27/2021	PER BWPCA REVIEW
02/10/2021	EASE. ADDED/ZONE/CT WATER COMMENTS
03/30/2021	TOWN & ENGINEERING REVIEW
04/20/2021	IWWC APPROVAL CONDITIONS
09/15/2021	TOWN ROAD FRONTAGE

Killingly Engineering Associates
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FOR REVIEW ONLY
NOT FOR CONSTRUCTION

APPROVED BY THE BROOKLYN
PLANNING AND ZONING COMMISSION

FINAL APPROVAL DATE_______________

CHAIRMAN_______________ DATE:__________

EXPIRATION DATE:_______________

Per Sec. 8.26c of the Connecticut General Statutes, as amended, approval automatically expires _______________ if all public improvements required by this plan are not completed by that date.

ENDORSED BY THE BROOKLYN INLAND
WETLANDS COMMISSION

CHAIRMAN DATE

April 23, 2020

NORMAND THIBEAULT, JR., P.E. No. 22834 DATE

SHEET 1 OF 11
JOB NO: 20014

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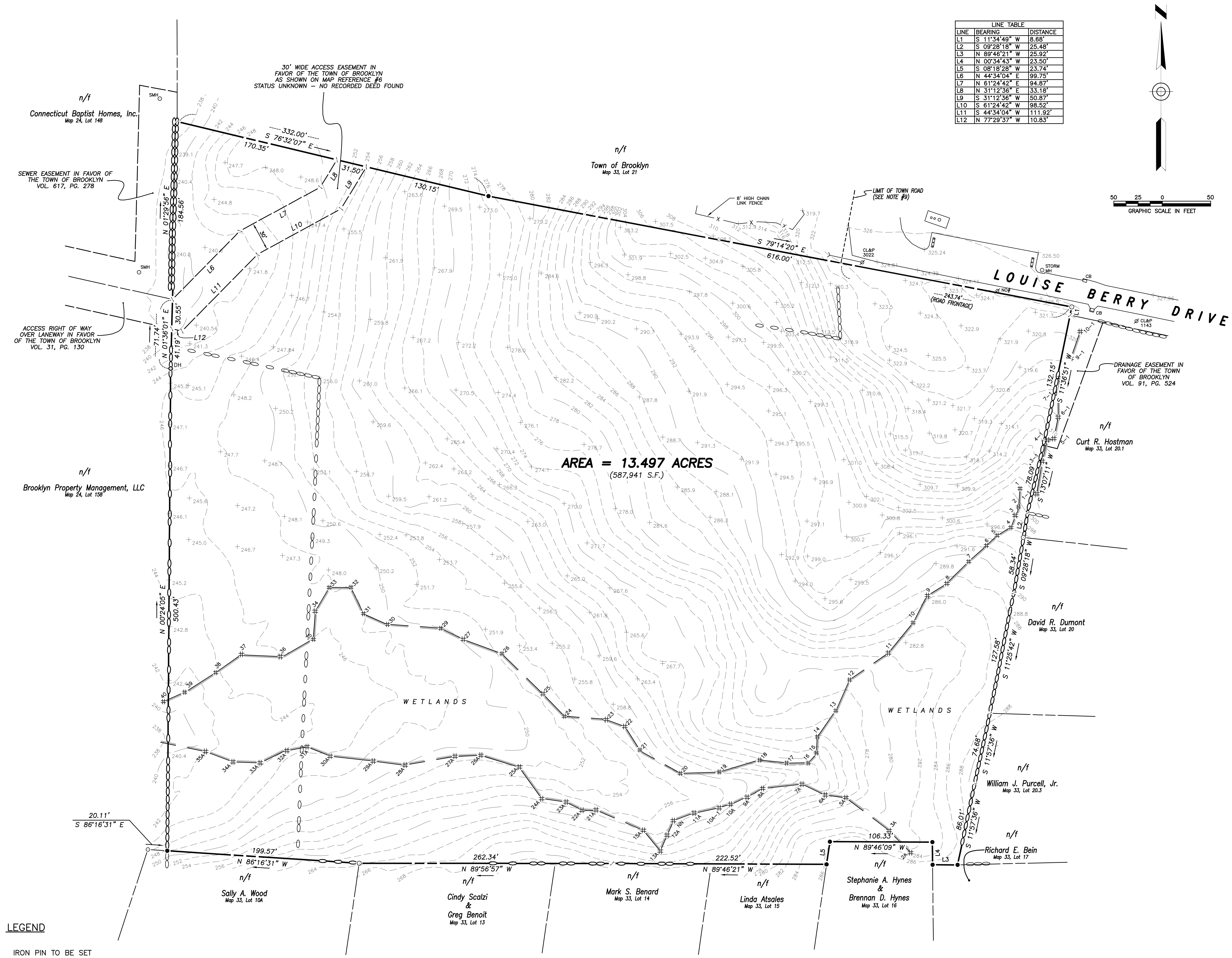

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S 11°34'49" W	8.68'
L2	S 09°28'18" W	25.48'
L3	N 89°46'21" W	25.92'
L4	N 00°34'43" W	23.50'
L5	S 08°18'28" W	23.74'
L6	N 44°34'04" E	99.75'
L7	N 61°24'42" E	94.87'
L8	N 31°12'36" E	33.18'
L9	S 31°12'36" W	50.87'
L10	S 61°24'42" W	98.52'
L11	S 44°34'04" W	111.92'
L12	N 77°29'37" W	10.83'

NOTES:

1. This survey has been prepared pursuant to the Regulations of Connecticut State Agencies Sections 20–300b–1 through 20–300b–20 and the "Standards for Surveys and Maps in the State of Connecticut" as adopted by the Connecticut Association of Land Surveyors, Inc. on September 26, 1996;
   - This survey conforms to a Class "A–2" horizontal accuracy.
   - Topographic features conform to a Class "T–2", "V–2" vertical accuracy.
   - Survey Type: Property Survey
   - Boundary Determination Category: Resurvey.
2. Zone = R–30.
3. Owner of record: Shane J. Pollock & Erin F. Mancuso
   101 Mackin Drive
   Griswold, CT 06351
   See Volume 659, Page 151
4. Parcel is shown as Lot 19 on Assessors Map 33.
5. North orientation is based on North American Datum of 1982 (NAD 82) and is taken from GPS observations.
6. Elevations shown are based on an North American Vertical Datum of 1988 (NAVD 88). Contours taken from actual field survey. Contour interval = 2'.
7. Parcel lies within Flood Hazard Zone 'C' (areas of minimal flooding) as shown on FIRM Map # 090164 Panel 0005A Effective Date: Jan. 3, 1985.
8. Wetlands shown were delineated in the field by Joseph Theroux, Certified Soil Scientist, in 2019.
9. Town road limit was established by referencing the CDOT 2020 Town Roads Report, which designates the length of Louise Berry Drive to be .12 miles or 634' in length.

MAP REFERENCES:

1. "Plan of site for new school in the Town of Brooklyn, Conn. – Scale: 1" = 100' Date: June 9, 1952 – Prepared by: William W. Pike, Surveyor." On file in the Brooklyn land records.
2. "Layout of Franklin Drive in the Town of Brooklyn, Conn. – Scale: 1" = 100' – Date: Oct. 15, 1959 – Prepared by: William W. Pike, Surveyor." On File in the Brooklyn land records.
3. "Subdivision Plan – property of Kurt R. & Lempi E. Hostman – Gorman Road – Brooklyn, CT – Date: Aug. 1987 – Revised to: Jan. 21, 1988 – Scale: 1" = 40' Prepared by: Louis J. Soja, Jr." On file in the Brooklyn land records.
4. "Property Survey and inland wetland field location – Pierce Memorial Baptist Home Inc. – Route 169 – Brooklyn, Connecticut – Date: Mar. 6, 1989 – Revised to: 7/25/1989 – Scale: 1" = 50' – Sheet 6 of 6 – Prepared by: Hallisey & Herbert, Civil Engineers & Surveyors." On File in the Brooklyn Land Records.
5. "Easement Plan prepared for Town of Brooklyn – Brooklyn Elementary School & Brooklyn Junior High School – Route 205 (Wauregan Road) – Brooklyn, Connecticut Date: 4/5/1999 – Scale: 1" = 40' – Sheet 2 of 2. Prepared by: KWP Associates." On File in the Brooklyn land records.
6. "Easement Plan showing proposed easement on land of Eggs, Inc. prepared for Town of Brooklyn – Wauregan Road (Route #205) – Brooklyn, Connecticut – Date: 4/20/2001 – Scale: 1" = 50' – Sheet 1 of 1 – Prepared by KWP Associates. On file in the Brooklyn land records.
7. "Property survey showing portion of land of pierce Memorial Baptist Home, Inc. 44 Canterbury Road and Vina Lane – Brooklyn, Connecticut – Date: November 26, 2007 – Scale: 1" = 100' – Sheet 1 of 2 – Prepared by Dicesare Bentley." On file in the Brooklyn land records.
8. "Perimeter Survey prepared for Eggs Inc. – Gorman Road / Franklin Drive / Wauregan Road – Brooklyn, Connecticut – Date: Oct. 2014 – Scale: 1" = 125' – Sheet 1 of 1 – Prepared by Archer Surveying, LLC." On file in the Brooklyn land records.
9. "Boundary Line Agreement prepared for Brooklyn Center Complex, BLB, LLC and Vina Land, LLC – Wauregan Road & Vina Lane – Brooklyn, Connecticut – Date: December 11, 2019 – Scale: 1" = 125' – Sheet 1 of 1 – Prepared by Archer Surveying, LLC." Not on file.

DATE	DESCRIPTION
09/15/2021	TOWN ROAD FRONTAGE
04/20/2021	IWWC APPROVAL CONDITIONS
03/30/2021	PER TOWN & ENGINEERING REVIEW
02/10/2021	EASEMENT ADDED / ZONE CORRECTION / CT WATER COMMENTS
01/27/2021	PER BWPCA REVIEW

REVISIONS

PROPERTY SURVEY

PREPARED FOR

SHANE POLLOCK

LOUISE BERRY DRIVE

BROOKLYN, CONNECTICUT

Killingly Engineering Associates

Civil Engineering & Surveying

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P.O. Box 421
Killingly, Connecticut 06241
(860) 779-7299
www.killinglyengineering.com

DATE: 4/23/2020	DRAWN: DNE
SCALE: 1" = 50'	DESIGN: NET
SHEET: 2 OF 11	CHK BY: GG
DWG. No: CLIENT FILE	JOB No: 20014

I HAVE REVIEWED THE FLAGGED INLAND WETLANDS LOCATION SHOWN ON THIS PLAN AND THEY APPEAR TO BE SUBSTANTIALLY CORRECT.

Certified Soil Scientist   Date

TO MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON,

GREG A. GLAUDE, L.S.   LIC. NO. 70191   DATE

NO CERTIFICATION IS EXPRESSED OR IMPLIED UNLESS THIS MAP BEARS THE ORIGINAL SEAL AND SIGNATURE OF THE LAND SURVEYOR.

LEGEND

- IRON PIN TO BE SET
- IRON PIN FOUND
- DRILL HOLE FOUND
- UTILITY POLE
- CATCH BASIN
- SANITARY MANHOLE
- EXISTING CONTOURS
- INLAND WETLANDS FLAG
- STONE WALL
- STONE WALL REMAINS

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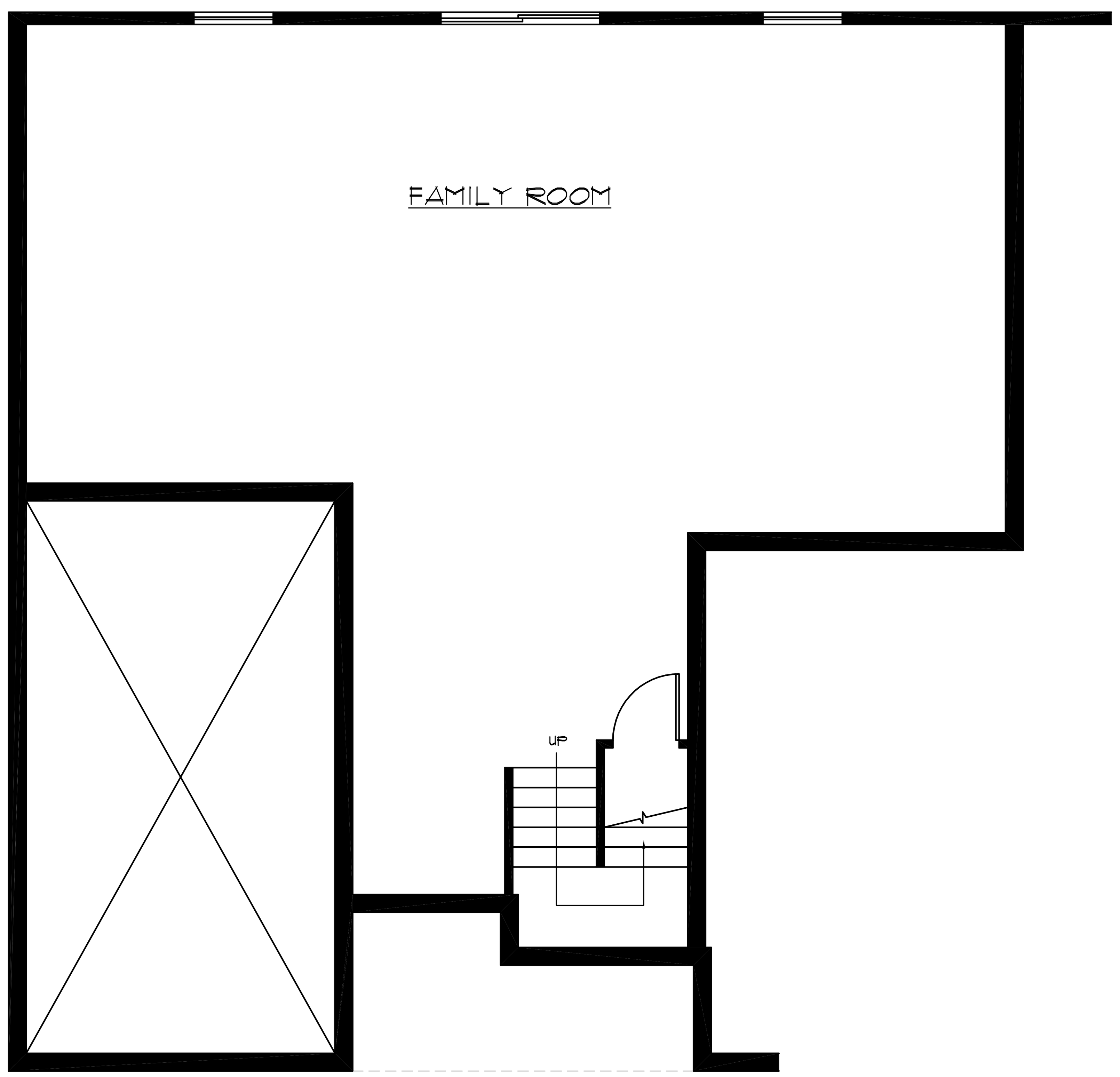
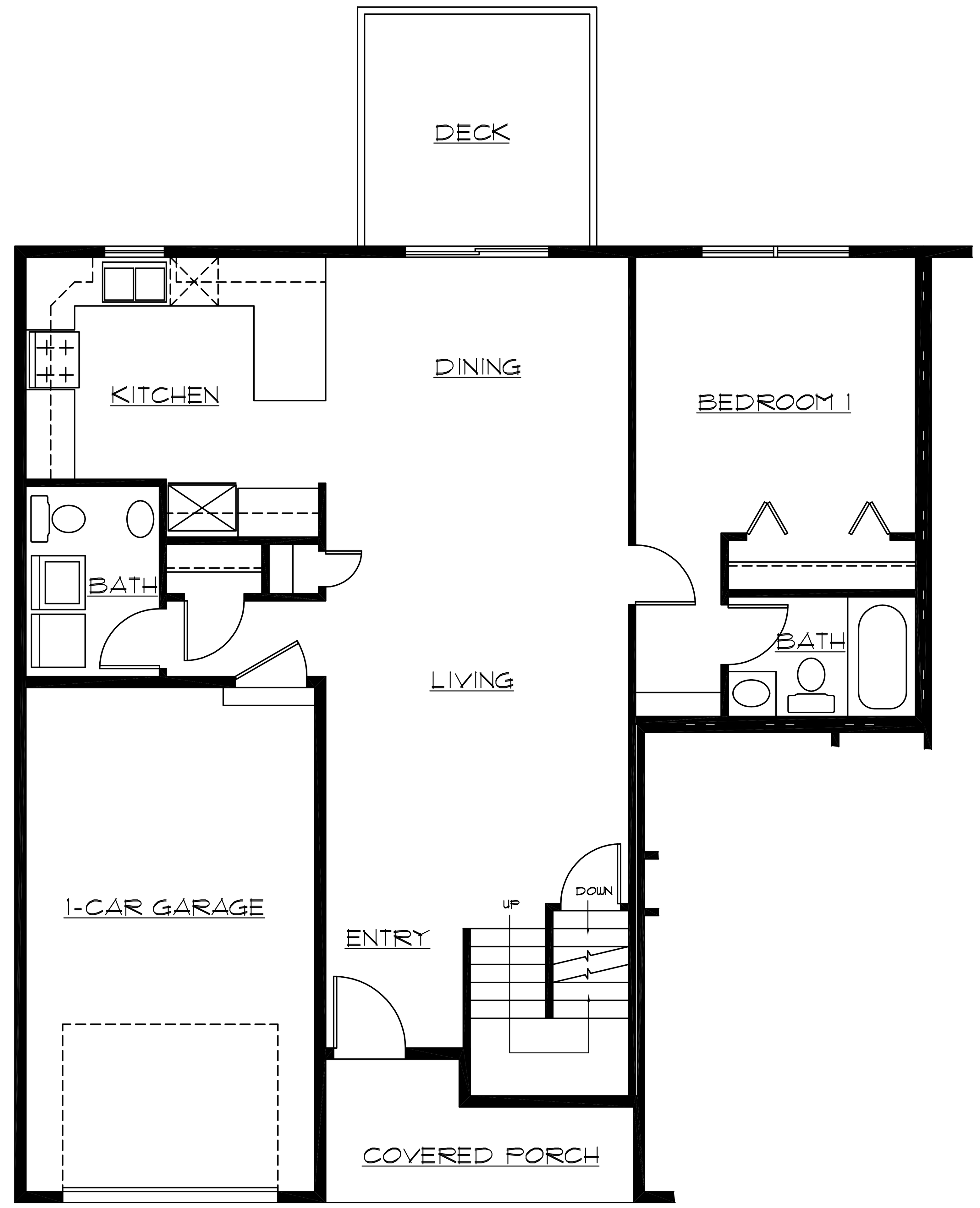
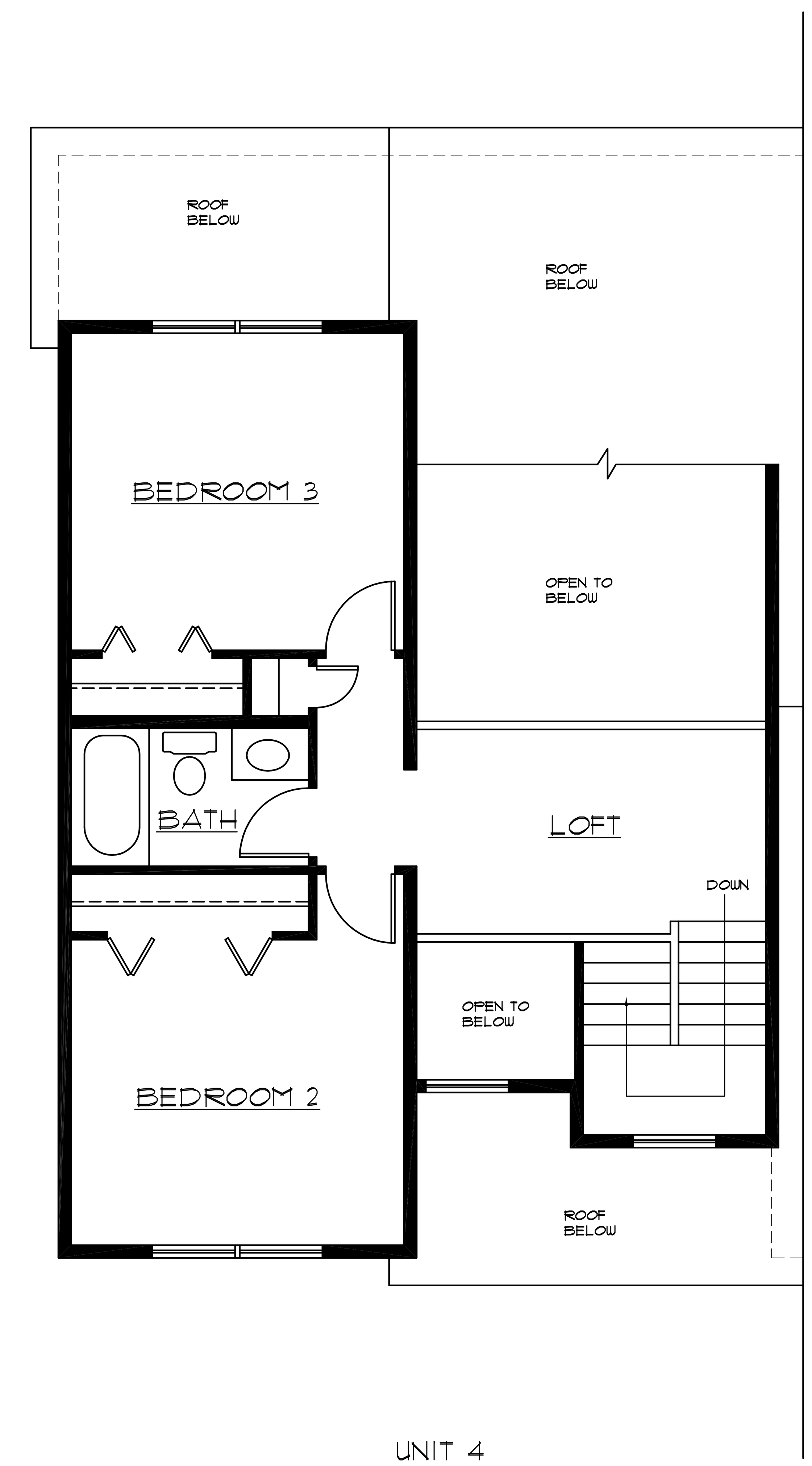


UNIT 4
LOWER LEVEL

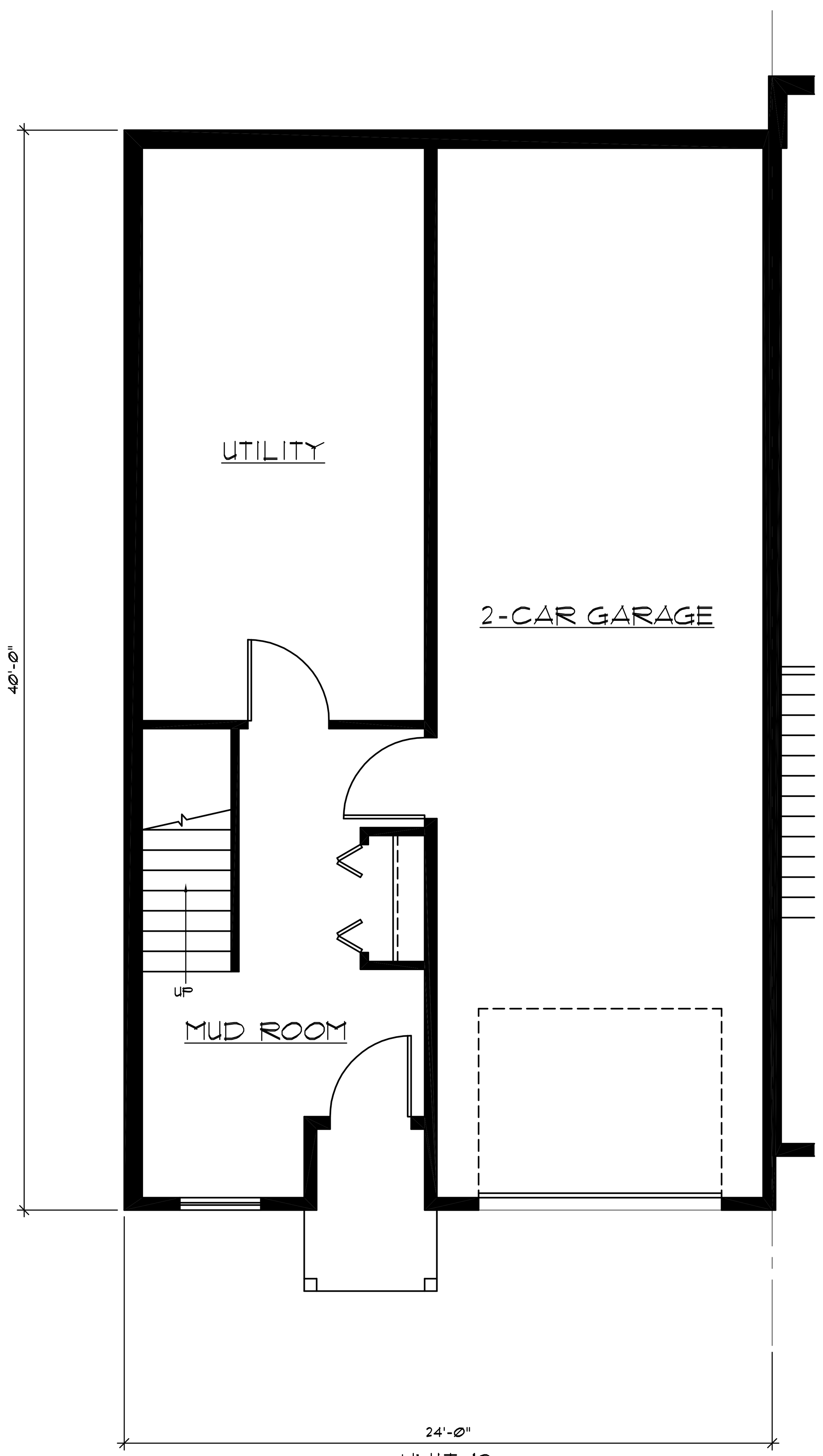


UNIT 4
MAIN LEVEL

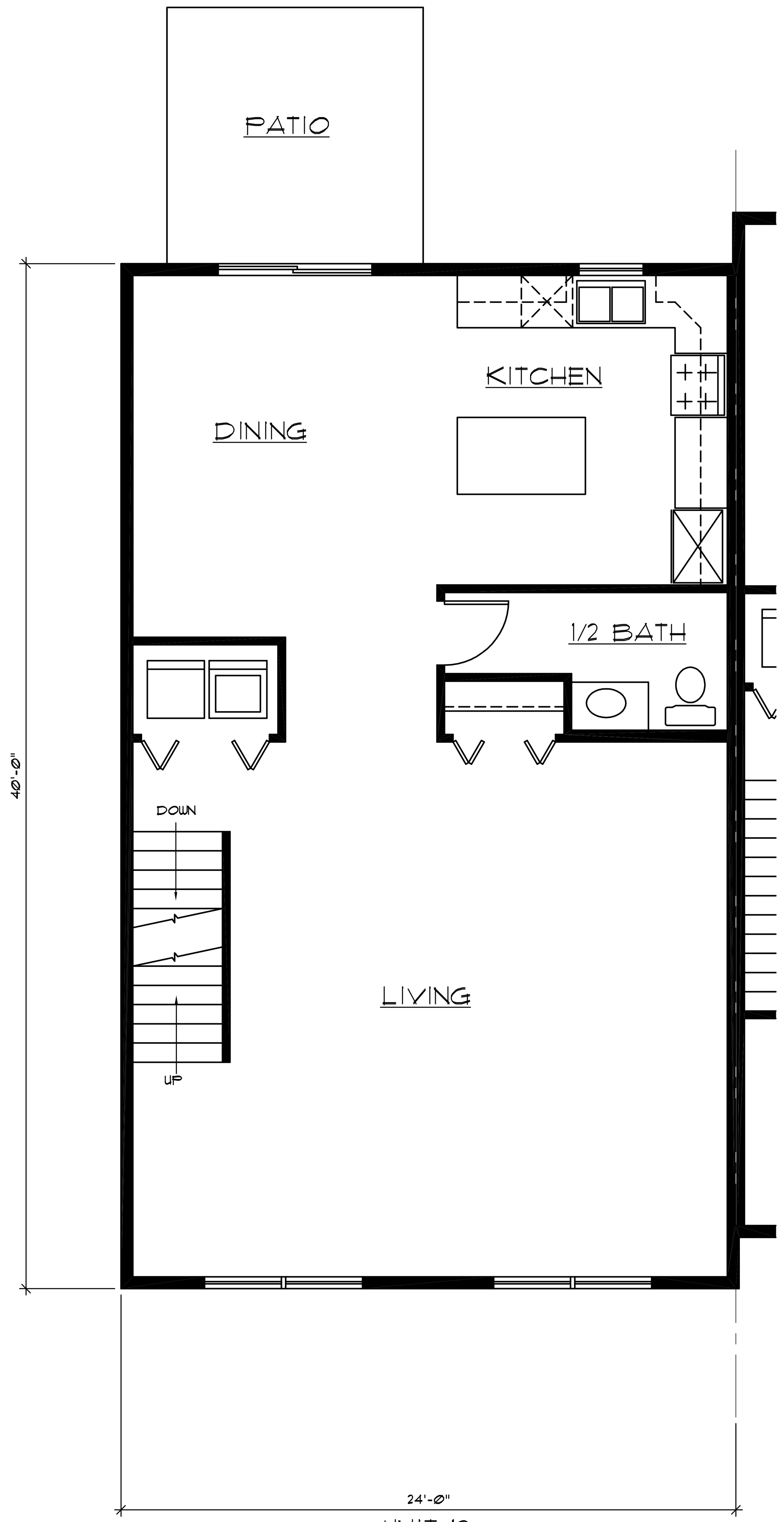


UNIT 4
UPPER LEVEL

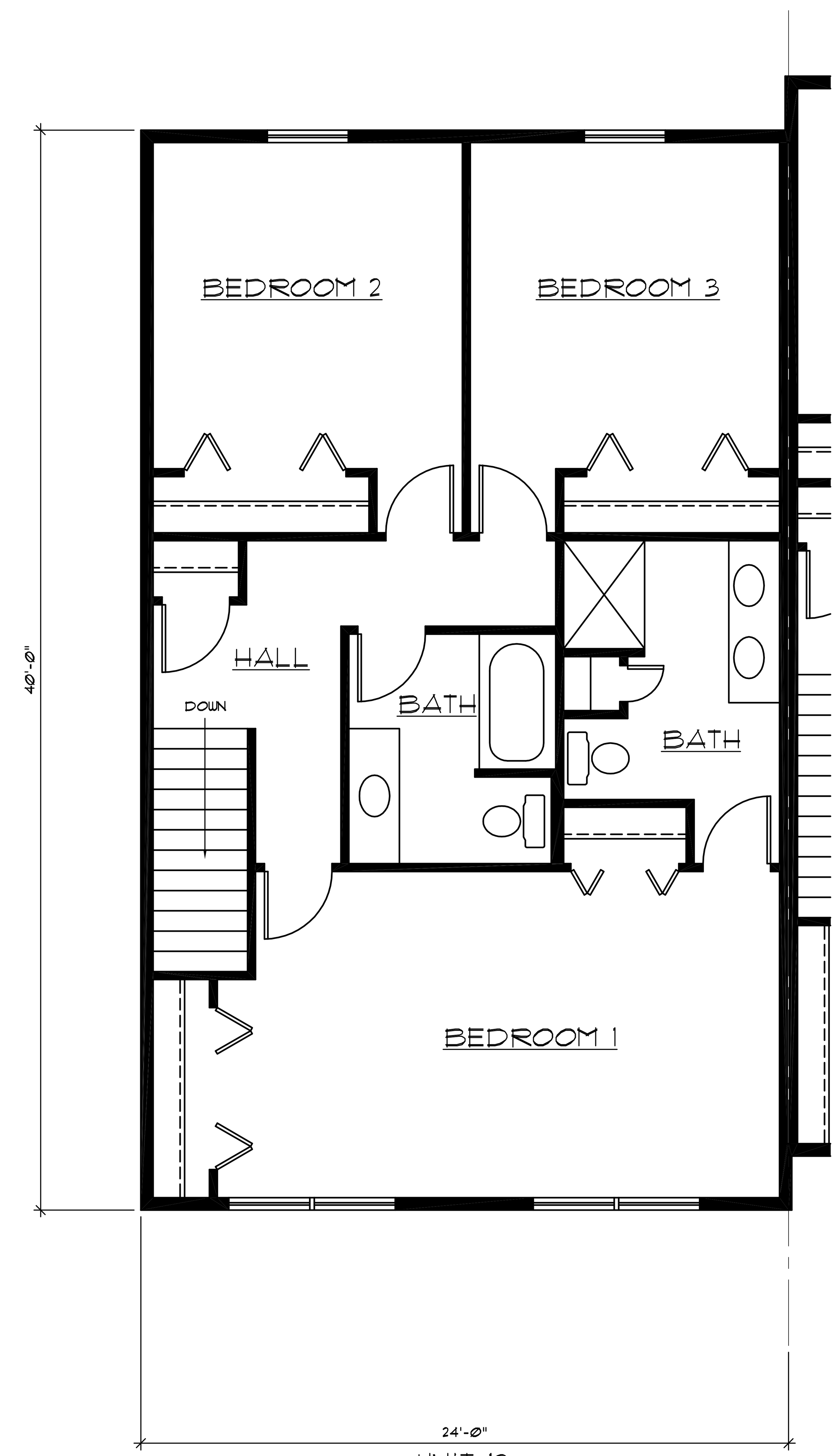

UNIT 4
UNIT 5
UNIT 6
UNIT 7



UNIT 13
LOWER LEVEL

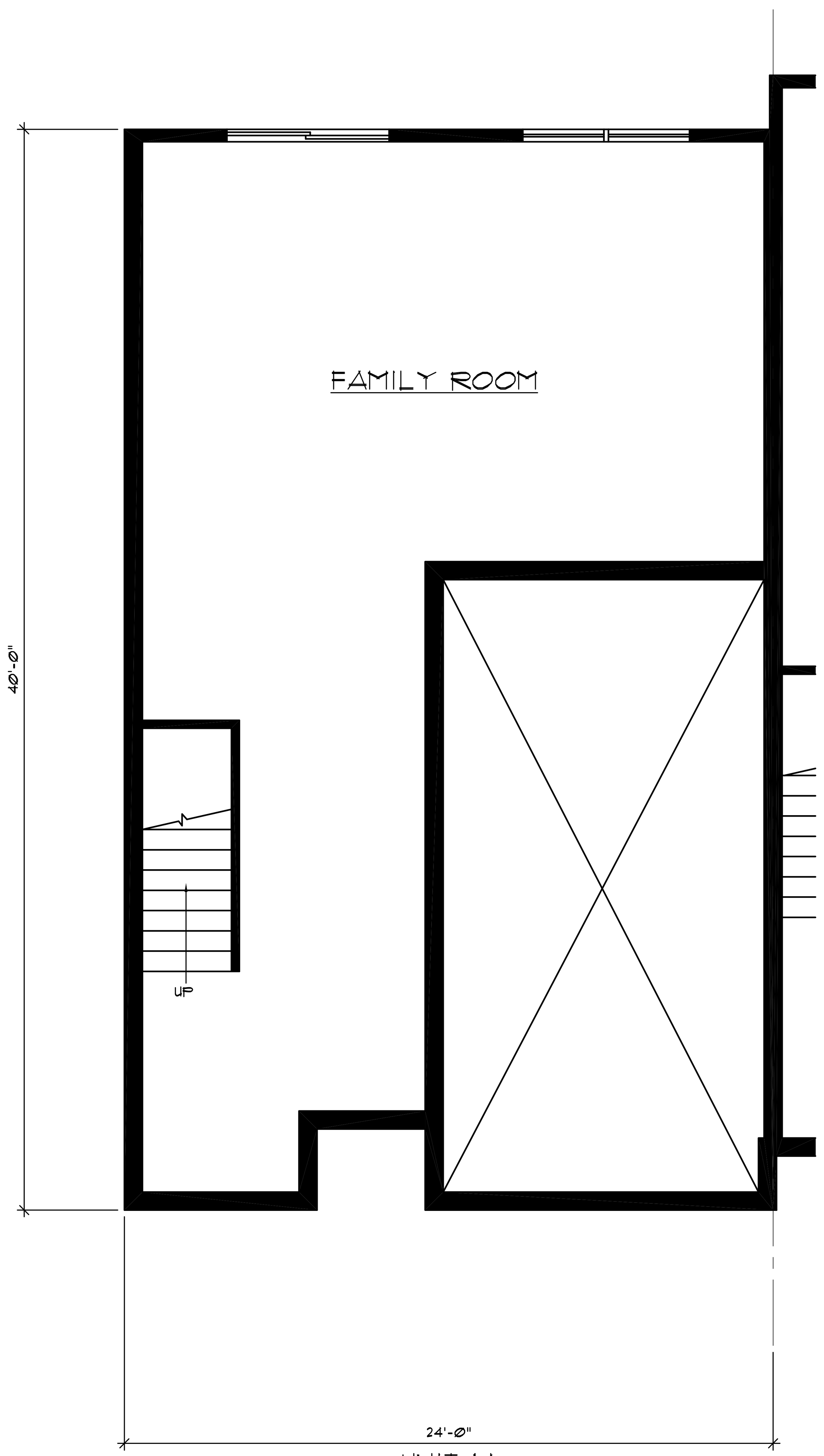


UNIT 13
MAIN LEVEL

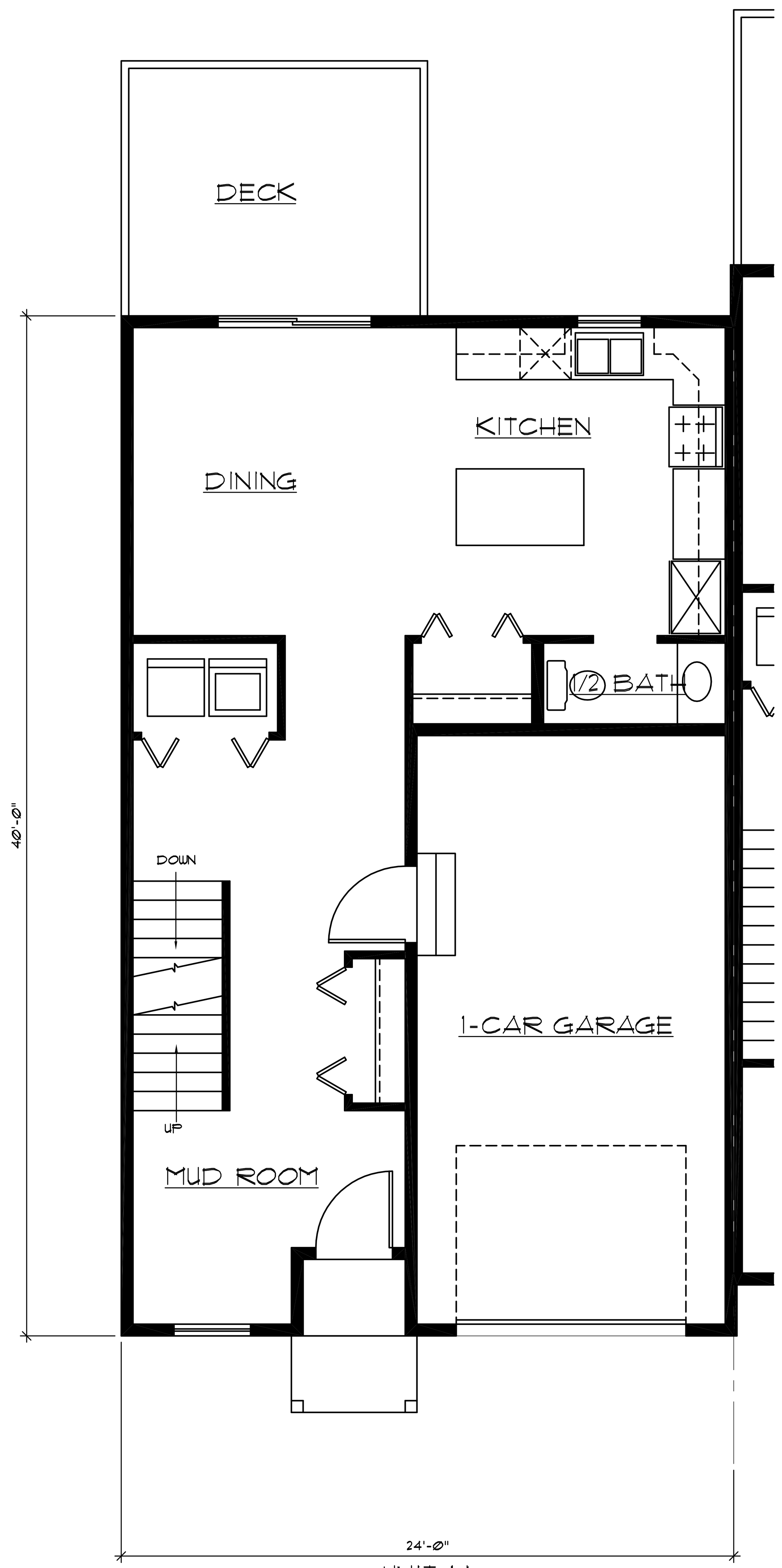


UNIT 13
UPPER LEVEL

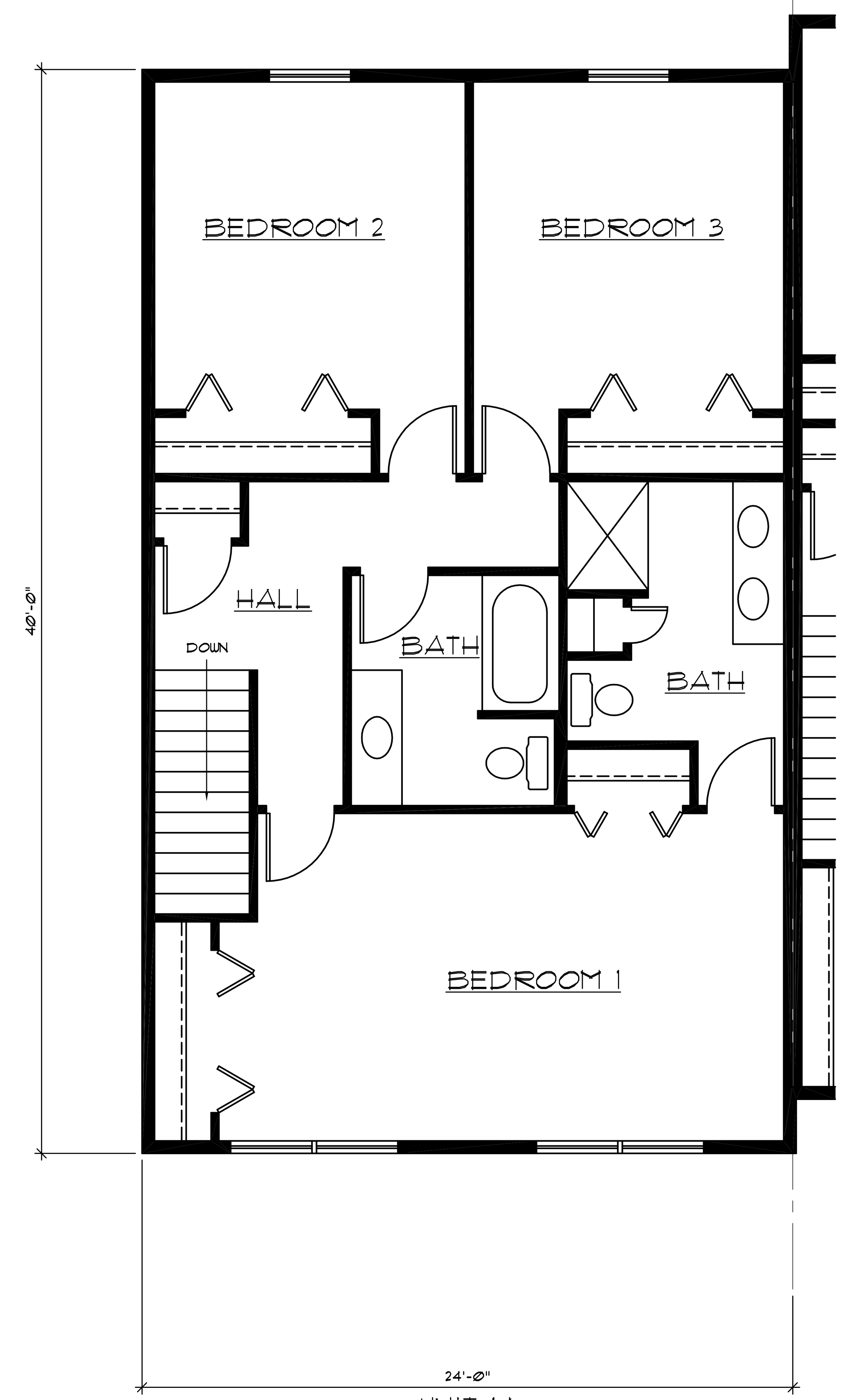

UNIT 13
UNIT 12
UNIT 11
UNIT 10
UNIT 9



UNIT 14
LOWER LEVEL



UNIT 14
MAIN LEVEL



UNIT 14
UPPER LEVEL


UNIT 14
UNIT 15
UNIT 16
UNIT 17
UNIT 18

TOWN OF BROOKLYN
PLANNING AND ZONING COMMISSION
PUBLIC HEARING
LEGAL NOTICE

The Planning and Zoning Commission will hold a public hearing on Tuesday, September 21, 2021, at 6:30 p.m. via Webex and in-person (masks required) at the Brooklyn Middle School Auditorium, 119 Gorman Road, Brooklyn, CT on the following:

SP 21-002: Special Permit Application for Multi-Family Development (51 Condominium units) on south side of Louise Berry Drive (formerly School Street), Assessor's Map 33, Lot 19, 13.5 acres, R-30 Zone, Applicant: Shane Pollock.

Copies of applications will be available for review on the Town of Brooklyn website.

All interested parties may attend the meeting, be heard and written correspondence received.

Dated this 30th day of August, 2021

NOTICE TO ADJACENT LAND OWNERS

August 31, 2021

The Town of Brooklyn Planning & Zoning Commission will hold a Public Hearing on Wednesday, September 21, 2021 at 6:30 P.M. via Webex and in-person (masks required) at the Brooklyn Middle School Auditorium, 119 Gorman Road, Brooklyn, Connecticut. This hearing deals with application SP21-002 for a multi-family condominium development on the south side of Louise Berry Drive.

The property is owned by Shane J. Pollock and Erin F. Mancuso, located on Louise Berry Drive, shown as Lot #19, on Assessors Map #33.

Maps and other application information are available for review on the Town of Brooklyn website.

At this hearing, any interested persons may be heard and written communications received regarding this matter.

LIST OF AJACENT LAND OWNERS - INCLUDING ACROSS THE STREET as of 7/14/2021 NECCOG

Shane J. Pollock & Erin F. Mancuso
Louise Berry Drive
Brooklyn, CT

MAP/LOT	NAME
33/21	Town of Brooklyn PO Box 356 Brooklyn, CT 06234
24/148	Connecticut Baptist Homes Inc. 292 Thorpe Ave Meriden, CT 06450
24/158	Brooklyn Property Management LLC 211 Wauregan Road Brooklyn, CT 06234
24/158B	Carl R Baker & Darlene A Baker NO LAND 68 Vina Lane Brooklyn, CT 06234
33/10A	Sally A. Wood 68 Franklin Drive Brooklyn, CT 06234
33/13	Cindy Scalzi & Greg Benoit 36 Franklin Drive Brooklyn, CT 06234
33/14	Mark S Benard 273 Main Street Hampton, CT 06247
33/15	Linda Atsales 24 Franklin Drive Brooklyn, CT 06234
33/16	Stephanie A. Hynes & Brennan D. Hynes 20 Franklin Drive Brooklyn, CT 06234
33/17	Richard E Bein 12 Franklin Drive Brooklyn, CT 06234
33/20.3	William J Purcell Jr 179 Gorman Road Brooklyn, CT 06234
33/20	David R Dumont 173 Gorman Road Brooklyn, CT 06234
33/20.1	Curt R Hostman PO Box 351 Brooklyn, CT 06234

TOWN OF BROOKLYN
PLANNING AND ZONING COMMISSION
PUBLIC HEARING
LEGAL NOTICE

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Copies of applications will be available for review on the Town of Brooklyn website.

All interested parties may attend the meeting, be heard and written correspondence received.

Dated this 30th day of August, 2021

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Brooklyn, CT 06234

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Brooklyn, CT 06234

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273 Main Street
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292 Thorpe Ave
Meriden, CT 06450

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Brooklyn, CT 06234

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Brooklyn, CT 06234

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EVERSOURCE
1144
TOWN OF BROOKLYN
APPLICATION ON THIS PROPERTY
PLANNING & ZONING COMMISSION
PUBLIC HEARING DATE: SEPTEMBER 21, 2021
TIME: 6:30 PM
LOCATION: VIA WEBEX & IN-PERSON (MASKS REQUIRED) AT THE
BROOKLYN MIDDLE SCHOOL - AUDITORIUM
119 GORMAN ROAD, BROOKLYN, CT
SPECIAL PERMIT FOR: #SP 21-002 SHANE POLLOCK
MULTI -FAMILY DEVELOPMENT (51 CONDOMINIUM UNITS)
FOR INFORMATION CALL: LAND USE OFFICE AT 860-779-3411

KWH Enterprise, LLC
277 Reservoir Avenue, Suite 1101
Meriden, CT 06451
Phone: (203) 807-5482
Cell: (203) 606-3525
Fax: (203) 440-0788
kermit.hua@kwhenterprise.com

September 7, 2021

Jana Butts Roberson, AICP
Director of Community Development/Town Planner
Town of Brooklyn
PO Box 356
Brooklyn, CT 06234

Reference: Traffic review of proposed multi-family condominium development on Louise Berry Drive, Brooklyn, Connecticut

Dear Ms. Roberson:

At the Town's request, I conducted a peer review of the traffic study and site plans for the proposed housing development on Louise Berry Drive in Brooklyn, Connecticut. The traffic report was prepared by F. A. Hesketh & Associates, Inc. and was dated July 13, 2021. The site plans were prepared by Killingly Engineering Associated with a revision date of April 23, 2021.

I evaluated the adequacy and comprehensiveness of the following aspects of the traffic study and site layout:

- Traffic data collection and traffic volumes;
- Existing roadway system in the area;
- Traffic generation for the proposed development;
- Directional distribution (approach and departure) of site traffic;
- Traffic impact and the adequacy of nearby roadways;
- Queuing;
- Traffic safety; and
- On-site traffic circulation.

Project Understanding

The 51-unit housing development will be accessed via a driveway on Louise Berry Drive. Louise Berry Drive intersects with Gorman Road in an area of primarily single-family houses and two schools.

The following intersections were analyzed for the traffic study:

- Gorman Road and Louise Berry Drive; and
- Louise Berry Drive and the future site driveway.

It should be noted that Louise Berry Drive is labeled as School Street on CTDOT and Google maps.

Traffic Peer Review Comments

1. Traffic Impact Study Methodology

   The analysis and documentation submitted by the applicant's traffic consultant are generally in accordance with accepted industry procedures and standards with a few exceptions that are noted later in this letter.

2. Traffic Volumes

   The traffic consultant used pre-pandemic traffic volumes collected by CTDOT on Gorman Road and field counts collected during the pandemic on June 7, 2021 for the traffic analysis. The weekday morning peak hour traffic volumes for Louise Berry Drive used in the traffic analysis were based on field counts, and the weekday afternoon commute hour traffic volumes for Louise Berry Drive were based on trip generation for the elementary school.

   I have two questions about the traffic volumes: 1. Louise Berry Drive is connected to both the elementary school and the middle school. Why only trip generation for the elementary school was used in estimating its afternoon peak-hour traffic? 2. The observed traffic for Louise Berry Drive for the weekday morning peak hour in Table 2 of the report is much lower than the elementary school trips from ITE trip generation, assuming the latter method is applicable here. Since we are still in a pandemic, why didn't the consultant adjust the observed volumes to reflect normal conditions without the pandemic?

   Schools are in session at the time of this review. My recommendation is that new counts be collected at the intersection of Gorman Road and Louise Berry Drive and at the two middle school driveway intersections with Gorman Road to the north during weekday morning peak hours and adjustments be made to remove the impact of the pandemic in the field counts by comparing trip generations for the two schools and entry and exit volumes at the three intersections. This will result in more reliable weekday morning traffic volumes for the intersection of Gorman Road and Louise Berry Drive, which can be used for updating the traffic analysis.

3. Trip Generation

   The amount of traffic generated by the proposed condominiums was estimated using Land Use (LU) 210, Single Family Detached Housing from ITE (Institute of Transportation Engineers) *Trip Generation Manual*. The development is projected to generate 44 and 57 trips for the respective weekday morning and afternoon peak hours; these represent increases of 27 percent and 25 percent to peak-hour background traffic on Gorman Road. The traffic report used the wrong land use (LU) category for the development. The site plans show that the units are attached. In other words, they are not detached houses; they are condominiums. Although the trip generation rates for different kinds of residential developments in a suburban setting are similar, using single family detached housing in describing the development misleads readers on the nature of the development if they do not also look at the site plans.

Depending on the number of stories for the units, the appropriate ITE land use categories are likely to be LU 220, Multifamily Housing (Low-Rise); or LU 221, Multifamily Housing (Mid-Rise). The trip generation, associated analysis, and the land use description of the report should be updated.

In general, residential developments, including the condominiums for this site, are not major traffic generators when compared with retail or office uses of comparable floor space.

4. Trip Distribution/Assignment of Site Traffic

The trip distribution assigns 70 percent of the trips to the north and 30 percent to the south along Gorman Road. This distribution is reasonable because of the site's location in relation to the main area roadway Route 6, which is north of the site.

5. Level of Service Analysis

The State of Connecticut doesn't have a specific policy or requirement on traffic level of service. Generally, a LOS (levels of service) C or better at an intersection is desirable. In many cases, a LOS D is acceptable during peak periods since this usually lasts for short durations during a day.

The traffic analysis of the study concluded that the two unsignalized intersections, Gorman Road and Louise Berry Drive, and Louis Berry Drive and the site driveway, will operate at LOS A and B with minimal queues during peak weekday morning and weekday afternoon commute hours when the development is completed. Because of the issues with the traffic volumes and the trip generation used for the study, these results need to be updated in subsequent submissions.

6. Parking

On the cover sheet of the plan set, 155 proposed parking spaces were described as two garage spaces and one driveway space per unit and two "additional spaces." This does not match the "Layout & Landscape Plan." On the plan, there are eight such "additional spaces" not associated with individual units. Units #1 through #3 have garage entrances on the sides of units; does this mean that only one car can be parked in the garages of these three units?

Reference: Traffic review of proposed multi-family condominium development on Louise Berry Drive, Brooklyn, Connecticut

Separately, in a response to engineer comment #5, it was noted that “KEA states that each unit will have a garage for one (1) parking space.” This contradicts the parking information on the plan cover sheet.

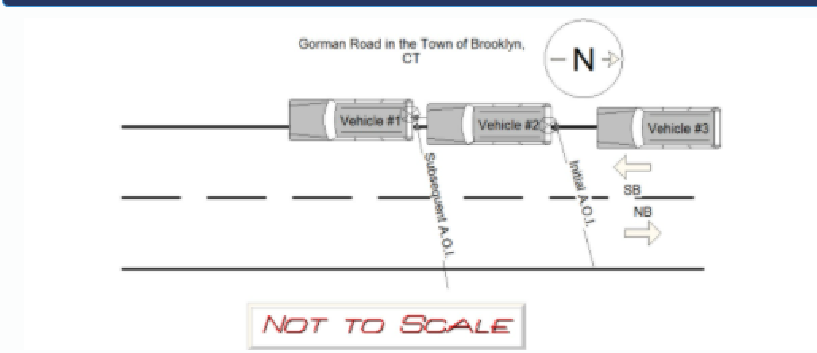
7. Crash Experiences

Three-year traffic accident records for Gorman Road are included in the traffic report. Six accidents, including one injury accident, were reported. Four of them were single car crashes involving roadside objects. One nearby crash was a rear-end accident among southbound vehicles at the northern driveway to the Middle School (Figure 1).

No abnormal accident patterns can be identified from these records.

Figure 1 Record of Nearby Crash

Diagrams of the Current Page of Results



CrashID:	731977
Town Name:	Brooklyn
Date Of Crash:	2020-01-02
Time of Crash:	08:45:00
Crash Severity:	Property Damage Only
Most Severe Injury:	No Apparent Injury (O)
Route Class:	Local
Road Description:	GORMAN RD
Roadway Name:	GORMAN RD
Intersecting Roadway Name:	unknown
First Harmful Event:	Motor Vehicle in Operation
Manner of Crash / Collision Impact:	Front to rear
Weather Condition:	Clear
Weather 2:	Not Applicable
Light Condition:	Daylight
Road Surface Condition:	Dry
Average Daily Traffic:	2100
Functional Classification:	MAJOR COLLECTOR - NEW HPMS
Rural or Urban:	Urban

8. Impact on Schools

   Near the site driveway, Louise Berry Drive provides access to one drop-off loop southeast of the elementary school and one parking and drop-off area southwest of the elementary school. The proposed site driveway will be located opposite existing 90-degree parking spaces for the elementary school on the north side of Louise Berry Drive. In addition, Louise Berry Drive is connected to the middle school to the north.

   The traffic report indicates that staff arrived at about 8:15 AM and “a significant portion of parents” entered from the Middle School driveway to the north and queued in the parking lot southwest of the elementary school and dropped off students between 9:15 AM and 9:30 AM. The report also states that during the morning peak hour “school buses do not use Louise Berry Drive.”

   Because school days for both the elementary school and the middle school end before typical afternoon commute hours (usually after 4:30 PM), the weekday morning peak hour is likely to be the only time when the site traffic can potentially conflict with the school traffic. It is not known whether any loading/unloading of students occurs on Louise Berry Drive and how school buses access the elementary school if they do not use Louise Berry Drive. Are school buses not running because of the pandemic? Under non-pandemic conditions, will school buses queue on Louise Berry Drive and stop other traffic on the street? I recommend that the revised traffic report be forwarded to staff of the two schools for comments, suggestions, and concerns, if any.

9. On-Site Circulation

   On the “Layout & Landscaping Plan,” a 24-foot width is used for all on-site roadways. The radius for the cul-de-sac at the western end of the development is 50 feet. The site engineer used relatively small curb radii, five feet and 10 feet, for the development. I recommend that these design elements be evaluated in the context of facilitating on-site circulation and minimizing traffic conflicts.

   The main traffic circulation issue is whether large vehicles can safely maneuver on the site. Tractor trailers such as WB-50 will likely visit the site infrequently. 30-foot SU-30 trucks will be on the site more often. In emergencies, ladder trucks will need room to move and set up on the site and in some instances have access to more than one side of buildings; access requirements for ladder trucks need to be confirmed with local fire officials. The site engineer needs to demonstrate how these large vehicles will travel on the site and whether the roadway widths, curb radii, and cul-de-sac as designed are adequate.

Reference: Traffic review of proposed multi-family condominium development on Louise Berry Drive, Brooklyn, Connecticut

10. Summary

    The weekday morning peak-hour traffic analysis on Louise Berry Drive will require further revisions and input from staff of the two schools. More clarifications and vehicular movement exhibits are needed for large vehicles and for ladder trucks during emergencies. This letter also identified several issues with the traffic volumes and the trip generation used in the study, and the study needs to be updated accordingly.

I appreciate the opportunity to prepare this review. I look forward to additional information from the applicant in response to these comments. Should you have any questions or need additional information, please feel free to contact me.

Sincerely,

KWH Enterprise, LLC

Kermit Hua, PE, PTOE
Principal
kermit.hua@kwhenterprise.com
Cell: (203) 606-3525

Jana Roberson

From: douglas kramer <kramer190@hotmail.com>
Sent: Thursday, September 09, 2021 11:26 AM
To: Jana Roberson
Subject: Condos

Jana,
Per chapter 18 of the Connecticut state fire code 18.2.3.4.3 turning radius. Gives the authority having jurisdiction, (AHJ) which is the Fire Marshal, the authority to approve the size of the turn around. Upon preliminary evaluation, I would ask that the turn around be no less than 75 feet, to have ample room for the fire trucks to be able to turn around at the end of the road.
Also the road width per the Connecticut statue needs to be 26 feet with a hydrant.
I will require a hydrant at the beginning of the road and one at the end.

Douglas P Kramer SR.
Brooklyn Fire Marshal

Sent from my iPhone

17.3.5.2.1.10 Vehicle Parking Areas. Vehicle parking areas within the immediate landscaped zone shall be maintained free of dry grasses and fine fuels that could be ignited by hot exhaust systems or firebrands. [**1144:**5.11]

17.3.5.2.1.11 Exterior Exposure Hazards.

17.3.5.2.1.11.1* Heat and flame sources that are unprotected or unsupervised shall not be permitted within 30 ft (9 m) of the primary structure. [**1144:**5.12.1]

17.3.5.2.1.11.2 Incinerators, outdoor fireplaces, permanent barbecues, and grills shall not be built, installed, or maintained in hazardous fire areas without prior approval of the AHJ. [**1144:**5.12.2]

17.3.5.2.1.11.3 Openings in incinerators, outdoor fireplaces, permanent barbecues, and grills shall be provided with an approved spark arrester, screen, or door. [**1144:**5.12.3]

17.3.5.2.1.11.4 Propane tanks and other flammable or combustible liquids storage shall conform to NFPA 58, *Liquefied Petroleum Gas Code*, and the wildland fire hazard mitigation plan required in 17.1.10. [**1144:**5.12.4]

17.3.5.2.1.11.5 Other combustible materials within 30 ft (9 m) of any structure shall be removed or stored in conformance with the wildland fire hazard mitigation plan as approved by the AHJ. [**1144:**5.12.5]

17.3.5.2.2 Where required by the AHJ because of extra hazardous conditions, additional areas shall be maintained to include additional defensible space from buildings or structures, trees adjacent to or overhanging a building shall be maintained free of deadwood, and the roof of a structure shall be free of leaves, needles, or other dead vegetative growth.

17.3.5.3 Roadways. Areas within 10 ft (3 m) on each side of portions of highways and private streets shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do not form a means of readily transmitting fire.

17.3.6 Unusual Circumstances. The AHJ shall determine that difficult terrain, danger of erosion, or other unusual circumstances could require additional safeguards.

17.3.7 Fire Roads, Firebreaks, and Emergency Access.

17.3.7.1 The provisions of 17.3.7 and Section 18.2 shall be used to determine the design, clearances, and provisions for emergency access (ingress and egress).

17.3.7.2 Unauthorized vehicles shall not be driven upon fire roads or firebreaks. Vehicles shall not be parked in a manner that obstructs the entrance to a fire road or firebreak.

17.3.7.3 Radio and television aerials, guy wires, and other obstructions shall not be installed or maintained on fire roads or firebreaks unless the vertical clearance is sufficient to allow the movement of fire and emergency apparatus.

17.3.7.4 Motorcycles, motor scooters, and motor vehicles shall not be operated within hazardous fire areas, except upon clearly established public or private roads.

17.3.8 Tampering with Fire Safety Equipment. See Section 10.7 for requirements on tampering with fire safety equipment.

17.3.9 Maintenance. See 4.5.8 for requirements on maintenance.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

18.1.1 Application.

18.1.1.1 This chapter shall apply to public and privately owned fire apparatus access roads.

18.1.1.2 This chapter shall apply to public and privately owned fire hydrant systems.

18.1.2 Permits. Permits, where required, shall comply with Section 1.12.

18.1.3 Plans.

18.1.3.1 Fire Apparatus Access. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

18.1.3.2 Fire Hydrant Systems. Plans and specifications for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

18.2 Fire Department Access.

18.2.1 Fire department access and fire department access roads shall be provided and maintained in accordance with Section 18.2.

18.2.2* Access to Structures or Areas.

18.2.2.1 Access Box(es). The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to or within a structure or area is difficult because of security. The access box(es) shall be of an approved type listed in accordance with UL 1037.

18.2.2.2 Access to Gated Subdivisions or Developments. The AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

18.2.2.3 Access Maintenance. The owner or occupant of a structure or area, with required fire department access as specified in 18.2.2.1 or 18.2.2.2, shall notify the AHJ when the access is modified in a manner that could prevent fire department access.

18.2.3 Fire Department Access Roads.

18.2.3.1 Required Access.

18.2.3.1.1 Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

18.2.3.1.2 Fire department access roads shall consist of roadways, fire lanes, parking lot lanes, or a combination thereof.

18.2.3.1.3* The provisions of 18.2.3.1 through 18.2.3.2.2.1 shall be permitted to be modified by the AHJ where any of the following conditions exists:

(1) One- and two-family dwellings protected by an approved automatic sprinkler system in accordance with Section 13.1

Existing one- and two-family dwellings
Private garages having an area not exceeding 400 ft^2
Carports having an area not exceeding 400 ft^2
Agricultural buildings having an area not exceeding 400 ft^2
Sheds and other detached buildings having an area not exceeding 400 ft^2

2.3.1.4 When fire department access roads cannot be in- ed due to location on property, topography, waterways, non- able grades, or other similar conditions, the AHJ shall be rized to require additional fire protection features.

2.3.2 Access to Building.

2.3.2.1 A fire department access road shall extend to in 50 ft (15 m) of at least one exterior door that can be ed from the outside and that provides access to the inte- of the building.

2.3.2.1.1 Where a one- or two-family dwelling, or town- se, is protected with an approved automatic sprinkler sys- that is installed in accordance with NFPA 13D or A 13R, as applicable, the distance in 18.2.3.2.1 shall be itted to be increased to 150 ft (46 m).

2.3.2.2 Fire department access roads shall be provided that any portion of the facility or any portion of an exte- wall of the first story of the building is located not more 150 ft (46 m) from fire department access roads as mea- ed by an approved route around the exterior of the build- or facility.

2.3.2.2.1 When buildings are protected throughout with an oved automatic sprinkler system that is installed in accor- ce with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 3.2.2 shall be permitted to be increased to 450 ft (137 m).

2.3.3 Multiple Access Roads. More than one fire depart- nt access road shall be provided when it is determined by AHJ that access by a single road could be impaired by icle congestion, condition of terrain, climatic conditions, other factors that could limit access.

2.3.4 Specifications.

2.3.4.1 Dimensions.

2.3.4.1.1 Fire department access roads shall have an unob- cted width of not less than 20 ft (6.1 m).

2.3.4.1.2 Fire department access roads shall have an unob- cted vertical clearance of not less than 13 ft 6 in. (4.1 m).

2.3.4.1.2.1 Vertical clearance shall be permitted to be re- ed, provided such reduction does not impair access by fire aratus, and approved signs are installed and maintained cating the established vertical clearance when approved.

2.3.4.1.2.2 Vertical clearances or widths shall be increased en vertical clearances or widths are not adequate to accom- date fire apparatus.

2.3.4.2 Surface. Fire department access roads shall be de- ed and maintained to support the imposed loads of fire aratus and shall be provided with an all-weather driving face.

2.3.4.3 Turning Radius.

2.3.4.3.1 The turning radius of a fire department access d shall be as approved by the AHJ.

18.2.3.4.3.2 Turns in fire department access roads shall maintain the minimum road width.

18.2.3.4.4 Dead Ends. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

18.2.3.4.5 Bridges.

18.2.3.4.5.1 When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with nationally recognized standards.

18.2.3.4.5.2 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

18.2.3.4.5.3 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

18.2.3.4.6 Grade.

18.2.3.4.6.1 The gradient for a fire department access road shall not exceed the maximum approved.

18.2.3.4.6.2* The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by the AHJ.

18.2.3.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

18.2.3.4.7 Traffic Calming Devices. The design and use of traffic calming devices shall be approved by the AHJ.

18.2.3.5 Marking of Fire Apparatus Access Road.

18.2.3.5.1 Where required by the AHJ, approved signs, approved roadway surface markings, or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof or both.

18.2.3.5.2 A marked fire apparatus access road shall also be known as a fire lane.

18.2.4* Obstruction and Control of Fire Department Access Road.

18.2.4.1 General.

18.2.4.1.1 The required width of a fire department access road shall not be obstructed in any manner, including by the parking of vehicles.

18.2.4.1.2 Minimum required widths and clearances established under 18.2.3.4 shall be maintained at all times.

18.2.4.1.3* Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

18.2.4.1.4 Entrances to fire department access roads that have been closed with gates and barriers in accordance with 18.2.4.2.1 shall not be obstructed by parked vehicles.

18.2.4.2 Closure of Accessways.

18.2.4.2.1 The AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other accessways not including public streets, alleys, or highways.

18.2.4.2.2 Where required, gates and barricades shall be secured in an approved manner.

LADA, P.C.

Land Planners Land Development Consulting, Site Planning, Landscape Architects, Planners, Corridor Studies, Visual Assessment, Environmental Impact Statements, Erosion Control Specialists, Streetscapes, Recreation, and Master Planning

September 13, 2021

Ms. Jana Butts Roberson, AICP
Director of Community Development
Town of Brooklyn
4 Wolf Den Road
Brooklyn, CT 06234

Re: Proposed Multi-family project on 13.5 Acres for Shane Pollack

Dear Ms. Roberson,

As requested, LADA has reviewed the following:

1. Site Plan set prepared by Killingly Engineering Associates dated April 23, 2020 last revised April 20, 2021- 11 sheets
2. Application for Special Permit dated May 12, 2021
3. Application for Site Plan Review dated May 12, 2021
4. Statement of Use prepared by Killingly Engineering Associates, no date
5. Wetland Report prepared by Joseph R. Theroux dated 9/23/20
6. Northeastern Connecticut Council of Governments Engineering Plan Review by Syl Pauley, last revised based on Plans dated February 10 , 2021 (Black, red, green, blue and purple markups)

Our scope is limited to the review of the plans and documents as they relate to the Site Plan and Special Permit objectives as stated in the Zoning Regulations dated effective July 20, 2020. Additional comments related to erosion control and stormwater are to be provided by others.

As per section 9.C.5- the following are the Site Plan objectives as stated in the regulations. Our comments or recommendations are noted below each point.

1. Protect the health, safety, convenience and property values of the public in general and the immediate neighborhood in particular.

> There is insufficient information to determine if the adjacent neighbors are affected by the proposed project. Please locate the existing houses and buildings in the area and provide some simple distance measurements to the existing homes, school building etc. This can be done on available aerial photo information provided by the State of Connecticut but should not be done using internet mapping.

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2. Encourage or require modifications of the plans as it shall deem necessary to ensure the accomplishment of the general objectives outlined in this section.

No comment required

3. Ensure that the proposed site plan will be in general accordance with the Plan of Conservation and Development, including the provision and adequacy of public improvements.

The property is identified as a “Moderate Critical Resource Area” in the Plan of Conservation and Development. As such, and consistent with Item #10 of the Special Permit Criteria, the applicant should provide a review of the Plan of Conservation and Development and how this project is consistent with that document. Once submitted , the Planning and Zoning Commission can then determine if they agree with the applicant’s assessment.

4. Not used

No comment required.

5. Ensure all the buildings, structures, uses , equipment, or material are readily accessible for fire and police protection.

Please indicate the location of the nearest existing hydrant that might be needed during construction. Please add the proposed hydrants to the legend on all sheets and provide a legend on the utility plan and all other plans. Please provide a vehicle turning plan for the largest fire truck that the Brooklyn Fire Department has. Has the Fire Department/Fire Marshal reviewed the plan to determine what other issues there might be for fire protection?

The plans do not show where the front door for any unit is located, therefore, it is difficult to determine how emergency personnel will access these units. In addition- it is unclear how a pedestrian will access these units from their drive or overall project pedestrian circulation.

6. Ensure that appropriate provision is made for transportation including:
a. adequate off street parking and loading are provided to prevent on-street and off street traffic congestion

It is unclear as to where the public right of way used to access this parcel ends. The traffic patterns for the school, hours of use, etc are also unclear and could potentially be a source of

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congestion. A plan to show how this right-of way is used, how it interfaces with school traffic and how the increased traffic from this project will actually move through the right-of way, especially if there is a queue, such as into the school at the proposed drive or out at Gorman.

There are several existing parking spaces located opposite the project entry on Louise Berry drive. These could potentially be a source of congestion, confusion and a safety hazard if allowed to be maintained. We would recommend that these be removed to reduce conflicts in traffic flow.

b. all parking and maneuvering areas are suitably identified

Please provide a truck movement plan showing how a large moving truck will access each of the various units and turnaround. See notes above.

The applicant should consider how the cul-de-sac might be more sensitively designed to reduce pavement but still allow a safe turnaround for trucks.

c. entrances and exits are suitably identified and designed to specific use radii

Please review all entry drive curves- they are too small for vehicle turning- this includes the main drive and all unit shared drives.

d. the interior circulation system is adequately designed to provide safe and convenient access to all structures, uses and or parking spaces.

There is insufficient information to determine if there is safe and convenient access to the individual units. Please provide finish floor elevations, building elevations and a cross-section through the five buildings on the north side showing the building massing, floor elevations, deck elevations, etc. In addition, for units on the south side of the main drive- please show a section elevation and explain how these drives, sidewalks and planting areas transition along the 10% drive.

Please provide vertical curve calculations based on the typical speed limit for a drive of this kind that meets the town's requirements. It would appear that the vertical curve at the entry is very small. How does the 10% slope on the road transition to 7.5%? The road profile should show the location of the shared access drives. Typically, these shared access drives would cause the road profile to flatten where they intersect. At this time, that does not occur. Please show how the extra parking spaces along the main drive meet the maximum 5% slope standard.

Show how a person would walk from their unit to the recreation area.

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Please show how the recreation area ties into the adjacent trail system and how residents would access it. Also, there are two parking spaces shown at the potential trailhead (which should be better defined) - what is the purpose of these spaces? How will the project be able to keep these spaces from becoming long term storage or a place to abandon vehicles? If the intent is to provide trailhead parking, there may be a conflict between public access and use and project access and use. This should be clarified on the plans and for the longer term.

e. parking areas are provided with suitable bumper guards, guard rails, islands, crosswalks, speed bumps and similar safety devices when deemed necessary to adequately protect life and property

Due to the steep slope on the main drive, it is unclear where there are any accessible parking spaces on this site. Please explain how this project meets the ADA requirements for accessible spaces.

The layout plan should indicate the dimensions of the parking area in front of the garage.

f. provision is made for safe pedestrian movement by avoidance of vehicular conflict within and adjacent to the property by installation of sidewalks and other appropriate means

There are no details indicating how the sidewalk meets the shared access drives- will there be a ramp?

The sidewalk is extremely steep at 10%- has consideration been given to provide a walkable loop through the property from the units rather than along the road?

7. Ensure that all proposed traffic and pedestrian access ways do not create traffic hazards and are: adequate, but not excessive in number; adequate in width, grade, alignment and visibility; adequate in distance from street corners, places of public assembly and other access ways; and adequate in design for other similar safety considerations.

Same as #6 above

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8. Ensure that the general landscaping of the site complies with the purpose and intent of these regulations; that existing trees are preserved to the maximum extent possible; and that parking, storage, refuse and service areas are suitably screened during all seasons form the view of adjacent residential areas and public rights of way.

The existing vegetative cover is significantly damaged due to recent storms and is likely to be of limited use for screening. Please provide a review of the existing cover, especially with respect to what is proposed to remain. If the review indicates that there will need to be tree removal and thinning of shrub layer due to damage, invasive species, etc- then the use of the existing woods to meet this requirement will be insufficient. A more robust planting plan needs to be provided that provides screening during all seasons as noted above. Please show all utilities as part of that plan so that appropriate plant locations that will not be in conflict with the utilities can be chosen. Please provide screening for the adjacent neighbor to the east as construction of the proposed walls are likely to require the removal of tree cover to the property line.

The effect of the loss of wooded habitat is noted in the project biologist report. Typically, in projects like this there would be habitat planting along the edge of the remaining woods, replacement trees along the edge to offset the loss of cover and tree variety, and additional habitat planting at the edge closest to the wetlands. These mitigation measures are not currently provided. Choice of trees, shrubs and herbaceous material should reflect the existing species variety being removed and provide enhancements.

Planting of trees at the end of each shared access drive is likely to be damaged during snow plow operations. Please consider a better layout and arrangement to ensure the longevity of the trees.

All proposed trees are small flower trees. There are no street trees or shade trees proposed.

How will garbage be handled on the site? There are currently no dumpster areas shown.

Please indicate the seed mixes to be used on the site and which portions are proposed to be mowed as lawn. How will the 3:1 slopes be maintained?

The planting plan indicates that the island between the parking spaces at each unit will contain 1 small tree and 2 shrubs. There are no dimensions on this island so it is difficult to determine whether this is appropriate. However, the plans also seem to be missing a sidewalk in this area as well.

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It is unclear what happens between the deck at the rear of the building on the single loaded access drive units (units 34-39 for example). How far is the deck from the drive? What is being done to provide privacy, avoid car lights? Does the deck have an access to the ground? Does this access require a paved landing? At this time, these units have no privacy. In addition, it is unclear where the snow piles will be along the drive especially at the back of units 40-44.

9. Ensure lighting of the site shall be adequate at ground level for protection and safety fo the public in regard to pedestrian and vehicular circulation.

Please provide a full lighting plan including where and what kind of light will be provided on the buildings, where the doors are, etc. Please note there is a light pole shown in a parking space near unit 40. The lighting and hydrants should be shown on all plans.

10. Ensure that the glare from installation of outdoor lights of illuminated signs is properly shielded from the view of adjacent property and public rights -of-way.

There is no project sign shown.

11. Ensure that all utility systems are suitably located, adequately designed and properly installed to serve the proposed uses, to protect the property from adverse air, water or land pollution.

See review by others

12. Same as #8 above

No comment required

13. Ensure the rate and quantity of storm water being discharged onto adjacent properties is not to be increased without drainage easements obtained from the abutting landowner.

See review by others. Given the discharge location, a drainage easement from the downstream neighbor seems prudent.

Please note the required planting to meet the Connecticut Stormwater Manual requirements is not shown. We would note that given the steep grades, the amount of grading and the likely area of soil disturbance, a construction sequence plan should be provided as per Section 9.C.5.7.

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14. Ensure that in planning the layout on the site and design of structures, consideration is given to energy conservation.

The applicant should provide a description of any proposed energy conservation methods, techniques and materials.

15. Ensure that the development of the site will preserve sensitive environmental land features such as steep slopes, wetlands, watercourses, and large rock outcroppings and will attempt to preserve public scenic views or historically significant buildings or sites.

This site is immediate adjacent to a critical connection to the trail from the Village center. The applicant has not provided any information regarding how this might be to the benefit of the proposed project.

Other thoughts:
Please show the regulated areas on all plans.

Please provide a legend on the planting and layout plan. Please indicate the number of proposed plants.

There is a conflict between the parking and garage numbers listed on the cover sheet and the applicant's response noted in the review comments from the COG. The layout plan clearly shows one garage. This should be confirmed by providing architectural plans for the buildings at a preliminary level to be able to determine if the plans meet the Town's requirements.

Overall, the project lacks a sense that the land is usable by anyone except to get into and out of their units and into their car. Recent events has indicated a change in how people use units in this kind of project. People like to walk around to take a break in their day, have a safe place to walk with their kids and dogs and generally have a usable outdoor landscape. Additional care thinking about how people might use the out of doors would provide a more livable project without losing units. Although, the adjacent school does provide some relief, when school is in session, the school administration is likely to have a different approach to people walking on their grounds during the school year and day. Therefore, it is important to use the existing land and available public recreation facilities in the vicinity and on the project property.

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As per Section 9.D.5, the Special Permit Criteria includes eleven (11) areas of additional concern and review. It is conventional for the applicant to prepare a review of these criteria to show how the project meets these requirements for the Commission's consideration. Once submitted the Planning and Zoning Commission can then determine if they agree with the applicant's assessment.

If you have any questions, please let me know.

Sincerely,

Terri-Ann P. Hahn, PLA
Principal

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September 14, 2021

Ms. Michelle Sigfridson, Chairman
Planning and Zoning Commission
Town of Brooklyn
Clifford B. Green Memorial Center
69 South Main Street
Suite 22
Brooklyn, Connecticut 06234

RE: Proposed Multi-Family Condominium Development
Louise Berry Drive
Brooklyn, Connecticut

Dear Ms. Sigfridson and Members of the Planning and Zoning Commission,

At the request of Jana Roberson, Town Planner, I have performed a civil engineering services review of the above referenced project focusing on erosion/sediment control and stormwater management as well as certain sections of the Brooklyn Zoning Regulations.

Compliance with the certain sections of the Brooklyn Zoning Regulations:

Section 7.F – PERFORMANCE STANDARDS:

Section 7.F.2: Not applicable to this application.

Section 7.F.3.1: Not applicable to this application.

Section 7.F.3.2: In general, the application complies with this section, however, there are serious issues with the stormwater management plan as stated below where the plan does not comply with sub-section g.

Section 7.F.4: Not applicable to this application.

Section 7.F.5.1: While erosion control measures are proposed for the site, the plan is not in compliance with the CT DEP 2002 Guidelines for Soil Erosion and Sediment Control (2003 Guidelines).

Section 7.F.5.2: The application is not in compliance with the requirements found in this section as the narrative is not in compliance with the 2002 Guidelines.

Section 7.H – STORMWATER MANAGEMENT:

Section 7.H.1: The stormwater management plans are not in compliance with this section as the proposed system will not reduce non-point source pollutant loads which will be discharged to the downgradient wetland/watercourse system. The design does not provide the Groundwater Recharge Volume. The system will also not reduce flooding as there are significant increases in runoff volume which will be discharged to the downstream wetland/watercourse system. The application does provide any Low Impact Development strategies to address stormwater management from the site.

Section 7.H.2: Application must comply with this section. While a stormwater management plan has been prepared, it will not function as intended.

Section 7.H.3.1a: Not in compliance as no assessment has been provided which demonstrates that non-point source pollutant loads are being reduced.

Section 7.H.3.1.b: Not in compliance as the Groundwater Recharge Volume will not be infiltrated.

Section 7.H.3.1.c: Peak rate attenuation has been required.

Section 7.H.3.2: Not in compliance as no LID practices are proposed.

Section 7.H.4: This section is applicable to this application.

Section 9.C – SITE PLAN APPLICATION:

Section 9.C.1: Application complies

Section 9.C.2: Application complies

Section 9.C.3: After a review of the material, the application appears to comply with this section.

Section 9.C.4: After a review of the material, the application appears to comply with this section.

Section 9.C.5: Compliance with this section is the jurisdiction of the commission.

Site Plan Objectives:

1. Applicant to provide written statement that they are in compliance.
2. To be determined by the Planning and Zoning Commission.
3. To be determined by the Planning and Zoning Commission.
4. No standard
5. It has not been demonstrated if emergency vehicles, particularly fire trucks can access and freely move within the proposed development.
6. Applicant to provide written statement that they are in compliance.
7. Applicant to provide written statement that they are in compliance.
8. Applicant to provide written statement that they are in compliance.
9. Applicant to provide written statement that they are in compliance.
10. Applicant to provide written statement that they are in compliance.
11. The proposed sanitary sewer, water, and other underground utilities appear appropriate for the site design.
12. Applicant to provide written statement that they are in compliance.
13. The plan is not in compliance with this section.
14. Applicant to provide written statement that they are in compliance.
15. It is my professional that this plan is not protective of the wetlands and watercourse on the site as development will intercept and divert the base flow from the groundwater table which currently provides recharge to the wetland system on the site. This diversion will

result in lower groundwater baseflows to the wetland area which will change the hydroperiod within the wetland system. When the hydroperiod within a wetland area is reduced, this will affect the types of vegetation which will survive within the wetland area.

Section 9.C.6, 7, and 8: To be determined by the commission.

Section 9.D.5 – SPECIAL PERMIT CRITERIA:

1. To be determined by the commission.
2. It is my professional opinion that the application does not comply with this section as there will be increased pollutant loads which will be discharged to the wetlands/watercourse system. Additionally, the development will change the hydroperiod of the downgradient wetland. As there is no reduction in runoff volume from the development. The increased runoff volumes will cause adverse impacts to the downgradient watercourse which goes to a man-made pond just north of Wauregan Road. The increased runoff volumes will cause the watercourse to flow at a higher level for a longer period for a given storm event. This will cause erosion of the channel banks and then result sedimentation further downstream. The increased runoff volumes may overwhelm the capacity of the man-made pond and could result in overtopping of the existing earth berm.
3. To be determined by the Planning and Zoning Commission.
4. To be determined by the Planning and Zoning Commission.
5. Applicant to provide written statement that they are in compliance.
6. Applicant to provide written statement that they are in compliance.
7. Application follows this section.
8. To be determined by the Planning and Zoning Commission.
9. Regarding erosion and stormwater management, the plan does not comply with this section. The LADA Review will address the other sections for compliance.
10. Applicant to provide written statement that they are in compliance.

Applicant to provide written statement that they are in compliance.

Potential impact to Anderson Brook and Creamery Brook Drainage Basin:

The discharge from the proposed stormwater basin is being directed to western limit of a wetland/watercourse corridor. Runoff then enters Anderson Brook and flows in a generally southerly direction toward Wauregan Road. Anderson Brook enters a man-made pond located just north of Wauregan Road. After passing under Wauregan Road, Anderson Brook eventually enters Creamery Brook and then into a large body of water.

The proposed stormwater management system for this project will not reduce runoff volumes so these increased volumes will be directed to Anderson Brook and the man-made pond. Increased runoff volumes will have the following adverse impacts to the watercourse:

a. The duration of flow within the stream for a given storm event will increase significantly over natural conditions due to the discharge from the detention basin.
b. As the duration of flow at the nominal water surface is increased, the watercourse becomes stressed, and erosion of the channel slopes begin to occur as the channel is trying to get back to a hydraulic equilibrium.

c. This erosion will continue over time and the eroded material will be carried downstream and deposited in a location where the velocity of the flow slows down, and the sediments can settle out. This sedimentation may also occur with the man-made pond.
d. The culvert under Wauregan Road may not have the capacity to pass the increased runoff volume from the development site. If the culvert does not have adequate capacity to pass the flows, overtopping of the road could occur.

REVIEW OF APPLICATION MATERIALS
Stormwater management Report:

1. Groundwater recharge volume is not provided as stated for following reasons:
    a. Under Low Impact Development (LID) and conventional stormwater management, infiltration is only considered which occurs on the bottom of the stormwater practice,
    b. The basin side slopes are being cut by a hydraulic excavator which will compact the native soil layer, thus reducing any infiltrative capacity of the soil layer,
    c. Lateral infiltration as claimed by the applicant will not occur as this requires a substantial hydraulic head (column of water above the proposed infiltration layer) to use pressure to push the water into the soil,
    d. A percolation test is not the correct test to measure vertical saturated conductivity as is measures in theory, both horizontal and vertical movement of water in the soil which over-estimates the actual vertical saturated hydraulic conductivity. For stormwater infiltrative practices, only vertical hydraulic conductivity is used for the modeling of infiltration practices,
    e. A percolation test was conducted 24" below the ground surface is not appropriate as the upper soil layer are not the soil layers into which infiltration would occur. For the proper modeling of an infiltration practice, a Double Ring Infiltrometer test must be done at or below the bottom of the infiltrative practice.
2. Because there will be no infiltration of runoff from the proposed development, there will be significant increases of runoff volume for all storm events which will be discharged to the off-site wetlands and downstream watercourse as shown in Table 1 below:

Table 1 – Summary of Pre-Development and Post-Development Runoff Volumes (all values are in acre-feet):

Storm Event	Pre-Dev. Summary	Post-Dev. Summary**	Net Change	Percent Change
2-year	0.437	0.821	0.384	87.8%
5-year	0.871	1.313	0.442	50.7%
10-year	1.311	1.768	0.457	34.8%
25-year	2.000	2.441	0.441	22.0%
50-year	2.563	2.993	0.430	16.8%
100-year	3.208	3.558	0.350	10.9%

** Post-development runoff volumes are under-estimated as the applicant did not reduce the soil class for post-development vegetated areas (grass) from the pre-development soil class.

3. According to the information in the stormwater report, Soil Class B was used for both pre-development and post-development conditions. Soil Class C needs to be used for post-development conditions for grassed areas as the grass will be placed on regraded soils which do not have the same infiltrative capacity as the original undisturbed soils. When soils are cut and filled, the original properties of the soil are not maintained such as porosity as the void spaces between the soil particles are compressed or eliminated. When this occurs, the infiltration rate is significantly reduced.
4. The report states that the full Water Quality Volume (WQV) of 8417 cubic feet is provided in the stormwater basin. This is not correct. According to the data for the basin design, the bottom is at elevation 242.0' and the low flow orifice is at elevation of 243.0', so the fixed storage volume between these two elevations is 5,660.5 cubic feet (67.2% of the required WQV). Section 7 of the CT DEP 2004 Storm Water Quality Manual requires that the WQV be "captured and treated" which means that the full WQV must be held either in the bottom of the basin as a permanent pool or be fully infiltrated. Neither condition is met in this design.
5. In the routing analysis for the stormwater basin, the applicant uses an exfiltration rate of 4.5" per hour over the horizontal bottom area of the basin which will not occur as the bottom of the basin will be below the seasonal high groundwater table. This assumption also conflicts with the applicant's statement that infiltration will occur horizontally in the soil layer between 242.5' and 245.0' in the report.

Stormwater Management Plan (sheet 6 of 11):

1. The stormwater management plan consists of conventional approaches which do not address the increased pollutant loads associated with non-point source runoff. These practices include catch basins with 4' sumps and hooded outlets, a riprap swale, grass swale, and a stormwater basin.
2. These pollutants include Total Suspended Solids (TSS), Metals, with zinc as an indicator of all metals (Zn), Total Petroleum Hydrocarbons (TPH), Total Phosphorous (TP), and Total Nitrogen (TN). A discussion of the adverse impacts on the environment associated with these pollutants is provided in Appendix A.
3. Catch basins with 4' sumps and hooded outlets will only remove 9% of TSS loads found in the runoff and while the hooded outlets can prevent soluble hydrocarbons from being discharged, the liquid in the sumps must be removed at least twice a year to ensure the soluble hydrocarbons are not discharged from the sump.
4. A riprap swale does not provide any water quality benefit at all.
5. While a grass swale can provide some water quality benefit, the grass swale in this case is designed for conveyance and not water quality treatment. To provide water quality benefits, the grass swale must be designed in accordance with Section 11-P5, pages 1 through 8.
6. The proposed basin does not comply with the design requirements found in the CT DEP 2004 Storm Water Quality Manual (2004 Manual). The 2004 Manual is considered a Guidance Manual by the CT DEP and provides design information for many types of stormwater practices including ponds and constructed wetlands in addition to some LID practices. When designing any type of basin, there are various components which must be included in the design to function properly, such as a forebay, permanent pools, long flow paths from inlet to outlet, high/low marsh areas to name a few. Reference is made

to Section 11-P1, pages 1 through 15 of the 2004 Manual for more information on pond types and forebays.

7. While the applicant states that the basin has a forebay, it does not. A forebay is an excavated hole where runoff enters the basin, is 4'-6' in depth which contains a minimum of 10% of the required WQV and have a minimum length to width ratio of 2:1. The purpose of a forebay is to trap coarse and fine sediment particles in the runoff. A forebay is an integral component of all types of stormwater basins.
8. The forebay shown in the basin is level with the basin bottom and is defined by a berm of CT DOT #3 stone (1" – 2-1/2" in size). This stone berm will not trap sediment and will easily permit turbid water to pass right through it.
9. The stormwater basin consists of a level bottom excavation where the bottom of the basin is between 5' & 6' below the existing grade. Based upon the three test pits by the applicant, evidence of the seasonal high groundwater table is located at 243.2' which is slightly higher than the bottom of the basin which is proposed at 242.0'. This means that the bottom of the basin will be below seasonal high groundwater, so no infiltration will occur at the bottom of the basin as claimed by the applicant as water will not infiltrate when the soil is already saturated.
10. The level spreader at the end of the outlet pipe from the basin has not been designed in accordance with the CT DEP 2002 Guidelines for Soil Erosion and Sediment Control (2002 Guidelines) and as proposed will not reduce flow velocities to non-erosive levels.
11. What is the purpose of the underdrain shown around the perimeter of the basin? It does not provide any water quality benefit to the basin.
12. No roof drains are shown for Units #1-#3. Where will this runoff be directed?
13. Roof drains from Units #4 - #8 are directed onto a regraded or natural slope to a riprap pad. No detail was provided for the riprap pad. The applicant needs to demonstrate that the discharge of the roof runoff will not erode the downgradient slopes. This comment also applies to the roof drains shown of Units #27 - #33. The discharge of concentrated flow onto regraded or natural slopes which do not currently experience
14. The roof runoff from these units will not be treated as they are not directed to the stormwater basin. Runoff from all impervious surfaces must be treated as professional literature has documented that 40% of nutrient loads in non-point source runoff occur as atmospheric deposition on impervious surfaces.

Erosion and Sedimentation Controls (Sheets 6 and 8 of 11):

1. It is proposed to use the permanent stormwater basin as a temporary sediment basin. There are no provisions on the plans as to how the temporary sediment basin will be converted to the permanent basin and vegetate the basin as stormwater is directed to the basin.
2. No sizing computations per the 2002 Guidelines have been provided for the temporary sediment basin.
3. How will runoff from most of the development area be conveyed to the temporary sediment basin?
4. No phasing plan has been provided to restricts the area of site disturbance to 5 acres or less at one time per the CT General Permit. If more than 5 acres is to be disturbed at one time, then an Individual Permit from CT DEEP is required and a much more robust, detailed erosion control plan must be provided per the 2002 Guidelines.

5. The applicant proposes a perimeter erosion barrier consisting of double staked hay bales back by a wire supported siltation fence or siltation fence backed by either wood chip berms, straw wattles, or compost socks. Who will make the final decision as to what will be part of the perimeter erosion controls? Hay bales are an ineffective erosion control barrier even when properly installed.
6. In many locations, the perimeter barriers are shown perpendicular to contours which is incorrect as this will result in concentrated runoff and channel erosion occurring along the face of the barrier.
7. There are no provisions to divert overland flow from portions of the northern side of the site which drain to the development area in the vicinity of Units #9 to #13 and Units #19 to #26. If no diversion is proposed, how will the overland runoff from these areas be handled?

Recommendations to address Erosion Issues identified above:

1. Provide redundant erosion control barriers which are parallel with contours and only turned up at each end. Use an 18" Filtrexx Soxx or approved equal as the primary erosion control row with a staked siltation fence installed downhill and 3' on center to the Filtrexx Soxx.
2. Provide multiple rows of erosion controls across the site so that the distance between rows is not greater than 100' to minimize the slope length and thus the ability of runoff to concentrate and overwhelm the perimeter barrier.
3. Design a temporary sediment basin which is not the permanent stormwater basin or design multiple sediment traps for the site. Whether a sediment basin or sediment trap is used, they must be designed in accord with CT DEP 2002 Guidelines for Soil Erosion and Sediment Control with all supporting computations. Small, multiple temporary sediment traps should be designed and located throughout the area of the proposed development where runoff from small (10,000 square feet or so) areas can easily be directed, so that construction stormwater is not directed to a single practice.
4. Swales to direct runoff to either a sediment basin or trap shall be designed in accordance with the 2002 Guidelines.
5. Design diversions as necessary for those upslope areas above the proposed development area in compliance with the 2002 Guidelines.
6. A detailed phasing plan shall be provided for the project. The construction narrative shall be revised to conform to the form and content found in the 2002 Guidelines.
7. Riprap aprons at the end of all pipes shall be sized per the 2002 Guidelines for the flow rate associated with the 25-year event. All computations for the aprons shall be provided.

Recommendations to address Stormwater Management issues identified above:

1. Use Soil Class C for post-development grass areas, recalculate the Composite RCN value and peak rates of runoff for each post-development drainage area.
2. Eliminate 4' sumps and hooded outlets except for last two catch basins before a stormwater management basin. This will not affect the pollutant removal of the stormwater system as water quality treatment will occur in the actual practice as stated below.

3. Convert the grass swale to a riprap swale, maintain the existing riprap swale and size the swale safely convey the peak rate of runoff of a ten-year storm with a flow depth of 6" or less. The riprap swale should have a minimum free board of 12" from the top of the water surface to the top of the swale.
4. The currently proposed stormwater basin shall be redesigned as an Extended Detention Shallow Wetland or a Pond/Wetland basin per the 2004 Manual, including a forebay and other specific components for either of these systems. The full WQV must be held completely below the invert elevation of the lowest orifice outlet control.
5. It is also suggested to construct a second basin below and between Units #4 - #8 and Units #14 - #18 and split the runoff from the proposed development to two basins instead of a single basin.
6. From a hydrologic perspective, the following standards need to be incorporated into the design of the basins:
    a. As 90% of all annual rainfall events are less than 1.5" per 24 hours, zero increase shall also be provided for this storm event, commonly known as the Water Quality Storm.
    b. The Channel Protection Volume (CPV) per the 2004 Manual shall be provided in all stormwater basins. The CPV requires the post-development peak rate to be reduced to 50% of the pre-development peak rate at the design point. In this case, this is where the wetland/watercourse crosses the western property line. The purpose of the CPV is to lower the nominal water surface in a receiving watercourse so that the water surface occurs in a naturally more stable section of the channel so that the increased flow duration from the stormwater basin does not cause erosion of the existing channel section.
    c. A minimum 12" freeboard from the top of the water surface of the 100-year storm shall be provided to the top of the basin berm.
    d. If any portion of the basin berm is higher than four (4) feet above the existing grade, then the berm shall be designed as a dam.
    e. The minimum length to width flow path per the 2004 Manual within the basin shall be provided from the inlet pipe to the outlet pipe as the long contact time between the runoff and soils/vegetation in the bottom of the basin is what greatly reduces non-point source pollutant loads.
7. The access and building layout as proposed are not conducive to the use of Bioretention systems for roof drains or other impervious cover. I would recommend that soil testing is done to the south of Unit #1 - #3, south of Units #4 - #8, (possibly accepting roof drains from Units #14 - #18), and west of units #47 - #51 to determine the depth of mottling and/or ledge to determine if the areas are suitable for underground infiltration practices for roof drains from these buildings so that some portion of the Groundwater Recharge Volume can be provided. If roof runoff from these units can be infiltrated, then potential stormwater basins could be made smaller. If the deep test holes are suitable then Double Ring Infiltration tests would need to be done at or below the bottom of the infiltration practice to confirm the suitability of the soil layer below the practice to infiltrate runoff. 50% of the slowest observed infiltration rate would be used for the hydrologic modeling of the underground infiltration practice.

8. There may be a need to slightly reduce the number of units on the site to address the stormwater management requirements stated above, but that determination will be left up to the design engineer.

The review by Syl Pauley, PE of NECCOG was a detailed engineering review of many aspects of the plan. My review was a detailed analysis of the erosion control plans, stormwater management plans and potential impacts of stormwater management on downgradient properties. My review was done to compliment and provide more detailed comments on stormwater management than the report by Mr. Pauley.

Please feel free to contact my office if you have any questions concerning this information.

Respectfully Submitted,
Trinkaus Engineering, LLC

Steven D. Trinkaus, PE

Appendix "A"
Discussion of Environmental Impacts due to Non-Point Source Pollutants excerpted from the Town of Morris Low Impact Sustainable Development Manual

Non-point source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include:

A. Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas.
B. Oil, grease, and toxic chemicals from urban runoff and energy production.
C. Sediment from improperly managed construction sites, crop, and forest lands, and eroding stream banks.
D. Salt from irrigation practices and acid drainage from abandoned mines.
E. Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.
F. Atmospheric deposition and Hydro modification are also sources of non-point source pollution.

The most common pollutants which are found in non-point source runoff are Litter, Sediment and Total Suspended Solids (TSS), Total Nitrogen (TN), Total Phosphorus (TP), Metals, such as Zinc (Zn) and Copper (Cu), Hydrocarbons, Thermal Impacts, Oxygen demanding substances and Pathogens. Each pollutant and its impact on the natural environment are stated below.

<u>Litter</u>

Litter while not causing toxic impacts on the environment, the presence of litter is an aesthetic issue that is not well received by the public.

<u>Total Suspended Solids (TSS)</u>

Total Suspended Solids are fine soil particles, such as silts and clay which are dissolved in water. In excessive amounts it causes turbidity in water. The turbidity blocks light in the water column which causes reduced photosynthesis, which in turn reduces the oxygen levels in the water. Coarse and fine sediments can clog the gravel substrate in breeding streams thus affecting the biological community ability to reproduce. Common sources of TSS and sediment are runoff from construction sites, winter sanding operations, atmospheric deposition, and decomposition of organic matter, such as leaves. Turbidity is measured as NTU. A range of turbidity levels are shown in Figure 2.4.5 below.

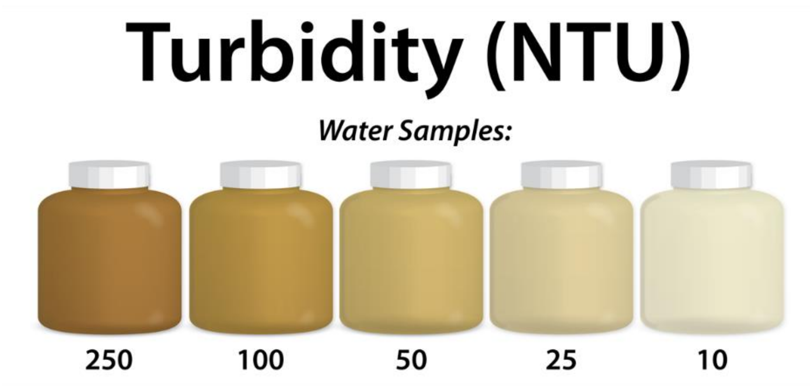

Figure 2.4.6 - Range of Turbidity in water samples

Nutrients

Phosphorus and nitrogen are commonly found in non-point runoff with the primary source being lawn fertilizers. Excessive levels of phosphorus in freshwater systems are a concern as this nutrient cause's excess growth of non-native aquatic plants and algae in lakes. As a result of increased nutrient loads, toxic algae blooms are becoming more prevalent in lakes in Connecticut, including Bantam Lake. These toxic algae blooms have resulted in beach closures as exposure to the algae blooms can cause adverse health issues in humans. A further problem occurs, when the algae die off, the decomposition process of organic matter removes oxygen from the water column, thus reducing oxygen levels in the water. The reduced oxygen levels in the waterbody can result in fish kills. Nitrogen, in the form of nitrate, is a direct human health hazard and an indirect hazard in some areas where it leads to a release of arsenic from sediments. While not a major concern for freshwater systems, nitrate can cause environmental impacts in tidal regions, even though the source of nitrate can be far away from coastal regions. Sources of nutrients are organic and inorganic fertilizers, animal manure, bio solids and failing sewage disposal systems.

Figure 2.4.7 - Phosphorus impacts on a freshwater pond

Metals

Metals in non-point source runoff are very toxic to aquatic life. The adverse effects of metals are far reaching for both aquatic and human health. Many metals can bio accumulate in the environment, which can affect higher living organisms. While the concentration of zinc or copper in stormwater generally is not high enough to bother humans, these same concentrations can be deadly for aquatic organisms. Many microorganisms in soil are especially sensitive to low concentrations of cadmium. Zinc, Copper, and Cadmium found in non-point source runoff result from the movement and wear and tear of automobiles on our roadways.

Of the above discussed metals, zinc and copper are the two metals which are found dominantly in non-point source runoff. Metals commonly bind themselves to sediment and organic matter in stormwater and thus are transported to the receiving waters. Since natural rainfall is slightly acidic, metal roofs or components on the roof can be a significant source of the zinc or copper concentrations in stormwater.

Figure 2.4.8 - Primary source of zinc (automobile brake pads)

Hydrocarbons

Total Petroleum Hydrocarbons (TPH) are highly toxic in the aquatic environment, especially to aquatic invertebrates. The primary sources of petroleum hydrocarbons are oil, grease drops from an automobile, gas spills, and vehicle exhaust. Polycyclic Aromatic Hydrocarbons (PAHs) are also toxic to aquatic life. PAHs can be discharged into the environment using coal tar asphalt sealants, commonly used by homeowners on residential driveways. The movement of vehicles or people walking over the sealed driveway can release dust particles containing PAH, which can then be washed off with the next rainfall into the stormwater management system. PAHs are also generated by the burning of fossil fuels and the airborne particles are then deposited by atmospheric deposition on an impervious surface, especially large flat roof areas. When it rains, the accumulations of PAHs due to atmospheric deposition are carried off in the stormwater.

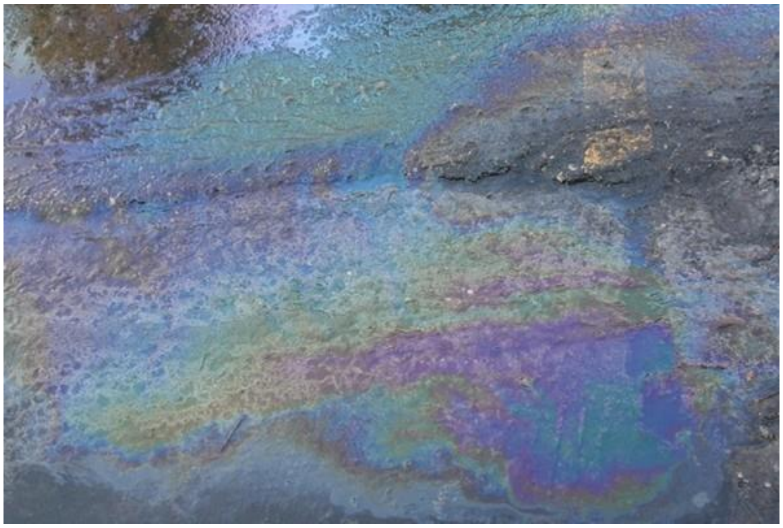

Figure 2.4.9 - Petroleum Hydrocarbons in Stormwater

Thermal Impacts

Impervious surfaces, such as roofs and moderately sized paved areas, such as residential driveways can heat up during sunny days and hold onto this heat. When rainfall occurs on these heated surfaces, the resulting runoff will have a highly elevated temperature because of the heat transference from the impervious surface to the runoff. As this heated runoff is discharged into receiving waters, the temperature of the receiving water is raised to a level which can exceed the temperature tolerance limits for fish and invertebrates, thus lowering their survival rates. Elevated water temperatures will also contribute to reduced oxygen levels in the water.

Figure 2.4.10 - Fish kills due to increased thermal levels

Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)

Biochemical oxygen demand (BOD) is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in each water sample at certain temperature over a specific time. The BOD value is most expressed in milligrams of oxygen consumed per liter of sample during 5 days of incubation at 20 °C and is often used as a surrogate of the degree of organic pollution of water. Dissolved oxygen depletion is most likely to become evident during the initial aquatic microbial population explosion in response to a large amount of organic material. If the microbial population deoxygenates the water, however, that lack of oxygen imposes a limit on population growth of aerobic aquatic microbial organisms resulting in a longer-term food surplus and oxygen deficit.

Chemical oxygen demand (COD) is the total measurement of all chemicals in the water that can be oxidized. Total Organic Carbon (TOC) is the measurement of organic carbons. The chemical oxygen demand test procedure is based on the chemical decomposition of organic and inorganic contaminants, dissolved, or suspended in water. The result of a chemical oxygen demand test indicates the amount of water-dissolved oxygen (expressed as parts per million or milligrams per liter of water) consumed by the contaminants, during two hours of decomposition from a solution of boiling potassium dichromate. The higher the chemical oxygen demand, the higher the amount of pollution in the test sample.

Both BOD and COD are surrogates for the direct measures of specific pollutants found in non-point source runoff.

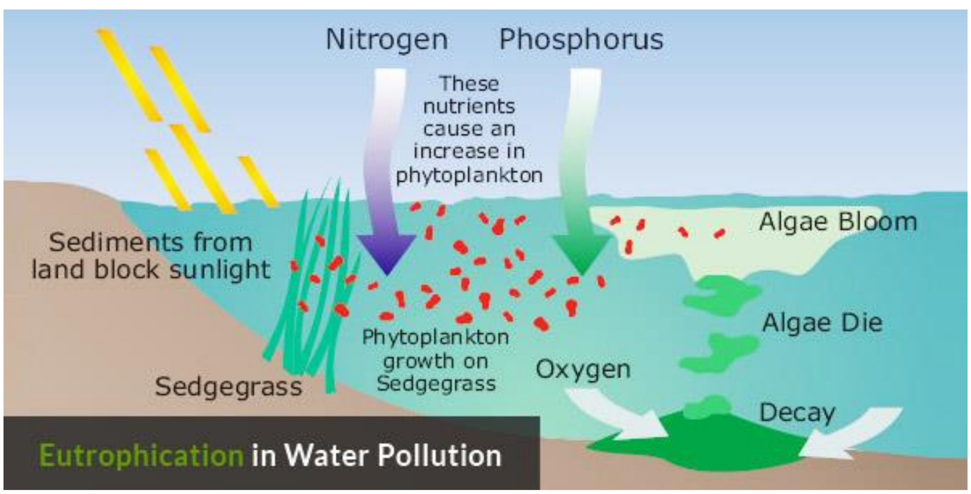

Figure 2.4.11 - Impacts of Nitrogen and phosphorus on aquatic systems

Pathogens

Pathogens are bacteria and viruses, which can cause disease in humans. Most pathogens are found in discharges from overflowing sanitary sewers or in combined sanitary/stormwater systems which is not applicable to the Town of Morris. In communities such as Morris, the primary source of pathogens in stormwater is pet waste which is not picked up along roadways. Dog poop which washes into a storm drain are the common source of both fecal coliform and enterococci bacteria which are used as indicators for the presence of pathogenic organisms, yet their presence does not mean a pathogen is present, just that there is a higher risk of being present.

Figure 2.4.12 - Primary source of pathogens in stormwater

NORTHEASTERN CONNECTICUT COUNCIL OF GOVERNMENTS

ENGINEERING ARCHITECTURAL PLAN REVIEW
PERTAINING TO
PROPOSED 51-UNIT MULTI-FAMILY DEVELOPMENT
(ASSESSOR'S MAP 38, LOT 22)
LOUISE BERRY DRIVE
BROOKLYN, CT

(September 16, 2021)

The following comments pertain to my review of the recently submitted (September 10, 2021) architectural plans for 51-unit multi-family condominium housing units proposed for this project. The plans cannot be adequately identified herein as the plans do not identify the architectural firm responsible for the drawings, the seal of the responsible professional, or a date of production.

- The plans do not adequately address all proposed multi-unit buildings, i.e., the floor plans submitted are only for buildings with Unit Nos. 4-7, 9-13 and 14-18. All buildings need to be drawn on as many plans as necessary with the following information for each sheet/building:

  - Architectural drawing scale with graphical representation
  - Top of foundation elevation, ground floor slab elevation as well as every finish floor elevation to be constructed above the ground floor
  - Floor plan dimensions (overall and all interior spaces)
  - ADA building and sidewalk access details
  - Utility rooms with equipment layout
  - Firewall locations
  - Underground utility entrances at foundation
  - Secondary access identified on plans
  - Outside deck finish floor elevation and proposed ground elevation underneath the same
  - Front, side and rear elevation (profile) drawings for each building including the proposed ground line along each side
  - Solar panel locations
  - Exterior building materials including texture and color schemes
  - Any other pertinent architectural detail drawings needed to evaluate building structure

- Due to the main access driveway's steep slope (10%±), the relationship of the driveway, off-street parking lots and elevations of adjacent residential units with and without stepped construction is to be demonstrated on a plan to see how well they are integrated with the design so as not to cause an impediment to pedestrian or vehicular movement.
- Statement that building design is certified as to current building code requirements

- The plans must show the name, address and contact information of the firm who designed the residences and the responsible person certifying the plans along with the designer's name, signature and date of certification, all of which shall be affixed to every plan sheet.

- In the July 22, 2020 Killingly Engineering Associates response to my question about how many bedrooms were in each unit, they stated "two (2)." The architectural plans show three (3) bedrooms per unit.

- Brooklyn Zoning Regulation Section 6.E.3.9 stipulates that the maximum heights for all buildings within a multi-family development shall be the lesser of two (2) stories or thirty-five (35) feet. The exterior profile elevations of all sides of the buildings with proposed ground elevations adjacent thereto have not been submitted for review thus making it impossible to assess this requirement. However, a review of the project site plans shows the grading to the rear of the majority of buildings (7 buildings containing 41 units) will have approximately an eight (8) foot difference between the proposed finished ground floor elevation and the second floor, which, therefore, may not comply with this regulation

- At this time, the plans submitted for review and approval by the Applicant are incomplete and unacceptable. A complete finished set of plans need to be submitted in order to conduct a formal review for this application.

By: Samuel Jr., P.E.
Syl Pauley, Jr., P.E., NECCOG Regional Engineer

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RECEIVED

SEP 0 2 2021

PLANNING AND ZONING COMMISSION

TOWN OF BROOKLYN

CONECTICUT

Received Date 9/2/21

Action Date__________

Application #SPR 21-003

Check# 22425

APPLICATION FOR SITE PLAN REVIEW

Name of Applicant Consolidated Edison Solutions Inc. - Amaris Jattan Phone (203) 512-4500
Mailing Address 38 Beaver Brook Road, Danbury, CT 06810 Phone (203) 616-4211

Name of Owner Paul Cristofori Phone (860) 917-8331
Mailing Address 80 South Street, Brooklyn, CT Phone__________

Name of Engineer/Surveyor Solar Foundations USA
Address 1142 River Road, New Castle, DE 19720
Contact Person Jim Douglas Phone(855) 738-7200 Fax__________

Property location/address 80 South Street, Brooklyn, CT
Map # 40 Lot # 129-9 Zone RA Total Acres 8.6

Proposed Activity Ground mounted solar utilizing helical piles. PV installation consists of (42) LG375N1C-A6 modules tied to (1) SolarEdge SE11400H-US inverter. Trenching from array to home will be back-fill with existing earth.

Change of Use: Yes____ No X If Yes, Previous Use__________
Area of Proposed Structure(s) or Expansion __________

Utilities - Septic: On Site______ Municipal ________ Existing_______ Proposed__________
Water: Private______ Public __________ Existing_______ Proposed__________

Compliance with Article 4, Site Plan Requirements

The following shall accompany the application when required:

Fee$ 460.00 **State Fee ($60.00)** ______ 3 copies of plans_______ Sanitary Report______
4.5.5 Application/ Report of Decision from the Inland Wetlands Commission
4.5.5 Applications filed with other Agencies
12.1 Erosion and Sediment Control Plans
See also Site Plan Review Worksheet

Variances obtained__________ Date__________

The owner and applicant hereby grant the Brooklyn Planning and Zoning Commission, the Board of Selectman, Authorized Agents of the Planning and Zoning Commission or Board of Selectman, permission to enter the property to which the application is requested for the purpose of inspection and enforcement of the Zoning regulations and the Subdivision regulations of the Town of Brooklyn

Applicant: __________ Date 8/19/2021

Owner: DocuSigned by: Paul Cristofori AB295404DB98456... Date 8/19/2021

* Note: Any consulting fees will be paid by the applicant

PHOTOVOLTAIC SOLAR SYSTEM
For 80 South St. Brooklyn, CT 06234

SYSTEM DESCRIPTION

(42) SOLAR MODULE:LG375N1C-A6 (15.75 kW)
INVERTER: SOLAREDGE SE11400H-US W/P370 OPTIMIZERS (x42)
RACKING SYSTEM: PANEL CLAW FR10 ST BALLASTED RACKING
TOTAL DC SIZE: 15.75 kW DC
TOTAL AC SIZE: 11.4 kW AC

GENERAL NOTE

NOTE: CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO INSTALLATION.

APPLICABLE CODES

RELEVANT CODES AND STANDARDS: ALL WORK PERFORMED BY THE CONTRACTOR SHALL MEET OR EXCEED WITH ALL RELEVANT LOCAL, STATE, AND NATIONAL CODES AND STANDARDS AND COMPLY WITH THE AUTHORITIES HAVING JURISDICTION (AHJ.) THESE CODES AND STANDARDS SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING:

a.	ACI 318-14	ACI
b.	2015 IBC	ICC
c.	AISC 360-10	AISC
d.	AISC 303-10	AISC
e.	ASCE 7-10	ASCE
f.	ATS-2013	NETA
g.	IEEE 1547	IEEE
h.	2015 IFC	ICC
i.	NESC 2012	IEEE
j.	NFPA 70: NEC, THE LATER OF 2014 OR AS ADOPTED BY THE AHJ	NFPA
k.	UL 1703	UL
l.	UL 1741	UL
m.	THE REQUIREMENTS OF DUKE ENERGY IN PUBLICATIONS	

IN THE CASE OF CONFLICTS BETWEEN THE CODES AND STANDARDS AND THE PLANS, THE MOST STRINGENT SHALL TAKE PRECEDENCE. WHERE THE PLANS EXCEED THE REQUIREMENTS OF THE CODES AND STANDARDS, THE PLANS SHALL TAKE PRECEDENCE. NO EXTRA PAYMENTS WILL BE MADE FOR WORK OR CHANGES REQUIRED BY AHJ'S.

TABLE OF CONTENTS

SHEET #	SHEET NAME	DRAWING TITLE	REV	INT	PER	CON
1	TS-1	TITTLE SHEET		X	X	
2	SP-1	SITE PLAN		X	X	
3	PV-1	ARRAY LAYOUT AND TECHNICAL DATA			X	
4	SP-E1	EQUIPMENT LOCATION AND CONDUIT RUN			X	
5	SP-E2	GROUND MOUNT SETBACK			X	
6	SP-C	ELECTRICAL EXISTING			X	
7	E1/E3	ELECTRICAL DESIGN		X	X	
8	WM-1	STRING LAYOUT				
9	LD-1	LABELING DIAGRAM				
1	APPENDIX	PLACARD				
2	APPENDIX	ENGINEER LETTER (STRUCTURAL UPGRADES NOT REQUIRED)			X	
3	APPENDIX	ML- MATERIAL LIST			X	

*INT= INTERCONNECTION - PER= PERMITTING - CON= CONSTRUCTION

N

1 TS-1 ARRAY LOCATION
NTS

conEdison Solutions®
a Con Edison Clean Energy Business
38 Beaver Brook Road
DANBURY, CT 06810
www.conedsolutions.solar
PH: 203.512.4500

REVISION

REV:	BY:	DATE:	ISSUED FOR / DESCRIPTION:	CHECKED:	DATE:
#1					
#2					
#3					
#4					
#5					
#6					
#7					
#8					
#9					

DRAWING TITLE: TITTLE SHEET

PROJECT NAME AND ADDRESS:
Paul L. Cristofori
80 South St
Brooklyn CT 06234
(860) 917-8331
Deltek# DS2100038

DESIGNED BY: Andrei Belov

DRAWN BY: Leandro

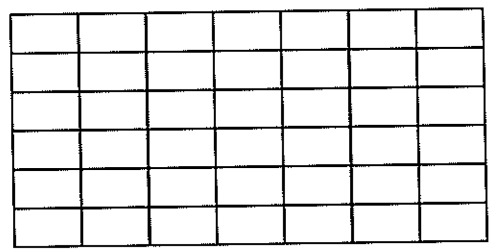
APPROVED BY: Andy Mayshar

CREATED DATE: 05/02/2021

SHEET NUMBER

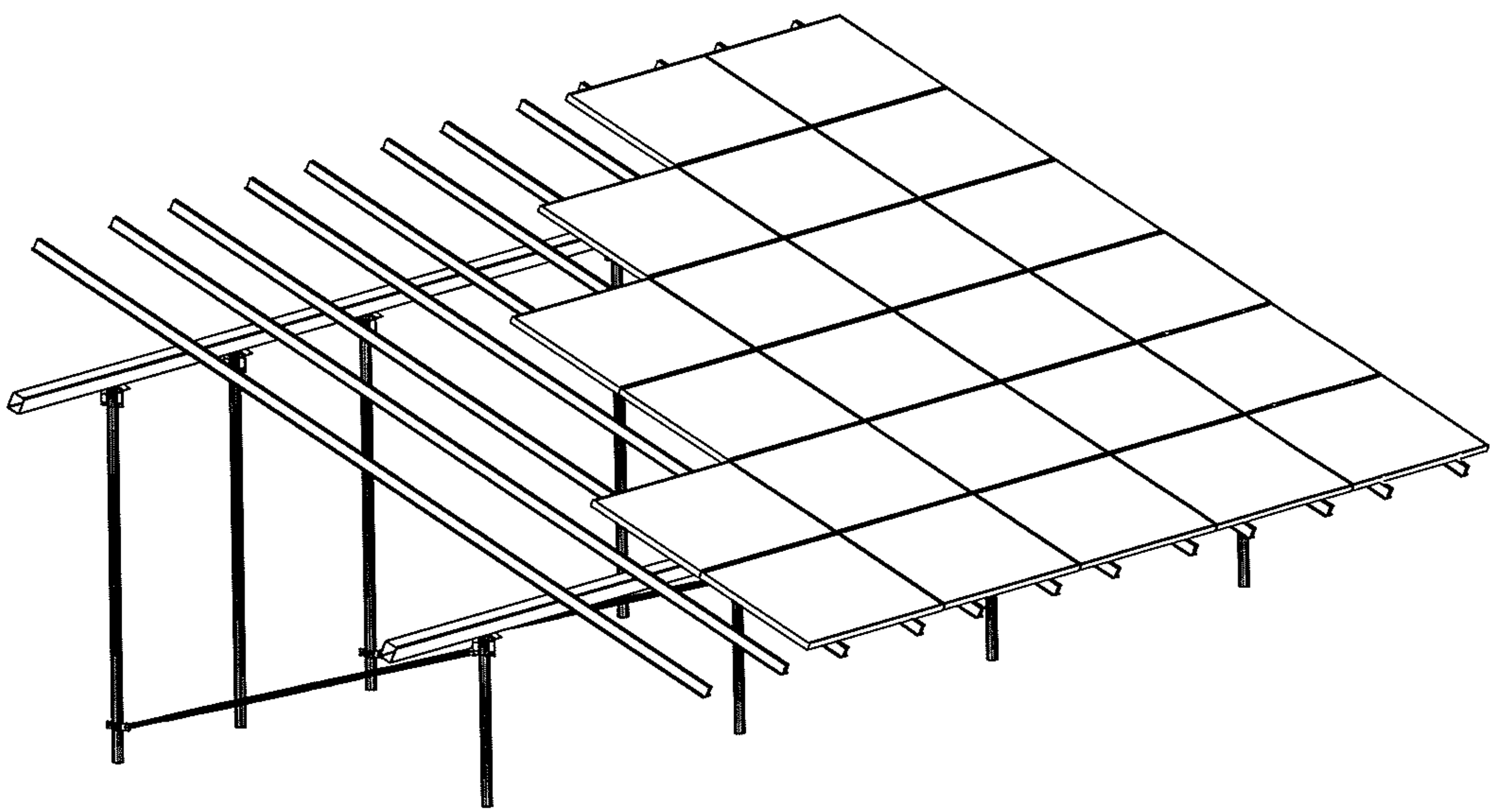
TS-1

SHEET 1 OF 10



Plan View

NOT TO SCALE



Site Design Conditions

Basic Wind Speed: (Risk Category II)	120 MPH	Max. Leg Axial Bearing:	4,480 lbs.
Basic Wind Speed: (Risk Category I)	110 MPH	Max. Leg Uplift:	1,690 lbs.
Exposure Category:	B	Max. Lateral Resistance:	1,400 lbs.
Ground Snow Load:	35 PSF	Top Rail Max. Loading:	117.6 plf
Flat Roof Snow Load: (if applicable)	30 PSF	Helical Pile Depth:	60" Min
Site Contour:	<5 Degree Slope	Lateral Resistance Plate Size:	Not Req'd

All design work has been performed in accordance with the 2018 Connecticut State Building Code including but not limited to the 2015 International Building Code with state directed amendments in Chapter 16 and Appendix N for wind and snow load design parameters.

Net design pressures were calculated in accordance with ASCE 7-10 section 27.4.3, "Open Buildings with Monoslope, Pitched, or Troughed Roofs". All load cases were evaluated in determining the limiting design conditions. The data table above provides the results for the limiting load case. Maximum leg reaction forces represent the highest load condition seen by any leg in the structure. All legs in the structure are designed to meet the maximum load conditions.

6Lx7C Sub-Array Design Conditions

Front Leg Height:	42"	Array Tilt Angle:	26 Degrees
Rear Leg Height:	104¼"	Overall Array East-West Dim:	40'-2"
North-South Leg Spacing:	127¾"	Number of Modules/Sub-Array:	42
West Span Leg Spacing:	10'-9"	Number of Sub-Arrays:	1
East Span Leg Spacing:	10'-9"	Module Columns/Sub-Array:	7
Quantity Center Spans:	1	Number of Module Rows:	6
Center Span Leg Spacing:	10'-6"	Module Orientation:	Landscape
East & West Overhang:	3'-3"	Module Column Spacing	⅜"
Overall Beam Length:	38'-6"	Module Row Spacing	¼"
Front Edge Ground Clearance:	28"	Module Model:	LG375N1C-A6
Horizontal Rail Material:	5"x4"x⅛" HSS	Module Size:	41.02" x 68.50"
Top Rail Material:	SF Rails	Individual Module Rating:	375 watt
Qty Rails per Panel:	2	Sub Array Power Rating:	15.75 kw
Top Rail Length:	254"	Total Power Rating:	15.75 kw
Top Rail Center Span:	142"		
Top Rail Overhangs:	56"		

1 Additional North Column is to be installed per field direction. The Column is to support equipment mounting needs. It is not required for North beam support.

Sheet 1 of 3

Date	Revision	Drawn By:	Review By:
06/16/2021	Original	MM	JD

Consolidated Edison Solutions Inc.

Project:
Cristofori Residence
80 South St
Brooklyn, CT 06234

Solar Foundations USA

1142 River Road, New Castle, DE 19720 Ph: (855) 738-7200 Fax: (866) 644-5665

1 SP-E2 SITE PLAN SETBACK
SCALE: 1/64" = 1'-0"

THIS DESIGN SHALL BE VIEWED AS AN ADDENDUM TO CUSTOMER'S ORIGINAL CONTRACT: INVERTERS AND/OR PANELS MAY HAVE BEEN MODIFIED FROM YOUR ORIGINAL CONTRACT. THESE CHANGES MAY HAVE OCCURRED TO ADDRESS: SHADING, STRUCTURAL, ELECTRICAL PRODUCTION OR EQUIPMENT AVAILABILITY THESE EQUIPMENT MODIFICATIONS DO NOT CHANGE THE CONTRACT PRICE. "BY SIGNING THIS DOCUMENT YOU AGREE TO THE ABOVE SYSTEM DESIGN AND ANY EQUIPMENT MODIFICATIONS TO THE ORIGINAL CONTRACT. CONTRACT PRICE DOES NOT CHANGE UNLESS AGREED TO IN WRITING BY BOTH THE CUSTOMER AND CES. IF YOU HAVE ANY QUESTIONS OR CONCERNS PLEASE CONTACT OUR OFFICE AT 203-512 4500 dl-CESDanburydesignteam@ConEdCEB.com"

conEdison Solutions®
a Con Edison Clean Energy Business
38 Beaver Brook Road
DANBURY, CT 06810
www.conedsolutions.solar
PH: 203.512.4500

REVISION

REV:	BY:	DATE:	ISSUED FOR / DESCRIPTION:	CHECKED:	DATE:
#1					
#2					
#3					
#4					
#5					
#6					
#7					
#8					
#9					

DRAWING TITLE: GROUND MOUNT SETBACK

PROJECT NAME AND ADDRESS:
Paul L. Cristofori
80 South St
Brooklyn CT 06234
(860) 917-8331
Deltek# DS2100038

CUSTOMER APPROVAL: ____________

DATE: ____/____/____

DESIGNED BY: Andrei Belov

DRAWN BY: Leandro

APPROVED BY: Andy Mayshar

CREATED DATE: 05/02/2021

SHEET NUMBER
SP-E2

SHEET 6 OF 10

RECEIVED

SEP 1 4 2021

Received Date ____________

Action Date__________

PLANNING AND ZONING COMMISSION

TOWN OF BROOKLYN

CONECTICUT

Application #SPR 21-004

Check# 15685

APPLICATION FOR SITE PLAN REVIEW

Name of Applicant CHIP Fund 6 LLC & CHIP Fund 8 LLC Phone 203-257-5661

Mailing Address 18 Wells Hill Road, Easton, CT 06612 Phone__________

Name of Owner CHIP Fund 6 LLC & CHIP Fund 8 LLC Phone 203-257-5661

Mailing Address 18 Wells Hill Road, Easton, CT 06612 Phone__________

Name of Engineer/Surveyor Provost & Rovero, Inc.

Address P.O. Box 191, Plainfield, CT 06374

Contact Person David J. Held, P.E., L.S. Phone 860-234-3183 Fax 86-230-0860

Property location/address 5 Front Street & 29 Tiffany Street

Map # 47 Lot # 59, 60 Zone R-10 Total Acres 1.815

Proposed Activity Installation of a ground mounted solar array and solar carport array.

Change of Use: Yes____ No X If Yes, Previous Use__________

Area of Proposed Structure(s) or Expansion see attached site plans

Utilities - Septic: On Site______ Municipal X Existing______ Proposed______

Water: Private______ Public X Existing______ Proposed______

Compliance with Article 4, Site Plan Requirements

The following shall accompany the application when required:

Fee$ 400.00 **State Fee ($60.00)** ______ 3 copies of plans______ Sanitary Report______

4.5.5 Application/ Report of Decision from the Inland Wetlands Commission

4.5.5 Applications filed with other Agencies

12.1 Erosion and Sediment Control Plans

See also Site Plan Review Worksheet

Variances obtained N/A Date__________

The owner and applicant hereby grant the Brooklyn Planning and Zoning Commission, the Board of Selectman, Authorized Agents of the Planning and Zoning Commission or Board of Selectman, permission to enter the property to which the application is requested for the purpose of inspection and enforcement of the Zoning regulations and the Subdivision regulations of the Town of Brooklyn

Applicant: [signature] Date 9/14/2021

Owner: [signature] Date 9/14/2021

* Note: Any consulting fees will be paid by the applicant

Provost & Rovero, Inc.

Civil Engineering • Surveying • Site Planning • Structural • Mechanical • Architectural Engineering

P.O. Box 191
57 East Main Street
Plainfield, CT 06374

Telephone (860) 230-0856
Fax (860) 230-0860
www.prorovinc.com

September 14, 2021

Town of Brooklyn Planning & Zoning Commission
69 South Main Street, Suite 22
Brooklyn, CT 06234

RE: Proposed Solar Array – Front Street & Tiffany Street – Brooklyn, CT
P&R Job No. 213008

Dear Commissioners:

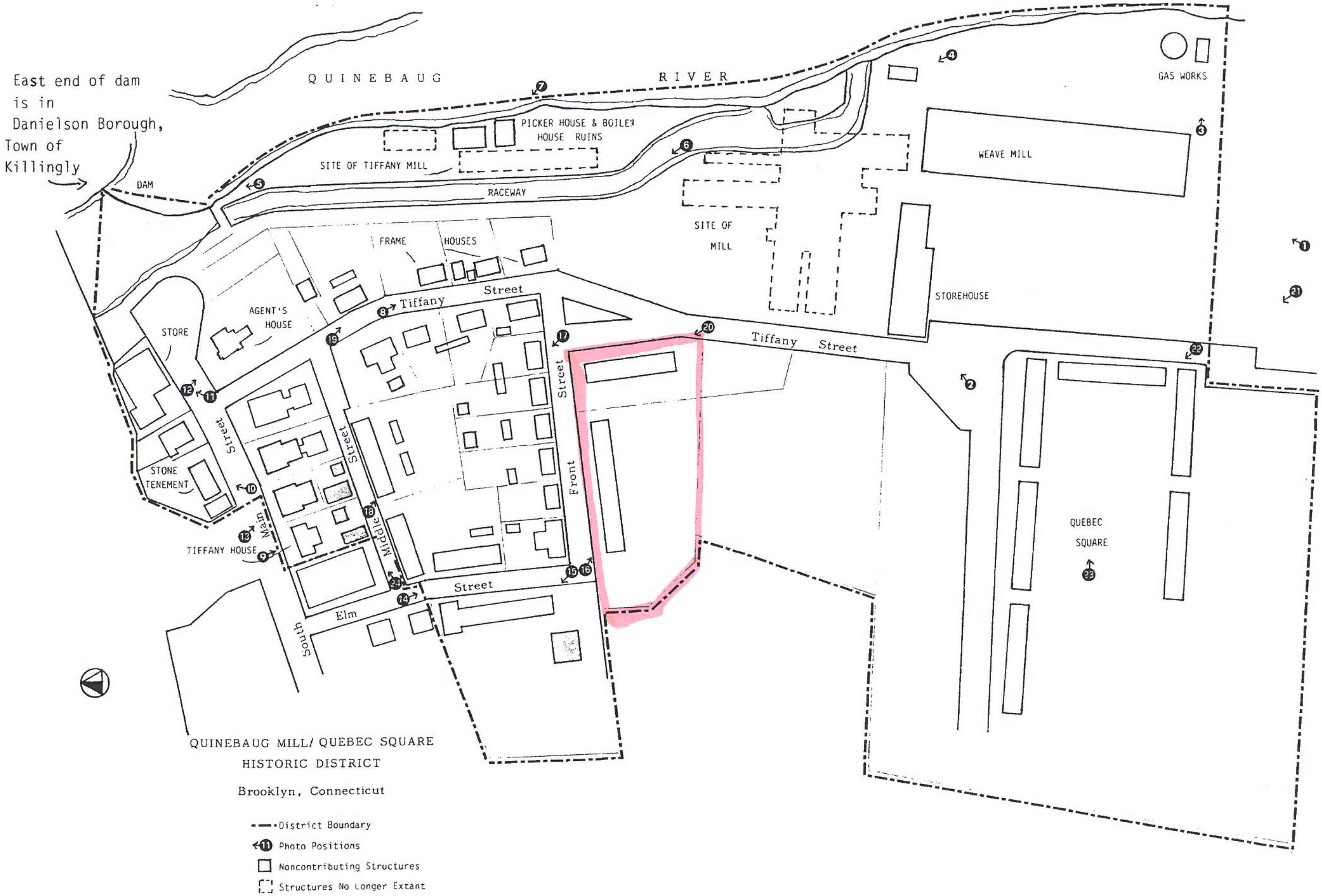
Attached hereto, please find a completed application form, $460.00 application fee and five (5) copies of site plans for a proposed solar array on property owned by CHIP Fund 8 LLC. The solar array is being proposed as part of the renovation of the existing 15 unit apartment building at 5 Front Street. The existing utility connection is located on 29 Tiffany Street, owned by CHIP Fund 6 LLC. It is anticipated that the solar array will provide power for both properties.

The proposed solar array includes three ground mounted racking rows and a carport array which will also provide covered parking spaces at 5 Front Street. There will be no reduction in parking spaces as a result of this project. The ground mounted array has been designed with a maximum ground coverage ratio (GCR) of 50% and as such, we are not assuming any increase in impervious surface as a result of this project. The ground mount racking is anticipated to utilize ground screw anchors or a similar foundation system.

Thank you for your consideration of this application. If you have any questions or need additional information, please do not hesitate to contact us at your convenience.

Sincerely,

David J. Held, P.E., L.S.
Provost & Rovero, Inc.

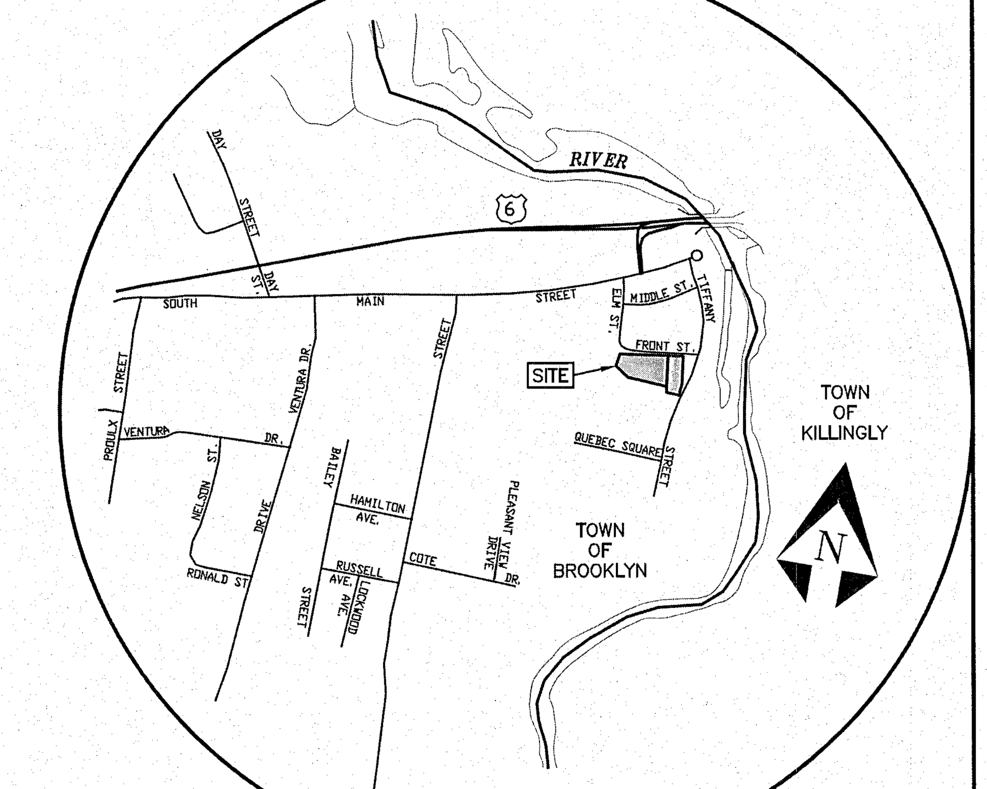

East end of dam is in Danielson Borough, Town of Killingly
DAM
QUINEBAUG RIVER
PICKER HOUSE & BOILER HOUSE RUINS
SITE OF TIFFANY MILL
RACEWAY
SITE OF MILL
WEAVE MILL
GAS WORKS
STOREHOUSE
FRAME HOUSES
AGENT'S HOUSE
STORE
STONE TENEMENT
TIFFANY HOUSE
Tiffany Street
Front Street
Middle Street
Main Street
Elm Street
South
QUEBEC SQUARE
QUINEBAUG MILL/ QUEBEC SQUARE HISTORIC DISTRICT
Brooklyn, Connecticut
District Boundary
Photo Positions
Noncontributing Structures
Structures No Longer Extant

NOTES:

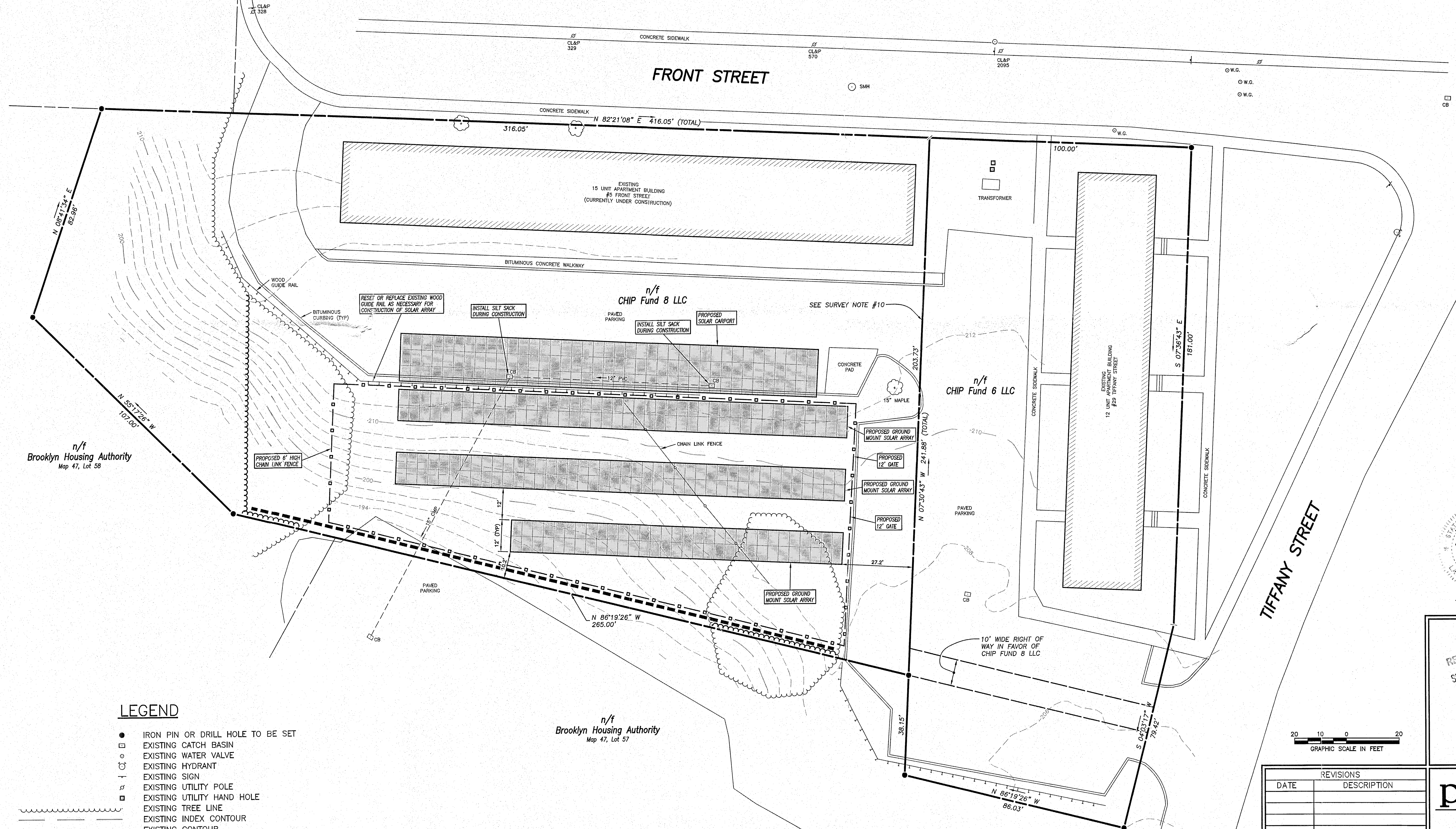
1. This survey has been prepared pursuant to the Regulations of Connecticut State Agencies Section 20-300b-1 through 20-300b-20 as amended on October 26, 2018;
   - This survey conforms to a Class "A-2" horizontal accuracy.
   - Topographic features conform to a Class "T-2" accuracy.
   - Boundary Determination Category: Resurvey.
   - Survey Type: Improvement Location Survey.
2. Zone = R-10.
3. Parcels are shown as Lots 59 and 60 on Assessors Map 47.
4. Owners of record: CHIP Fund 6 LLC & CHIP Fund 8 LLC
   18 Wells Hill Road
   Easton, CT 06612
5. The locations of existing utilities are based on surface evidence and other sources of information. Before any construction is to commence contact "CALL BEFORE YOU DIG" at 1-800-922-4455.
6. Elevations are referenced to NAVD 1988. Contour interval = 2'.
7. Bearings are referenced to CT state plane coordinates, NAD83(2011), Epoch 2010.0000.
8. The intent of this survey is to depict existing conditions for a proposed solar array.
9. These parcels are subject to and together with rights for existing utilities and access.
10. These parcels are subject to and together with a 10' wide right of way centered along the common boundary as shown.

MAP REFERENCES:

1. "Plan in Subdivision – of – Dwellings and Land – of – Wauregan–Quinebaug Mills Inc. – at – East Brooklyn & Danielson, Conn. – Scale: 1" = 100' – Oct. 1934 – Wm. K. Pike, C.E."
2. "Plan of Land – to be Acquired by – Quebec Square Housing Inc. – Quebec Square – Brooklyn, Connecticut – Scale: 1" = 40' – Dated: Nov. 12, 1977 – Kieltyka, Woodis & Pike"
3. "Site Layout & Planting Plan – Tiffany Place – Tiffany Street – Brooklyn, CT – Scale: 1" = 40' – Dziki & Associates Architects"



LOCATION MAP
SCALE: 1" = 1,000'



20 10 0 20
GRAPHIC SCALE IN FEET

N

ENGINEER 9/14/21 DATE

TO MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON,

DAVID J. HELD, L.S. LIC. NO. 24267 9/14/21 DATE

NO CERTIFICATION IS EXPRESSED OR IMPLIED UNLESS THIS MAP BEARS THE ORIGINAL SEAL AND SIGNATURE OF THE LAND SURVEYOR.

LEGEND

- IRON PIN OR DRILL HOLE TO BE SET
- EXISTING CATCH BASIN
- EXISTING WATER VALVE
- EXISTING HYDRANT
- EXISTING SIGN
- EXISTING UTILITY POLE
- EXISTING UTILITY HAND HOLE
- EXISTING TREE LINE
- EXISTING INDEX CONTOUR
- EXISTING CONTOUR
- EXISTING CHAIN LINK FENCE
- EXISTING WOOD GUIDE RAIL
- PROPOSED 6' CHAIN LINK FENCE
- PROPOSED CLEARING LIMITS
- PROPOSED SILT FENCE/HAY BALES

IMPROVEMENT LOCATION SURVEY
PROPOSED SOLAR ARRAY
PREPARED FOR

RECEIVED SEP 14 2021

CHIP FUND 6 LLC & CHIP FUND 8 LLC

FRONT STREET & TIFFANY STREET
BROOKLYN, CONNECTICUT

REVISIONS	
DATE	DESCRIPTION

DATE: 8/31/2021	DRAWN: DJH
SCALE: 1" = 20'	DESIGN: DJH
SHEET: 1 OF 2	CHK BY: ---
DWG. No: Client File	JOB No: 213008

Provost & Rovero, Inc.

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info@prorovinc.com
www.prorovinc.com

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EROSION AND SEDIMENT CONTROL PLAN:

REFERENCE IS MADE TO:

1. Connecticut Guidelines for Soil Erosion and Sediment Control 2002 (2002 Guidelines).
2. Soil Survey of Connecticut, N.R.C.S.

SILT FENCE INSTALLATION AND MAINTENANCE:

1. Dig a 6" deep trench on the uphill side of the barrier location.
2. Position the posts on the downhill side of the barrier and drive the posts 1.5 feet into the ground.
3. Lay the bottom 6" of the fabric in the trench to prevent undermining and backfill.
4. Inspect and repair barrier after heavy rainfall.
5. Inspections will be made at least once per week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater to determine maintenance needs.
6. Sediment deposits are to be removed when they reach a height of 1 foot behind the barrier or half the height of the barrier and are to be deposited in an area which is not regulated by the inland wetlands commission.
7. Replace or repair the fence within 24 hours of observed failure. Failure of the fence has occurred when sediment fails to be retained by the fence because:

- the fence has been overtopped, undercut or bypassed by runoff water,
- the fence has been moved out of position (knocked over), or
- the geotextile has decomposed or been damaged.

HAY BALE INSTALLATION AND MAINTENANCE:

1. Bales shall be placed as shown on the plans with the ends of the bales tightly abutting each other.
2. Each bale shall be securely anchored with at least 2 stakes and gaps between bales shall be wedged with straw to prevent water from passing between the bales.
3. Inspect bales at least once per week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs.
4. Remove sediment behind the bales when it reaches half the height of the bale and deposit in an area which is not regulated by the Inland Wetlands Commission.
5. Replace or repair the barrier within 24 hours of observed failure. Failure of the barrier has occurred when sediment fails to be retained by the barrier because:

- the barrier has been overtopped, undercut or bypassed by runoff water,
- the barrier has been moved out of position, or
- the hay bales have deteriorated or been damaged.

TEMPORARY VEGETATIVE COVER:

SEED SELECTION

Grass species shall be appropriate for the season and site conditions. Appropriate species are outlined in Figure TS-2 in the 2002 Guidelines.

TIMING CONSIDERATIONS

Seed with a temporary seed mixture within 7 days after the suspension of grading work in disturbed areas where the suspension of work is expected to be more than 30 days but less than 1 year.

SITE PREPARATION

Install needed erosion control measures such as diversions, grade stabilization structures, sediment basins and grassed waterways.

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application, and mulch anchoring.

SEEDBED PREPARATION

Loosen the soil to a depth of 3-4 inches with a slightly roughened surface. If the area has been recently loosened or disturbed, no further roughening is required. Soil preparation can be accomplished by tracking with a bulldozer, discing, harrowing, raking or dragging with a section of chain link fence. Avoid excessive compaction of the surface by equipment traveling back and forth over the surface. If the slope is tracked, the cleat marks shall be perpendicular to the anticipated direction of the flow of surface water.

If soil testing is not practical or feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10-10-10 or equivalent. Additionally, lime may be applied using rates given in Figure TS-1 in the 2002 Guidelines.

SEEDING

Apply seed uniformly by hand cyclone seeder, drill, cultipacker type seeder or hydroseeder at a minimum rate for the selected species. Increase seeding rates by 10% when hydroseeding.

MULCHING

Temporary seedings made during optimum seeding dates shall be mulched according to the recommendations in the 2002 Guidelines. When seeding outside of the recommended dates, increase the application of mulch to provide 95%-100% coverage.

MAINTENANCE

Inspect seeded area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for seed and mulch movement and rill erosion.

Where seed has moved or where soil erosion has occurred, determine the cause of the failure. Repair eroded areas and install additional controls if required to prevent reoccurrence of erosion.

Continue inspections until the grasses are firmly established. Grasses shall not be considered established until a ground cover is achieved which is mature enough to control soil erosion and to survive severe weather conditions (approximately 80% vegetative cover).

PERMANENT VEGETATIVE COVER:

Refer to Permanent Seeding Measure in the 2002 Guidelines for specific applications and details related to the installation and maintenance of a permanent vegetative cover. In general, the following sequence of operations shall apply:

1. Topsoil will be replaced once the excavation and grading has been completed. Topsoil will be spread at a uniform depth approximating existing conditions on imported silt or suitable on-site materials.
2. Apply agricultural ground limestone. Apply fertilizer. Quantities shall be determined based on laboratory soil tests. Work lime and fertilizer into the soil to a depth of 4".
3. Inspect seedbed before seeding. If traffic has compacted the soil, retill compacted areas.
4. Apply the chosen grass seed mix. The recommended seeding dates are: April 1 to June 15 & August 15 - October 1.
5. Following seeding, firm seedbed with a roller. Mulch immediately following seeding. If a permanent vegetative stand cannot be established by September 30, apply a temporary cover on the topsoil such as netting, mat or organic mulch.

EROSION AND SEDIMENT CONTROL NARRATIVE:

PRINCIPLES OF EROSION AND SEDIMENT CONTROL

The primary function of erosion and sediment controls is to absorb erosional energies and reduce runoff velocities that force the detachment and transport of soil and/or encourage the deposition of eroded soil particles before they reach any sensitive area.

KEEP LAND DISTURBANCE TO A MINIMUM

The more land that is in vegetative cover, the more surface water will infiltrate into the soil, thus minimizing stormwater runoff and potential erosion. Keeping land disturbance to a minimum not only involves minimizing the extent of exposure at any one time, but also the duration of exposure. Phasing, sequencing and construction scheduling are interrelated. Phasing divides a large project into distinct sections where construction work over a specific area occurs over distinct periods of time and each phase is not dependent upon a subsequent phase in order to be functional. A sequence is the order in which construction activities are to occur during any particular phase. A sequence should be developed on the premise of "first things first" and "last things last" with proper attention given to the inclusion of adequate erosion and sediment control measures. A construction schedule is a sequence with time lines applied to it and should address the potential overlap of actions in a sequence which may be in conflict with each other.

- Limit areas of clearing and grading. Protect natural vegetation from construction equipment with fencing, tree armoring, and retaining walls or tree wells.
- Route traffic patterns within the site to avoid existing or newly planted vegetation.
- Phase construction so that areas which are actively being developed at any one time are minimized and only that area under construction is exposed. Clear only those areas essential for construction.
- Sequence the construction of storm drainage systems so that they are operational as soon as possible during construction. Ensure all outlets are stable before outletting storm drainage flow into them.
- Schedule construction so that final grading and stabilization is completed as soon as possible.

SLOW THE FLOW

Detachment and transport of eroded soil must be kept to a minimum by absorbing and reducing the erosive energy of water. The erosive energy of water increases as the volume and velocity of runoff increases. The volume and velocity of runoff increases during development as a result of reduced infiltration rates caused by the removal of existing vegetation, removal of topsoil, compaction of soil and the construction of impervious surfaces.

- Use diversions, stone dikes, silt fences and similar measures to break flow lines and dissipate storm water energy.
- Avoid diverting one drainage system into another without calculating the potential for downstream flooding or erosion.

KEEP CLEAN RUNOFF SEPARATED

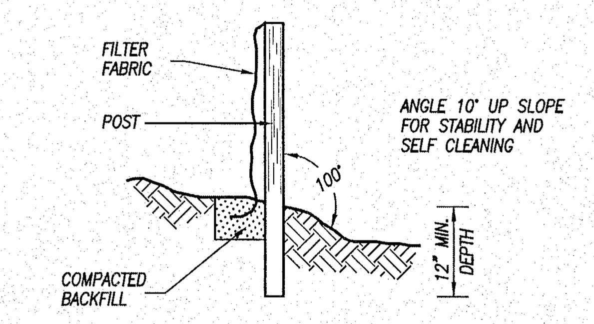
Clean runoff should be kept separated from sediment laden water and should not be directed over disturbed areas without additional controls. Additionally, prevent the mixing of clean off-site generated runoff with sediment laden runoff generated on-site until after adequate filtration of on-site waters has occurred.

- Segregate construction waters from clean water.
- Divert site runoff to keep it isolated from wetlands, watercourses and drainage ways that flow through or near the development until the sediment in that runoff is trapped or detained.

REDUCE ON SITE POTENTIAL INTERNALLY AND INSTALL PERIMETER CONTROLS

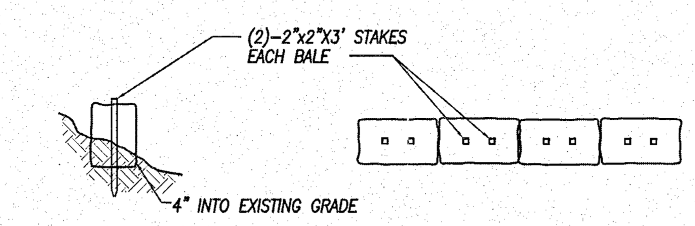
While it may seem less complicated to collect all waters to one point of discharge for treatment and just install a perimeter control, it can be more effective to apply internal controls to many small sub-drainage basins within the site. By reducing sediment loading from within the site, the chance of perimeter control failure and the potential off-site damage that it can cause is reduced. It is generally more expensive to correct off-site damage than it is to install proper internal controls.

- Control erosion and sedimentation in the smallest drainage area possible. It is easier to control erosion than to contend with sediment after it has been carried downstream and deposited in unwanted areas.
- Direct runoff from small disturbed areas to adjoining undisturbed vegetated areas to reduce the potential for concentrated flows and increase settlement and filtering of sediments.
- Concentrated runoff from development should be safely conveyed to stable outlets using rip rapped channels, waterways, diversions, storm drains or similar measures.
- Determine the need for sediment basins. Sediment basins are required on larger developments where major grading is planned and where it is impossible or impractical to control erosion at the source. Sediment basins are needed on large and small sites when sensitive areas such as wetlands, watercourses, and streets would be impacted by off-site sediment deposition. Do not locate sediment basins in wetlands or permanent or intermittent watercourses. Sediment basins should be located to intercept runoff prior to its entry into the wetland or watercourse.
- Grade and landscape around buildings and septic systems to divert water away from them.



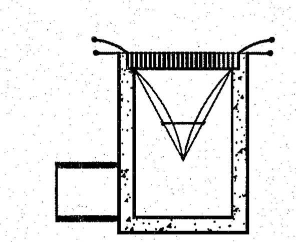
SILT FENCE

NOT TO SCALE

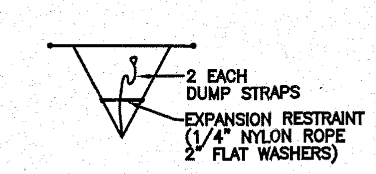


HAYBALE BARRIER

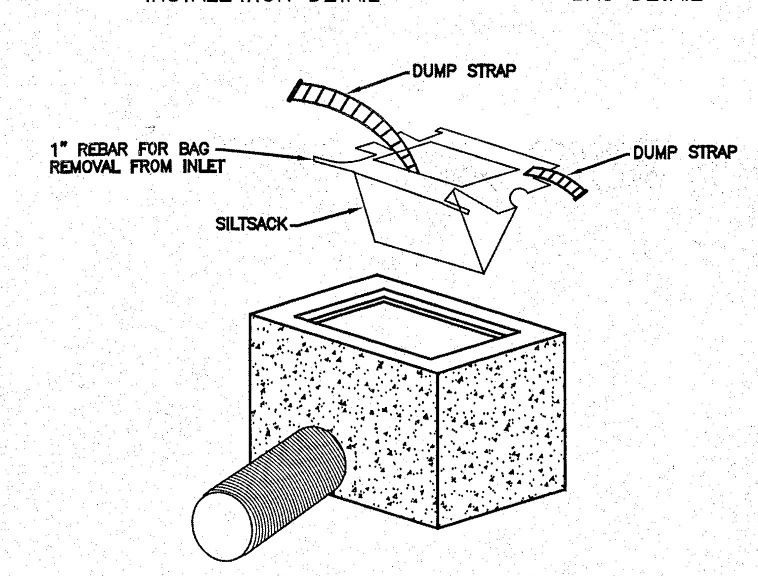
NOT TO SCALE



INSTALLATION DETAIL



BAG DETAIL



INLET SEDIMENT CONTROL DEVICE

NOT TO SCALE

INSTALLATION & MAINTENANCE

1. Install as directed by manufacturer.
2. Inspect the catch basin sediment device at least once a week (preferably twice) and after rainfall events of 0.5" or greater.
3. Remove sediment when the siltsack is 1/2 full. Sediment shall be deposited in an area which is not regulated by the Inland Wetlands Commission.
4. Replace or repair within 24-hours of observed failure. Failure may include:
   - Overtopping, or bypassed by runoff water.
   - The geotextile has decomposed or has been damaged.

ENGINEER 9/14/21 DATE

REVISIONS	
DATE	DESCRIPTION

DATE: 8/31/2021	DRAWN: DJH
SCALE: AS SHOWN	DESIGN: DJH
SHEET: 2 OF 2	CHK BY: ---
DWG. No: Client File	JOB No: 213008

DETAIL SHEET
PROPOSED SOLAR ARRAY
PREPARED FOR

CHIP FUND 6 LLC & CHIP FUND 8 LLC

FRONT STREET & TIFFANY STREET
BROOKLYN, CONNECTICUT

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