

TOWN OF MIDDLETOWN  
PLANNING BOARD  
APPLICATION FOR COMPREHENSIVE PERMIT

Name of Project: West House II

Date Filed: 01/19/2022 - Preliminary Plan Submission

Applicant's Name, Address, and Telephone Number The West House Corporation,  
50 Washington Square, Newport, RI 02840 401 846 5114

*(Applicant must be the owner of record of the property or must provide written authorization, signed by the owner of the property, that applicant is working as an agent on behalf of the owner)*

Developer's Name, Address, and Telephone Number Church Community Housing Corporation,  
50 Washington Square, Newport, RI 02840 401 846 5114

Status of Applicant:  Public Agency  Non-Profit  Private  
*(attach documentary evidence of status)*

Assessor's Plat & Lot of Property 113 - 6

Type of Development:  New Construction  Rehabilitation of existing structure(s)

**PROPERTY INFORMATION:**

Area of site in acres : 4.60

Zoning District(s) of site: OB

Is property serviced by public water?  Yes  No

Is elimination of lot lines proposed?  Yes  No

Is subdivision of land proposed?  Yes  No

Will streets or roads be eliminated?  Yes  No

Will new streets or roads be created?  Yes  No

**PROJECT INFORMATION:**

Subsidizing Agency and Program: Rhode Island Housing: Low Income Housing Tax Credits

Total number and type of housing units (with number of bedrooms) proposed: 54 units total comprised of 40 one-bedroom and 14 two-bedroom units proposed.

Description of low or moderate income housing units proposed:

*Include number, type (family, elderly, special needs), tenure (rent or own), and income level (ie. <65% MFI), and number of bedrooms.*

54 units of elderly rental housing units serving persons earning 80% of AMI or less. Units consist of 40 one-bedroom apartments and 14 two-bedroom apartments.

List of variances/waivers requested from zoning ordinance and/or other local regulations:

*(Specify each exception with precise reference to section of applicable regulation, attach additional sheets if necessary)*

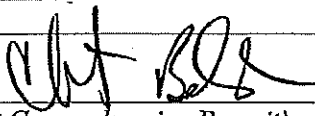
Please see attached Union Studio Master Plan Application Zoning Memorandum.

List of approvals needed from other public agencies:

*(Identify each local, regional, state or federal agency and specify approval to be sought)*

Underground Injection Control (UIC) Permit from RI DEM for stormwater management.

Owner's Signature



*(approval to request Comprehensive Permit)*

Action Taken By Administrative Officer

Application Certified as Complete

Application is incomplete and returned. The following deficiencies exist:

\_\_\_\_\_  
Signature of Administrative Office (when certified complete)

\_\_\_\_\_  
Date

**BOARD RESOLUTION**

**BE IT RESOLVED** that the Board of Directors of the West House Corporation hereby authorizes Christian Belden, Executive Director of Church Community Housing Corporation to prepare and submit the Comprehensive Permit application for the West House II project, in Middletown, RI, 02842.

I, Elizabeth Phelps, Board Member of the Board of Directors of  
Name Title  
West House Corporation, hereby certify that the above stated resolution was approved by a vote of the Board of Directors of the corporation on the 18<sup>th</sup> day of October, 2021.

Elizabeth D Phelps  
Signature

10/20/21  
Date



# Church Community Housing Corporation

*Working for decent housing for families of low  
and moderate income in Newport County*

Mr. Paul A. Croce, Chair  
Middletown Planning Board  
Middletown Town Hall  
350 East Main Rd.  
Middletown, RI 02842

Re: West House II 417 West Main Road – Comprehensive Permit for Affordable Housing

Dear Mr. Croce,

CCHC has filed a Comprehensive Permit Application to add 54-units of elderly Affordable Housing to the existing 50-unit elderly Affordable Housing development known as West House located at 417 West Main Road. The additional 54 units of proposed housing will be affordable as defined in the Low and Moderate Income Housing Act (RIGL 45-53).

The proposed development would typically require review by both the Middletown Zoning Board and Planning Board for the variances and waivers needed from the Town's Zoning and Subdivision Regulation. (Please see attached list of all requested relief).

Per Chapter 152 Article 17 Section 1704 of the Towns Code of Ordinances, as enabled by RIGL 45-53 we hereby respectfully request that the zoning and planning reviews be considered a single application to build low and moderate income housing lieu of separate applications to the applicable boards and that all requests for relief as specified therein be considered solely by the Planning Board.

Furthermore, I respectfully request that both Applications be considered a single Application to build low or moderate housing in lieu of separate applications to the applicable boards and commissions, and that all requests for relief as specified therein be considered solely by the Planning Commission. The provisions from which relief is being requested are laid out in the Applications and in the attached list.

Sincerely,

Christian Belden  
Executive Director



# Church Community Housing Corporation

*Working for decent housing for families of low  
and moderate income in Newport County*

10/22/2021

Mr. Paul A. Croce, Chair  
Middletown Planning Board  
Middletown Town Hall  
350 East Main Rd.  
Middletown, RI 02842

Re: West House II Comprehensive Permit for Affordable Housing - Density Bonus Request

For the proposed West House II elderly affordable housing development, the density we are seeking exceeds that allowed by zoning for multi-family residential. Church Community Housing Corporation hereby requests that the proposed increased density be considered a municipal subsidy in the form of a density bonus for the purpose of satisfying the submission requirement in accordance with §1704.1(B)(2).

Sincerely,

A handwritten signature in black ink, appearing to read 'Christian Belden', written in a cursive style.

Christian Belden  
Executive Director

**West House II Financial Proforma**

Development Item	Total Cost Low Mod Component	Total Cost Market Rate Component	%/TPC	Total Project Cost
<b>Development Costs</b>				
Site Acquisition	\$0	\$0	0.00%	\$0
<b>Hard Costs</b>				
Site preparation	\$0		0.00%	
Landscaping	\$0		0.00%	
Residential construction	\$10,686,600		72.80%	\$10,686,600
Hard cost contingency	\$534,330		3.64%	\$534,330
<b>Total Hard Costs</b>	<b>\$11,220,930</b>	<b>\$0</b>	<b>76.44%</b>	<b>\$11,220,930</b>
<b>Soft Costs</b>				
Permits/Surveys	\$20,000		0.14%	\$20,000
Architectural	\$801,495		5.46%	\$801,495
Engineering	\$18,000		0.12%	\$18,000
Legal	\$170,000		1.16%	\$170,000
Insurance	\$60,000		0.41%	\$60,000
Security	\$0		0.00%	
Construction Manager	\$106,866		0.73%	\$106,866
Property Taxes	\$25,000		0.17%	\$25,000
Construction Loan Interest	\$488,000		3.32%	\$488,000
Financing fees	\$303,297		2.07%	\$303,297
Appraisal	\$10,000		0.07%	\$10,000
Utilities	\$0		0.00%	
Accounting	\$20,000		0.14%	\$20,000
Marketing & Commissions	\$12,000		0.08%	\$12,000
Consultant	\$0		0.00%	
Operating and Replacement Reserves	\$363,234		2.47%	\$363,234
Developer Fee	\$1,020,600		6.95%	\$1,020,600
Soft Cost Contingency	\$40,000		0.27%	\$40,000
<b>Total Soft Costs</b>	<b>\$3,458,492</b>	<b>\$0</b>	<b>23.56%</b>	<b>\$3,458,492</b>
<b>Total Development Costs</b>	<b>\$14,679,422</b>	<b>\$0</b>	<b>100.00%</b>	<b>\$14,679,422</b>
<b>Sources</b>				
9% LIHTC equity	\$11,351,979		77.33%	\$11,351,979
Permanent mortgage	\$3,200,000		21.80%	\$3,200,000
RIH HOME	\$127,443		0.87%	\$127,443
	\$0		0.00%	
<b>Total Revenue</b>	<b>\$14,679,422</b>	<b>\$0</b>	<b>100.00%</b>	<b>\$14,679,422</b>

## Timeline

Benchmark	Expected Date
Comprehensive Permit Final Approval	03/09/2022
Receipt of all funding and financing approvals	08/15/2022
Financial closing	10/30/2022
Building Permits Issued	10/15/2022
Start Construction	11/15/2022
End Construction	11/01/2023
Full Occupancy	12/15/2023

Abutters List - 417 Forest Ave., Middletown, RI 02842

<u>PIN</u>	<u>Owner's Name</u>	<u>Mailing Address</u>	<u>City</u>	<u>State</u>	<u>Zip</u>	<u>Location</u>
107NE 305	CARFORA SALVATORE & KAREN	25 BUCK RD	MIDDLETOWN	RI	2842	25 BUCK RD
113 6A	CROCKETT NANCY L	391 FOREST AVENUE	MIDDLETOWN	RI	2842	391 FOREST AVE
113 9	DESANTIS FAMILY TRUST	429 FOREST AVENUE	MIDDLETOWN	RI	2842	429 FOREST AVE
113 15	ENTERPRISE CENTER PROPERTIES INC	25 ENTERPRISE CENTER	MIDDLETOWN	RI	2842	110 ENTERPRISE CTR
113 15D	KVH INDUSTRIES INC	50 ENTERPRISE CENTER	MIDDLETOWN	RI	2842	75 ENTERPRISE CTR
113 8	MUREDDU CHRISTOPHER P	1 OAK VIEW TERR	MIDDLETOWN	RI	2842	1 OAK VIEW TERR
113 7	REESE KAREN	148 HONEYMAN AVENUE	MIDDLETOWN	RI	2842	3 OAK VIEW TERR
113 6	WEST HOUSE CORPORATION THE	C/O PHOENIX PROP MGMT INC	WARWICK	RI	02886-4353	417 FOREST AVE

## West House II Comprehensive Permit Application

October 20<sup>th</sup>, 2021

### Approved Monitoring Agency:

Church Community Housing Corporation is the monitoring agency for the West House II development located at 417 Forest Avenue, Middletown, RI 02842. Church Community Housing Corporation is an Approved Monitoring Agent by RI Housing.



### Monitoring Agents (as of 6/19/2018)

#### **Church Community Housing Corp.**

Contact: Steve Ostiguy  
50 Washington Square  
Newport, RI 02840  
Phone: 401-846-5114  
Fax: 401-849-7930  
Email: [sostiguy@cchcnewport.org](mailto:sostiguy@cchcnewport.org)

#### **Community Housing Land Trust of RI**

Contact: Melissa Lodge  
1070 Main Street  
Pawtucket, RI 02806  
Phone: 401-721-5680  
Email: [mlodge@housingnetworkri.org](mailto:mlodge@housingnetworkri.org)

#### **Coventry Housing Authority**

Contact: Julie Leddy  
14 Manchester Circle  
Coventry, RI 02816  
Phone: 401-828-4367  
Fax: 401-823-5211  
Email: [jleddy@coventryhousing.org](mailto:jleddy@coventryhousing.org)

#### **East Bay Community Development**

Corp. Contact: Diane Mederos  
150 Franklin Street  
Bristol, RI 02809  
Phone: 401-253-2080  
Fax: 401-253-6997  
Email: [dmederos@ebcdc.org](mailto:dmederos@ebcdc.org)  
Web: [www.ebcdc.org](http://www.ebcdc.org)

#### **East Greenwich Housing Authority**

Contact: Marcia Sullivan  
146 First Avenue  
East Greenwich, RI 02818  
Phone: 401-885-2610  
Fax: 401-885-4166  
Email: [msullivan@eghousing.com](mailto:msullivan@eghousing.com)  
Web: [www.eghousing.com](http://www.eghousing.com)

#### **Narragansett Affordable Housing Corp.**

Contact: Mike McLoughlin  
25 Fifth Street  
Narragansett, RI 02882  
Phone: 401-789-9489  
Fax: 401-782-0150  
Email: [Mike@nahr-housing.com](mailto:Mike@nahr-housing.com)

#### **NeighborWorks Blackstone River Valley (formerly Woonsocket Neighborhood Development Corp.)**

Contact: Joe Gatlack  
719 Front Street, #103  
Woonsocket, RI 02895  
Phone: 401-762-0993 x 221  
Fax: 401-769-1010  
Email: [jgatlack@neighborworksbrv.org](mailto:jgatlack@neighborworksbrv.org)  
Web: [neighborworksbrv.org](http://neighborworksbrv.org)

#### **Valley Affordable Housing**

Contact: Peter Bouchard  
573 Mendon Road, Suite 3  
Cumberland, RI 02864  
Phone: 401-334-2678 x 14  
Fax: 401-312-0010  
Email: [pbouchard@valleyaffordablehousing.org](mailto:pbouchard@valleyaffordablehousing.org)

#### **Westerly Housing Authority**

Contact: Carlos Lopez  
5 Chestnut Street  
Westerly, RI 02891  
Phone: 401-596-4918  
Fax: 401-348-0714  
Email: [clopez@westerlyhousing.org](mailto:clopez@westerlyhousing.org)

## OPTION TO LEASE AGREEMENT

This Option to Lease Agreement ("Option Agreement") is entered into as of this 15th day of December, 2021, by and between Church Community Housing Corporation ("CCHC") and The West House Corporation ("WHC").

### RECITALS

A. WHC and CCHC have been discussing a lease agreement with respect to that certain real property located to the west of the West House structure on Middletown Tax assessors map 113, Lot 6 (the "Property").

B. WHC desires to grant to CCHC the option to lease the Property and CCHC desires to obtain an option to lease the Property, upon the terms and conditions set forth herein.

### WITNESSETH

For good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, and in consideration of the mutual covenants herein contained, it is hereby agreed by and between the parties as follows:

1. WHC hereby grants to CCHC, the right to lease the Property pursuant to a ground lease that will provide in pertinent part as follows: (i) a term of 99 years; (ii) a rental rate of \$1.00 per year; (iii) use restricted to low income elderly housing; (iv) leased land to include sufficient square footage to construct the West House II structure as proposed, with all required supporting infrastructure; and (v) allowances for cooperative use of the land by WHC (the "Ground Lease"). The Ground Lease shall also include standard terms and conditions common to ground leases of this type and such other provisions that may be reasonably required by lenders and equity partners.

2. The Option Period shall commence on the date hereof and terminate on December 31, 2026.

3. CCHC may exercise this Option to Lease by giving WHC thirty (30) business days prior written notice of its exercise of the Option to Lease together with a copy of the Lease signed by CCHC and the first month's rent payment and the security deposit.

4. CCHC may assign this Option to Lease to a related entity in connection with financing the construction of improvements on the Property.

5. From time to time, CCHC and its various advisors may need access to the Property for various reasons including but not limited to aid in the preparation of permit applications. CCHC shall request permission including a description of why access is required to WHC at least 2 business days prior to the day access is required. WHC shall act reasonably in providing permission for such access.

6. This Option to Lease Agreement, and the exhibits attached hereto, constitute the entire agreement between the parties with respect to the Property and supersede any and all prior understandings or agreements between the parties with respect to the Property.

7. This Agreement will terminate and be null and void in all respects without recourse to the parties hereto upon expiration of the Option Period.

IN WITNESS WHEREOF, WHC and CCHC each have caused this Option to Lease Agreement to be executed in its name by an authorized officer as of the date first above written.

The West House Corporation



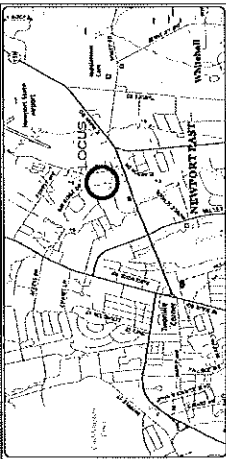
By: Elizabeth Phelps

Church Community Housing Corporation

Christian Belden

By: Christian Belden

Digitally signed by Christian Belden  
DN: cn=Christian Belden, o=Church  
Community Housing Corporation, ou,  
email=cbelden@cchcexport.org,  
c=US  
Date: 2021.12.16 10:44:57 -0500



**GENERAL NOTES:**

1. THIS PLAN IS A PRELIMINARY PLAN AND IS NOT TO BE USED FOR CONSTRUCTION.
2. OWNER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AND STATE AUTHORITIES.
3. ALL DIMENSIONS ARE IN FEET AND INCHES, UNLESS OTHERWISE SPECIFIED.
4. THE PROPOSED IMPROVEMENTS ARE SUBJECT TO THE APPROVAL OF THE LOCAL AND STATE AUTHORITIES.

**PROPOSED IMPROVEMENTS:**

ITEM	QUANTITY	UNIT PRICE	TOTAL
ASPHALT DRIVE	10,000	1.25	12,500.00
CONCRETE DRIVE	5,000	1.50	7,500.00
GRAVEL DRIVE	15,000	0.75	11,250.00
LANDSCAPING	10,000	0.50	5,000.00
UTILITIES	5,000	0.50	2,500.00
PAVING	10,000	0.50	5,000.00
SEWER	5,000	0.50	2,500.00
WATER	5,000	0.50	2,500.00
ELECTRIC	5,000	0.50	2,500.00
TELEPHONE	5,000	0.50	2,500.00
CABLE	5,000	0.50	2,500.00
TELEVISION	5,000	0.50	2,500.00
INTERNET	5,000	0.50	2,500.00
OTHER	5,000	0.50	2,500.00
<b>TOTAL</b>			<b>80,000.00</b>

**CONSTRUCTION NOTES:**

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LOCAL AND STATE REGULATIONS.
2. THE PROPOSED IMPROVEMENTS SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND STRUCTURES.
6. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A SAFE AND SOUND CONDITION AT ALL TIMES.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL DEBRIS AND WASTE.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL DAMAGE TO ADJACENT PROPERTIES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ENVIRONMENTAL FEATURES.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL HISTORICAL FEATURES.

**CONTRACTOR:**  
**WEST HOUSE CORPORATION**  
 417 FOREST AVENUE, MIDDLETOWN RI, 02842  
 C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

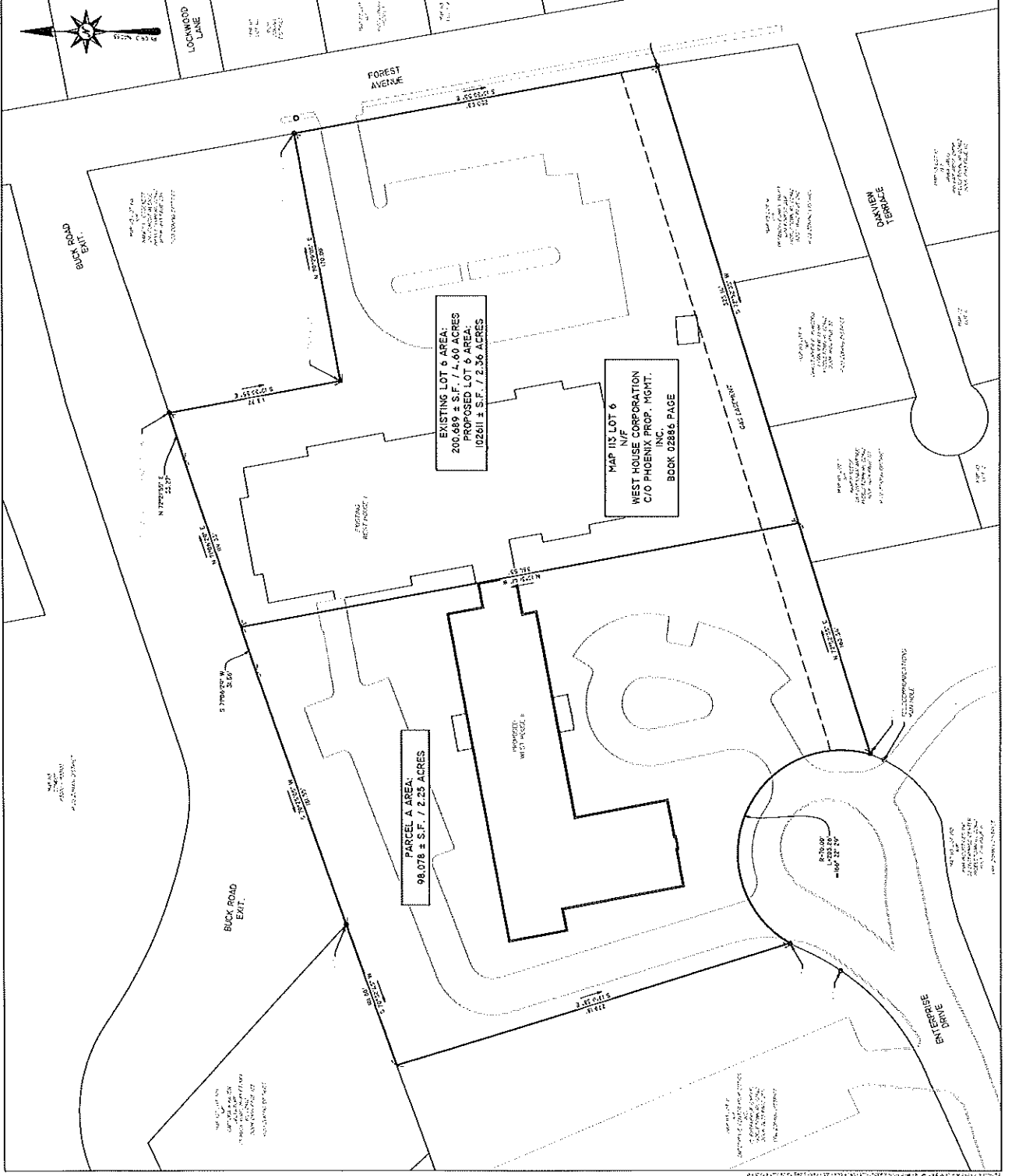
**ARCHITECT:**  
**ANN SITE ENGINEERING**  
 1000 WASHINGTON STREET, SUITE 100  
 PROVIDENCE, RI 02903  
 TEL: (401) 863-1111  
 FAX: (401) 863-1112  
 WWW.ANSITEENGINEERING.COM

**PROFESSIONAL SEAL:**  
 DATE: NOVEMBER 1, 2021  
 SCALE: 1" = 40' 0"

**ANN SITE ENGINEERING**  
 PROFESSIONAL ENGINEER LICENSE NO. 100000000  
 REGISTERED PROFESSIONAL ENGINEER  
 CIVIL ENGINEERING  
 STATE OF RHODE ISLAND

**GRAPHIC SCALE:**  
 1" = 40' 0"

**LEASE AREA PLAN**  
 WEST HOUSE II - AFFORDABLE SENIOR HOUSING  
 417 FOREST AVENUE, MIDDLETOWN RI, 02842  
 ASSESSOR'S MAP 11510110  
 ANNUAL: THE WEST HOUSE CORPORATION  
 C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886  
 JOB # 21-039 SCALE 1" = 40' 0" DRAWN BY JUC DATE NOVEMBER 1, 2021  
 REVISIONS



**PARCEL A AREA:**  
 98,078 s.f. / 2.25 ACRES

**EXISTING LOT & AREA:**  
 200,680 s.f. / 4.60 ACRES

**PROPOSED LOT & AREA:**  
 102,611 s.f. / 2.36 ACRES

**MAP IS LOT 6**  
 N/F  
 WEST HOUSE CORPORATION  
 C/O PHOENIX PROP. MGMT.  
 INC.  
 BOOK 02846 PAGE

**DEED RESTRICTION FOR LMI HOUSING**

This Deed Restriction is entered into as of the \_\_ day of June, 2020, by The West House Corporation, with a mailing address of 50 Washington Square, Newport, RI 02840 (the “Grantor”).

**WITNESSETH:**

**WHEREAS**, the Grantor has developed and improved certain real property known and identified as 417 Forest Avenue identified further as Plat 113 and Lot 26 in the Assessor’s Records of the Town of Middletown, State of Rhode Island, as further and more particularly described in the legal description attached hereto as Exhibit A and incorporated herein (the “Real Property”); and

**WHEREAS**, under the relevant provisions of the Town of Middletown’s Zoning Ordinance, including but not limited to Article I7 – Low and Moderate Income Housing (the “LMI Ordinance”) and the R.I. General Laws at 45-53-*et seq*, the R.I. Low and Moderate Income Housing Act (the “LMI Act”), a specified number of dwelling units shall be affordable subject to the review and approval of the Middletown Planning Board, sitting in their capacity as the local review board; and

**WHEREAS**, the Real Property requires the creation and maintenance of three (54) affordable housing units, which are described as Units \_\_, \_\_ and \_\_, in the Declaration of Condominium prepared by Grantor, created under the relevant provisions of the LMI Ordinance and LMI Act, which the Grantor agrees to produce and maintain at the Real Property; and

**WHEREAS**, the Grantor agrees and commits to provide no less than three low- and moderate-income dwelling units, which may be ownership or rental (the “LMI Units”) at the Real Property in fulfillment of their obligations to provide affordable housing under the relevant provisions of the LMI Ordinance and LMI Act, pursuant to the approval of the local review board; and

**WHEREAS**, [corporation/entity name] with offices at [address], [name], Rhode Island, (the “Monitoring Agent”) has been retained to monitor compliance with and to enforce the terms of this Deed Restriction. In the event that the Monitoring Agent is decertified as an Approved Monitoring Agent by Rhode Island Housing & Mortgage Finance Corporation (“RIHMFC”) or is otherwise unable to carry out its monitoring responsibilities, Rhode Island Housing shall automatically act as the monitoring agent under this Deed Restriction unless or until another successor Approved Monitoring Agent has been appointed by Rhode Island Housing. The Grantor may be required to pay to the Monitoring Agent, or its successor, a fee for monitoring services, as more fully provided in the Monitoring Services Agreement.

**NOW, THEREFORE**, as further consideration for the rental of the LMI Rental Units the Grantor, including their heirs, successors and assigns, hereby agree that the above Condominium Units shall be subject to the following rights and restrictions which are imposed for the benefit of, and shall be enforceable by, the Town of Middletown (the “Municipality”), the Monitoring Agent, and,

if Rhode Island Housing is the Monitoring Agent, by Rhode Island Housing.

**1. Affordability Requirement.**

(a) This Deed Restriction shall remain in effect for a period of thirty (30) years commencing on the date this Deed Restriction is recorded in the Land Evidence Records of the Municipality and continuing for a period of thirty (30) years thereafter (such period, the "Affordability Requirement Period") unless terminated earlier by (i) the recording of a compliance certificate and a new deed restriction executed by the purchaser in form and substance substantially identical to this Deed Restriction establishing a new term or (ii) upon the occurrence of a Termination Event as set forth in Section 2 hereof.

(b) During the Affordability Requirement Period, the LMI Units shall be available for initial and subsequent rentals, at an "affordable rental price" (as hereinafter defined) only to an individual or family for which the rent, heat, and utilities other than telephone constitute no more than thirty percent (30%) of the gross annual household income for a household with eighty percent (80%) or less of area median income, determined at the time of leasing, adjusted for family size, for the Providence Metropolitan Statistical Area as established from time to time by the Department of Housing and Urban Development of the United States of America ("HUD") (an "Income Eligible") and as determined by the Monitoring Agent.

(c) Each LMI Unit shall qualify as affordable despite temporary noncompliance with Section 1(b) above if (i) such noncompliance is caused by increases in the incomes of existing tenants, and (ii) such action satisfactory to the Monitoring Agent in its sole discretion is being taken by the Grantee to ensure that all vacancies are filled in accordance with Section 1 hereof until such noncompliance is corrected. An tenant of an LMI Unit who ceases to qualify as an Income Eligible shall pay thirty percent (30%) of such tenant's adjusted monthly income, until such time as the tenant's income exceeds 100% area median income, at which time the tenant shall pay Fair Market Rent (FMR) as published by HUD on an annual basis, as recertified annually by the Monitoring Agent.

(d) Except as provided in Section 2(a) hereof, the LMI Unit shall remain affordable during the Affordability Requirement Period without regard to the term of any mortgage on such Dwelling or to any transfer of ownership thereof.

**2. Resale Requirements in the Event of Foreclosure.**

(a) With respect to all or any part of the Property, if the affordability restrictions set forth in this Deed Restriction are terminated before the expiration of the Affordability Requirement Period upon the occurrence of a "Termination Event" (as defined below), such affordability restrictions shall be reinstated upon the terms thereof in effect as of the date on which they were so terminated if, during the Affordability Requirement Period, the owner of record of such Property obtains a direct or indirect ownership interest in such Property. "Termination Event" shall mean, with respect to all or any part of the Property, a foreclosure thereof, transfer in lieu of foreclosure thereof, or an assignment of an FHA insured mortgage encumbering such Property to HUD, *provided that* prior to such Termination Event the mortgagee shall provide the Monitoring Agent,

the Municipality and Rhode Island Housing with notice of such proposed Termination Event and thereafter upon receipt by the Monitoring Agent, the Municipality and Rhode Island Housing of such notice, such mortgagee shall allow Rhode Island Housing the opportunity to cure the default within thirty (30) days after receipt of such notice. In addition to Rhode Island Housing's right to cure, Rhode Island Housing shall have the right on twenty (20) days' notice to purchase at par, plus any accrued and unpaid interest, such lender's loan. Such purchase shall occur within thirty (30) days of Rhode Island Housing's notice to such lender that Rhode Island Housing intends to exercise its right to purchase the loan.

(b) The Grantor shall promptly provide notice to the Monitoring Agent of any impending foreclosure or transfer in lieu of foreclosure so that the Monitoring Agent can determine whether the Affordability Period shall be suspended.

(c) If at any time following transfer by foreclosure or transfer in lieu of foreclosure, but still during the term of the Affordability Requirement Period, the owner of record prior to such foreclosure or transfer in lieu of foreclosure, or any entity that includes the former owner or those with whom the former owner has or has had family or business ties, (the "Related Party") obtains an ownership interest in the Property, the Affordability Requirement Period shall be reinstated according to its original terms.

(d) A certificate signed under penalties of perjury by a purchaser at a foreclosure sale (or any subsequent purchaser) certifying that such purchaser is not a Related Party shall, if recorded with the Land Evidence Records, be conclusive evidence that such purchaser is not a Related Party.

#### **4. Recording and Filing: Covenants to Run With the Real Property.**

(a) Upon execution and delivery hereof by the Grantor, the Municipality shall cause this Deed Restriction and all amendments hereto to be recorded and filed in the Land Evidence Records of Municipality. A copy of this Deed Restriction shall also be filed with the Monitoring Agent and the [municipal official] of the Town of Middletown, Rhode Island.

(b) The Grantor intends, declares and covenants, on behalf of themselves and their heirs, transferees, successors and assigns of the Real Property, that during the Affordability Requirement Period this Deed Restriction and the covenants and restrictions set forth in this Deed Restriction (i) shall run with the Real Property, shall encumber the Real Property during the Affordability Requirement Period, and shall be binding and enforceable upon such heirs, transferees, successors and assigns, and (ii) are not merely a personal covenant of the Grantor. The Grantor hereby agrees that any and all requirements of the laws of the State of Rhode Island required to be satisfied in order for the provisions of this Deed Restriction to become effective and constitute deed restrictions and covenants running with the Real Property are deemed to be satisfied in full, and that any requirements of privity of estate are deemed satisfied or, in the alternative, that an equitable servitude has been created to insure that these restrictions and covenants run with the Real Property. During the Affordability Requirement Period, each and every contract, deed or other instrument hereafter executed conveying the Real Property or any portion thereof shall expressly provide that such conveyance is subject to this Deed Restriction; *provided, however*, the restrictions and covenants contained herein shall survive and be effective regardless of whether

such contract, deed or other instrument provides that such conveyance is subject to this Deed Restriction.

(c) If the Grantor desires to sell, convey or otherwise transfer the Condominium Units, the Grantor shall promptly notify the Monitoring Agent, the Municipality, and Rhode Island Housing in writing of such intent ("Notice of Intent to Transfer") by certified mail return receipt requested at the addresses provided at Section 9(b) herein.

(d) Without limitation on any other rights or remedies of the Municipality, the Monitoring Agent, Rhode Island Housing and their successors and assigns, any sale or other transfer or conveyance of the Property in violation of the provisions of this Deed Restriction, shall, to the maximum extent permitted by law, be voidable by the Municipality, the Monitoring Agent, and/or Rhode Island Housing, their successors and assigns, by an action to enforce such rights, restrictions, covenants, and agreements.

#### 5. Enforcement.

(a) The rights hereby granted shall include the right of the Monitoring Agent and/or the Municipality to enforce this Deed Restriction independently by appropriate legal proceedings and to obtain injunctive and other appropriate relief against any violations including without limitation relief requiring restoration of the Real Property to its condition prior to any such violation and shall be in addition to, and not in limitation of, any other rights and remedies available to the Monitoring Agent and/or the Municipality.

(b) Without limitation of any other rights or remedies of the Monitoring Agent and/or the Municipality, or their successors and assigns, in the event of any sale, conveyance or other transfer or occupancy of the Real Property in violation of the provisions of this Deed Restriction the Monitoring Agent and/or the Municipality, shall be entitled to the following remedies, which shall be cumulative and not mutually exclusive:

- (i) specific performance of the provisions of this Deed Restriction;
- (ii) money damages for funds owed due to the Grantor not following the guidelines set forth in Section 1 with regard to the affordable price and/or the income eligibility of the owner, occupant or renter.
- (iv) the right to void any contract for sale or any sale, conveyance or other transfer of the Property in violation of the provisions of this Deed Restriction, by an action in equity to enforce this Deed Restriction; and
- (v) money damages for the cost of creating or obtaining a comparable dwelling unit for an Income Eligible owner or renter.

(c) In addition to the foregoing, in the event of a violation of the provisions of this Deed Restriction, the Monitoring Agent and/or the Municipality may take appropriate enforcement action against Grantor or Grantor's successors in title, including, without limitation, legal action to

compel Grantee to comply with the requirements of this Deed Restriction. Grantor hereby agrees to pay all fees and expenses (including legal fees and costs) of the Monitoring Agent and/or the Municipality, as the case may be, in the event successful enforcement action is taken against Grantor hereunder. Grantor hereby grants to the Monitoring Agent and the Municipality a lien on the Real Property, junior to the lien of any Permitted Mortgagee as holder of a first mortgage for Permitted Indebtedness on the Real Property, to secure payment of such fees and expenses in any successful enforcement action. Notwithstanding anything herein to the contrary, in the event that the Monitoring Agent fails to enforce this Deed Restriction as provided in this Section, Rhode Island Housing, its successors and assigns, shall have the same right to enforce this Deed Restriction as provided herein.

(d) Grantor for Grantor and Grantor's successors and assigns, hereby grants to the Monitoring Agent and the Municipality the right to enter upon the Condominium Units for the purpose of enforcing the restrictions herein contained, or of taking all actions with respect to the Condominium Units which such party may determine to be necessary or appropriate pursuant to court order, or with the consent of Grantor to prevent, remedy or abate any violation of this Deed Restriction.

6. **Provisions of Resale.** (a) When Grantor (jointly or severally) or any successor in title to Grantor shall desire to sell, dispose of or otherwise convey the Real Property, or any portion thereof, Grantor shall notify the Monitoring Agent, the Municipality and Rhode Island Housing in writing of the Grantor's intention to so convey the Real Property (the "Conveyance Notice"). Upon receipt of the Conveyance Notice, the Monitoring Agent shall promptly inform Grantor of the affordable rental price (as herein defined) for the LMI Units.

(b) Within ten (10) days of the closing the buyer shall deliver to the Monitoring Agent and the Director of Community Development of the Town of Middletown a copy of a new deed restriction executed by the purchaser which new deed restriction is identical in form and substance to this Deed Restriction, together with recording information. Failure of Grantor or Grantor's successors or assigns to comply with the preceding sentence shall not affect the validity of such conveyance. A copy of the new deed restriction shall also be recorded in the Land Evidence Records of the Town of Middletown, Rhode Island.

#### 9. **Miscellaneous Provisions.**

(a) **Amendments.** This Deed Restriction may only be amended by written agreement executed by each of the then current owners of the Condominium Units, the Monitoring Agent, and the Municipality and acknowledged by Rhode Island Housing.

(b) **Notice.** Any notices, demands or requests that may be given under this Deed Restriction shall be sufficiently served if given in writing and delivered by hand or mailed by certified or registered mail, return receipt requested, or via reputable overnight courier, in each case postage prepaid and addressed to the parties at their respective addresses set forth below. All notices shall be deemed delivered and received two business days after the deposit in the United States mail if sent by certified or registered mail and on the next business day if sent by overnight

courier:

To Grantor:  
Church Community Housing Corporation  
50 Washington Square  
Newport, RI 02840

To Monitoring Agent:  
[name and address]

To the Municipality:  
Sean Brown, Town Administrator  
350 East Main Road  
Middletown, RI 02842

with a copy to:

Rhode Island Housing:  
Rhode Island Housing  
44 Washington Street  
Providence, Rhode Island 02903  
Attn: Deputy Director or Policy and Planning

Any party may, by notice given as aforesaid, change its address for all subsequent notices.

(c) Further Assurances. Grantor agrees from time to time, as may be reasonably required by the Monitoring Agent, the Municipality and/or Rhode Island Housing, to furnish the Monitoring Agent, the Municipality and/or Rhode Island Housing with a written statement, signed and, if requested, acknowledged, setting forth the condition and occupancy of the Condominium Units, information concerning the resale of the Real Property and all other material information pertaining to the Condominium Units or Grantor's conformance with the terms of this Deed Restriction.

(d) Monitoring Agent Services. The Monitoring Agent has been engaged to monitor compliance of the Condominium Units with ongoing requirements of this Deed Restriction.

(e) Severability. If any provisions hereof or the application thereof to any person or circumstance shall come, to any extent, to be invalid or unenforceable, the remainder hereof, or the application of such provision to the persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each provision hereof shall be valid and enforced to the fullest extent permitted by law.

(f) Gender. The use of the plural in this Deed Restriction shall include the singular, the singular the plural and the use of any gender shall be deemed to include all genders.

(g) Waiver by Monitoring Agent, Municipality, or Rhode Island Housing; Counterparts: No waiver by the Monitoring Agent, Municipality, or Rhode Island Housing of any breach of this Deed Restriction shall be deemed to be a waiver of any other or subsequent breach. This Deed Restriction may be executed in any number of counterparts, each of which shall be deemed an original and all of which together shall constitute one agreement.

(h) Captions. The captions used in this Deed Restriction are inserted only as a matter of convenience and for reference and in no way define, limit or describe the scope of the intent of this Deed Restriction.

(i) Binding Successors. This Deed Restriction shall bind, and the benefits shall inure to, the respective parties hereto, their legal representatives, executors, administrators, successors in office or interest, and assigns; *provided that* Grantor may not assign this Deed Restriction or any of its obligations hereunder without the prior written approval of the Monitoring Agent, Municipality and/or Rhode Island Housing pursuant to the terms of this Deed Restriction.

(j) Governing Law. This Deed Restriction is being executed and delivered in the State of Rhode Island and shall in all respects be governed by, construed and enforced in accordance with the laws of said State without giving effect to its conflict of laws principles.

(k) Third Party Beneficiary. The Monitoring Agent, Municipality and/or Rhode Island Housing shall be entitled to enforce this Deed Restriction and may rely upon the benefits hereof.

**IN WITNESS WHEREOF**, the parties hereto each caused this Deed Restriction to be duly executed and delivered by their respective duly authorized representatives as of the day and year set forth above.

	TOWN OF Middletown, R.I.
	By:
	Name:
	Title:

[*corporate notary*]  
 STATE OF RHODE ISLAND  
 County of [name]

In [name], in said County and State, on the \_\_\_\_ day of \_\_\_\_\_, 2019, before me personally appeared the within-named \_\_\_\_\_, to me known and known by me to be the \_\_\_\_\_ of \_\_\_\_\_, the party executing the foregoing instrument, and he/she acknowledged said instrument by him/her so executed to be his free act and deed in such capacity and the free act and deed of Grantor.

\_\_\_\_\_  
 Notary Public:  
 My Commission Expires:

[signatures continued on next page]

	GRANTOR:
	The West House Corporation
	By: _____
	Name: Robert Sabel
	By: _____
	Name: _____

*[individual notary]*  
STATE OF RHODE ISLAND  
COUNTY OF NEWPORT

In [name], in said County and State, on the \_\_\_\_ day of \_\_\_\_\_, 2019, before me personally appeared the within-named \_\_\_\_\_ to me known and known by me to be the party executing the foregoing instrument, and he/she acknowledged said instrument by him/her so executed to be his/her free act and deed.

\_\_\_\_\_  
Notary Public:  
My Commission Expires:

The terms of this Deed Restriction are acknowledged by:

	RHODE ISLAND HOUSING AND MORTGAGE FINANCING CORPORATION
	By:
	Name:
	Title:

STATE OF RHODE ISLAND  
County of Providence

In Providence, in said County and State, on the \_\_\_\_ day of \_\_\_\_\_, 2019, before me personally appeared the within-named \_\_\_\_\_, to me known and known by me to be the \_\_\_\_\_ of Rhode Island Housing and Mortgage Finance Corporation and the person executing these presents on behalf of Rhode Island Housing and Mortgage Finance Corporation, the party executing the foregoing instrument, and he/she acknowledged said instrument by him/her so executed to be his/her free act and deed in such capacity and the free act and deed of Rhode Island Housing and Mortgage Finance Corporation.

\_\_\_\_\_  
Notary Public:  
My Commission Expires:

[signatures continued on next page]

	By:
	Name:
	Title:

STATE OF RHODE ISLAND  
 County of [name]

In [name], in said County and State, on the \_\_\_\_ day of \_\_\_\_\_, 2019, before me personally appeared the within-named \_\_\_\_\_, to me known and known by me to be the \_\_\_\_\_ of (the Monitoring Agent). and the person executing these presents on behalf of the Monitoring Agent the party executing the foregoing instrument, and he/she acknowledged said instrument by him/her so executed to be his/her free act and deed in such capacity and the free act and deed of .

\_\_\_\_\_  
 Notary Public:  
 My Commission Expires:

Exhibit A  
Legal Description

Property Address:

Assessor's Plat \_\_\_\_ Lot \_\_\_\_

**EXHIBIT A**

[Insert Property Description]

**TOWN OF MIDDLETOWN PLANNING BOARD**  
**APPLICATION FOR SUBDIVISION CERTIFICATE OF COMPLETENESS**

Name of Project: West House II

Stage of Review: Preliminary Plan

Date Filed: Jan. 19, 2022

Applicant's Name, Address and Telephone Number: The West House Corporation, 50 Washington Sq.,  
Newport, RI 02840, (401) 846-5114

Developer's Name, Address and Telephone Number: Church Community Housing Corporation, 50 Washington Sq,  
Newport, RI 02840, (401) 846-5114

Assessor's Plate & Lot of Land Being Subdivided: 113 - 6

Type of Subdivision: Major Land Development

Subdivision Description: 54 unit elderly Affordable Housing addition to existing 50 unit Aff. Elderly development:

IS APPLICATION A REVISION: <sup>West House</sup> Y OR N

IS APPLICATION A NEW SUBMISSION: Y OR N

ARE PREVIOUS PLANS TO BE WITHDRAWN: Y OR N

IF Y, DATE OF PLAN.) \_\_\_\_\_

\_\_\_\_\_

Owner's Signature



(approval to subdivide)

Action Taken By Administrative Officer

\_\_\_\_\_ Application Certified as Complete

\_\_\_\_\_ Application is incomplete and returned. The following deficiencies exist:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature of Administrative Office (when certified complete)

**MAJOR SUBDIVISION**  
**PRELIMINARY PLAN CHECKLIST**

**Contents of Preliminary Plan**

1. **Base Map.** At least eight (8) prints drawn to a scale of no smaller than forty feet to the inch (1"=40') to show at a minimum, the information listed below. Such information may be indicated on more than one plan.

- Name of the Subdivision.
- Name and address of the owner(s) and applicant(s).
- Date of plan preparation with revision dates.
- As applicable, name, address and telephone number of designer, engineer, and/or landscape architect, with stamp of registration.
- Name of land surveyor with stamp of registration and certification that survey conforms to the standards of a Class I survey. The perimeter survey shall be tied to the RIGS coordinate survey.
- North arrow and graphic scale.
- Tax Assessor's designation of land being subdivided.
- Perimeter survey of the site.
- Property lines of all lots abutting, or across any street from, the perimeter of the lot proposed to be subdivided, whether immediate or future, and the names of the property owners with lot/plat indicated thereon.
- Zoning district(s) of the subject property and abutting property.
- The location of existing streets, railroads, rights-of-way, easements, utilities, cemeteries and lot lines.
- Land area of subject parcel.

2. **Existing Conditions Plan(s)**

- Streams and water bodies
- Wetland lines with regulated setbacks, including areas within 200 feet of the perimeter of the project site
- Existing topography at intervals of no greater than two (2) feet.
- Base flood elevation line, or floodway encroachment lines, if applicable.
- Boundaries of wooded areas with notation of species of existing vegetation
- Large or unusual trees (greater than 18" dbh) and shrubs; unique vegetation
- Prime Farmland Soils and areas in active or recent agricultural use, with notation of use and condition

- Location of any other significant natural features
- Location and approximate dimensions of any existing buildings or significant aboveground structures the subject parcel and adjacent lots.
- Location of embankments, stone walls or any other significant physical features, including such features on adjacent land.
- Location and dimension of street rights-of-way, street paving, sidewalks, easements, boundary monuments, lots, lot lines and lot areas.
- Location and dimensions of all existing utilities within and on lots or streets adjacent to the subdivision, including sanitary sewers, storm water drainage facilities, water lines, fire hydrants, electrical, telephone, cable TV, fire alarm, utility poles, street lights or other above or underground utilities. (Number all manholes and catch basins)
- Location/description of proposed trees.
- Proposed street name(s).
- Lot numbers
- Notation on plan if the subdivision is located within or contains any of the following areas
  - Natural Heritage Areas (RIDEM)
  - Special Area Management Plan (CRMC)
  - Public Drinking Supply Watershed
  - Watershed Protection District
  - Groundwater aquifers, state-designated "groundwater reservoirs" recharge areas and wellhead protection areas.
  - State, regional or local greenways and greenspace priorities.

### 3. Proposed Design Condition Plan(s)

- A separate plan of land, on one sheet, drawn at a suitable scale, showing proposed improvements including streets, trails, sidewalks, lots, lot lines, with approximate lot areas and dimensions, and proposed building envelopes or build-to lines .
- Grading plan showing existing and proposed contours at two-foot intervals for all grading proposed for on and offsite street conditions, drainage facilities, and grading on individual lots if part of the proposed subdivision improvement.
- Stormwater Management Plan and drainage calculations prepared by a Registered Professional Engineer (as required by Section 516 -).
- Utilities plan, including sewer, water, gas, electric, phone, cable TV, fire alarm, hydrants, utility poles, or other proposed above or underground utilities as applicable.
- Landscaping plan, to show all significant proposed clearing of land, removal of existing vegetation, revegetation and/or landscaping on street rights-of way and upon individual lots, if part of proposed subdivision improvements. Include proposed street tree plantings

and sidewalks, trails, or bike paths.

- Open space plan, showing location, use and proposed improvements for any land proposed to be set aside as open space, with connections to house lots and the surrounding neighborhood.
- Limit of disturbance line/limit of clearing, with method of tree protection if applicable.
- SWMP plan (in accordance with Chapter X)
- Construction plans for access road(s) or route(s), temporary parking and storage areas location of construction trailers, and stockpiles of soil, stone or waste materials.
- Proposed street plans and profiles drawn at a scale of 1"=40'; horizontal and 1"=4' vertical
- Proposed street cross section(s)
- Location of all percolation test holes, indicated by the letter "P", with test hole numbers if Individual Sewage Disposal Systems (ISDS) are planned.
- Location of all ground water table determination test holes, indicated by a letter "W", with test hole numbers if ISDS are planned.
- Notation of proposed deed restrictions required by the Planning Board, utility companies or other appropriate agency/entity.

#### **Supporting Material – Preliminary Plan**

- All permits required by state and federal agencies prior to commencement of construction, including permits related to freshwater wetlands, the coastal zone, flood plains, and connections to state roads.
- Overall Plan of Development for any remaining part of the land being subdivided, as required by Section 509 -.
- Written confirmation, from appropriate utility companies, that they have reviewed and approve proposed plans for installation of water, electric, telephone, gas or other utilities, as may be proposed.
- Written confirmation from the RI Department of Environmental Management pursuant to the RIDEM Rules and Regulations Governing the Enforcement of the Freshwater Wetlands Act, and any subsequent amendments thereto, that plans of the proposed subdivision, including any required offsite construction, have been reviewed and indicating that the Wetlands Act either does not apply to the proposed site alteration(s) or that the approval has been granted for the proposed site alteration(s).

OR

An affidavit signed by a qualified professional stating the there are no freshwater wetlands present on or within 200 feet of the property being subdivided.

- A vicinity map drawn to a scale of 1"=200' or as necessary to show the area within one-half mile of the subdivision parcel showing the location of all streets, existing lot lines, and zoning district boundaries, as well as schools, parks, fire stations and other significant public facilities.

- Preliminary certification from R.I. Department of Environmental Management (DEM) as to the suitability of the subsoil and adequacy of percolation and water table tests for the use of individual sewage disposal systems, if such are planned.
- Profiles of all proposed streets in the subdivision plus all exiting streets in the vicinity where necessary, to show relationship with proposed streets.
- Profiles of all proposed storm water drainage facilities and sanitary sewers in the subdivision, if such are planned.
- Certification of the Tax Collector that all taxes due, on the land to be subdivided, have been paid for the period of five (5) years preceding the date of preliminary plan filing, and that there are no outstanding tax liens thereon.
- Names and address of all owners of abutting land or land across any street from the perimeter of the property to be subdivided, as determined from the most recent Tax Assessor's records. Submitted on abutters list form. (Page A-16)
- A Physical Alteration Permit (PAP) issued by the State Department of Transportation for any connection to or construction work within a State highway or other right-of-way, if applicable.
- Either of the following:
  - A letter to the Planning Board of the subdivider's intent to complete the required improvements prior to endorsement of the final plan; or,
  - A letter to the Planning Board requesting that security sufficient to cover the cost of required improvements be established by the Board according to the regulations.
- Water Quality Certification for construction activities that may temporarily affect surface waters in the vicinity of the site work to be performed.
- Any permits required under federal statute, including Section 404 Clean Water Act for Fill of Wetland and Waters of the US issued by the US Army Corps of Engineers.
- Proposed ownership scheme for open space areas, with draft legal documentation, such as Homeowner's Association bylaws.
- Open Space Management and Maintenance Plan, including standards and methods, specific responsibilities, and funding sources.
- Plan Location and draft legal language of Proposed Conservation Easements or Restrictions to be applied to open space areas.
- Pre-Application meeting with Town Planner, Public Works Director, Fire Chief and other required agencies/commissions held on September 28<sup>th</sup> 2021

(date)

(If not accomplished at Master Plan Review)

- Comments/recommendations from the Public Works Director, Chiefs of the Fire and Police Departments and other town officials, as appropriate.
- Draft copies of all legal documents describing the property, proposed easements and rights-of-way, dedications, restrictions, or other required legal documents.

u/ Filing fee of \$300 plus \$40.00 per lot or dwelling unit, whichever is greater.

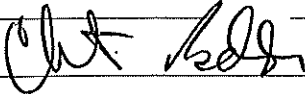
**TOWN OF MIDDLETOWN  
PLANNING BOARD**

**APPLICATION FOR DEVELOPMENT PLAN REVIEW CERTIFICATE OF  
COMPLETENESS**

All applications for Development Plan Review must include:

- Pre-application meeting
- Application Form
- Site Plans (5 copies +10 reduced)
- Abutter's List (see page A-19)
- Application Fee (see fee schedule)
- Tax Certificate (see Tax Collector)
- Certificate of Zoning Compliance (see Zoning Officer)
- Development Plan Review Checklist Items

For Office Use Only	
Item	Date
Pre-application Meeting	_____
Submission	_____
Certificate of Completeness	_____
Certificate of incompleteness	_____
TRC Meeting	_____
Planning Board Meeting	_____
TRC Decision	_____
Planning Board Decision	_____

DEVELOPMENT PLAN REVIEW APPLICATION FORM	
Project Name	<u>West House II</u>
Property Owner Name	<u>The West House Corporation</u>
Address	<u>50 Washington Square Newport, RI 02840</u>
Applicant (if different from owner*) Name	_____
Address	_____
Phone Number	<u>(401) 846-5114</u>
Phone Number	<u>( )</u>
* Signed letter from owner(s) authorizing application, if applicant is not the owner.	
Plat & Lot Number(s)	<u>113-6</u>
Area of Subject Property	<u>4.60</u>
Zoning District(s)	<u>OB</u>
Type of Development	
<input type="checkbox"/> New Development <input checked="" type="checkbox"/> Addition <input type="checkbox"/> Renovation <input type="checkbox"/> Site Change <input type="checkbox"/> Other _____	
Names and owners of existing rights-of-way within and adjacent to subject property	
<u>Buck Road Extension</u>	
<u>Enterprise Drive</u>	
<u>Forest Avenue</u>	
Signed by Owner/Applicant	<u></u>
Date	<u>10.20.2021</u>
Signed by Administrative Officer (when complete)	_____
Date	_____



## Town of Middletown Planning Department

350 East Main Rd., Middletown RI 02842 (401) 849-4027

### Development Plan Review Submission Checklist Required Items

#### 1. APPLICATION MATERIALS

Quantity	Description	Staff Use
5	<b>1.A Full scale site plan copies</b> (see section 4 this document for a list of site plan components) At least 1" = 40' with a sufficient number of sheets (sequentially numbered) to clearly show all of the information required (minimum size of 18" x 24")	
10	<b>1.B Reduced size copies of all plans</b> (minimum size of 8.5" X 11"; maximum size of 11" X 17"). Reduced size copies may be <u>submitted after the Technical Review Committee completes its review or one week prior to the Planning Board meeting during which the application will be heard, whichever is sooner.</u>	
1	<b>1.C Electronic Copies</b> Electronic copy of the full plan set and other application materials such as legal documents, abutters list, and permits.	
1	<b>1.D Abutters List</b> 200-foot abutters list in the format show in <a href="#">Appendix A §8</a>	
1	<b>1.E Application Form</b> Available in <a href="#">Appendix A §6</a>	
1	<b>1.F Municipal Lien Certificates</b> Municipal Lien Certificate for each lot involved in the proposed development (see Tax Assessor's Office)	

#### 2. SUPPORTING MATERIALS

Quantity	Description	Applicable Standard or Forms	Staff Use
2	<b>2.A Legal Documents</b> Copies of any required legal documents including proposed easements and rights-of way, dedications, restrictions, or other required legal documents, including, but not limited, to conservation easements, homeowners' association documents, and the like.		
14	<b>2.B External Lighting Plan</b> Location of any existing and proposed external lighting with specifications for proposed fixtures.	Subdivision regulations: <a href="#">§521 Commercial Development</a>	
14	<b>2.C Signage</b> Location of any existing and/or proposed outdoor signs, and specifications and photographs and/or renderings of all proposed signs	Zoning Code: <a href="#">Article 12 Signs</a>	
14	<b>2.D Development Impact Statement and review fee §</b> Development Impact statement and if applicable, fees paid to cover anticipated cost of additional reviews as required by the Planning Board <u>including, but not limited to fees for the town's consulting engineer and other expert assistance. (Fees not used will be refunded to the applicant at the conclusion of the application review process.)</u>	Zoning Code: <a href="#">§310 Development Impact Review</a>	
14	<b>2.E Building Elevations</b> Elevations showing all sides of new structures, or existing structures where any changes are proposed, with dimensions and a description of the materials to be used in any such structures	Subdivision regulations: <a href="#">§521 Commercial Development</a>	
1	<b>2.F Good Standing Documentation</b> If applicable, documentation indicating that the applicant company exists and is in good standing with the State of Rhode Island.		

4	<b>2.G Drainage/Stormwater Management and Operations Plan</b> Stormwater Management Plan and accompanying calculations	Chapter 153: <a href="#">Stormwater Management</a>	
1	<b>2.H Water Availability Letter</b> Written confirmation from the Newport Water Division that the proposed development may connect to the public water system, if applicable		
14	<b>2. I Landscape Maintenance Plan</b> A landscape maintenance plan including a schedule of initial and ongoing activities to be undertaken by the property owner, homeowners association or other appropriate party if a landscape plan is submitted	Subdivision regulations: <a href="#">§523 landscape maintenance</a>	

**3. PERMIT MATERIALS**

Quantity	Description	Staff Use
1	<b>3.A Freshwater Wetlands (RI Department of Environmental Management - RIDEM)</b> 1) Written confirmation from the RIDEM that development plans, including any required off-site construction, have been reviewed and indicating that the Wetlands Act either does not apply to the proposed site alteration, or that approval has been granted for the proposed site alteration or 2) Affidavit signed by a qualified professional (having minimum qualifications as described by the RIDEM Department of Freshwater Wetlands) stating that there are no freshwater wetlands or wetland buffers (perimeter wetlands) present on the subject property (in accordance with RIDEM Wetland Regulations)	
1	<b>3.B Coastal Wetlands (Coastal Resources Management Council – CRMC)</b> Preliminary determination from the CRMC if the property is subject to the jurisdiction of this agency	
1	<b>3.C Physical Alteration Permit (RI Department of Transportation – RIDOT)</b> A Physical Alteration Permit (PAP) issued by the RIDOT for any connection or construction work within a state highway or state right-of-way	
1	<b>3.D Wastewater (Middletown DPW or RIDEM )</b> 1) Written confirmation from the Middletown Department of Public Works certifying that the development can tie into the Middletown Sewer Service, or 2) RIDEM Preliminary Subdivision Suitability Report or water table verification within the proposed development area indicating the site is suitable for the safe and proper operation of the OWTS	
1	<b>3.E Construction Schedule</b> Identifying expected start and finish times for major construction tasks	

**4. SITE PLANS in the quantities required per Section 1. Application Materials, site plans must be submitted with the following items:**

Description	Applicable Standard or Forms	Staff Use
<b>4.A Class 1 Comprehensive Boundary Survey.</b> <i>All Plans shall conform to the Procedural &amp; Technical Standards for the Practice of Land Surveying in the State of Rhode Island and Providence Plantations, as prepared by the RI Society of Professional Land Surveyors, Inc, as amended.</i>		
<b>4.B Name and address of property owner and applicant</b>		
<b>4.C Graphic Scale, North Arrow, and legend showing all symbols</b>		
<b>4.D Name, address, and phone number of the preparer with stamp of registration and signature block</b>		
<b>4.E Date of plan and revisions</b>		
<b>4.F Assessors Plat and Lot numbers and Zoning District</b> Includes all properties adjacent and directly across the street from the subject property		
<b>4.G Vicinity or Locus Map</b>		
<b>4.H Existing Structures</b> Location, size and proposed use of existing buildings and structures on the property, including historic designation, if any		

<p>✓ <b>4.I Proposed Structures</b> Location and size of proposed buildings and structures, including the designation and area in square feet of each proposed use within the structure and total number of proposed seats indoor/outdoor</p>	<p>Zoning Code: Article 6: <a href="#">Application of District Regulations</a></p>	
<p>✓ <b>4.J Parking and Amenities</b> Location, dimension and number of existing and proposed parking spaces; handicapped parking spaces; vehicular drives and curb cuts; loading areas and total square footage of parking area (stalls &amp; aisles); and bicycle racks (1 for each 5 automobile parking spaces) must be shown. Any proposed amenities such as bus shelters, playground, benches must be identified.</p>	<p>Subdivision regulations: <a href="#">§521 Commercial Development</a> and Zoning Code: Article 13: <a href="#">Off-street Parking and Loading</a></p>	
<p>✓ <b>4.K Circulation</b> Location of any existing and proposed sidewalks and pedestrian, bicycle and vehicular connections to adjacent parcels</p>	<p>Subdivision regulations: <a href="#">§521 Commercial Development</a> and Article 6: <a href="#">Specifications for Required Improvements</a> Article 5: <a href="#">Required Minimum standards of Design Commercial Development</a></p>	
<p>✓ <b>4.L Improvements</b> Cross section and profiles of any proposed impervious surface construction, if intended as a public improvement</p>	<p>Subdivision regulations: <a href="#">Appendix B-Drawings</a></p>	
<p>✓ <b>4.M Solid Waste</b> Location of existing and proposed solid waste facilities, including dumpsters, and location of all screening. Trash receptacle for users of the site must be provided. A litter management control plan must be included on the site plan or as a separate document</p>	<p>Subdivision regulations: <a href="#">§521 Commercial Development</a></p>	
<p>✓ <b>4.N Legal/Permits</b> Notation of any special conditions of approval imposed by the Zoning or Planning Board, and any permits and agreements with state or federal agencies</p>		
<p>✓ <b>4.O Property Lines &amp; Easements</b> Location and dimensions of existing property lines, easements, reservations, and rights-of-way within or abutting the subject property.</p>		
<p>✓ <b>4.P Proposed Property Lines Easements</b> Location and notation of type of proposed easement(s) or existing easement(s) to remain, with accurate dimensions and areas indicated</p>		
<p>✓ <b>4.Q Streets</b> Location, width and names of existing streets abutting the subject property</p>		
<p>✓ <b>4.R Utilities Plan</b> Location of all existing and proposed utilities (electric, water, sewer, gas); including, but not limited to, abandoned wells and onsite wastewater treatment systems (OWTS) with a notation as such. Plan shall show location and descriptive notations necessary to locate all utility lines and easements, facilities appurtenant thereto.</p>	<p>Subdivision regulations: <a href="#">§521 Commercial Development</a> and Article 6: <a href="#">Specifications for Required Improvements</a> Article 5: <a href="#">Required Minimum standards of Design Commercial Development</a></p>	
<p>✓ <b>4.S Zoning</b> Setbacks and Lot coverage computations in accordance with the Zoning Ordinance</p>	<p>Zoning Code: Article 6: <a href="#">Application of District Regulations</a></p>	
<p>✓ <b>4.T Topography</b> Existing contours with intervals of two (2) feet and finished grade shown as solid lines (notation if no changes to contours are proposed, or where changes are proposed)</p>		

✓	<b>4.U Wetlands</b> Location of any wetlands, watercourses or their buffers (perimeter wetlands), as determined by a RIDEM qualified biologist (in accordance with RIDEM regulations)		
✓	<b>4.V Flood Zone</b> Notation as to the flood zone of the subject property including the base flood elevation (BFE) and flood zone as indicated by the Federal Emergency Management Agency's Flood Insurance Rate Map (FEMA FIRM). The Coastal Resources Management Agency's Suggested Design Elevations with 3 feet of sea level rise (CRMC SDE 3 SLR) must also be provided, if applicable.	Zoning Code: <a href="#">Article 10: Flood Hazard Areas</a> , Article 4: Definitions; <a href="#">Building Height</a> and Subdivision regulations: <a href="#">§517- Flood Prone Areas</a>	
✓	<b>4.W Trees</b> Location of wooded areas with a notation of existing trees with a twelve inch (12") or larger caliper, if any	Subdivision regulations: <a href="#">§518 Retention of Environmental Features</a>	
✓	<b>4.X Significant Features</b> Location of significant existing natural and man-made environmental features including rock outcrops and stone walls	Chapter 97: <a href="#">Stone Walls</a> and Subdivision regulations: <a href="#">§518 Retention of Environmental Features</a>	
✓	<b>4.Y Historic cemeteries</b> Location of historic cemeteries on, or immediately adjacent to, the subject property	Article 20: <a href="#">Cemeteries</a>	
✓	<b>4.Z Land for dedication</b> The location, dimension and area of any land proposed to be set aside as open space, or drainage, or conveyed to the Town for public purposes if applicable		
✓	<b>4.AA Permits</b> Notation of any permits and agreements with State and Federal Reviewing agencies		
✓	<b>4.BB Landscape Plan (with stamp of a Registered Rhode Island Landscape Architect)</b> Showing location and description of all proposed plantings and including calculations regarding the necessary percent of landscaped area relative to site development and size, caliper, and species of proposed street trees and parking lot trees if applicable.	Subdivision regulations: <a href="#">§622 Street Trees</a> , Subdivision regulations: <a href="#">§521 Commercial Development</a>	
✓	<b>4.CC Soil Erosion &amp; Sediment Control/Stormwater Pollution Prevention Plan</b>	Chapter 151: <a href="#">Construction Site Runoff Control</a>	

# Preliminary Plan of "WEST HOUSE II - AFFORDABLE SENIOR HOUSING" in Middletown, Rhode Island 02842

REGISTRY USE ONLY

DATE: February 16, 2022

## INDEX OF DRAWINGS

SHEET NUMBER	DESCRIPTION
1.	COVER SHEET
2.	SITE CONTEXT MAP
3.	EXISTING CONDITIONS PLAN
4.	LAYOUT PLAN
5.	EMERGENCY VEHICLE MANEUVERABILITY PLAN
6.	GRADING, DRAINAGE & UTILITY PLAN
7.	EROSION & SEDIMENT CONTROL PLAN
8.	DETAIL SHEET (1 OF 3)
9.	DETAIL SHEET (2 OF 3)
10.	DETAIL SHEET (3 OF 3)
11.	PRE WATERSHED ANALYSIS MAP
12.	POST WATERSHED ANALYSIS MAP

**GENERAL NOTES:**

- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
- ZONING DISTRICT: OB - OFFICE BUSINESS
- OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
- SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**DIMENSIONAL ZONING REQUIREMENTS:**

	REQUIRED
MINIMUM AREA	= 40,000 S.F.
MINIMUM FRONTAGE	= 150'
MINIMUM FRONT YARD SETBACK	= 25'
MINIMUM SIDE YARD SETBACK	= 25'
MINIMUM REAR YARD SETBACK	= 40'
MAXIMUM BUILDING HEIGHT	= 35'

**CERTIFICATION:**

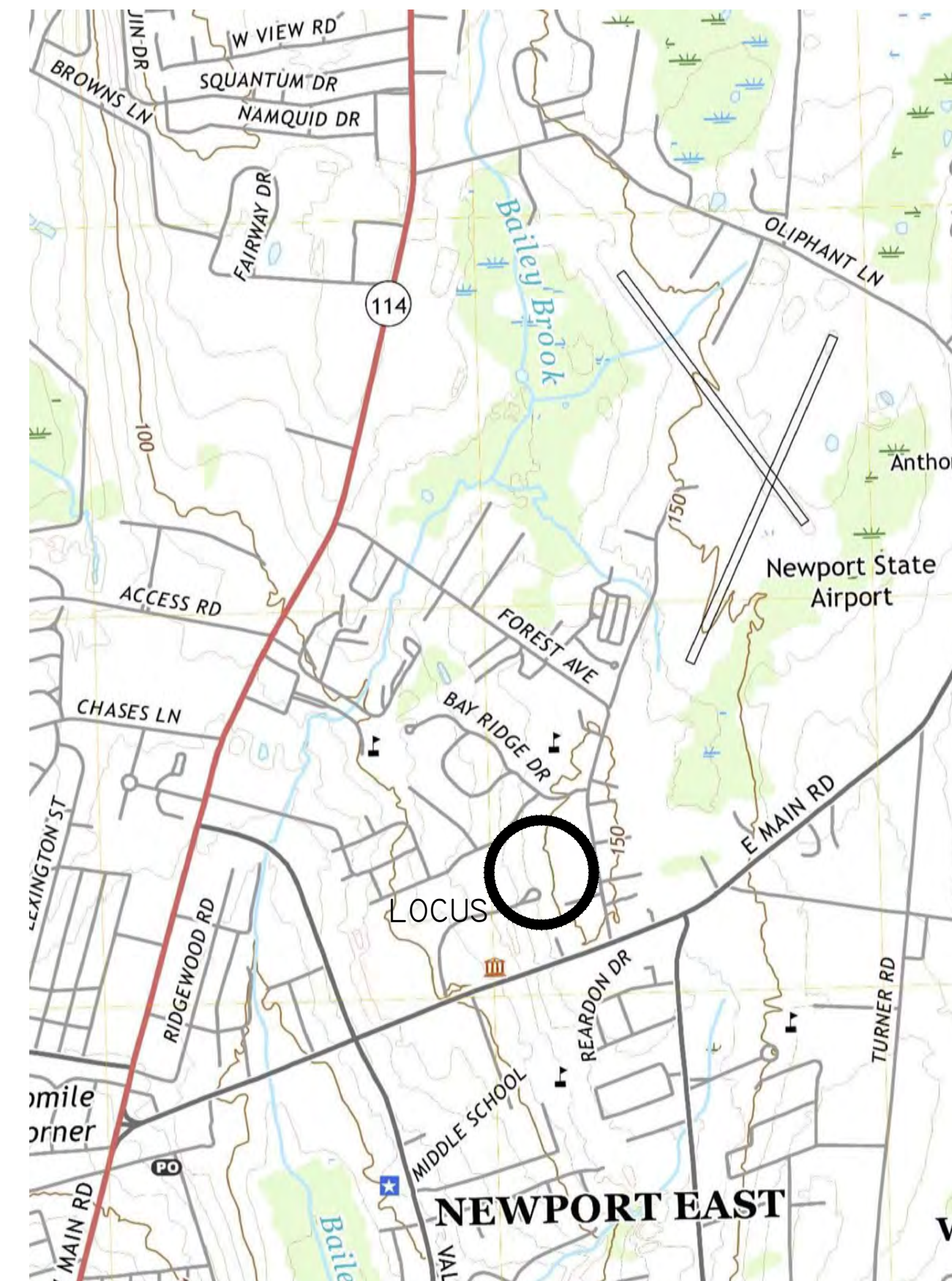
THIS SURVEY HAS BEEN CONDUCTED AND THE PLAN PREPARED PURSUANT TO SECTION 9 OF THE RULES AND REGULATIONS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS ON NOVEMBER 25, 2015 AS FOLLOWS:

TYPE OF SURVEY: COMPREHENSIVE BOUNDARY MEASUREMENT SPECIFICATION: CLASS I  
 TYPE OF SURVEY: DATA ACCUMULATION SURVEY MEASUREMENT SPECIFICATION: CLASS III  
 VERTICAL MEASUREMENT SPECIFICATION: V-3 TOPOGRAPHIC ACCURACY CLASS: T-2

THE PURPOSE FOR THE CONDUCT OF THE SURVEY AND FOR PREPARATION OF THE PLAT IS AS FOLLOWS:

- TO REPORT A PROFESSIONAL OPINION REGARDING THE LOCATION OF PROPERTY BOUNDARIES.
- TO DEPICT AND REPORT THE RELATIVE POSITIONS OF EXISTING PHYSICAL OBJECTS AND EXISTING SITE CONDITIONS.
- TO CREATE AN EXISTING CONDITIONS BASE PLAN FOR CONTEMPLATION OF DESIGNED CONSTRUCTION OR OTHER IMPROVEMENTS TO THE SITE.

*Marc Nyberg*  
 MARC NYBERG, PLS/REGISTERED PROFESSIONAL LAND SURVEYOR / 2/16/2022 / DATE  
 RHODE ISLAND PLS NO: 1797 RHODE ISLAND C.O.A. NO.: LS.0004468.COA



**LOCATION MAP**  
N.T.S.



**SITE MAP**  
SCALE 1"= 100'

SUBJECT TO A COVENANT DULY EXECUTED DATED THE \_\_\_\_\_ DAY OF \_\_\_\_\_ RUNNING WITH THE LAND, TO BE DULY RECORDED BY OR FOR THE OWNER OF RECORD, THIS PLAN IS SUBJECT TO ALL CONDITIONS OF THE MIDDLETOWN PLANNING BOARD CERTIFICATE OF ACTION DATED \_\_\_\_\_ FILED WITH THE MIDDLETOWN TOWN CLERK ON \_\_\_\_\_ AND HEREWITH RECORDED AS A PART OF THIS PLAN.

I HEREBY CERTIFY THAT THERE HAS BEEN NO APPEAL TAKEN TO THIS PLANNING BOARD ACTION DURING THE 20 DAY STATUTORY APPEAL PERIOD.  
 DATE: \_\_\_\_\_  
 TOWN CLERK, TOWN OF MIDDLETOWN \_\_\_\_\_

REVISION	DATE	COMMENTS
0	OCT. 20, 2021	MASTERPLAN APPLICATION
1	OCT. 22, 2021	ADDRESSING APPLICATION INCOMPLETE LETTER
2	DEC. 7, 2021	ADDRESS TRC & CONS. COMM. COMMENTS
3	DEC. 20, 2021	LIHTC APPLICATION
4	JAN. 19, 2022	PRELIMINARY APPLICATION
5	FEB 8, 2022	DEM APPLICATION
6	FEB 16, 2022	PRELIMINARY APPLICATION RESUBMISSION

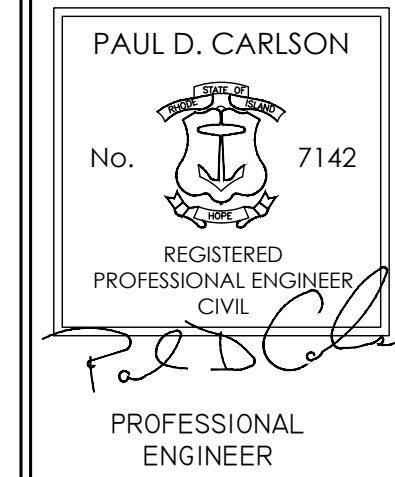
MIDDLETOWN PLANNING BOARD


"I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RHODE ISLAND BOARD OF REGISTRATION OF PROFESSIONAL LAND SURVEYORS STANDARDS

"I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS." THE CERTIFICATION SHOWN HEREON IS INTENDED TO MEET REGISTRY OF DEEDS REQUIREMENTS AND IS NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE LAND SHOWN.

"I HEREBY CERTIFY THAT THE ACTUAL SURVEY WAS MADE ON THE GROUND IN ACCORDANCE WITH TOWN OF MIDDLETOWN PLANNING BOARD AND STATE STANDARDS.

*Marc Nyberg*  
 PROFESSIONAL LAND SURVEYOR / 2/16/2022 / DATE

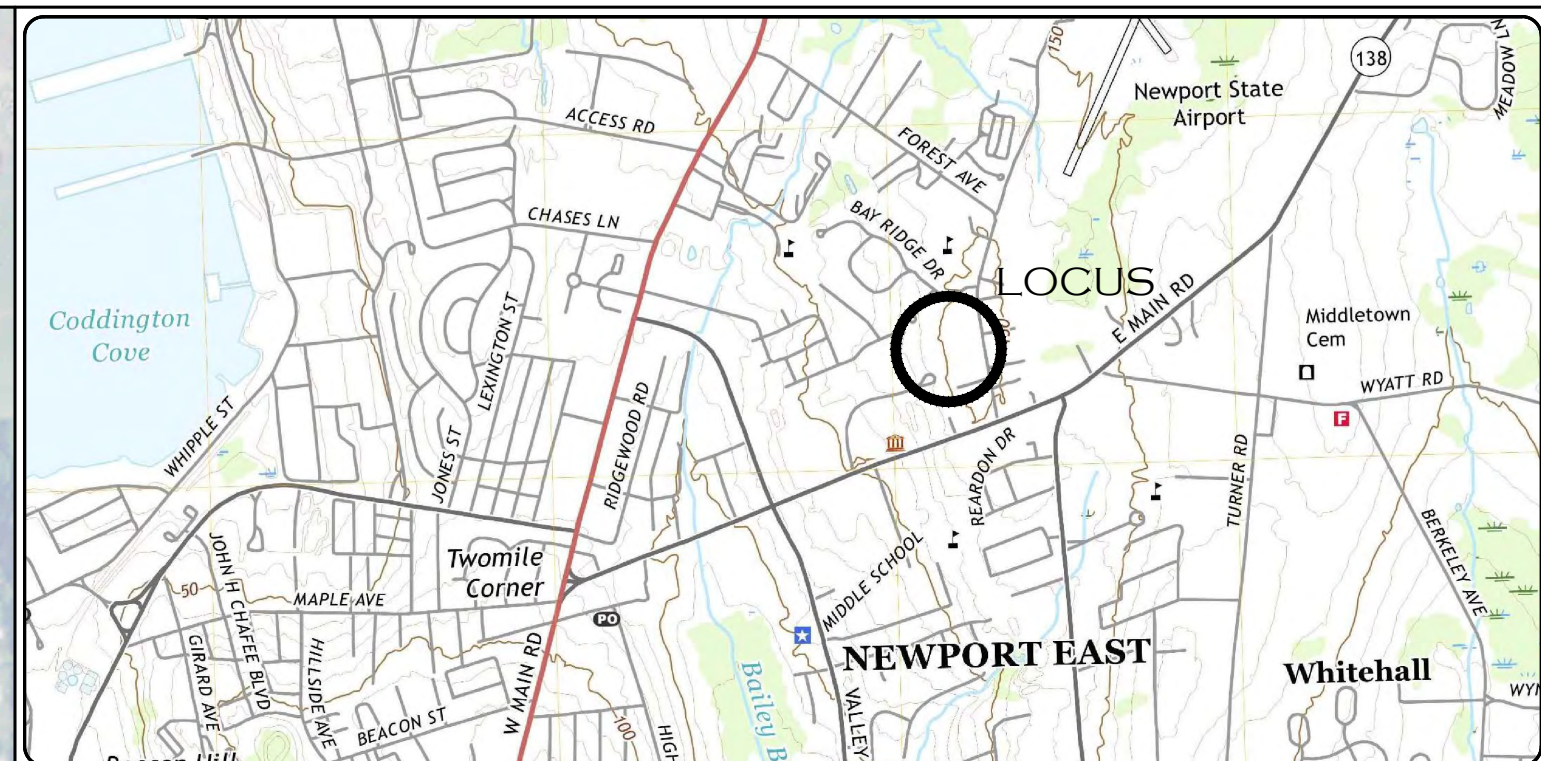
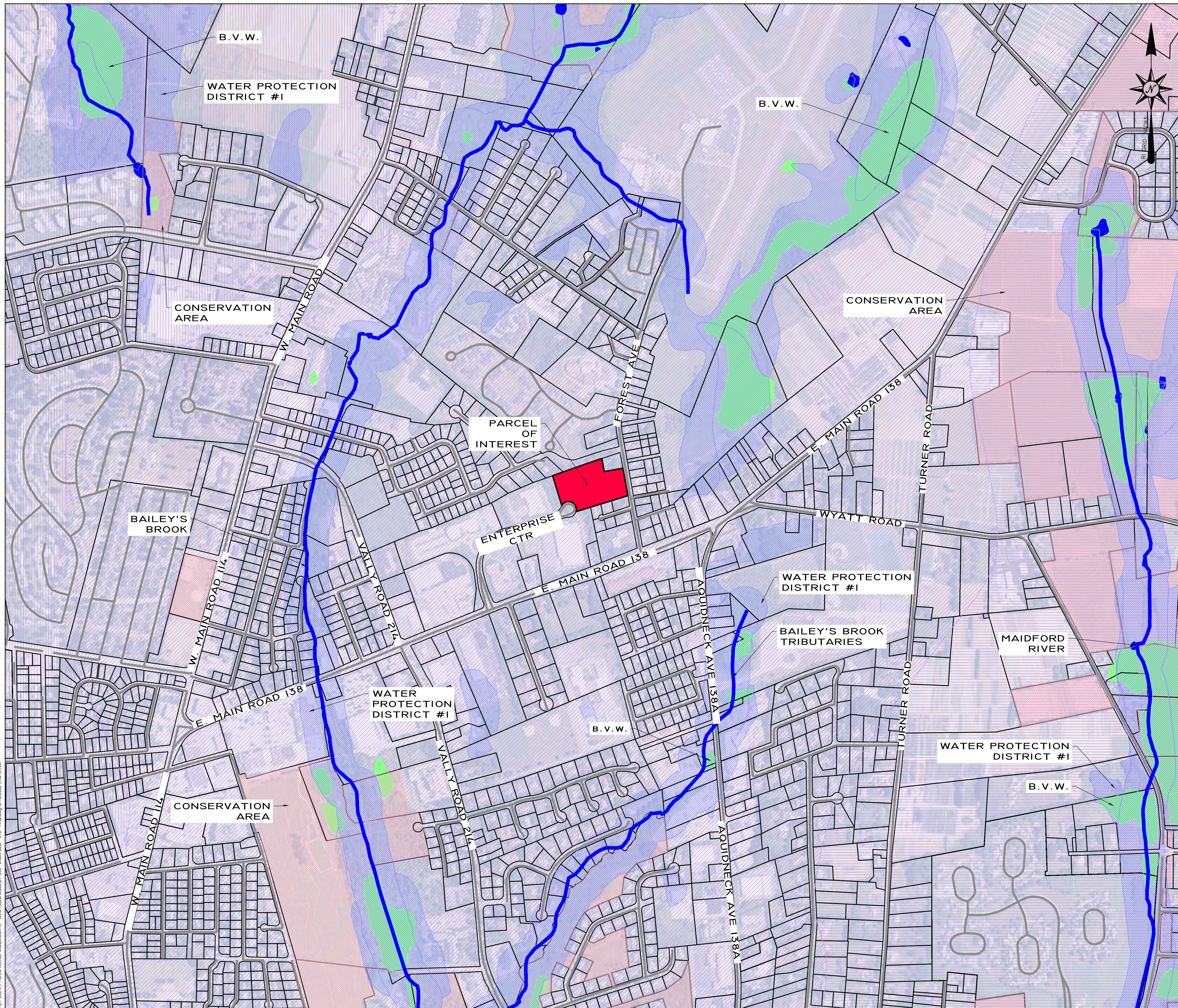


**COVER SHEET**

	<b>"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"</b> 417 FOREST AVENUE, MIDDLETOWN RI, 02842 ASSESSORS MAP 113 LOT 6		
APPLICANT: THE WEST HOUSE CORPORATION C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886			
JOB # 21-038	SCALE: AS SHOWN	DRAWN BY: LJG	DATE: FEBRUARY 16, 2022
REVISED:			

	InSite Professional Complex, Suite 1 1539 Fall River Avenue, Seekonk, MA 02771 Phone: (508) 336-4500 Fax: (508) 336-4558 Web Address: InsiteEngineers.com	SHEET <b>1</b> OF 12
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I:\21-038\417 Forest Avenue Middletown RI - West House\Cadd\21-038 - ENGR Base - 010 - Final.dwg 2/16/2022 9:38:13 AM

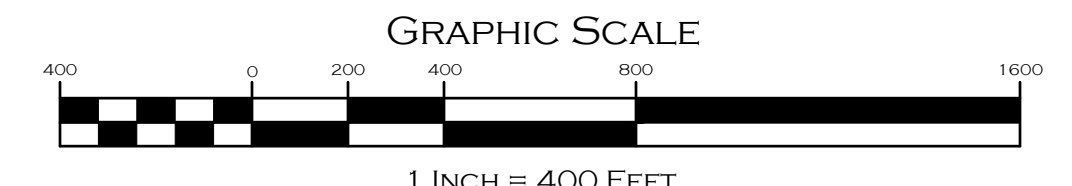


LOCATION (NOT TO SCALE) MAP

- GENERAL NOTES:**
1. LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  2. ZONING DISTRICT: OB - OFFICE BUSINESS
  3. OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  4. SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**SITE CONTEXT MAP LEGEND:**

PARCEL OF INTEREST:	
WETLANDS:	
SURFACE WATERS:	
WATER PROTECTION DISTRICT I:	
CONSERVATION LAND:	
ROADS:	
LOWREAST PASSAGE WATERSHED:	
AQUIDNECK ISLAND - FRONTAL ATLANTIC OCEAN WATERSHED:	
SAKONNET RIVER WATERSHED:	

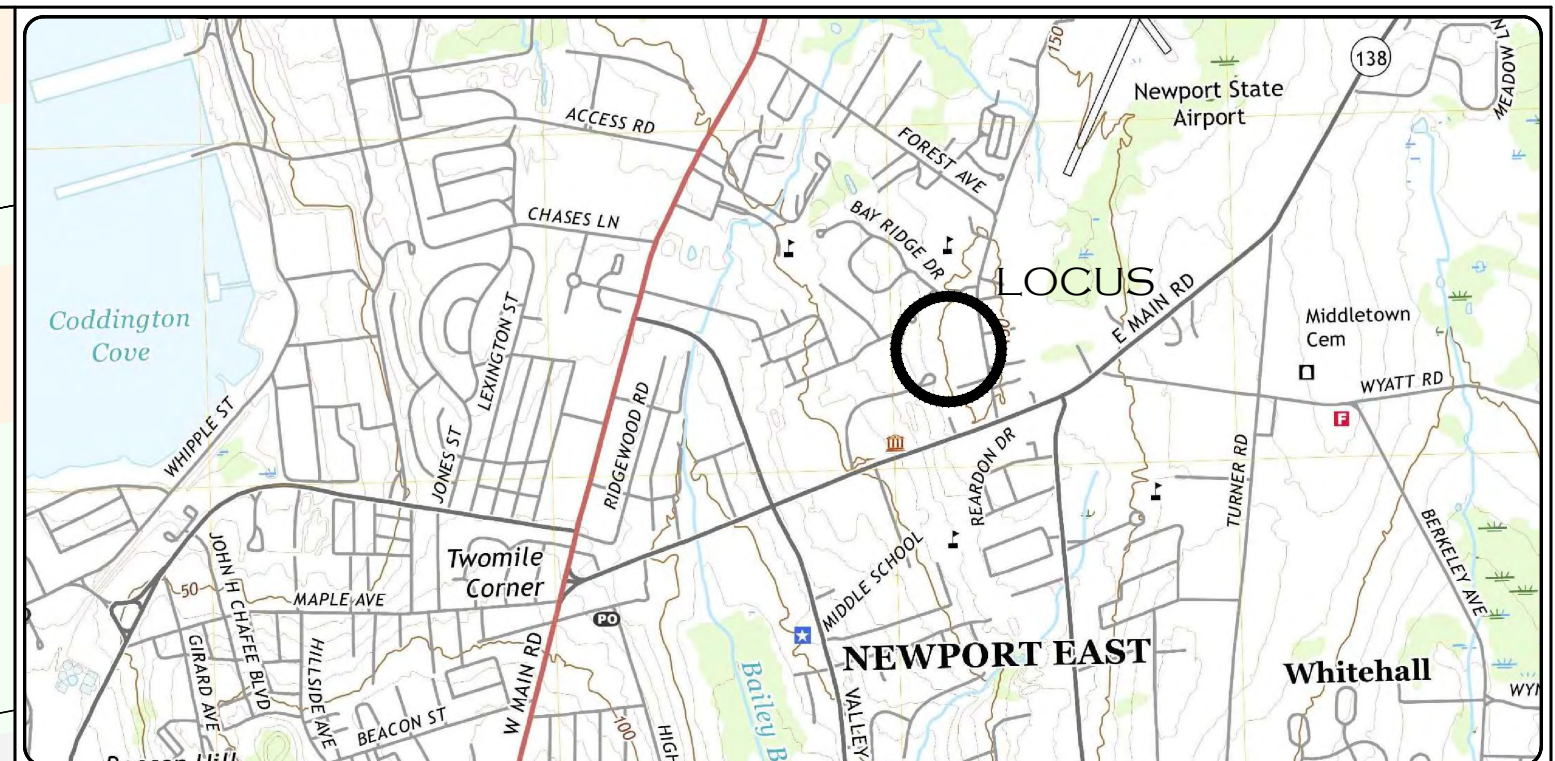
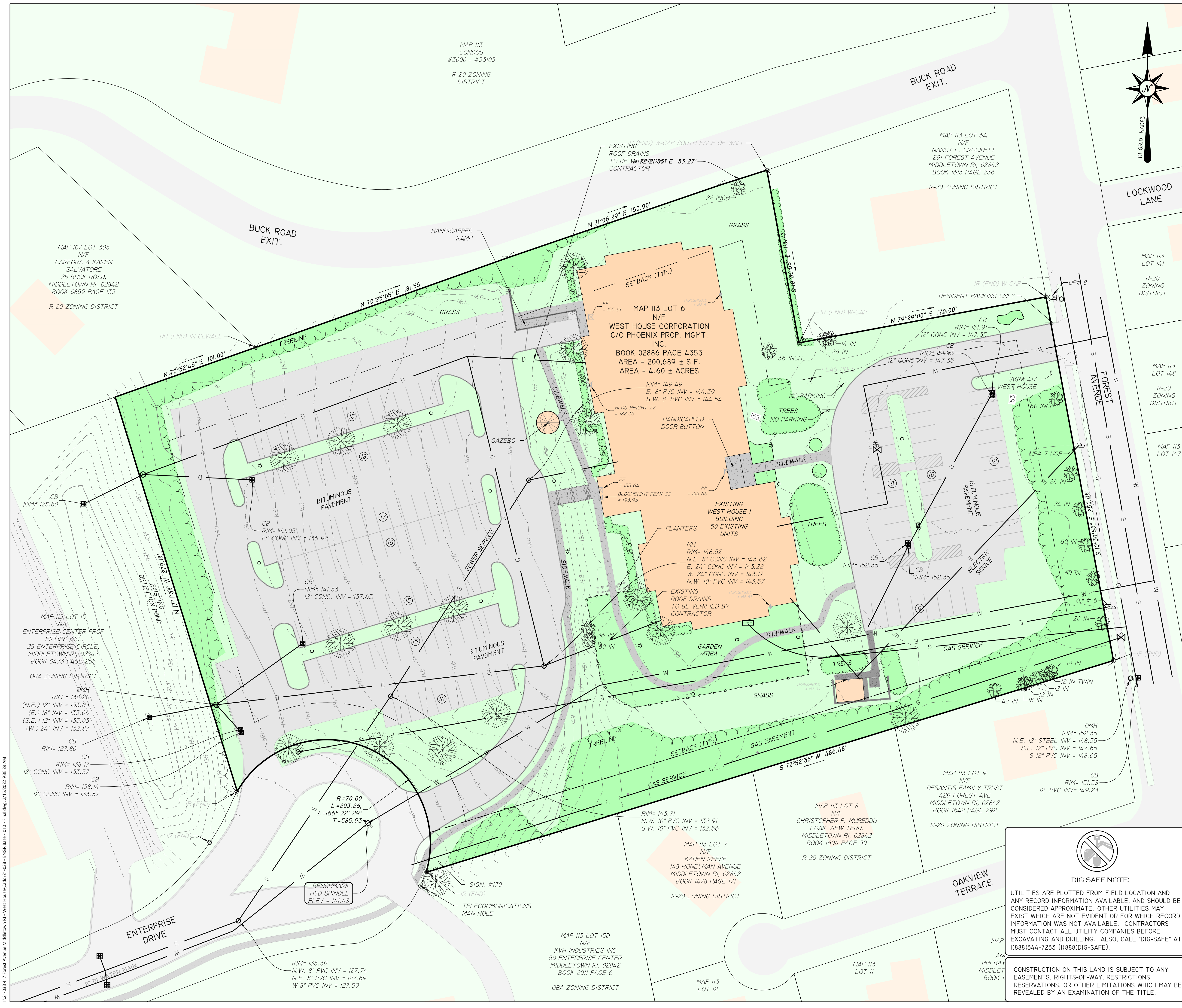


SITE CONTEXT MAP

	<b>"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"</b> 417 FOREST AVENUE, MIDDLETOWN RI, 02842 ASSESSORS MAP 113 LOT 6			
	APPLICANT: THE WEST HOUSE CORPORATION C/O PHOENIX PROPERTY MGMT, INC. WARWICK, RI 02886			
	JOB # 21-038	SCALE: 1" = 400'	DRAWN BY: LJG	DATE: FEBRUARY 16, 2022
	REVISED:			

	InSite Professional Complex, Suite 1 1539 Fall River Avenue Seekonk, MA 02771 Phone: (508) 336-4500 Fax: (508) 336-4558 Web Address: InsiteEngineers.com	<b>SHEET</b> <b>2</b> <b>OF 12</b>
	COPYRIGHT: INSITE ENGINEERING SERVICES	

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LOCATION (NOT TO SCALE) MAP

- GENERAL NOTES:**
- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  - ZONING DISTRICT: OB - OFFICE BUSINESS
  - OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  - SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**DIMENSIONAL ZONING REQUIREMENTS:**

	REQUIRED	EXISTING
MINIMUM AREA	= 40,000 S.F.	200,689
MINIMUM FRONTAGE	= 150'	= 203.3'
MINIMUM FRONT YARD SETBACK	= 25'	= 199.9'
MINIMUM SIDE YARD SETBACK	= 25'	= 72.4'
MINIMUM REAR YARD SETBACK	= 40'	= 20.1'
MAXIMUM BUILDING HEIGHT	= 35'	= 38'
MAXIMUM % COVERAGE		
PRINCIPAL & ACCESSORY	= 30%	= 13%
IMPERVIOUS AREA	= N/A	= 57%

- REFERENCE PLANS:**
- AS-BUILT SURVEY PLAN - "THE WEST HOUSE CORPORATION" BY NARRAGANSETT ENGINEERING INC., DATED AUGUST 26, 1997

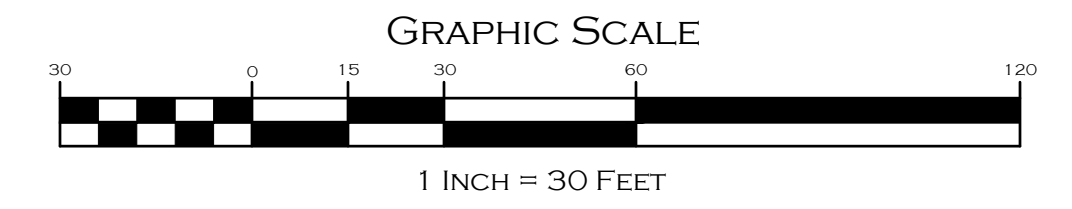
- NATURAL RESOURCE INVENTORY:**
- THE SITE IS CLASSIFIED UNDER THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AS THE AQUIDNECK ISLAND-FRONTAL ATLANTIC OCEAN WATERSHED. THE GROUNDWATER IN THIS AREA IS CLASSIFIED AS GA. BAILEY BROOK (ID NUMBER RI0007035R-01) LOCATED APPROXIMATELY 2,200 FEET AWAY, THIS IS A FRESHWATER CLASS AA BODY OF WATER. IMPAIRMENTS CATEGORY 5. IMPAIRMENTS ARE AS FOLLOWS: ENTEROCOCCUS, PHOSPHORUS, TOTAL LEAD. THE SITE IS LOCATED IN THE WATER PROTECTION DISTRICT 2.
  - THE SITE IS LOCATED APPROXIMATELY 0.5 MILES AWAY FROM THE NEAREST 100-YEAR FLOOD PLAIN.
  - THE SITE DOES NOT CONTAIN ANY NATURAL HERITAGE SITES, UNFRAGMENTED FOREST TRACKS, PRIME FARMLAND SOILS, LAND IN ACTIVE AGRICULTURAL USE, OR ANY STATE, REGIONAL, OR COMMUNITY GREENWAYS.

**CERTIFICATION:**  
THIS SURVEY HAS BEEN CONDUCTED AND THE PLAN PREPARED PURSUANT TO SECTION 9 OF THE RULES AND REGULATIONS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS ON NOVEMBER 26, 2015 AS FOLLOWS:

TYPE OF SURVEY: COMPREHENSIVE BOUNDARY MEASUREMENT SPECIFICATION: CLASS I  
 TYPE OF SURVEY: DATA ACCUMULATION SURVEY MEASUREMENT SPECIFICATION: CLASS III  
 VERTICAL MEASUREMENT SPECIFICATION: V-3 TOPOGRAPHIC ACCURACY CLASS: T-2

THE PURPOSE FOR THE CONDUCT OF THE SURVEY AND FOR PREPARATION OF THE PLAT IS AS FOLLOWS:  
 1. TO REPORT A PROFESSIONAL OPINION REGARDING THE LOCATION OF PROPERTY BOUNDARIES.  
 2. TO DEPICT AND REPORT THE RELATIVE POSITIONS OF EXISTING PHYSICAL OBJECTS AND EXISTING SITE CONDITIONS.  
 3. TO CREATE AN EXISTING CONDITIONS BASE PLAN FOR CONTEMPLATION OF DESIGNED CONSTRUCTION OR OTHER IMPROVEMENTS TO THE SITE.

*Marc N. Nyberg*  
 MARC NYBERG, PLS REGISTERED PROFESSIONAL LAND SURVEYOR / DATE 2/16/2022  
 RHODE ISLAND PLS NO. 1797 RHODE ISLAND C.O.A. NO.: LS.000A68.COA



**EXISTING CONDITIONS PLAN**

**"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"**  
 417 FOREST AVENUE, MIDDLETOWN RI, 02842  
 ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
 C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038 SCALE: 1" = 30' DRAWN BY: LJJ DATE: FEBRUARY 16, 2022

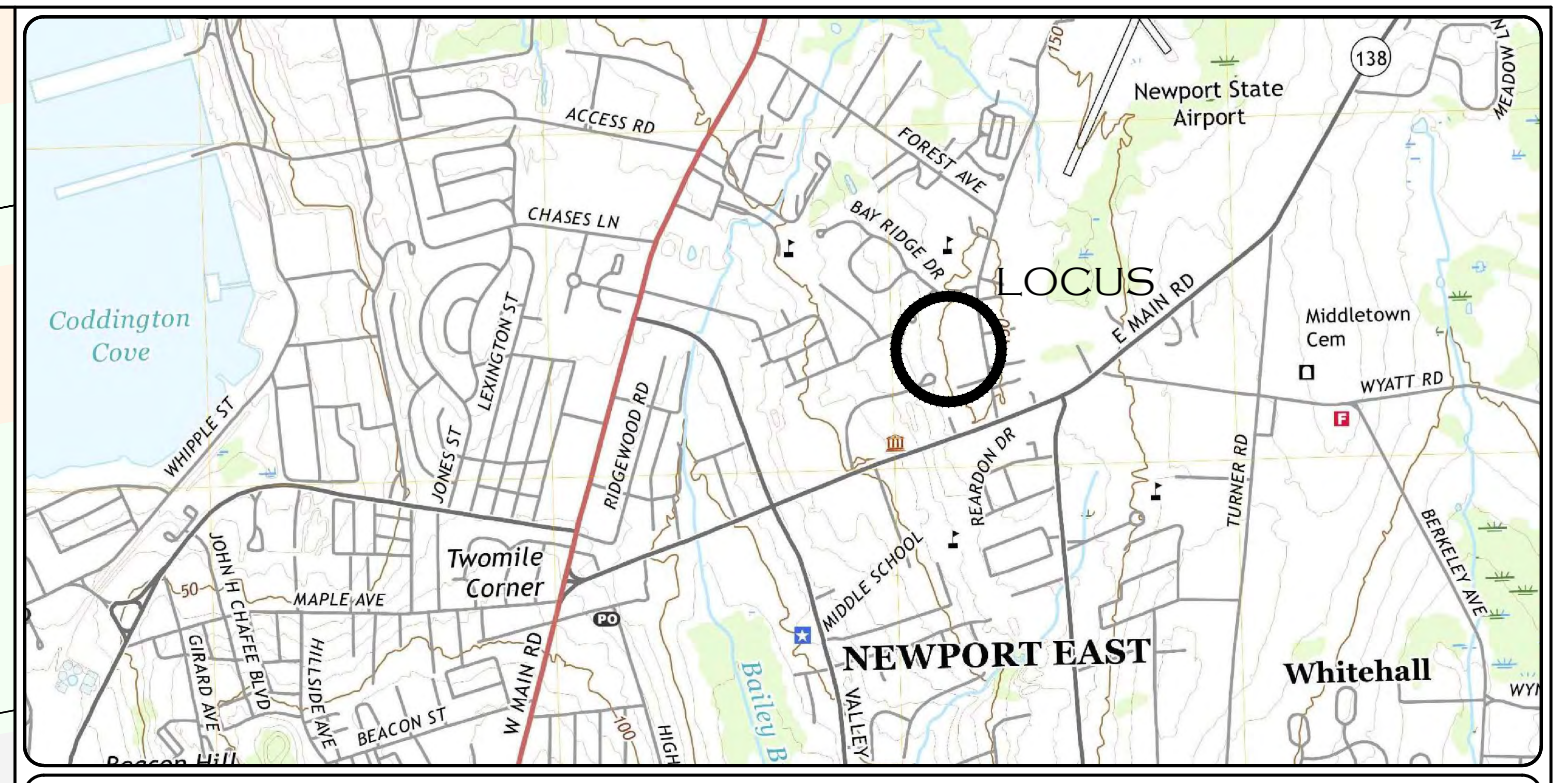
REVISED:

**INSITE** Engineering Services, LLC  
 PROFESSIONAL ENGINEERS | LAND SURVEYORS  
 Precision. Clarity. Certainty.

InSite Professional Complex, Suite 1  
 1539 Fall River Avenue Seekonk, MA 02771  
 Phone: (508) 336-4500 Fax: (508) 336-4558  
 Web Address: InSiteEngineers.com

**SHEET 3 OF 12**

1/21/2022 4:17 PM Forest Avenue Middletown RI - West House/Case21-038 - ENGR Base - 010 - Final.dwg 2/16/2022 9:38:29 AM



LOCATION (NOT TO SCALE) MAP

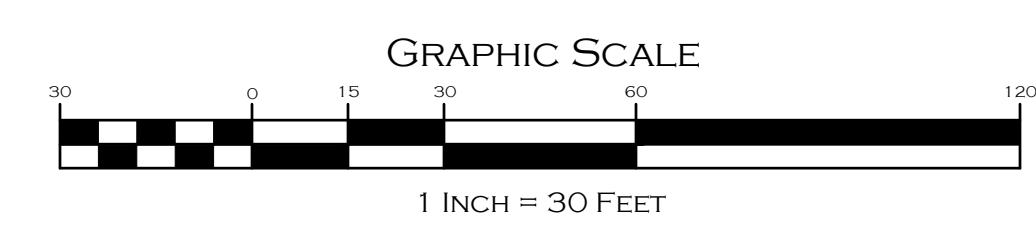
- GENERAL NOTES:**
- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  - ZONING DISTRICT: OB - OFFICE BUSINESS
  - OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT. INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  - SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**DIMENSIONAL ZONING REQUIREMENTS:**

OFFICE BUSINESS - OB - ZONING DISTRICT - MULTIFAMILY DWELLING STRUCTURE

	REQUIRED	PROPOSED
MINIMUM AREA	= 40,000 S.F.	200,689 S.F.
MINIMUM FRONTAGE	= 150'	203.26'
MINIMUM FRONT YARD SETBACK	= 25'	38.94'
MINIMUM SIDE YARD SETBACK	= 25'	52.73'
MINIMUM REAR YARD SETBACK	= 40'	99.37'
MAXIMUM BUILDING HEIGHT	= 35'	40'
MAXIMUM BUILDING COVERAGE	= 30%	21%

- PARKING BREAKDOWN:**
- SEC. 1304 - MINIMUM AND MAXIMUM OFF-STREET PARKING REQUIREMENTS FOR 'ELDERLY HOUSING': ONE SPACE FOR EACH DWELLING UNIT.
  - DWELLING UNITS: 50 (WEST HOUSE 1) + 54 (WEST HOUSE 2) = 104 UNITS TOTAL
  - CODE REQUIREMENTS:
    - 104 UNITS \* 1 SPACE / UNIT = 104 PARKING SPACES
    - REQUIRED: 104 PARKING SPACES
    - PROPOSED: 77 PARKING SPACES
  - HANDICAPPED SPACE REQUIREMENTS:
    - 104 PARKING SPACES \* 1 HANDICAPPED SPACE / 25 PARKING SPACES = 5 HANDICAPPED PARKING SPACE
    - REQUIRED: 5 HANDICAPPED PARKING SPACES
    - PROPOSED: 22 HANDICAPPED PARKING SPACE



**LAYOUT PLAN**

"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038 SCALE: 1" = 30' DRAWN BY: LJJ DATE: FEBRUARY 16, 2022

REVISED:

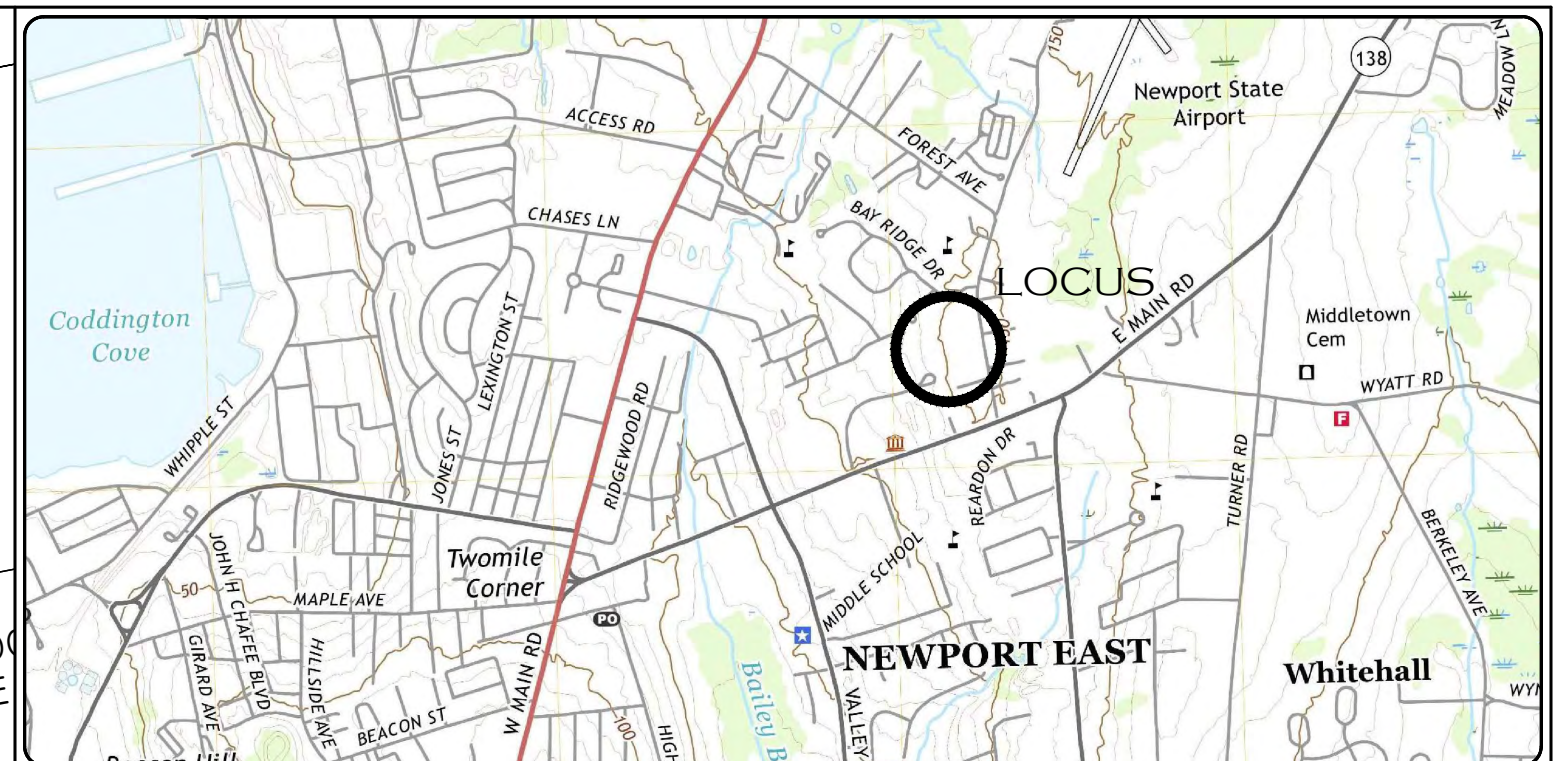
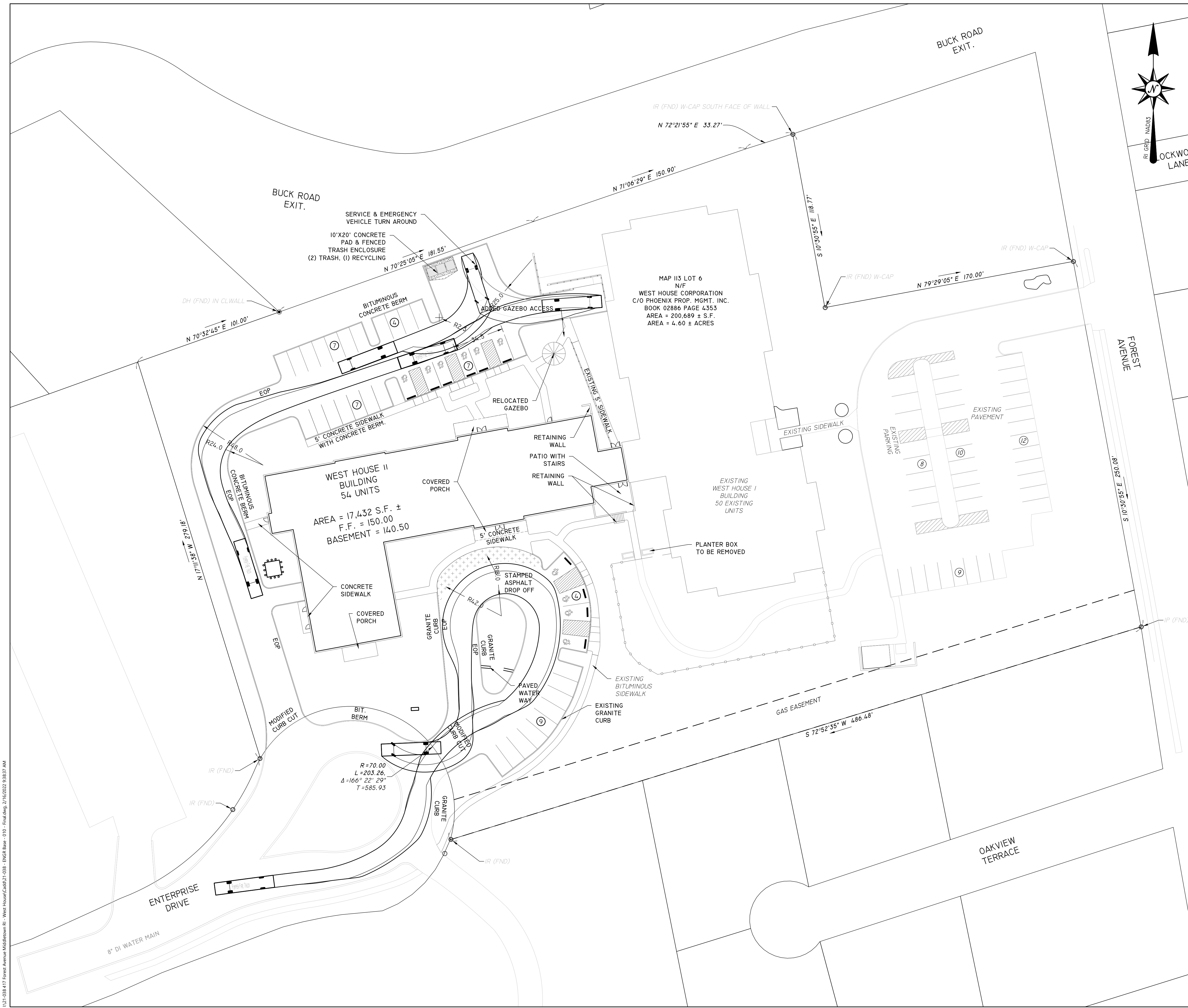
**PAUL D. CARLSON**  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
PROFESSIONAL SEAL

**INSITE** Engineering Services, LLC  
PROFESSIONAL ENGINEERS | LAND SURVEYORS  
Precision. Clarity. Certainty.

InSite Professional Complex, Suite 1  
1539 Fall River Avenue Seekonk, MA 02771  
Phone: (508) 336-4500 Fax: (508) 336-4558  
Web Address: InSiteEngineers.com

**SHEET 4 OF 12**

1/21/2022 11:47 AM Forest Avenue Middletown RI - West House II.dwg - ENGR Base - 010 - Final.dwg 2/16/2022 9:38:33 AM



LOCATION (NOT TO SCALE) MAP

- GENERAL NOTES:**
- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  - ZONING DISTRICT: OB - OFFICE BUSINESS
  - OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP. MGMT. INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  - SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**DIMENSIONAL ZONING REQUIREMENTS:**

OFFICE BUSINESS - OB - ZONING DISTRICT - MULTIFAMILY DWELLING STRUCTURE

	REQUIRED	PROPOSED
MINIMUM AREA	= 40,000 S.F.	200,689 S.F.
MINIMUM FRONTAGE	= 150'	203.26'
MINIMUM FRONT YARD SETBACK	= 25'	38.94'
MINIMUM SIDE YARD SETBACK	= 25'	52.73'
MINIMUM REAR YARD SETBACK	= 40'	99.37'
MAXIMUM BUILDING HEIGHT	= 35'	40'
MAXIMUM BUILDING COVERAGE	= 30%	21%

GRAPHIC SCALE

1 INCH = 20 FEET

**EMERGENCY VEHICLE MANEUVERABILITY PLAN**

PAUL D. CARLSON  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
PROFESSIONAL SEAL

"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038 SCALE: 1" = 30' DRAWN BY: LJJ DATE: FEBRUARY 16, 2022

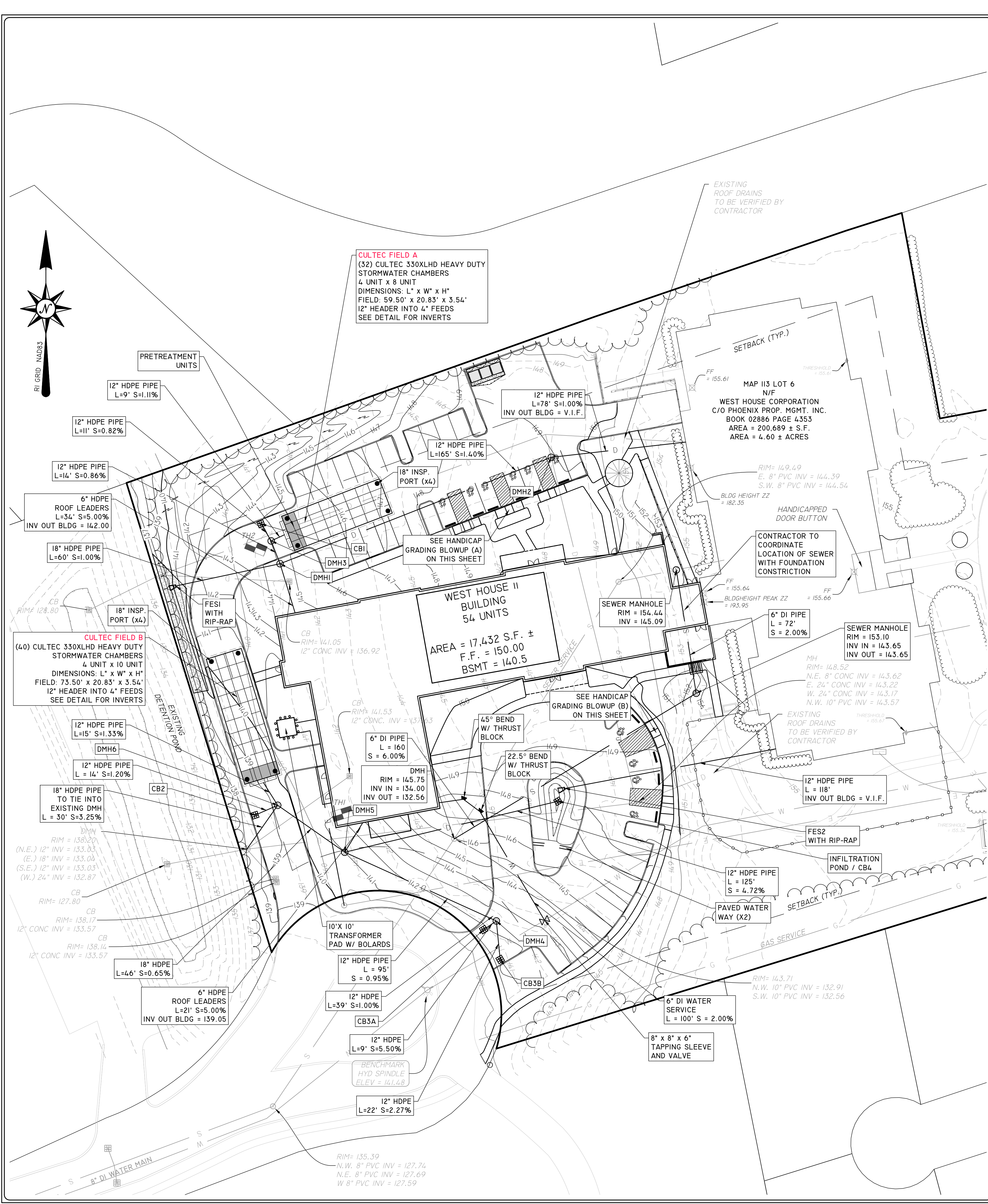
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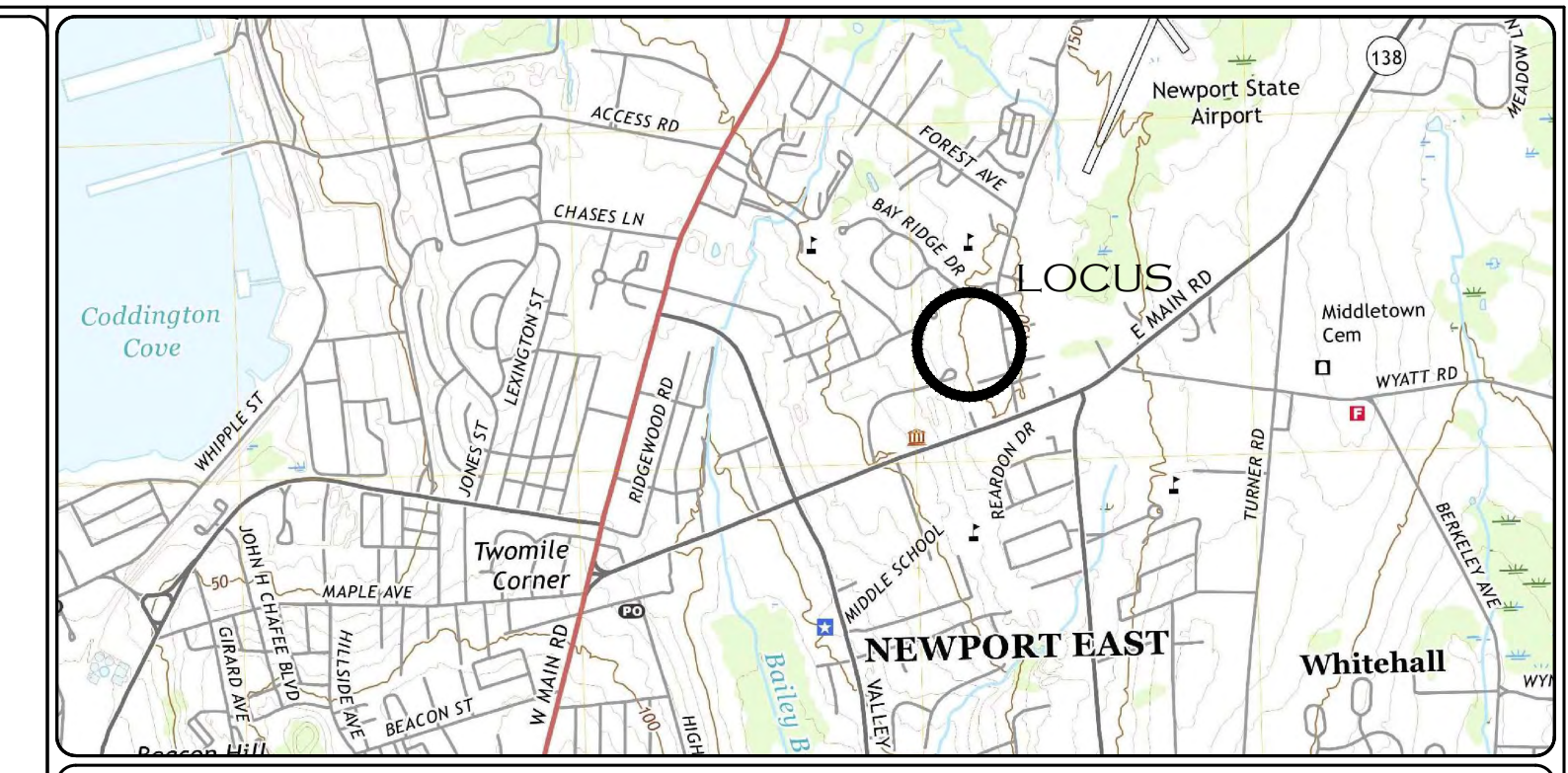
SHEET 5 OF 12

1/21/2022 4:17 PM Forest Avenue Middletown RI - West House/Cadd/21-038 - ENGR Base - 010 - Final.dwg 2/16/2022 9:38:37 AM



Structure Name	Structure Details
CB 1	RIM = 144.00 12" HDPE INV. OUT = 141.00
CB 2	RIM = 138.50 12" HDPE INV. OUT = 135.50
CB3 A	RIM = 141.25 12" HDPE INV. OUT = 138.00
CB3 B	RIM = 141.25 12" HDPE INV. OUT = 138.00
CB 4	RIM = 145.50 12" HDPE INV. OUT = 142.5
DMH 1	RIM = 144.50 (N.) 12" HDPE INV. IN = 139.53 (S.) 6" HDPE INV. IN = 140.30 (E.) 12" HDPE INV. IN = 140.99 (W.) 18" HDPE INV. OUT = 138.00
DMH 2	RIM = 148.80 INV IN = V.I.F. 12" HDPE INV. OUT = 143.30
DMH 3	RIM = 144.00 (N.) 12" HDPE INV. IN = 140.91 WEIR INV = 141.30 (E.) 12" HDPE INV. OUT = 141.00 (S.) 12" HDPE INV. OUT = 139.65
DMH 4	RIM = 142.40 (S.W.) 12" HDPE INV. IN = 137.50 (S.) 12" HDPE INV. IN = 137.50 (N.W.) 12" HDPE INV. OUT = 137.50
DMH 5	RIM = 141.00 (N.E.) 6" HDPE INV. IN = 138.00 (E.) 12" HDPE INV. IN = 136.60 (S.E.) 12" HDPE INV. IN = 136.60 (S.W.) 18" HDPE INV. OUT = 136.60
DMH 6	RIM = 139.20 (S.E.) 18" HDPE INV. IN = 136.30 (W.) 12" HDPE INV. IN = 135.33 WEIR INV = 136.20 (N.) 12" HDPE INV. OUT = 136.00 (S.W.) 18" HDPE INV. OUT = 133.47
FES 1	INV. OUT = 137.40
FES 2	INV. OUT = 146.00

**DRAINAGE STRUCTURE ELEVATION TABLE**



**LOCATION (NOT TO SCALE) MAP**

- GENERAL NOTES:**
- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  - ZONING DISTRICT: OB - OFFICE BUSINESS
  - OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  - SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**DIMENSIONAL ZONING REQUIREMENTS:**

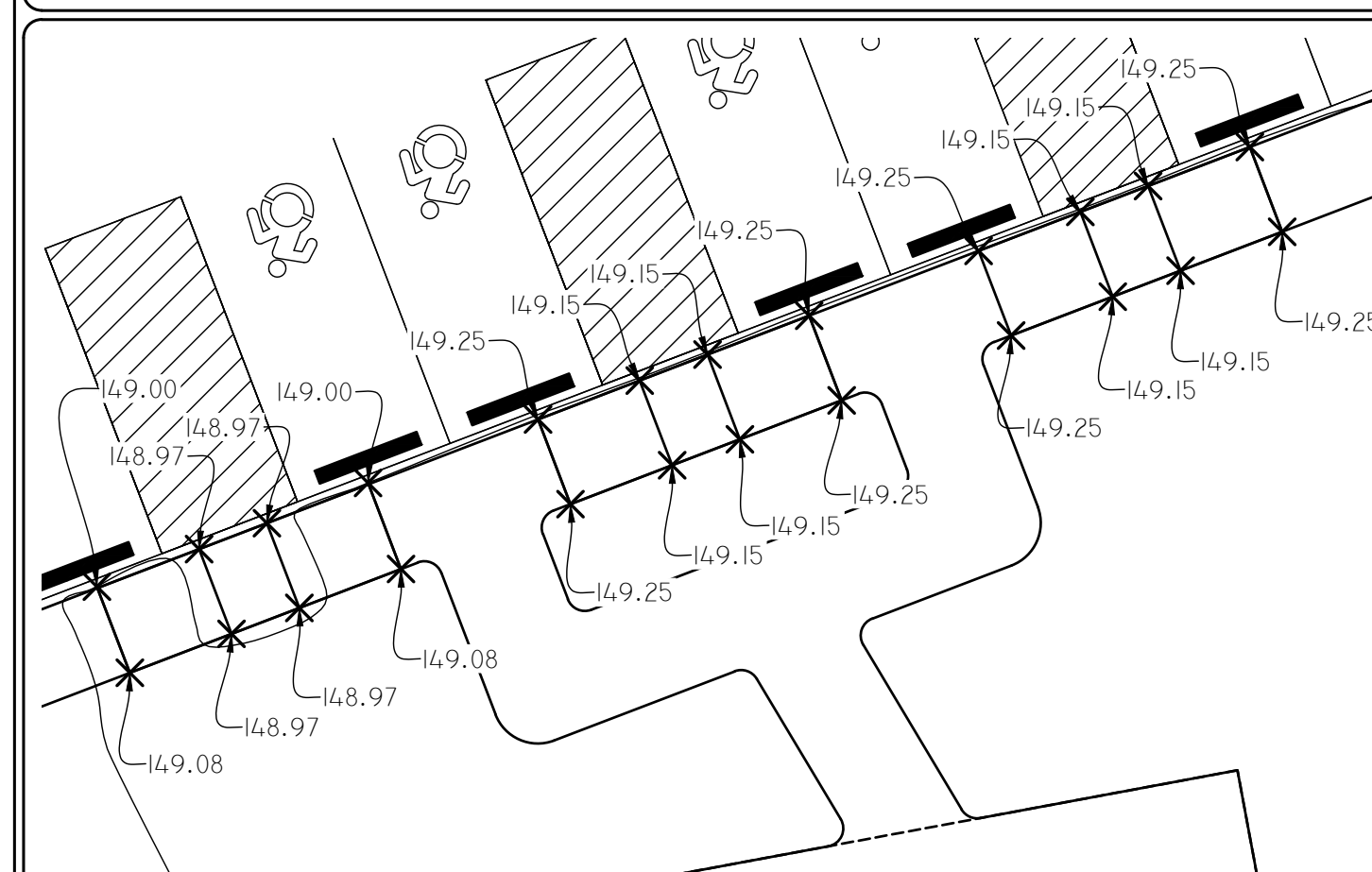
OFFICE BUSINESS - OB - ZONING DISTRICT - MULTIFAMILY DWELLING STRUCTURE

	REQUIRED	PROPOSED
MINIMUM AREA	= 40,000 S.F.	200,689 S.F.
MINIMUM FRONTAGE	= 150'	203.26'
MINIMUM FRONT YARD SETBACK	= 25'	38.94'
MINIMUM SIDE YARD SETBACK	= 25'	52.73'
MINIMUM REAR YARD SETBACK	= 40'	39.37'
MAXIMUM BUILDING HEIGHT	= 35'	40'
MAXIMUM BUILDING COVERAGE	= 30%	21%

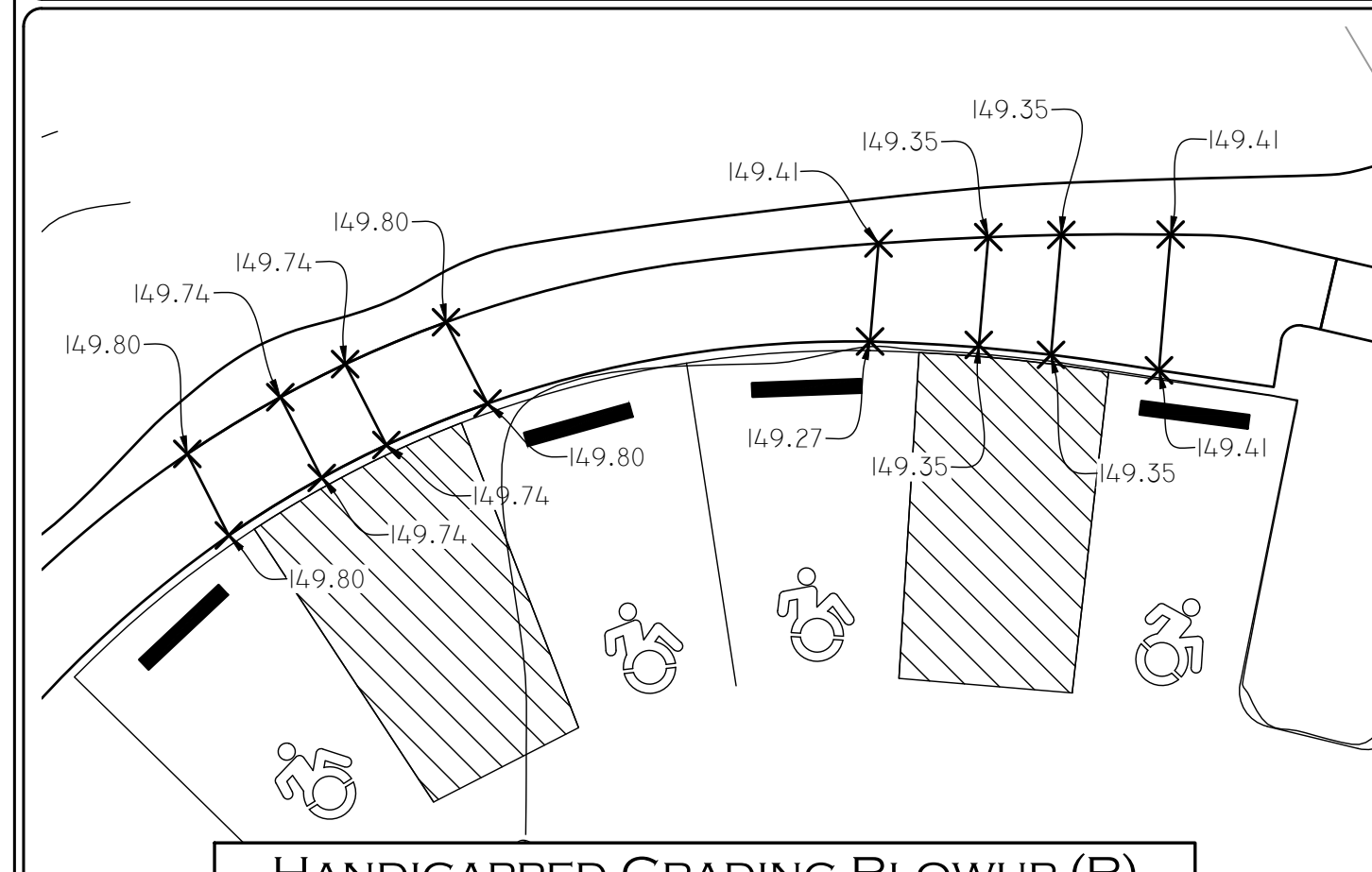
**DISCLAIMER:**  
ELEVATIONS ASSOCIATED WITH ALL CULTEC UNITS, STORMCEPTORS, CATCH BASINS, MAN HOLES, AND OTHER DRAINAGE RELATED STRUCTURES ARE SUBJECT TO CHANGE AFTER THE COMPLETION OF A ON SITE SOIL ANALYSIS.

**DRAINAGE SOIL EVALUATIONS:**

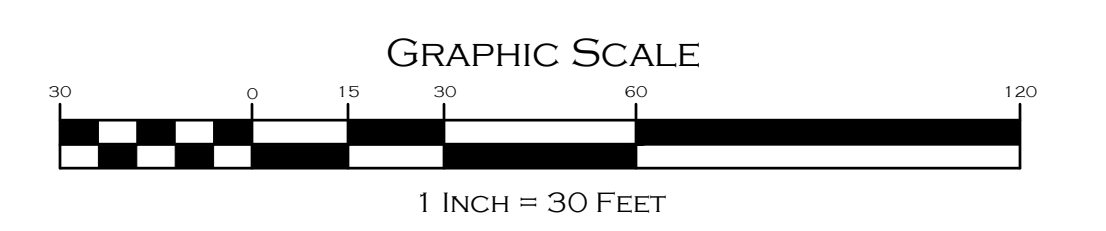
#	Date	Depth (in.)	Horizon	Soil Texture (USDA)	Color	Redox	Other (Consistency, Structure, etc.)	PERFORMED BY: MICHAEL S. FARIA
TH1	11-10-2021	0 - 36	HTM	gifs	10YR5/2	36" & 48" - few in roots	redox in roots not due to gwt	
		36 - 132	C	gifs	ESTIMATED GROUND WATER: >132", NO WEEPING, NO STANDING		gifs = gravelly loamy fine sand	
TH2	11-10-2021	0 - 36	HTM	gifs	10YR5/1		no redox found	
		36 - 132	C	gifs	ESTIMATED GROUND WATER: >132", NO WEEPING, NO STANDING		gifs = gravelly loamy fine medium sand	



**HANDICAPPED GRADING BLOWUP (A)**



**HANDICAPPED GRADING BLOWUP (B)**



**GRADING, DRIANAGE & UTILITY PLAN**

**"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"**  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038 SCALE: 1" = 30' DRAWN BY: LJJ DATE: FEBRUARY 16, 2022

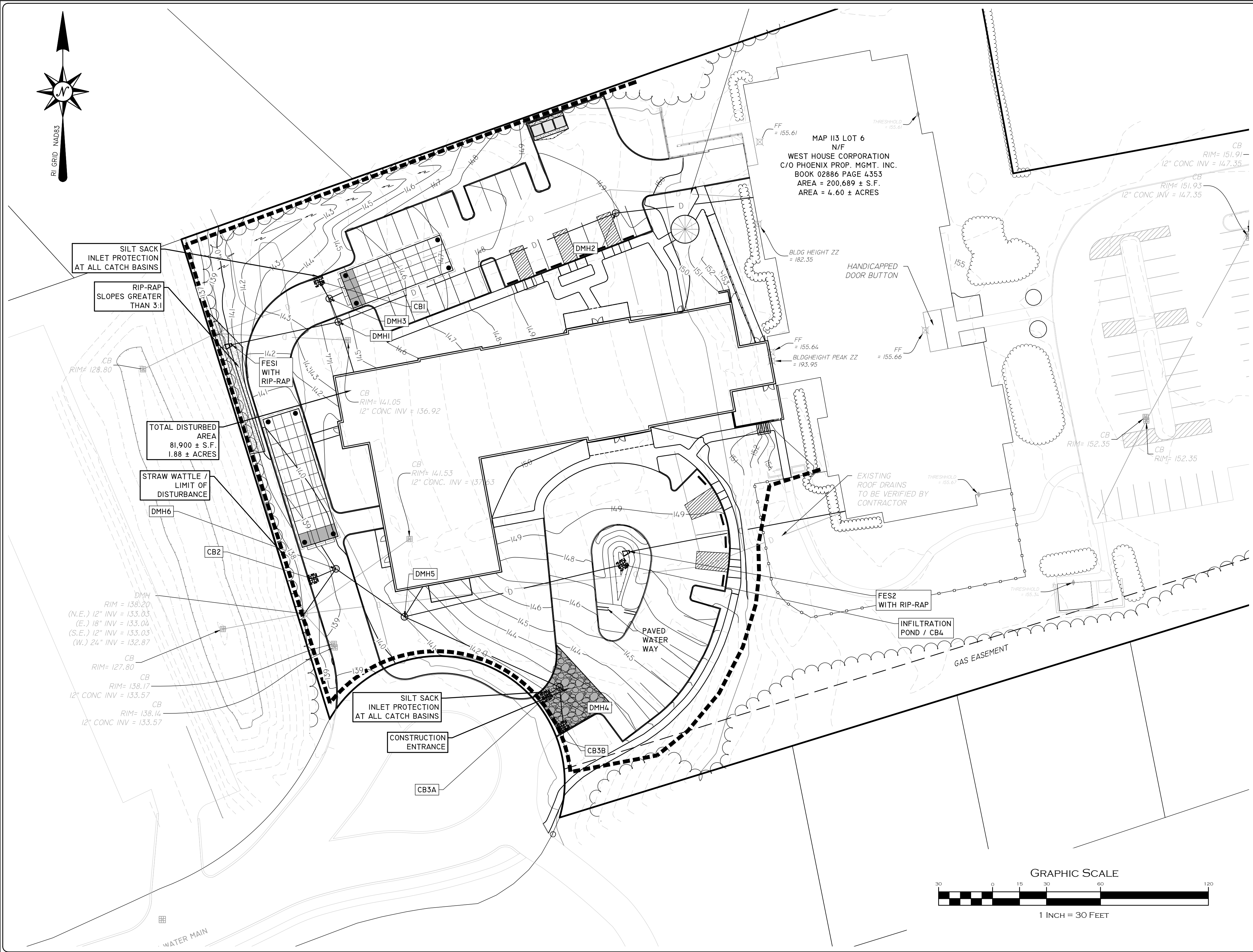
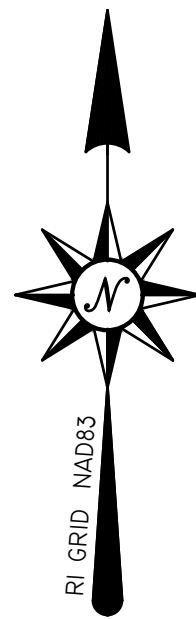
REVISED:

**PAUL D. CARLSON**  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER CIVIL  
PROFESSIONAL SEAL

**INSITE** Engineering Services, LLC  
PROFESSIONAL ENGINEERS | LAND SURVEYORS  
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1539 Fall River Avenue, Seekonk, MA 02771  
Phone: (508) 336-4500 Fax: (508) 336-4558  
Web Address: InsiteEngineers.com

**SHEET 6 OF 12**



**OPERATION & MAINTENANCE PLAN NOTES:**

THIS PLAN SHOULD BE USED IN CONJUNCTION WITH SEPARATE OPERATIONS AND MAINTENANCE PLAN DOCUMENT FOR "WEST HOUSE II - AFFORDABLE SENIOR HOUSING" DATE: FEBRUARY 16, 2022.

THIS PLAN SHOULD BE USED IN CONJUNCTION WITH SEPARATE STORMWATER POLLUTION PREVENTION PLAN DOCUMENT FOR "WEST HOUSE II - AFFORDABLE SENIOR HOUSING" DATE: FEBRUARY 16, 2022.

THE MAINTENANCE AND UPKEEP ON THE EXISTING ROADWAY WILL INCLUDE THE FOLLOWING ELEMENTS:

CONSTRUCTION VEHICLES SHALL BE LIMITED TO ONE ACCESS POINT ON EACH LOT WHERE A CRUSHED-STONE CONSTRUCTION PAD ENTRANCE SHALL BE INSTALLED IN THE AREA OF THE PERMANENT DRIVEWAY TO ENSURE THAT MUD AND DEBRIS ARE NOT TRACKED ONTO THE ROADWAY. IF MUD IS INADVERTENTLY TRACKED ONTO THE ROAD, IT SHOULD BE REMOVED PROMPTLY.

GENERAL MAINTENANCE OF EROSION CONTROL ELEMENTS INCLUDING REGRADING, REVEGETATION, REPLACING RIPRAP, ETC., ON AN AS NEEDED BASIS.

STORMCEPTER, INFILTRATION FACILITY AND CATCH BASINS WILL BE INSPECTED SEMI-ANNUALLY BY THE OWNER AND WILL BE MAINTAINED AS REQUIRED.

BUILD UP OF SEDIMENTATION AND DEBRIS SHALL BE MONITORED AND REMOVED ON A SEMI-ANNUALLY BASIS IN ORDER TO KEEP THE DISCHARGES AND FLOWS INTO THE INFILTRATION FACILITY FUNCTIONING PROPERLY.

ALL STORMWATER MANAGEMENT SYSTEMS MUST HAVE AN OPERATION AND MAINTENANCE PLAN TO ENSURE THAT SYSTEMS FUNCTION AS DESIGNED.

THE OWNER WILL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE STORMWATER MANAGEMENT SYSTEM AND ALL OF ITS APPURTENANCES. THE FOLLOWING MAINTENANCE PROGRAM SHALL BE IMPLEMENTED:

**A. CATCH BASIN INLETS**

- 1. THE CATCH BASINS SHALL BE INSPECTED MONTHLY TO ASSURE THEY ARE FUNCTIONING PROPERLY, AND CLEANED BY REMOVING SEDIMENT AND DEBRIS FOUR TIMES PER YEAR. CLEANING SHALL BE PERFORMED BY USE OF A VACUUM TRUCK OR OTHER METHOD AS RECOMMENDED BY THE CATCH BASIN MANUFACTURER.
- 2. ALL SEDIMENT AND HYDROCARBONS (PETROLEUM PRODUCTS) SHALL BE PROPERLY HANDLED AND DISPOSED IN ACCORDANCE WITH APPLICABLE GUIDELINES.
- 3. ALL DRAINAGE SYSTEM OUTLETS SHALL ALSO BE INSPECTED FOR DEBRIS AND MAINTAINED ACCORDINGLY. INSPECTION AND MAINTENANCE SHALL OCCUR IN MAY AND DECEMBER OF EACH YEAR.
- 4. ALL INSPECTIONS AND MAINTENANCE SHALL BE PERFORMED BY QUALIFIED INDIVIDUALS. RECORDS OF THE INSPECTIONS AND MAINTENANCE SHALL BE KEPT FOR A PERIOD OF FIVE (5) YEARS AND SHALL BE MADE AVAILABLE UPON REQUEST.

**B. UNDERGROUND INFILTRATION SYSTEM**

- 1. THE INFILTRATION SYSTEMS SHALL BE INSPECTED AT LEAST EVERY SIX MONTHS AND AFTER EVERY MAJOR STORM DURING THE FIRST YEAR TO ASSURE THEY ARE FUNCTIONING PROPERLY.
- 2. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY.
- 3. CLEANING SHALL BE PERFORMED BY USE OF A VACUUM TRUCK OR OTHER METHOD AS RECOMMENDED BY THE PIPING MANUFACTURER.
- 4. ALL DRAINAGE SYSTEM OUTLETS SHALL ALSO BE INSPECTED FOR DEBRIS AND MAINTAINED ACCORDINGLY. INSPECTION AND MAINTENANCE SHALL OCCUR IN MAY AND DECEMBER OF EACH YEAR.
- 5. IF THE INFILTRATION FACILITY FAILS TO DRAIN WITHIN 72 HOURS THEN A QUALIFIED PROFESSIONAL SHOULD ACCESS THE DEVICES AND PROVIDE RECOMMENDATIONS FOR CORRECTIVE ACTIONS, AND THE OWNER SHOULD TAKE IMMEDIATE ACTION TO IMPLEMENT THESE RECOMMENDATIONS TO RESTORE THE INFILTRATION FUNCTION.
- 6. ALL INSPECTIONS AND MAINTENANCE SHALL BE PERFORMED BY QUALIFIED INDIVIDUALS. RECORDS OF THE INSPECTIONS AND MAINTENANCE SHALL BE KEPT FOR A PERIOD OF FIVE (5) YEARS AND SHALL BE MADE AVAILABLE UPON REQUEST.

THE OWNER SHALL KEEP A WRITTEN RECORD OF INSPECTION DATES AND FINDINGS, MAINTENANCE OPERATIONS, AND ALL REPAIRS. AN INSPECTION/MAINTENANCE CHECKLIST SHALL BE USED IN THE SPECIFIED INSPECTIONS. RECORDS OF INSPECTIONS AND MAINTENANCE SHALL BE KEPT FOR AT LEAST THREE YEARS, AND AVAILABLE ON REASONABLE NOTICE FOR INSPECTION BY THE APPROPRIATE TOWN AGENCY.

**EROSION & SEDIMENT CONTROL NOTES:**

- 1. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION. GRAVEL CONSTRUCTION ENTRANCE WILL BE INSTALLED BEFORE CONSTRUCTION TRAFFIC INTO AND OUT OF PROJECT AREA BEGINS. STABILIZATION OF ALL REGRADED AND SOIL STOCKPILE AREAS WILL BE INITIATED AND MAINTAINED DURING ALL PHASES OF CONSTRUCTION.
- 2. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF MIDDLETOWN REGULATIONS. ALL EROSION CONTROL MEASURES ARE TO BE MAINTAINED AND UPGRADED AS REQUIRED TO ACHIEVE PROPER SEDIMENT CONTROL DURING CONSTRUCTION.
- 3. ADDITIONAL CONTROL MEASURES WILL BE INSTALLED DURING CONSTRUCTION PERIOD, IF DEEMED NECESSARY BY THE ENGINEER OR TOWN AGENCIES.
- 4. THE LOT SHALL BE REQUIRED TO MAINTAIN EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION. ADDITIONAL MEASURES WILL BE REQUIRED TO PREVENT SEDIMENT DISCHARGE INTO THE STREET, AND DRAINAGE SYSTEMS.
- 5. SEEDING MIXTURE FOR FINISHED GRASSED AREAS WILL BE AS FOLLOWS:
  - KENTUCKY BLUE GRASS = 45
  - CREeping RED FESCUE = 45
  - PERENNIAL RYE GRASS = 10SEED TO APPLIED AT A RATE OF 4 LBS / 1000 S.F. FERTILIZER SHALL BE APPLIED AT A RATE OF 2 LBS / 1000 S.F. PLANTING SEASON SHALL BE APRIL 1 TO OCTOBER 15. AFTER OCTOBER 15 AREAS NOT SEEDED SHALL BE STABILIZED WITH STRAW WATTLES, HAY BALE CHECK DAMS, FILTER FABRIC OR WOODEN MULCH AS REQUIRED TO CONTROL EROSION.
- 6. AREAS LEFT BARE BEFORE FINISH GRADING AND SEEDING IS ACHIEVED, SHALL RECEIVE A TEMPORARY SEEDING OF PERENNIAL RYE GRASS APPLIED TO A RATE OF 2 LBS / 1000 S.F. AT A DEPTH OF 1/2" LIMESTONE (EQUIVALENT TO BE 50 % CALCIUM PLUS MAGNESIUM OXIDE) SHALL BE APPLIED AS SEEDBED PREPARATION AT A RATE OF 120 LBS / 1000 S.F., WHERE GRASS PREDOMINATES, FERTILIZE ACCORDING TO A SOIL TEST AT A MINIMUM APPLICATION RATE OF 1 LB OF NITROGEN PER 1000 S.F. AREAS TO BE LEFT BARE BEFORE FINISH GRADING AND SEEDING OUTSIDE OF PLANTING SEASONS SHALL RECEIVE AN AIR-DRIED WOOD CHIP MULCH, FREE OF COURSE MATTER, TREATED WITH 12 LBS NITROGEN PER TON, APPLIED AT A RATE OF 185-275 LBS / 1000 S.F.
- 7. CONTRACTOR SHALL BE ASSIGNED THE RESPONSIBILITY FOR IMPLEMENTING THIS 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, AND NOTIFY THE PROPER TOWN AGENCY OF ANY TRANSFER OF THIS RESPONSIBILITY. THE OWNER SHALL BE RESPONSIBLE FOR CONVEYING A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN IF THE TITLE TO THE LAND IS TRANSFERRED.
- 8. THE CONTRACTOR SHALL REQUEST THE APPROPRIATE TOWNS AGENCIES TO INSPECT AND APPROVE THE INSTALLATION OF ALL EROSION CONTROL MEASURES PRIOR TO THE START OF CONSTRUCTION. PERIODIC INSPECTIONS OF EROSION CONTROL MEASURES MAY BE PERFORMED BY THE AGENCIES. THE CONTRACTOR SHALL REPAIR, UPGRADE OR REPAIR ANY MEASURES THE AGENT MAY FEEL ARE IN NEED OF SUCH.
- 9. STOCKPILES OF SOIL SHALL BE SURROUNDED BY A SEDIMENT BARRIER. SOIL STOCKPILES TO BE LEFT BARE FOR MORE THAN FIFTEEN (15) DAYS SHALL BE STABILIZED WITH TEMPORARY VEGETATION OR MULCH, IF STOCKPILES ARE TO REMAIN FOR MORE THAN SIXTY (60) DAYS, FILTER FABRIC SHALL BE USED IN PLACE OF HAY BALES. SIDE SLOPES SHALL NOT EXCEED 2:1.
- 10. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE LIFE OF HIS CONTRACT. DUST CONTROL SHALL INCLUDE BUT NOT LIMITED TO SPRINKLING WATER ON EXPOSED SOILS AND HAUL ROADS. CONTRACTOR SHALL CONTROL DUST TO PREVENT A HAZARD TO TRAFFIC ON ADJACENT ROADWAYS.
- 11. SEDIMENT SHALL BE REMOVED ONCE THE VOLUME REACHES 1/4 TO 1/2 THE HEIGHT OF THE SILT FENCE OR HAY BALE, OR SILT SOCK.
- 12. ALL STOCKPILES SHALL BE SURROUNDED BY SEDIMENT CONTROLS.
- 13. DISTURBED AREAS REMAINING IDLE FOR MORE THAN 14 DAYS SHALL BE STABILIZED.
- 14. ALL FACILITIES USED AS TEMPORARY MEASURES SHALL BE CLEANED PRIOR TO BEING PUT INTO FINAL OPERATION.
- 15. PER THE RIDEP, BMP'S ARE NOT TO BE USED FOR TEMPORARY STORMWATER RUNOFF COLLECTION DURING THE PROJECTS CONSTRUCTION.

**CONSTRUCTION PROCEDURES AND SEQUENCING**

- THE ENGINEER SHALL HAVE THE SOLE RESPONSIBILITY FOR THE DESIGN IMPLEMENTATION. HE SHALL BE RESPONSIBLE FOR ENSURING THAT ALL CONTRACTORS AND SUBCONTRACTORS ARE AWARE OF THE PROVISIONS ON THE PLANS.
- THE CONTRACTOR SHALL ORGANIZE SITE CONSTRUCTION IN A MANNER WHICH WILL ENSURE THE IMMEDIATE STABILIZATION OF SURFACES. PERIMETER CONTROLS EQUAL APPROVED PROJECT LIMITS.
- PRIOR TO ANY CONSTRUCTION ON SITE, THE CONTRACTOR SHALL SETUP PRE-CONSTRUCTION MEETING WITH OWNER, ENGINEER, TOWN PLANNING AND DPW PERSONAL.
- PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, A LINE STRAW WATTLES, WILL BE PLACED AT ALL CONSTRUCTION TOE OF SLOPES IN THE AREA OF ROADWAY, PONDS, LANDSCAPED AREAS, AND ALONG PERIMETER OF PROJECT LIMIT OF DISTURBANCE WHERE INDICATED ON PROJECT PLANS.
- RESERVE EROSION CONTROL DEVICES SHALL BE STOCKPILED ON SITE IN THE EVENT OF EMERGENCIES, AND SHALL BE LOCATED 100' FROM REGULATED WETLAND RESOURCE AREAS.
- THE CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS FOR THE PROPER STORAGE AND/OR REMOVAL OF DEBRIS ON SITE TO AVOID UNNECESSARY ACCUMULATION ON SITE.
- DRAINAGE STRUCTURES SHALL BE CONSTRUCTED FROM DOWNSTREAM UP AND CONSTRUCTION SHALL INCLUDE THE PLACEMENT OF STONE AT THE FLARED PIPE ENDS AND OUTLET STRUCTURE

**INLETS AND OUTLETS AS SHOWN ON PROJECT PLANS.**

- IN STREAM CONTROLS SUCH AS HAY BALE CHECK DAMS SHALL BE ESTABLISHED PRIOR TO CONSTRUCTION IF NEEDED.

**INFILTRATION SURFACE PROTECTION**

TO PROTECT THE INFILTRATION SURFACES (BENEATH AND ADJACENT TO THE RECHARGE SYSTEMS) FROM DEGRADATION BY CONSTRUCTION ACTIVITIES INCLUDE:

- 1. PROVIDE DEEP ROTOTILLING OF VAIN FLOOR IMMEDIATELY PRIOR TO SEEDING WITH NO SUBSEQUENT TRAFFICKING ON SURFACE.
- 2. PREVENTION OF CONTAMINATION OF THE EXPOSED SUBGRADE BY CONSTRUCTION VEHICLES.
- 3. PREVENTION OF EXCESSIVE COMPACTION BY CONSTRUCTION VEHICLES.
- 4. PREVENTION OF THE DISCHARGE OF WATER FROM CONSTRUCTION DEWATERING ACTIVITIES INTO THESE FACILITIES.
- 5. PREVENTION OF DISCHARGE OF STORMWATER INTO THESE FACILITIES UNTIL THE CONTRIBUTING AREAS ARE STABILIZED, UNLESS SPECIFIC MEASURES ARE PROVIDED FOR PROTECTING AND RESTORING THE INFILTRATION SURFACE.

**CONSTRUCTION INSPECTION**

THE ENGINEER SHALL BE CALLED ON SITE DURING THE CONSTRUCTION OF THE INFILTRATION BASIN. THE ENGINEER SHALL BE ON SITE DURING THE CONSTRUCTION AND LAYOUT OF ALL OUTLET STRUCTURES.

THE ENGINEER SHALL PERFORM FREQUENT INSPECTION OF THE STORMWATER SYSTEM DURING CONSTRUCTION, WITH CLEANING AND MAINTENANCE AS WARRANTED. DURING ACTIVE CONSTRUCTION PERIODS, WEEKLY INSPECTION IS REQUIRED.

IF CONSTRUCTION IS SUSPENDED (E.G., OVER THE WINTER), THEN MONTHLY INSPECTIONS ARE REQUIRED. IN ADDITION, THE SYSTEM SHOULD BE CHECKED AFTER ANY SIGNIFICANT RAINFALL, TO INSURE IT IS FUNCTIONING CORRECTLY AND TO MONITOR SEDIMENT ACCUMULATION FROM THE DISTURBED AREAS OF THE SITE.

**ROUGH GRADING**

DURING GRADING, THE POTENTIAL FOR EROSION IS HIGH. DURING GRADING OPERATIONS, DISTURBED SLOPES WILL BE MULCHED AND VEGETATION ESTABLISHED TO PREVENT SEDIMENT EROSION TO THE SATISFACTION OF THE ENGINEER.

**EROSION & SEDIMENT CONTROL PLAN**

PAUL D. CARLSON  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
PROFESSIONAL SEAL

"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 Lot 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

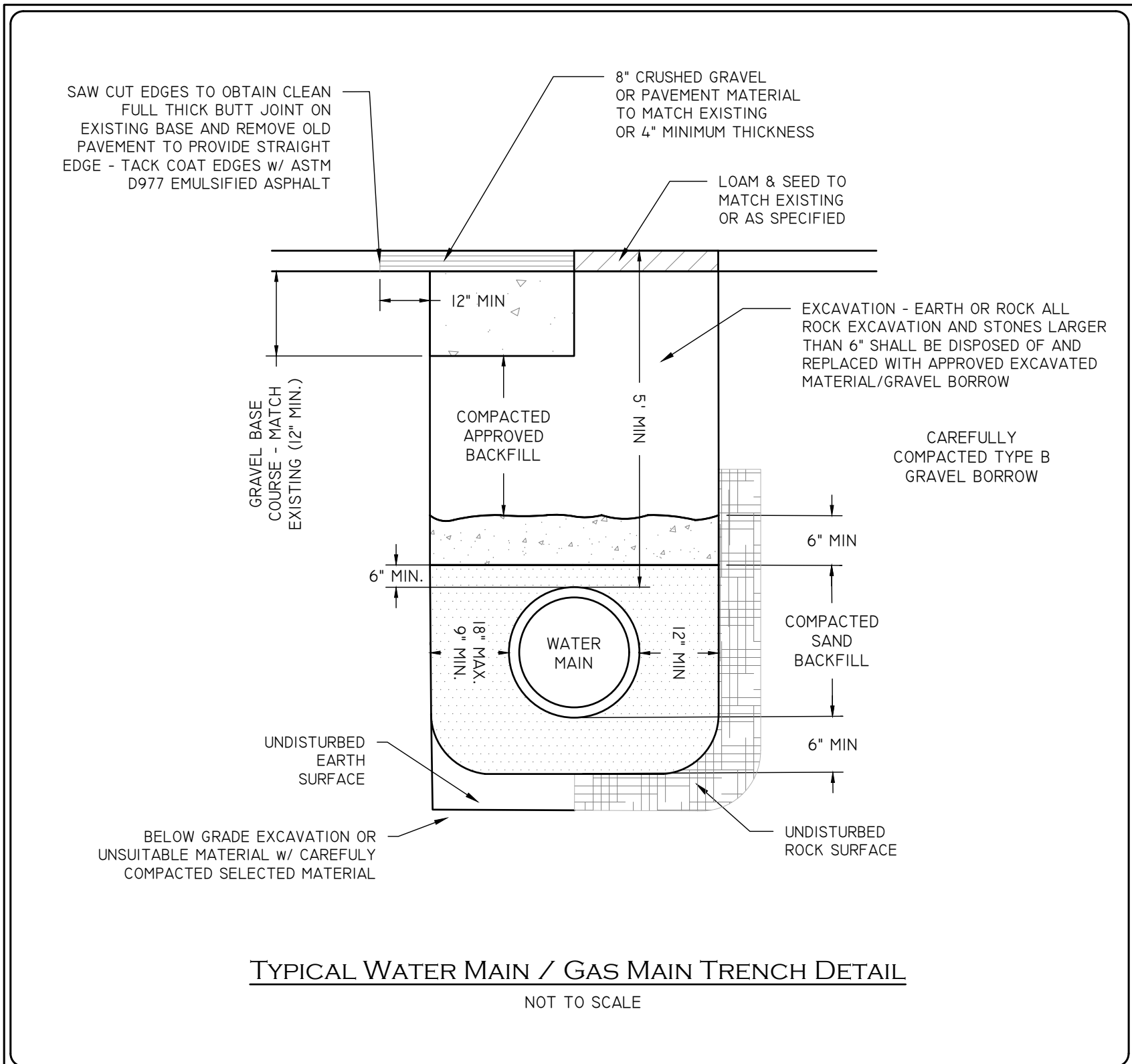
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DRAWN BY: LJJ DATE: FEBRUARY 16, 2022

REVISED:

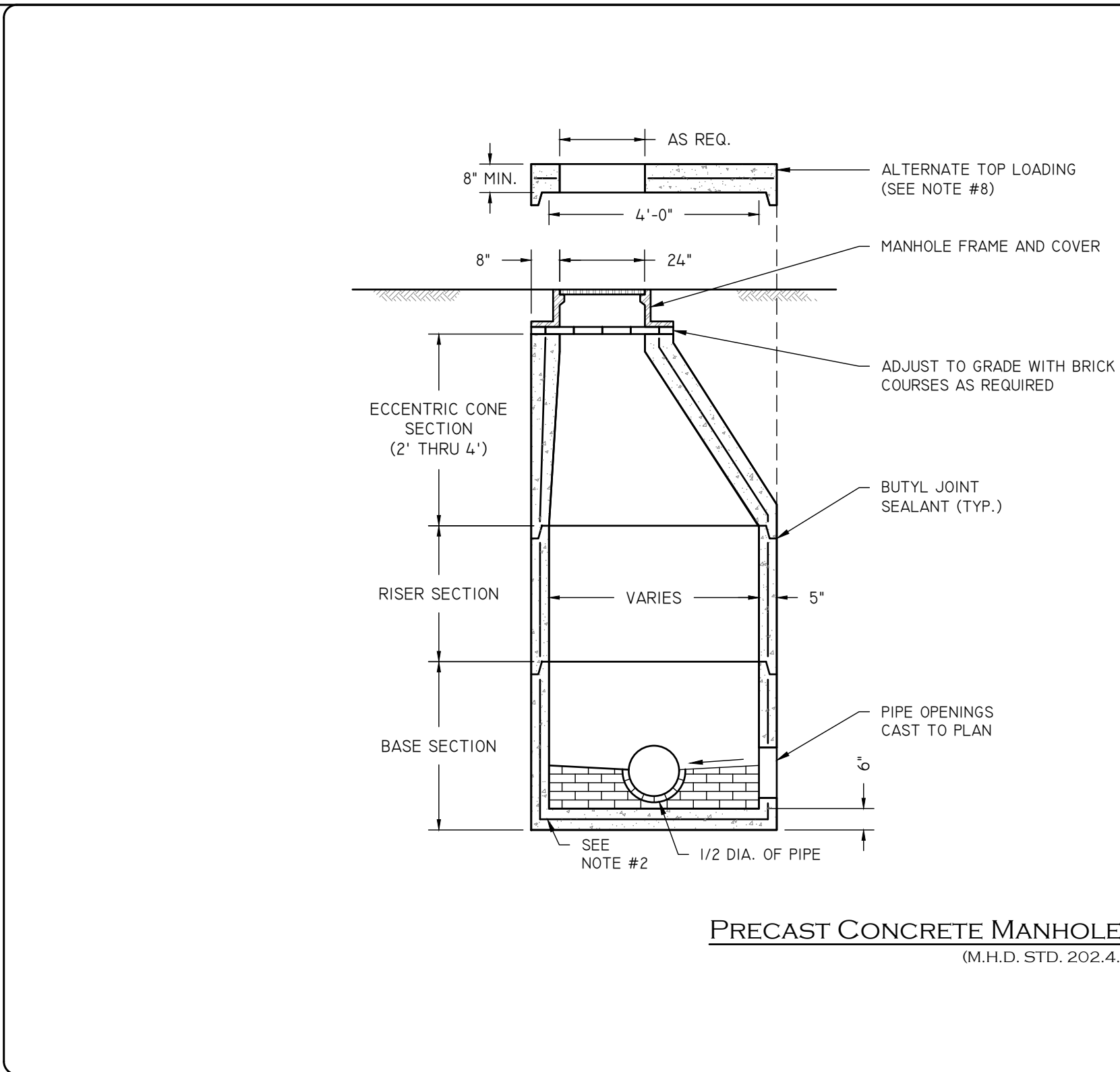
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SHEET  
7  
OF 12

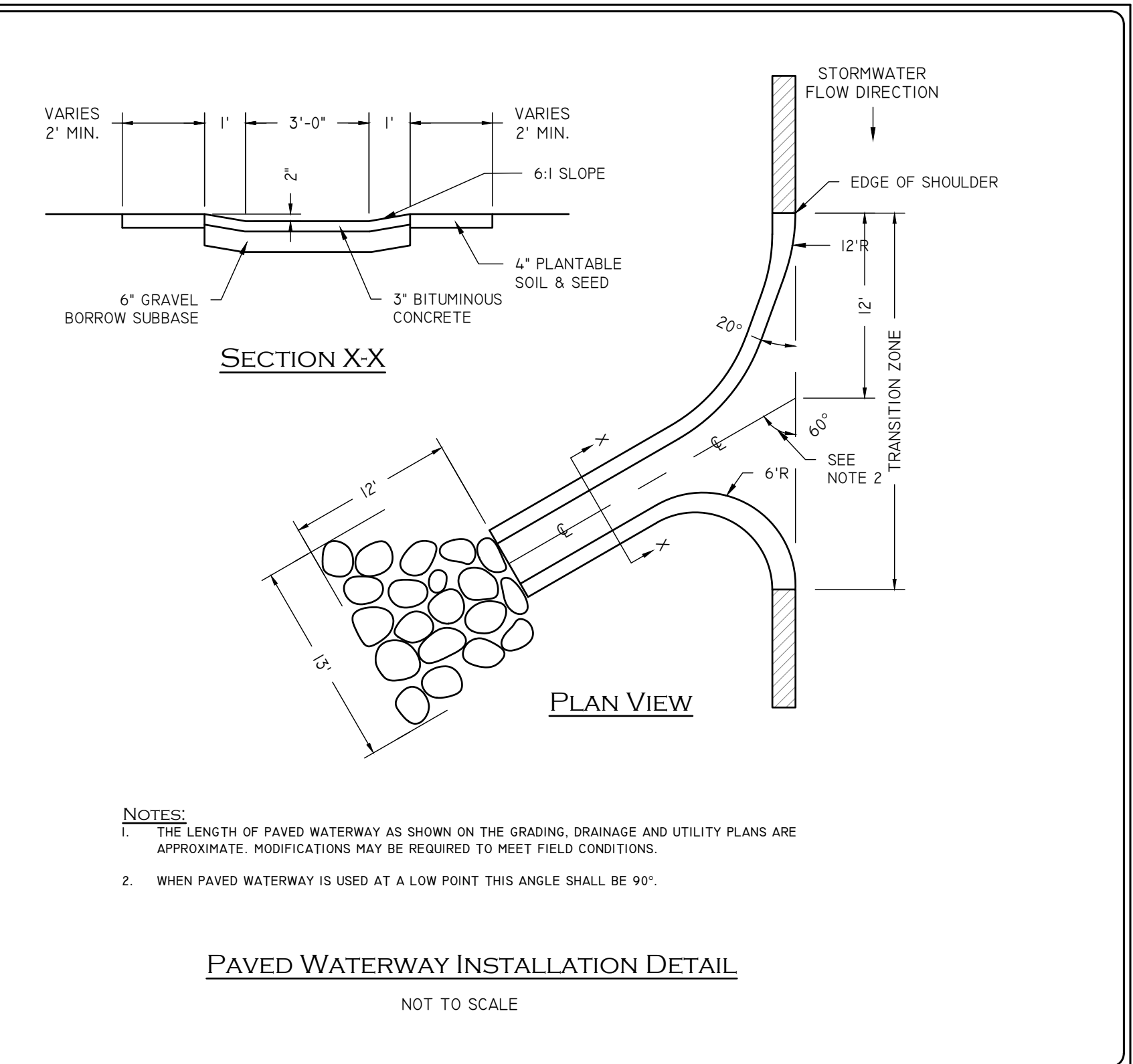


**TYPICAL WATER MAIN / GAS MAIN TRENCH DETAIL**  
NOT TO SCALE

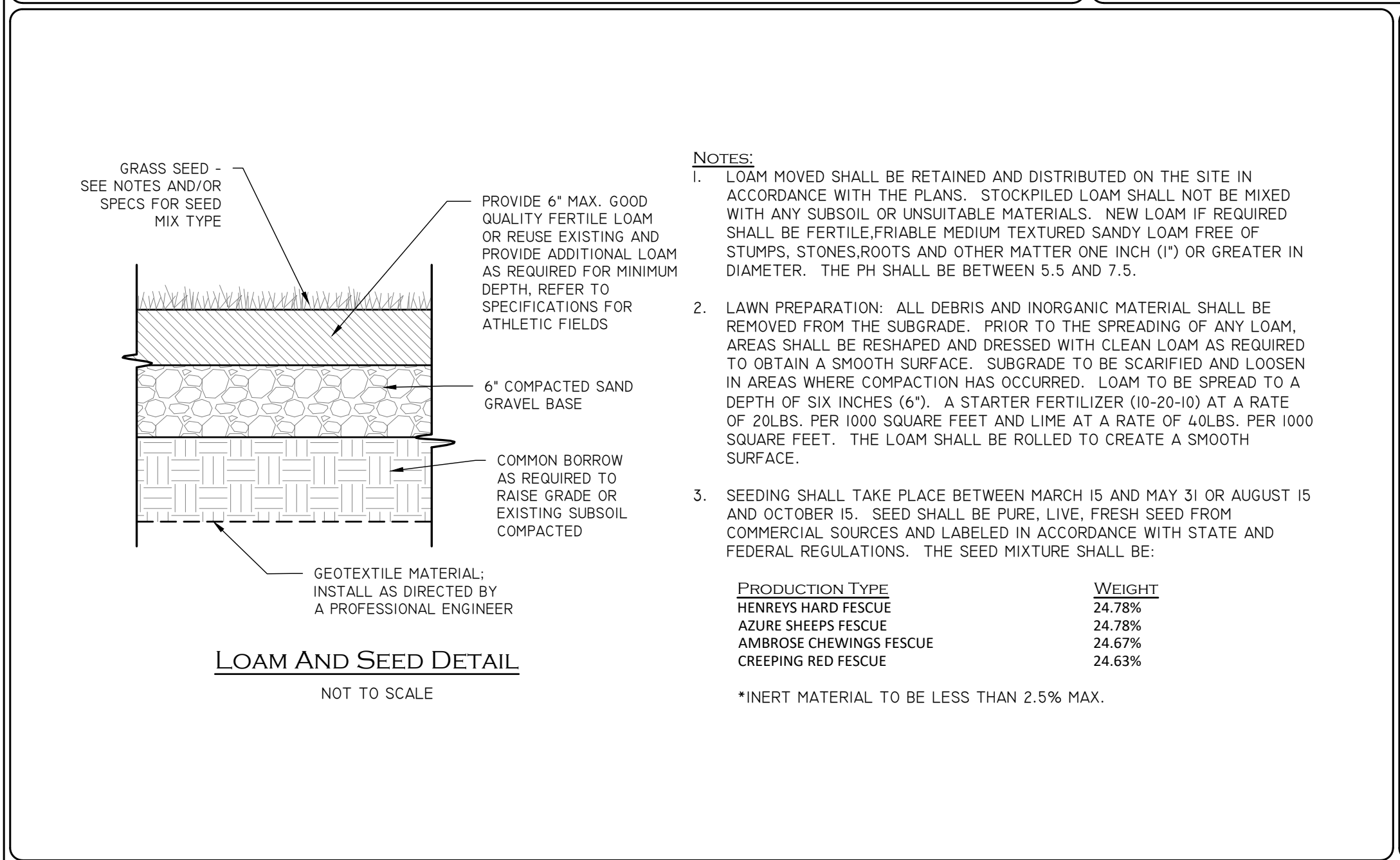


**PRECAST CONCRETE MANHOLE - 4', 5', 6' DIAMETER**  
(M.H.D. STD. 202.4.0)

- NOTES:**
1. ALL REINFORCING STEEL MUST CONFORM TO THE LATEST ASTM A185 AND/OR A615 GRADE 60. SPECIFICATION 0.12 SQ. IN/LINEAL FT.
  2. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MIN. OF 0.12 SQ. IN/LINEAL FT. (BOTH WAYS)
  3. MANHOLE SPECS. CONFORM TO THE LATEST ASTM C478 SPEC. FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS" WITH THE EXCEPTION OF PORTLAND CEMENT CONCRETE MIX DESIGN AND MATERIALS REQUIREMENTS, WHICH SHALL CONFORM WITH SECTION 900 OF THE M.H.D. STANDARD SPECS. ALL PORTLAND CEMENT CONCRETE SHALL BE CLASS 3000 PSI, 3/4" AGGREGATE, TYPE II.
  4. MORTAR SHALL CONFORM TO SECTION M4.02.15 OF THE M.H.D. STANDARD SPECS. FOR HIGHWAYS AND BRIDGES. ONE POUR MONOLITHIC BASE SECTION.
  5. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS, CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
  6. RED CLAY BRICK SHALL CONFORM WITH SECTION M4.05.2 CLAY BRICK OF M.H.D. STANDARD SPECS. FOR HIGHWAY AND BRIDGES. NOT TO SCALE.
  7. ALTERNATE SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING.

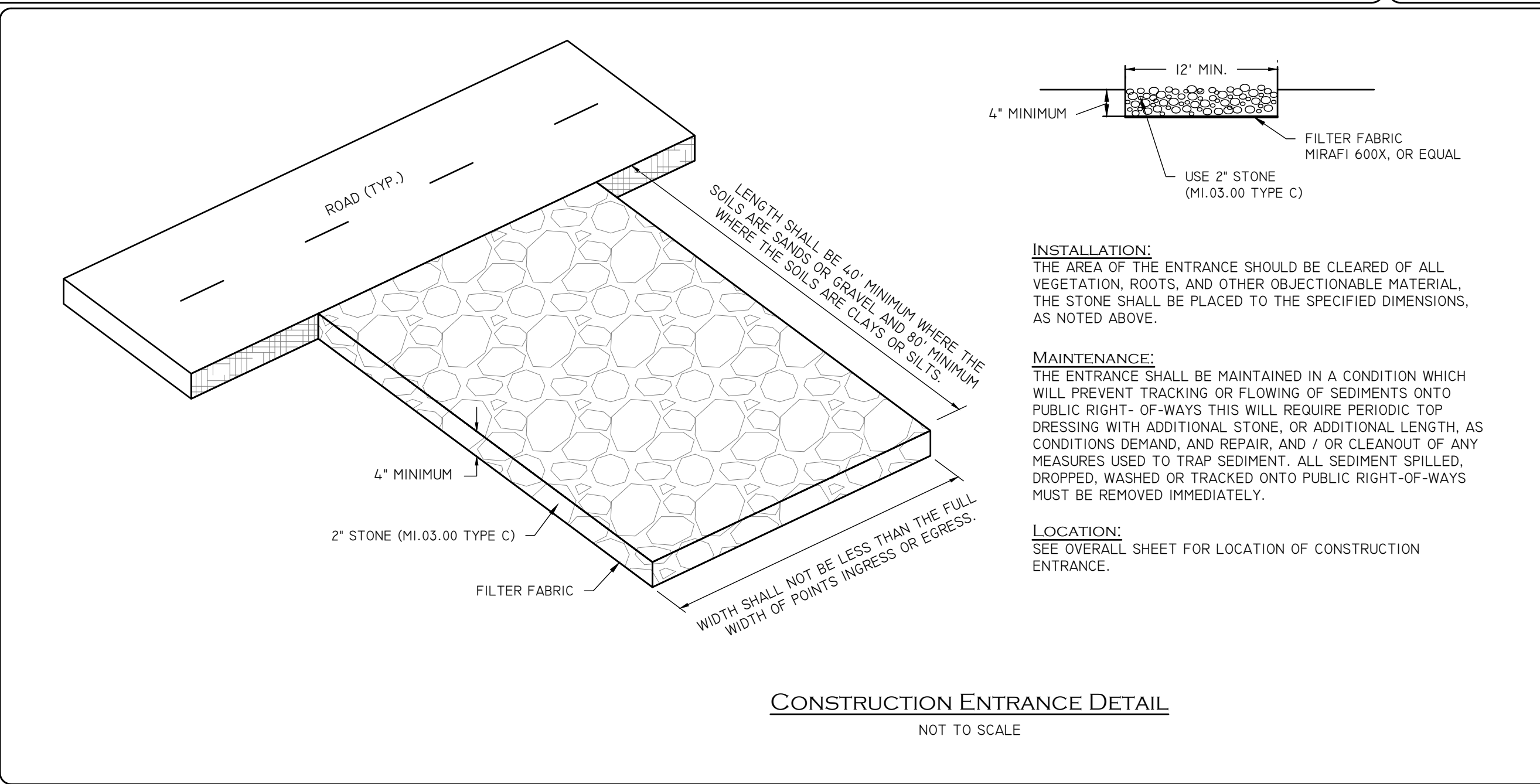


**PAVED WATERWAY INSTALLATION DETAIL**  
NOT TO SCALE

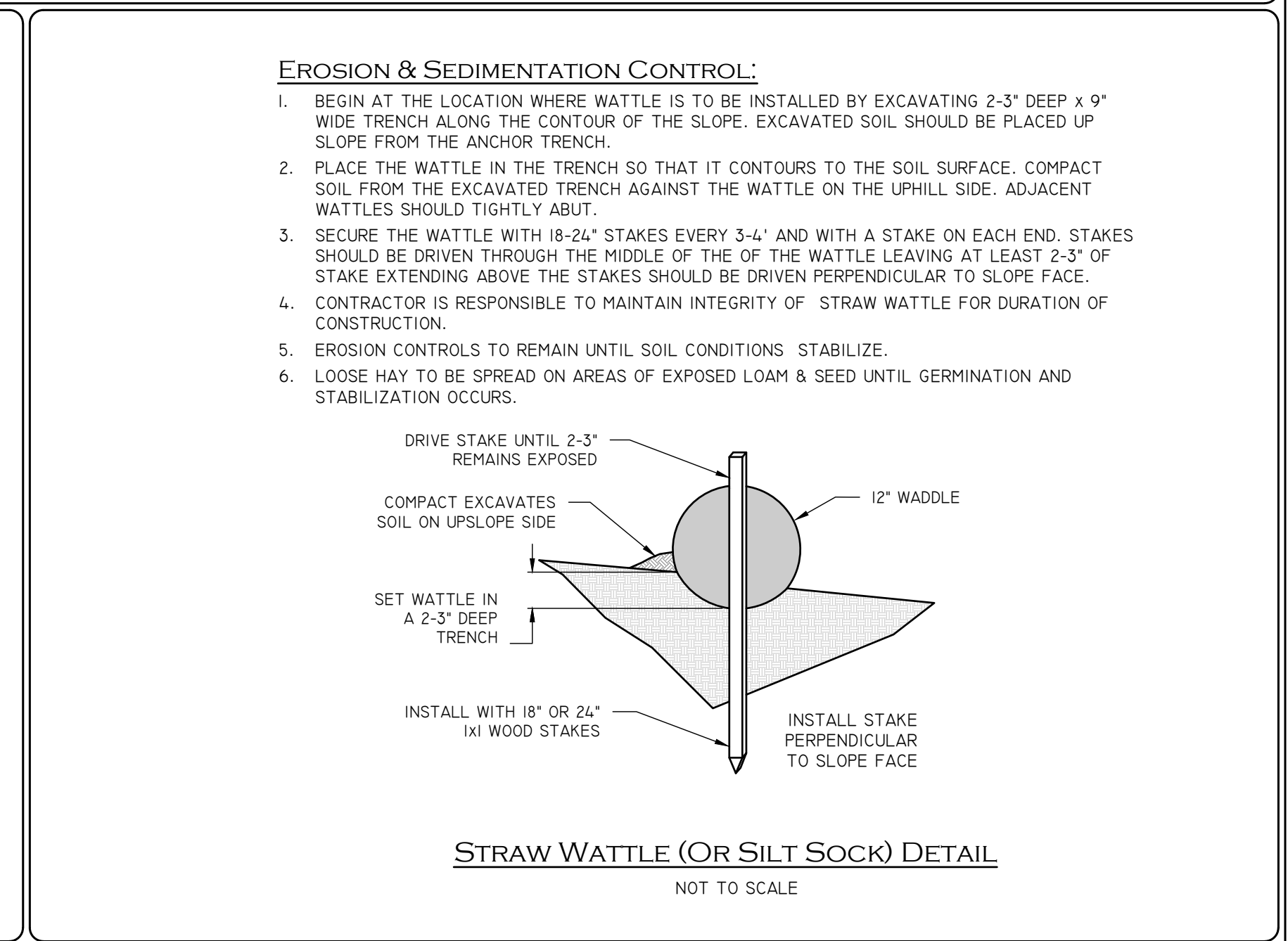


**LOAM AND SEED DETAIL**  
NOT TO SCALE

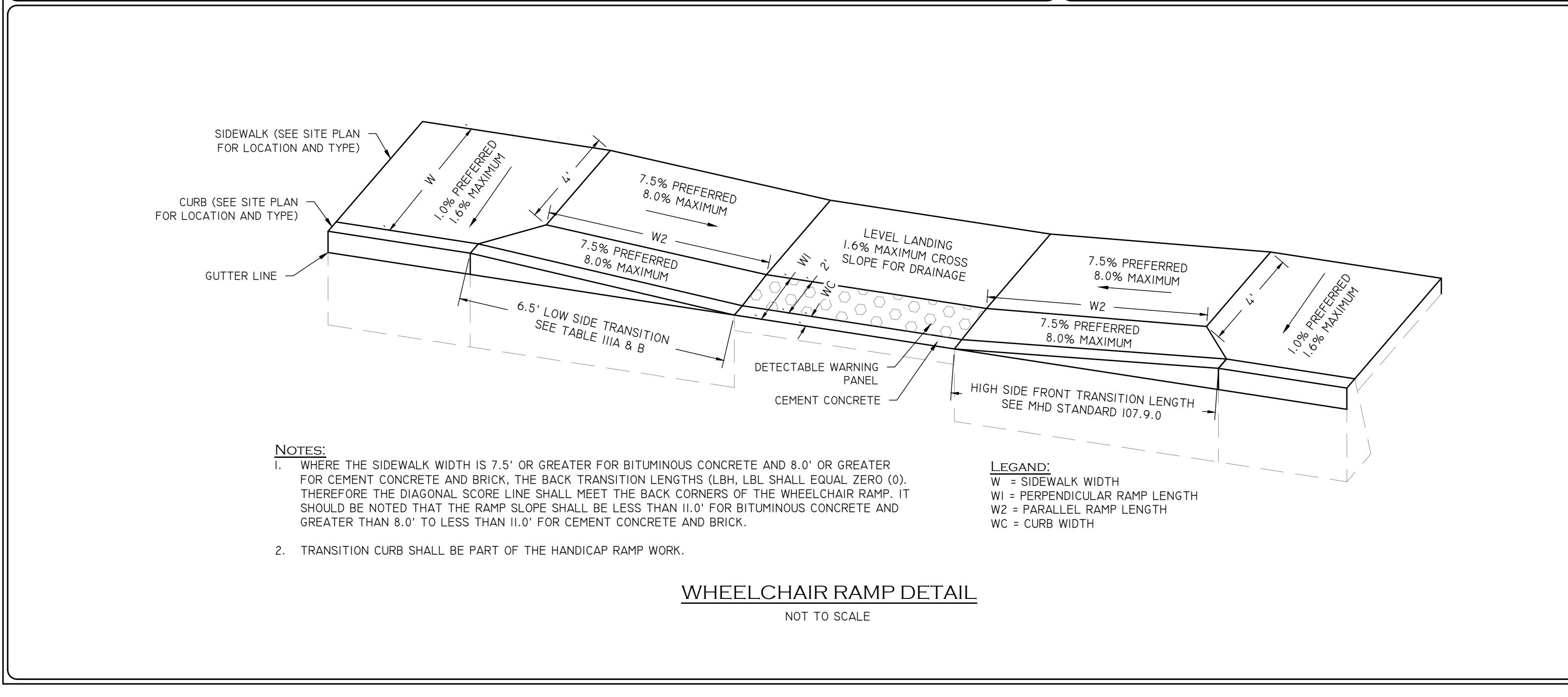
- NOTES:**
1. LOAM MOVED SHALL BE RETAINED AND DISTRIBUTED ON THE SITE IN ACCORDANCE WITH THE PLANS. STOCKPILED LOAM SHALL NOT BE MIXED WITH ANY SUBSOIL OR UNSUITABLE MATERIALS. NEW LOAM IF REQUIRED SHALL BE FERTILE, FRIABLE, MEDIUM TEXTURED SANDY LOAM FREE OF STUMPS, STONES, ROOTS AND OTHER MATTER ONE INCH (1") OR GREATER IN DIAMETER. THE PH SHALL BE BETWEEN 5.5 AND 7.5.
  2. LAWN PREPARATION: ALL DEBRIS AND INORGANIC MATERIAL SHALL BE REMOVED FROM THE SUBGRADE. PRIOR TO THE SPREADING OF ANY LOAM, AREAS SHALL BE RESHAPED AND DRESSED WITH CLEAN LOAM AS REQUIRED TO OBTAIN A SMOOTH SURFACE. SUBGRADE TO BE SCARIFIED AND LOOSEN IN AREAS WHERE COMPACTION HAS OCCURRED. LOAM TO BE SPREAD TO A DEPTH OF SIX INCHES (6"). A STARTER FERTILIZER (10-20-10) AT A RATE OF 20 LBS. PER 1000 SQUARE FEET AND LIME AT A RATE OF 40 LBS. PER 1000 SQUARE FEET. THE LOAM SHALL BE ROLLED TO CREATE A SMOOTH SURFACE.
  3. SEEDING SHALL TAKE PLACE BETWEEN MARCH 15 AND MAY 31 OR AUGUST 15 AND OCTOBER 15. SEED SHALL BE PURE, LIVE, FRESH SEED FROM COMMERCIAL SOURCES AND LABELED IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS. THE SEED MIXTURE SHALL BE:
- | PRODUCTION TYPE         | WEIGHT |
|-------------------------|--------|
| HENREYS HARD FESCUE     | 24.78% |
| AZURE SHEEPS FESCUE     | 24.78% |
| AMBROSE CHEWINGS FESCUE | 24.67% |
| CREeping RED FESCUE     | 24.63% |
- \*INERT MATERIAL TO BE LESS THAN 2.5% MAX.



**CONSTRUCTION ENTRANCE DETAIL**  
NOT TO SCALE

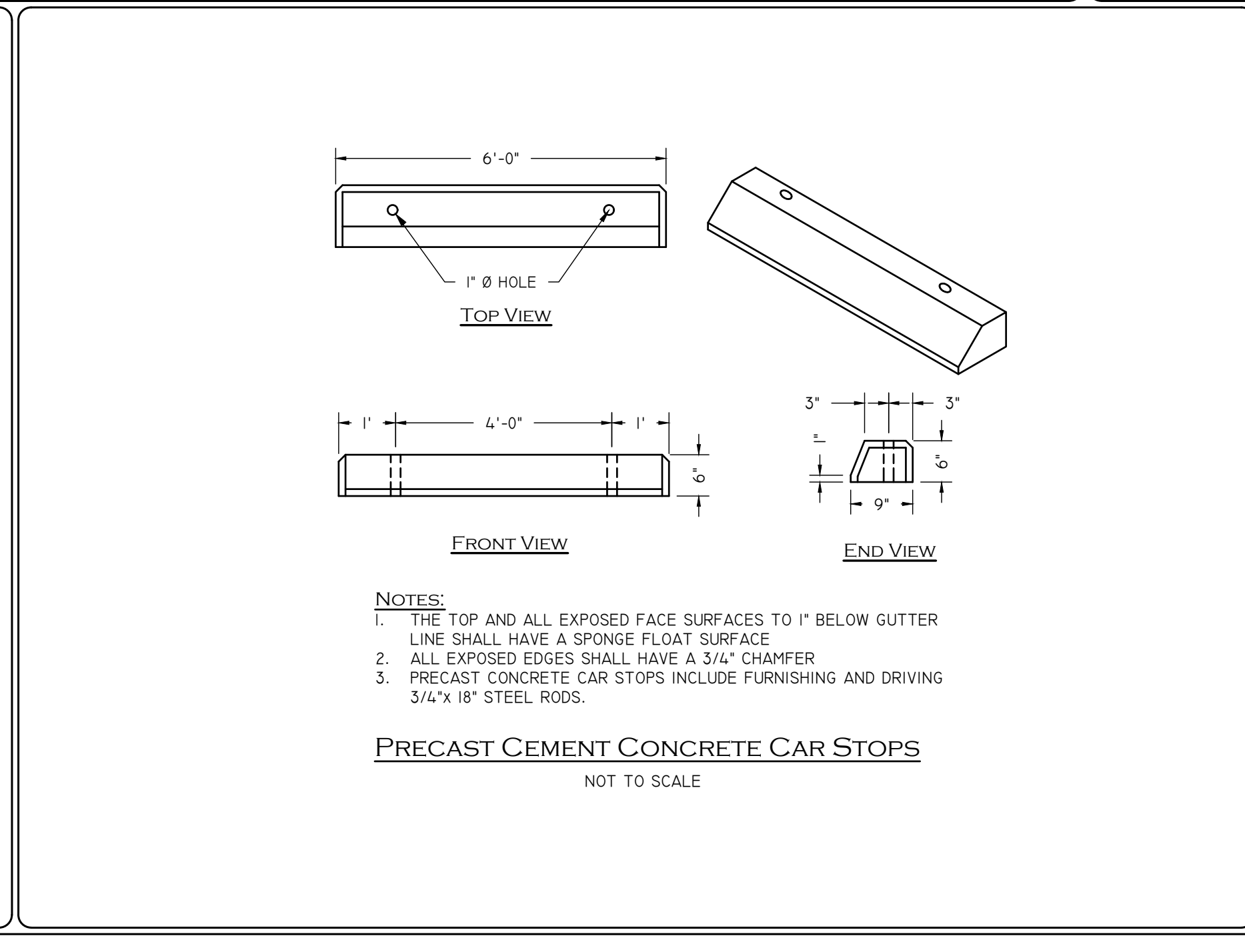


**STRAW WATTLE (OR SILT SOCK) DETAIL**  
NOT TO SCALE



**WHEELCHAIR RAMP DETAIL**  
NOT TO SCALE

- NOTES:**
1. WHERE THE SIDEWALK WIDTH IS 7.5' OR GREATER FOR BITUMINOUS CONCRETE AND 8.0' OR GREATER FOR CEMENT CONCRETE AND BRICK, THE BACK TRANSITION LENGTHS (LBH, LBL SHALL EQUAL ZERO (0). THEREFORE THE DIAGONAL SCORE LINE SHALL MEET THE BACK CORNERS OF THE WHEELCHAIR RAMP. IT SHOULD BE NOTED THAT THE RAMP SLOPE SHALL BE LESS THAN 11.0' FOR BITUMINOUS CONCRETE AND GREATER THAN 8.0' TO LESS THAN 11.0' FOR CEMENT CONCRETE AND BRICK.
  2. TRANSITION CURB SHALL BE PART OF THE HANDICAP RAMP WORK.
- LEGEND:**  
W = SIDEWALK WIDTH  
W1 = PERPENDICULAR RAMP LENGTH  
W2 = PARALLEL RAMP LENGTH  
WC = CURB WIDTH



**PRECAST CEMENT CONCRETE CAR STOPS**  
NOT TO SCALE

- NOTES:**
1. THE TOP AND ALL EXPOSED FACE SURFACES TO 1' BELOW GUTTER LINE SHALL HAVE A SPONGE FLOAT SURFACE
  2. ALL EXPOSED EDGES SHALL HAVE A 3/4" CHAMFER
  3. PRECAST CONCRETE CAR STOPS INCLUDE FURNISHING AND DRIVING 3/4"x 18" STEEL RODS.

**DETAIL SHEET (1 OF 3)**

**PAUL D. CARLSON**  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
PROFESSIONAL SEAL

**"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"**  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038	SCALE: N.T.S.	DRAWN BY: LJG	DATE: FEBRUARY 16, 2022
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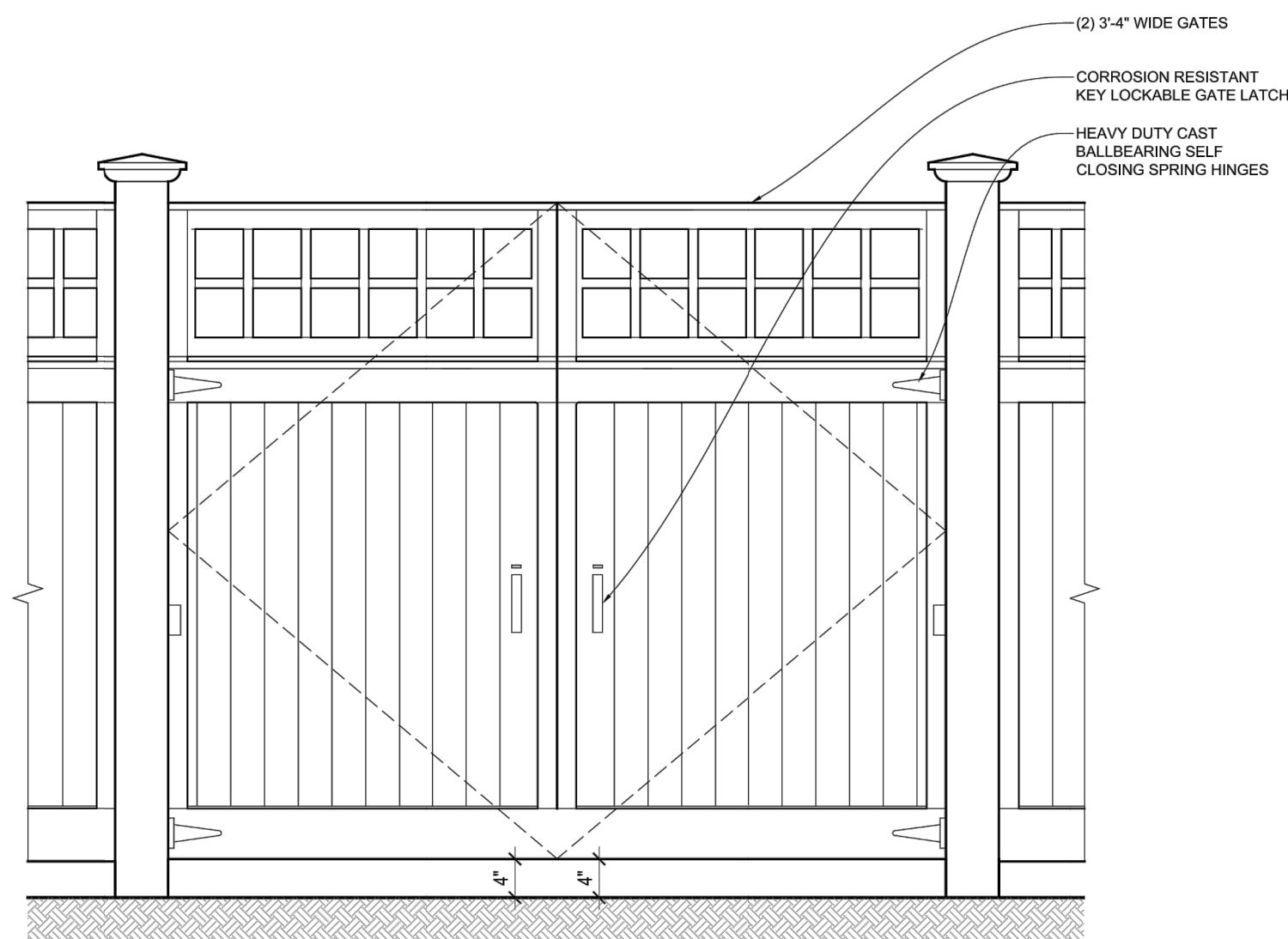
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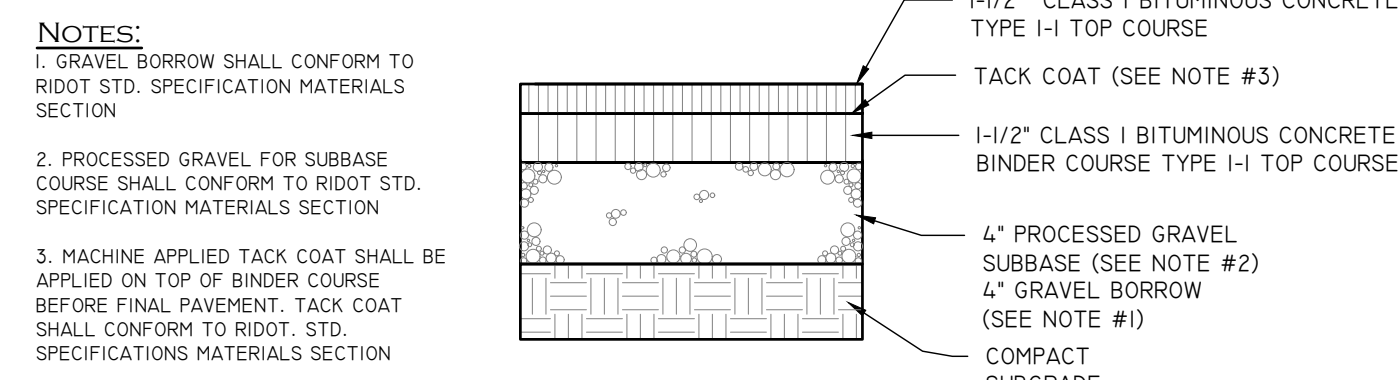
InSite Professional Complex, Suite 1  
1539 Fall River Avenue, Seekonk, MA 02771  
Phone: (508) 336-4500 Fax: (508) 336-4558  
Web Address: InSiteEngineers.com

**SHEET 8 OF 12**

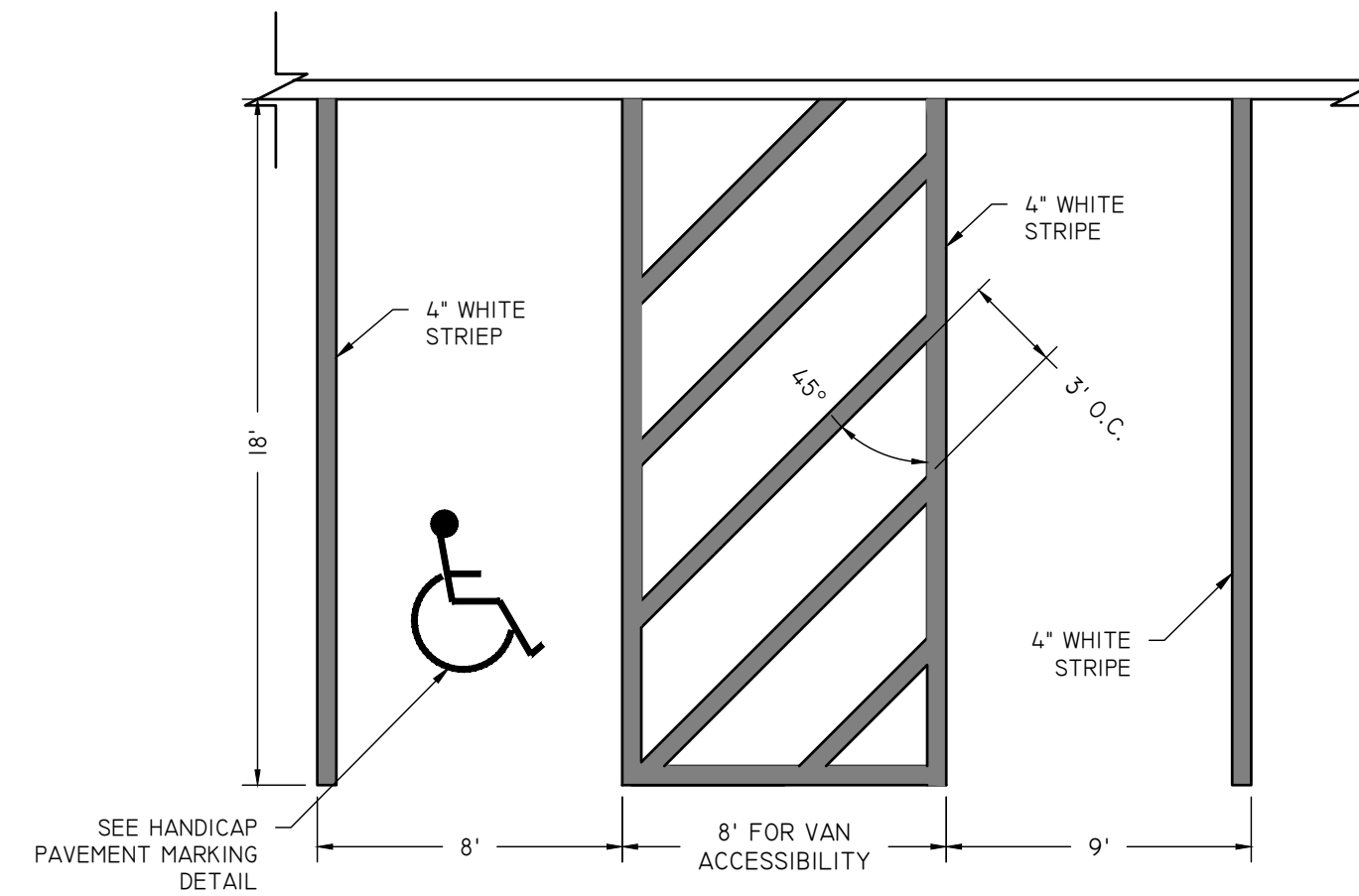
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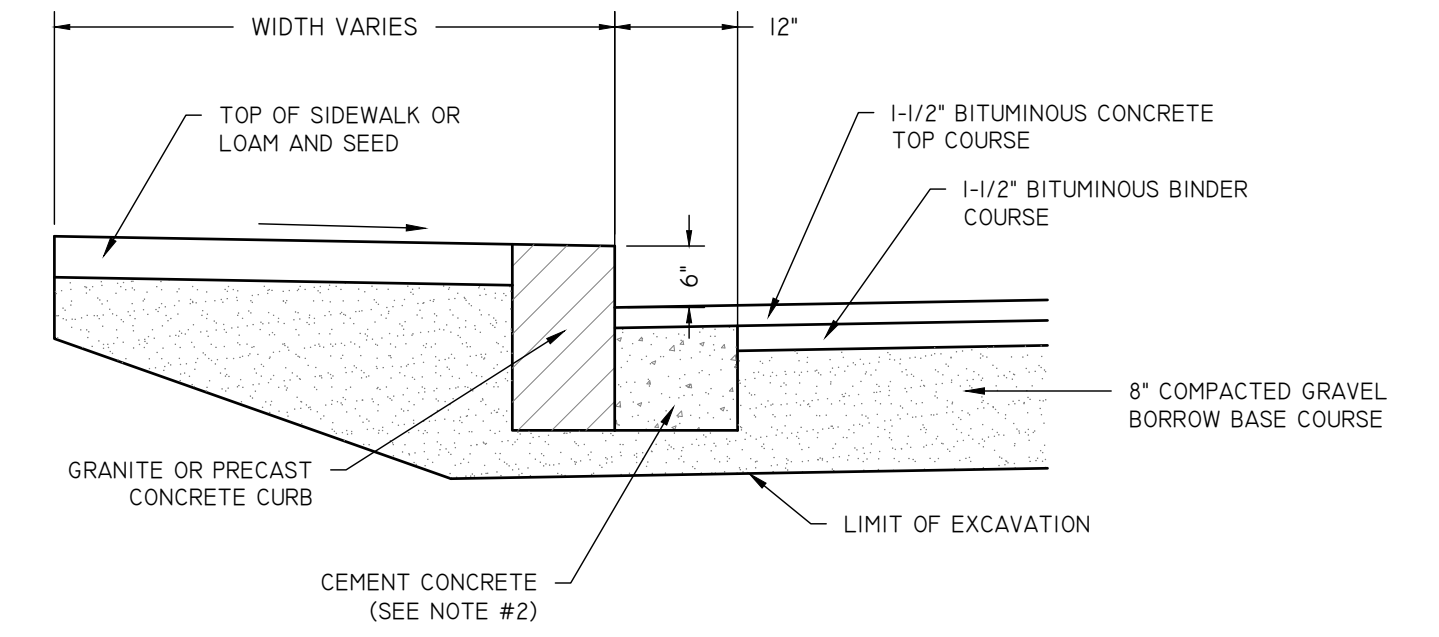
**EXTERIOR TRASH ENCLOSURE FENCE GATE DETAILS**  
NOT TO SCALE



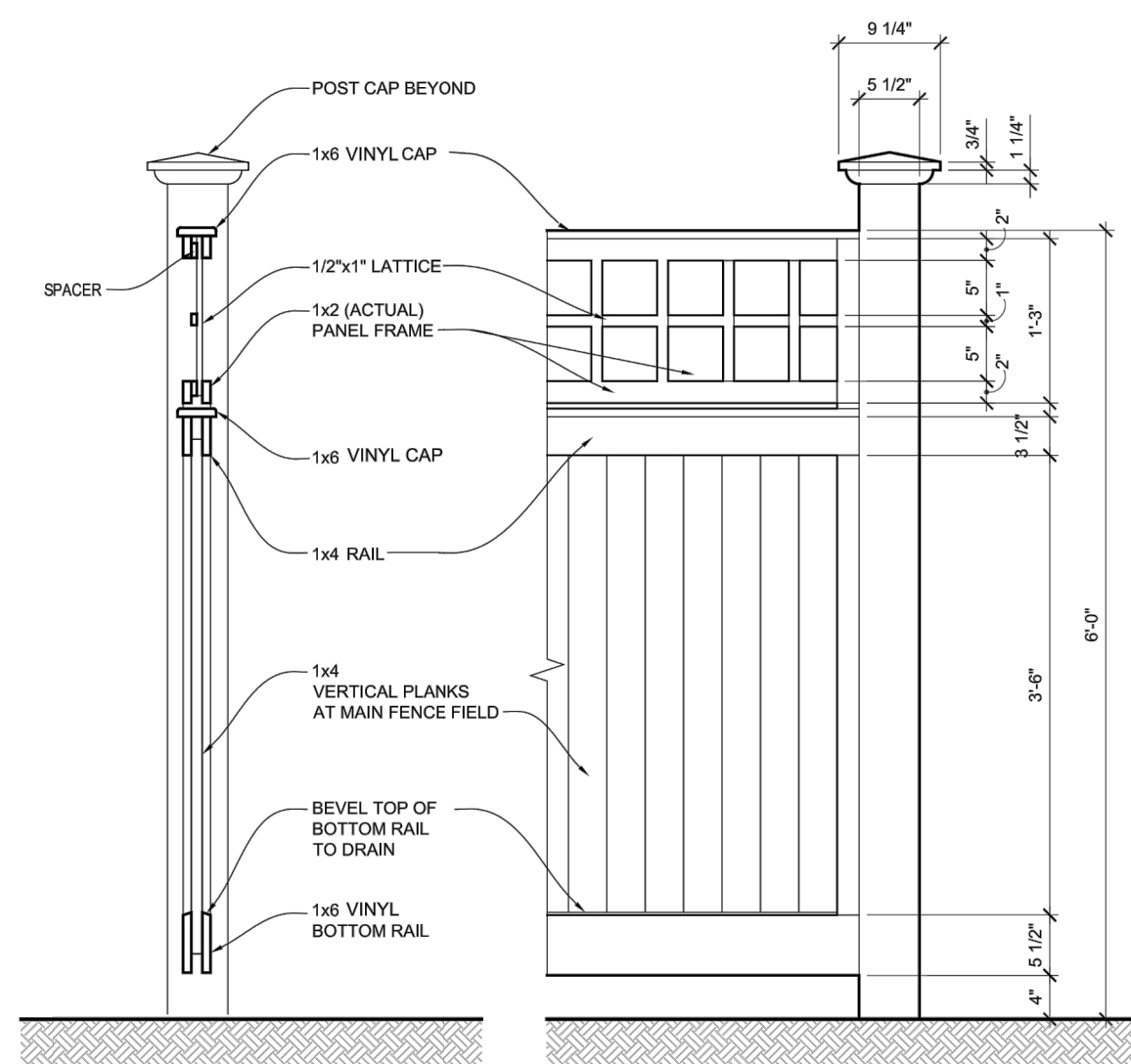
**BITUMINOUS CONCRETE PAVEMENT DETAIL**  
NOT TO SCALE



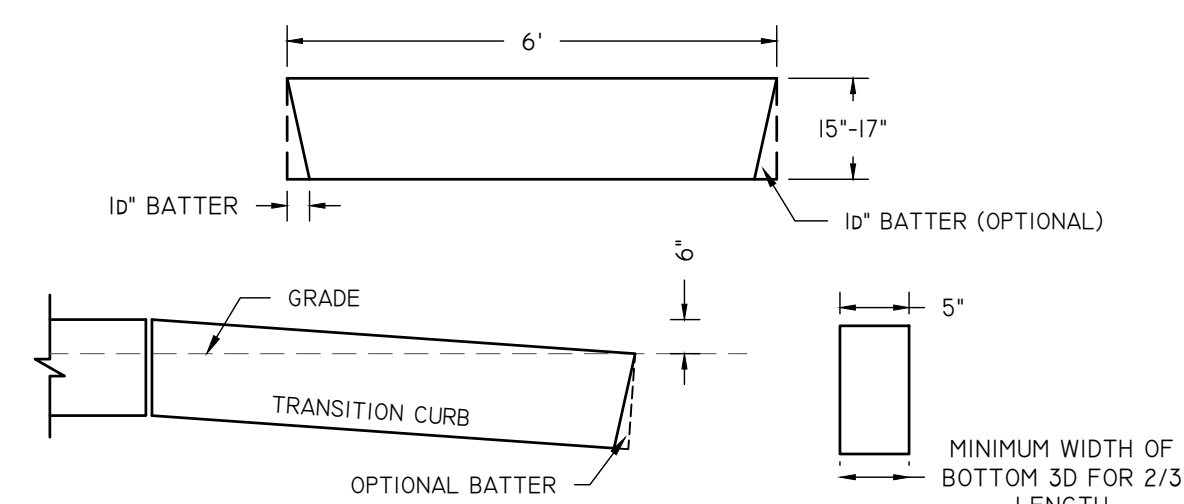
**HANDICAP PARKING AND STANDARD STALLS**  
NOT TO SCALE



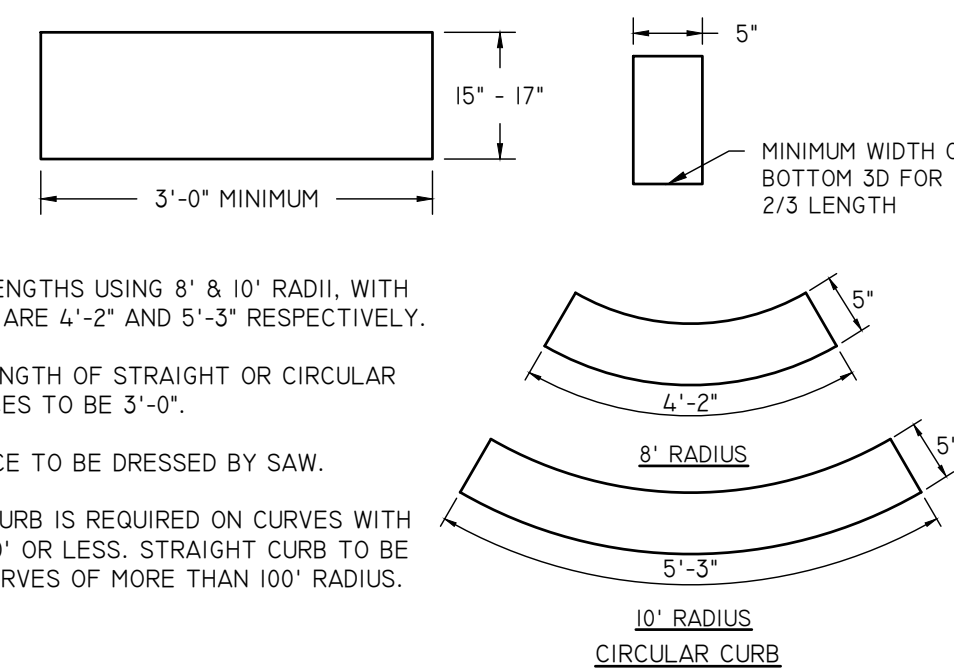
**METHOD OF SETTING VERTICAL CURB**  
NOT TO SCALE



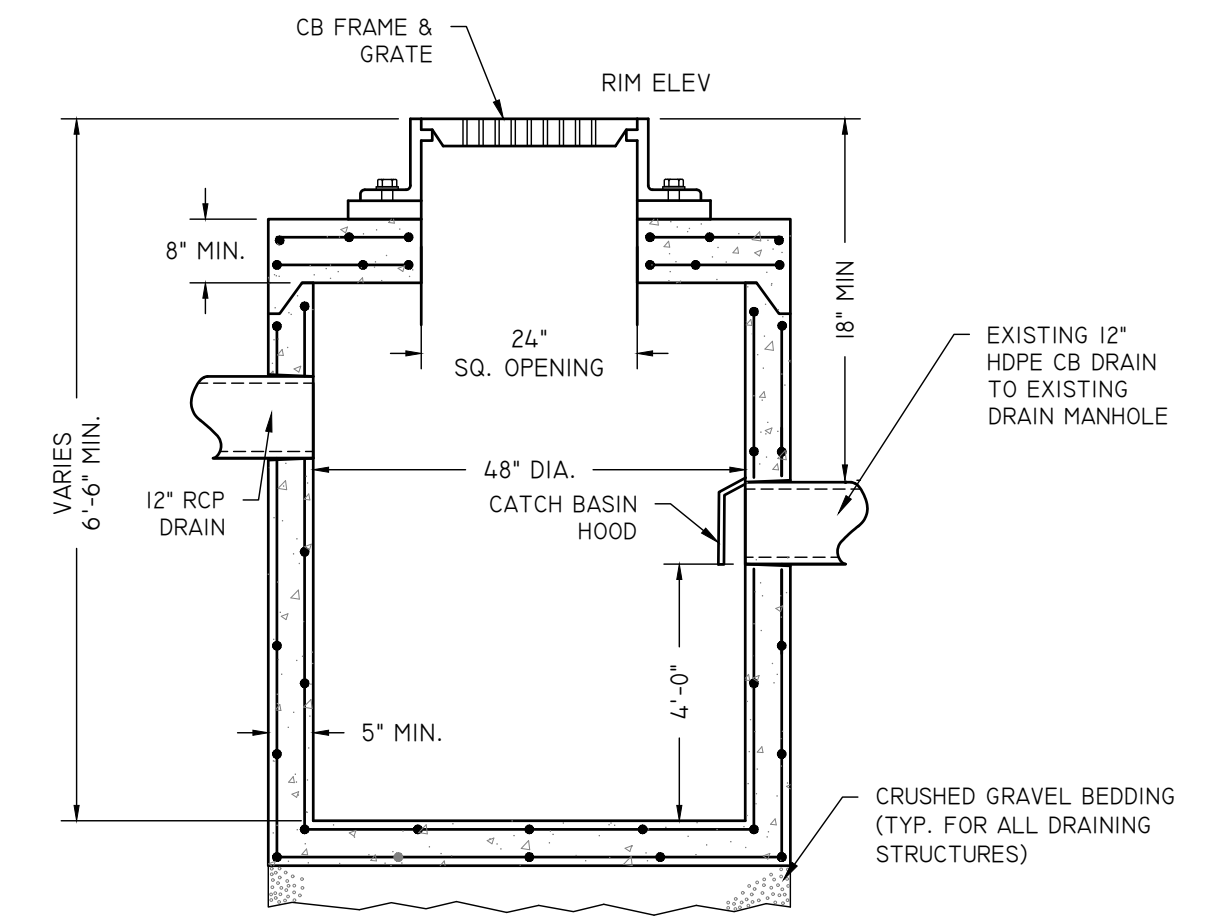
**EXTERIOR TRASH ENCLOSURE FENCE DETAILS**  
NOT TO SCALE



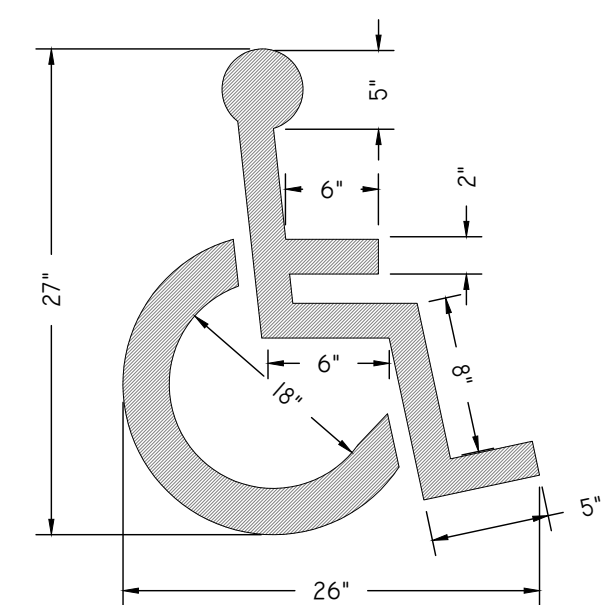
**6' PRECAST TRANSITION CURB**  
NOT TO SCALE



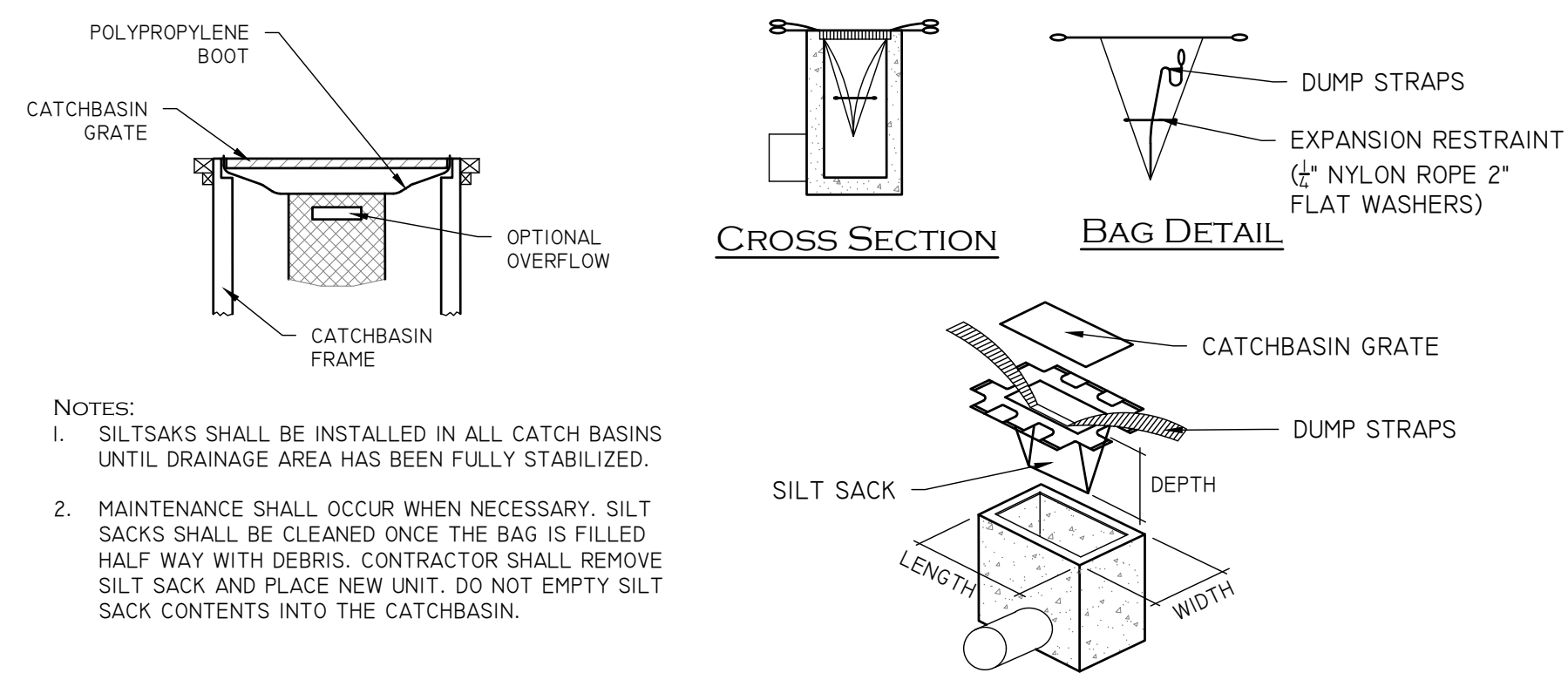
**PRECAST CONCRETE CURB**  
NOT TO SCALE



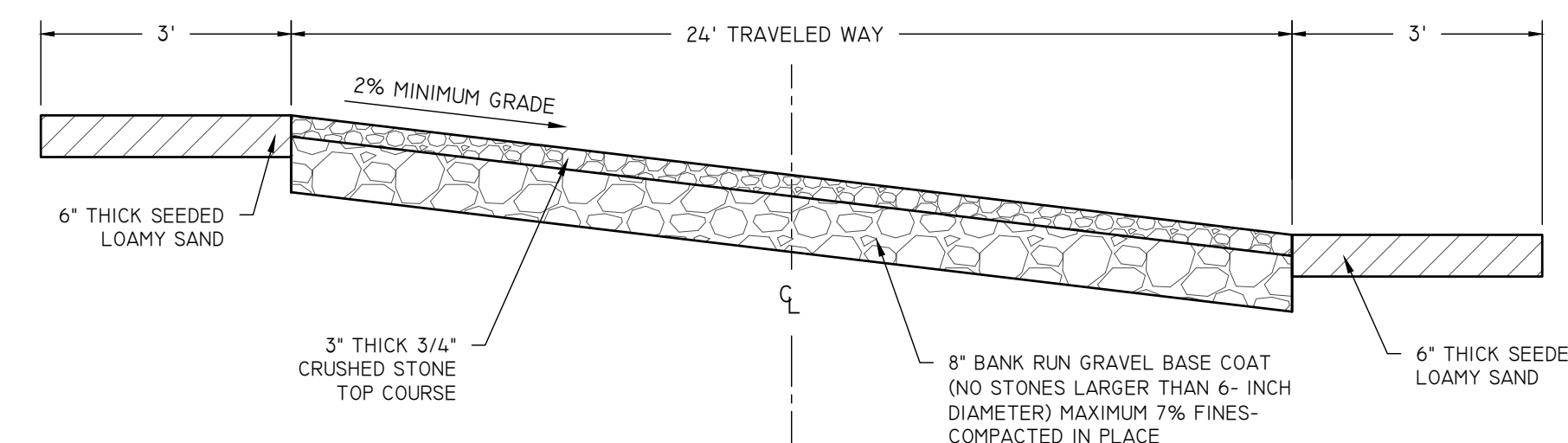
**DEEP SUMP CATCH BASIN DETAIL**  
NOT TO SCALE



**HANDICAP PAVEMENT MARKING**  
NOT TO SCALE



**CATCH BASIN WITH SILT SACK INLET PROTECTION**  
NOT TO SCALE



**SUPERELEVATED DRIVEWAY CROSS SECTION**  
NOT TO SCALE

**DETAIL SHEET (2 OF 3)**

PAUL D. CARLSON  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
PROFESSIONAL SEAL

"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

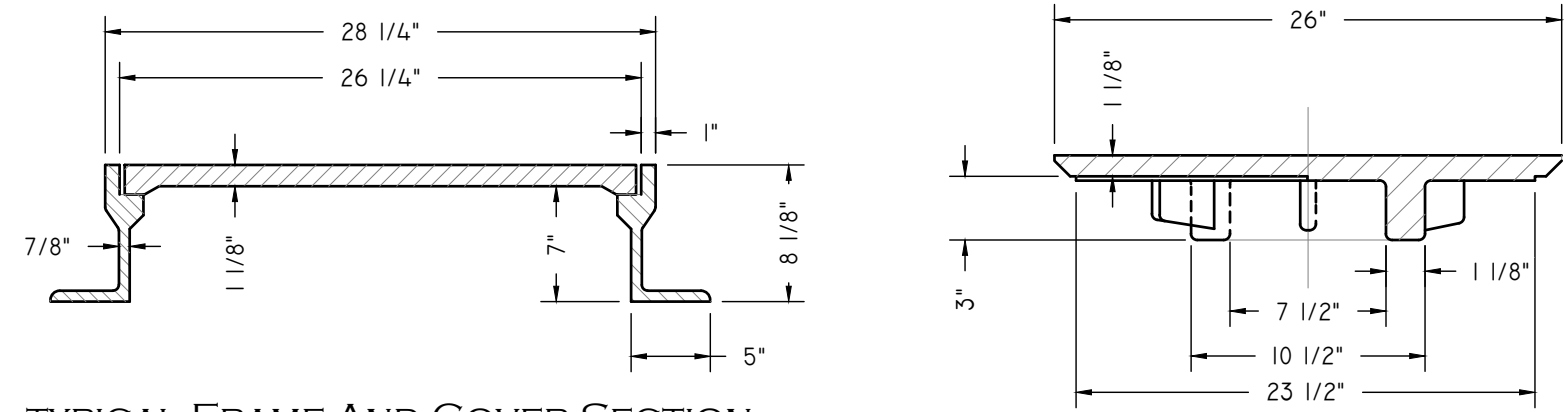
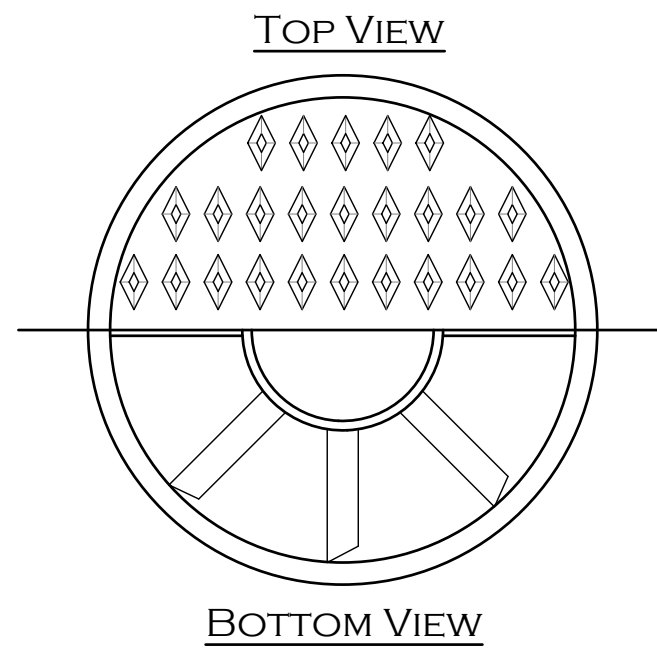
JOB # 21-038 SCALE: N.T.S. DRAWN BY: L.J.G. DATE: FEBRUARY 16, 2022

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SHEET  
**9**  
OF 12



TYPICAL FRAME AND COVER SECTION

TYPICAL COVER

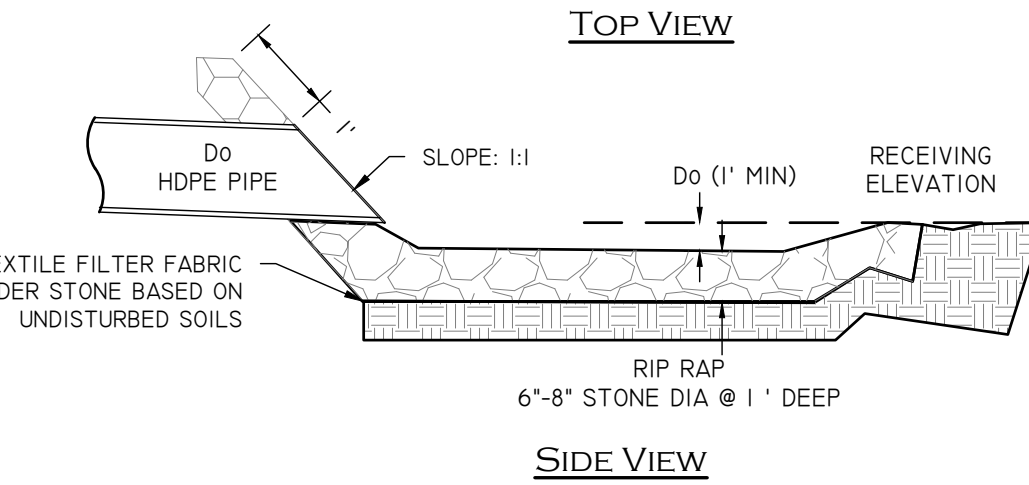
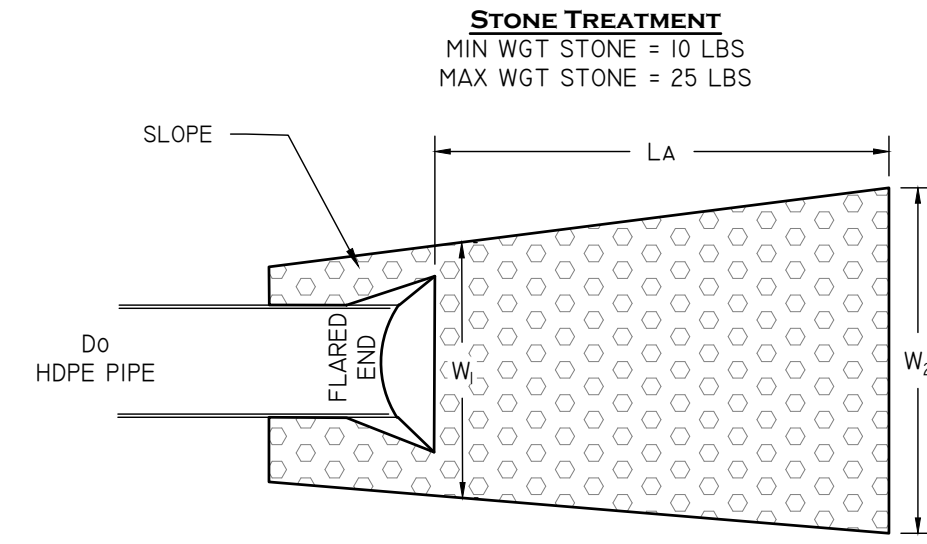
NOTES:

- SANITARY MANHOLE SHALL HAVE "SEWER" CAST ON THE COVER.
- DRAINAGE MANHOLE SHALL HAVE "DRAIN" CAST ON THE COVER.

ROUND MANHOLE FRAME AND COVER (HEAVY DUTY)

NOT TO SCALE

Do	LA	W <sub>1</sub>	W <sub>2</sub>	D
12"	8'	3'	9'	1.5'
18"	17'	5'	22'	1.5'

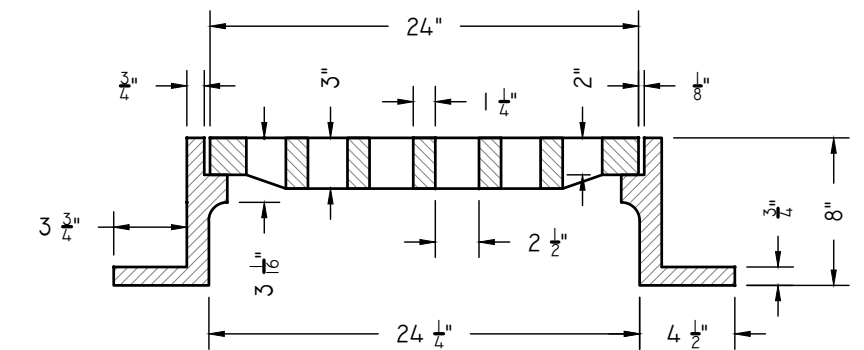
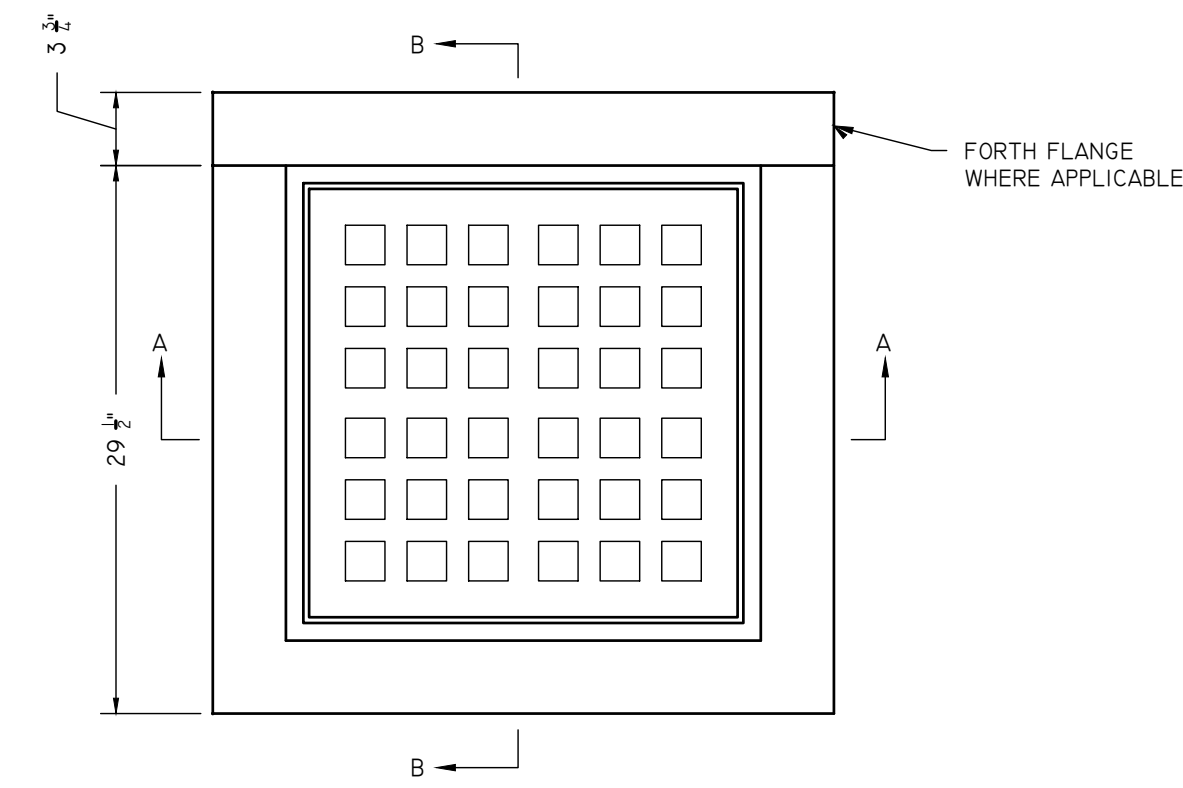


NOTES:

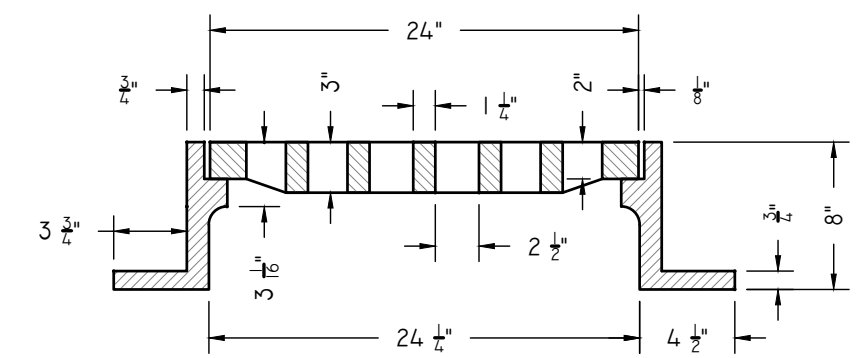
- RIP RAP TO BE CONSTRUCTED OVER 6" THICK BASE OF RIP RAP BEDDING CONSISTING OF 3/4" TO 1-1/2" CRUSHED STONE.

TYPICAL FLARED END SECTION / RIP RAP DETAIL

NOT TO SCALE



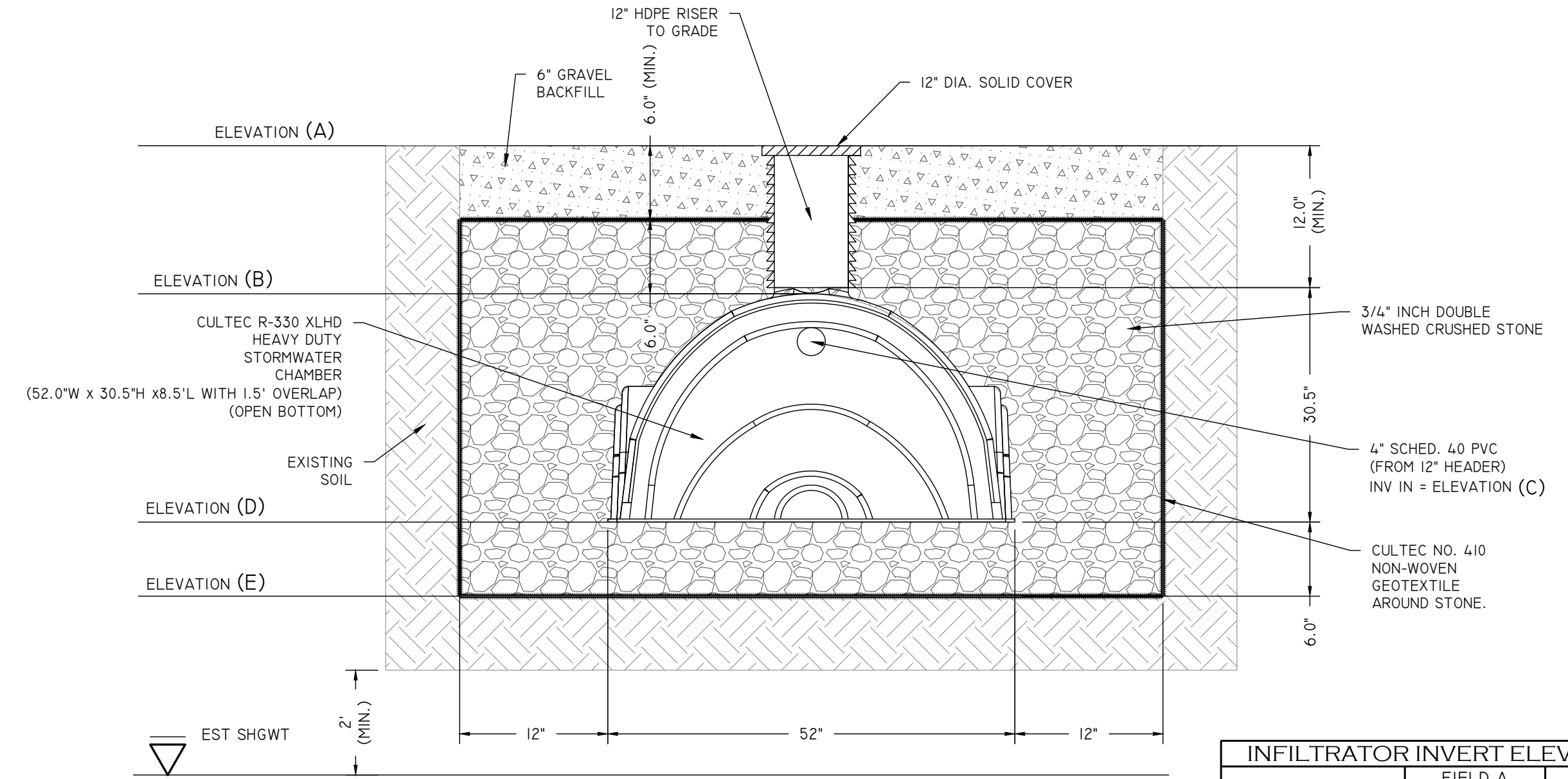
SECTION A-A



SECTION B-B

SQUARE CATCH BASIN FRAME & GRATE

NOT TO SCALE

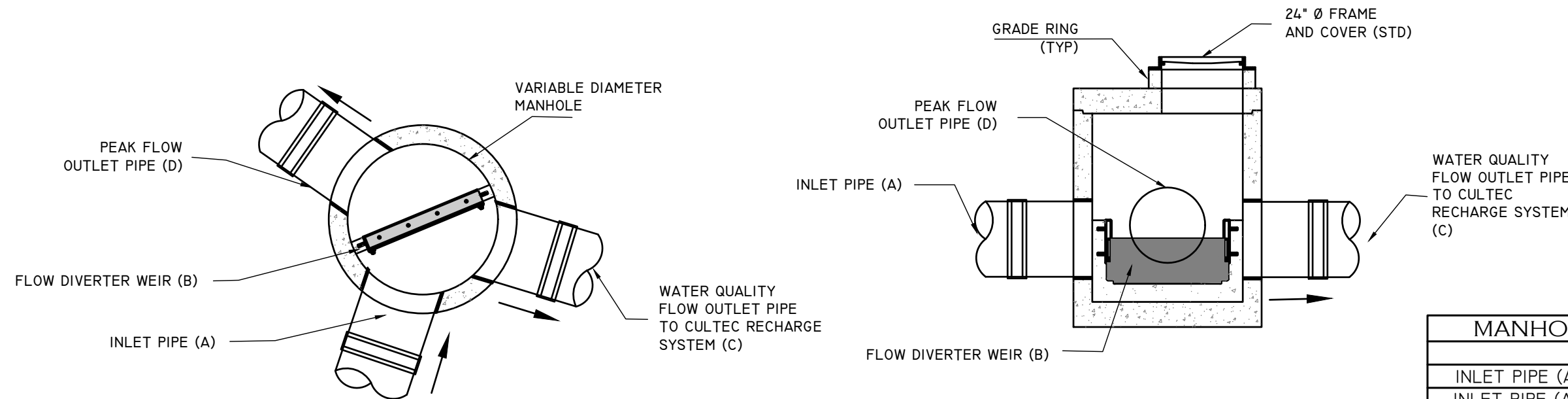


CULTEC R-330-XLHD HEAVY DUTY INFILTRATOR SYSTEM CROSS SECTION

NOT TO SCALE

INFILTRATOR INVERT ELEVATIONS

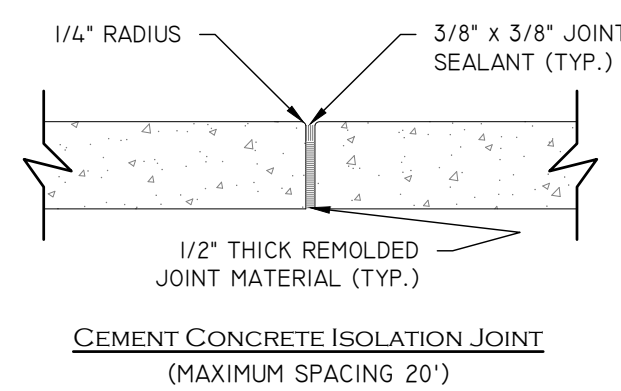
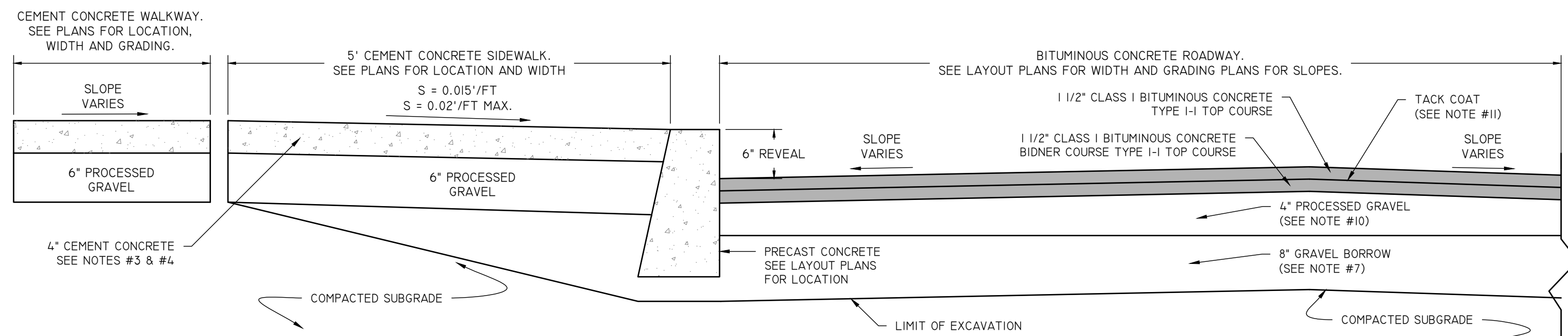
ELEVATION	FIELD A	FIELD B
ELEVATION A	167.00	160.25
ELEVATION B	161.40	136.40
ELEVATION C	160.90	135.80
ELEVATION D	138.90	133.90
ELEVATION E	138.40	133.40
SHGWT	128.00	128.00



DRAIN MANHOLE WITH FLOW DIVERTER

MANHOLE INVERT ELEVATIONS

	DMH 3	DMH 6
INLET PIPE (A1)	140.91	136.30
INLET PIPE (A2)	N/A	136.33
WEIR (B)	141.30	136.20
WATER QUALITY (C)	141.00	136.00
OVERFLOW (D)	139.65	133.47



CEMENT CONCRETE ISOLATION JOINT (MAXIMUM SPACING 20')

NOTES:

- CEMENT CONCRETE FOR SIDEWALK SHALL ATTAIN COMPRESSIVE STRENGTH OF 4000 PSI (28 DAYS) WITH AIR ENTRAINMENT CONTENT OF 7%.
- CONSTRUCTION JOINTS WITH 1/4" PREMOLDED EXPANSION JOINT FILLER SHALL BE PLACED EVERY 20 FEET.
- IF SIDEWALK IS TO ABUT A SMOOTH WALL, FOUNDATION OR STATIONARY OBJECT, PLACE THE EXPANSION JOINT FILLER FULL DEPTH, BETWEEN SIDEWALK CONCRETE AND SURFACE OF WALL, FOUNDATION OR STATIONARY OBJECT.
- IF SIDEWALK IS TO ABUT AN IRREGULAR WALL, FOUNDATION OR STATIONARY OBJECT, PLACE THE EXPANSION JOINT FILLER FULL DEPTH, FOUR (4) INCHES FROM IRREGULAR SURFACE, AND POUR CONCRETE BETWEEN THE ABOVE MENTIONED SURFACES AND THE EXPANSION JOINT MATERIAL.
- THE FORCING OF PREMOLDED EXPANSION JOINT FILLER INTO FRESHLY PLACED CONCRETE WILL NOT BE ALLOWED.

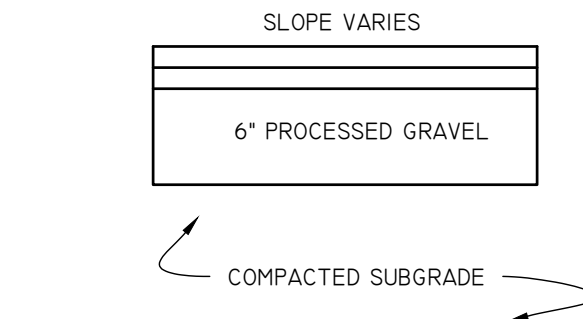
NOTES:

- THE MAXIMUM TOLERANCE FOR THE 4" CONCRETE THICKNESS IS ±1/2".
- GRAVEL BORROW SHALL CONFORM TO RIDOT STD. SPECIFICATION MATERIALS SECTION.
- BITUMINOUS CONCRETE BERM SHALL BE MONOLITHIC PLACE WITH TOP COURSE OF BITUMINOUS PAVEMENT.
- USE 75' FOR TYPE A BITUMINOUS CONCRETE BERM WHEN USED WITH ADJACENT LOAM AREA FOR APPLICATION WITH SIDEWALK USE 90° ANGLE FOR BACK OF BERM.
- PROCESSED GRAVEL FOR SUBBASE COURSE SHALL CONFORM TO RIDOT STD. SPECIFICATION MATERIALS SECTION.
- MACHINE APPLIED TACK COAT SHALL BE APPLIED ON TOP OF BINDER COURSE BEFORE FINAL PAVEMENT. TACK COAT SHALL CONFORM TO RIDOT, STD. SPECIFICATIONS MATERIALS SECTION.

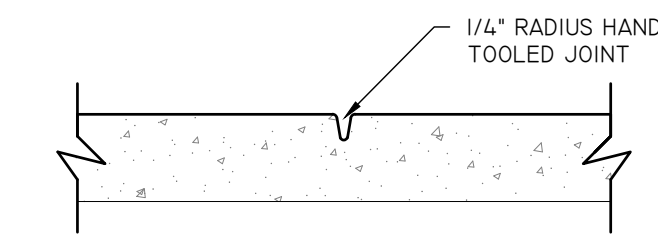
PAVEMENT, SIDEWALK AND WALKWAY DETAIL

NOT TO SCALE

DENSE MIX BITUMINOUS CONCRETE WALKWAY PLACES IN 2 COURSES OF 1 1/2" EACH SEE LAYOUT PLANS FOR LOCATION, WIDTH AND GRADING



BITUMINOUS CONCRETE PAVEMENT NOT TO SCALE



CEMENT CONCRETE CONTROL JOINT (MINIMUM SPACING 4' OR AS INDICATED ON THE PLANS)

DETAIL SHEET (3 OF 3)

PAUL D. CARLSON  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
PROFESSIONAL SEAL

"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

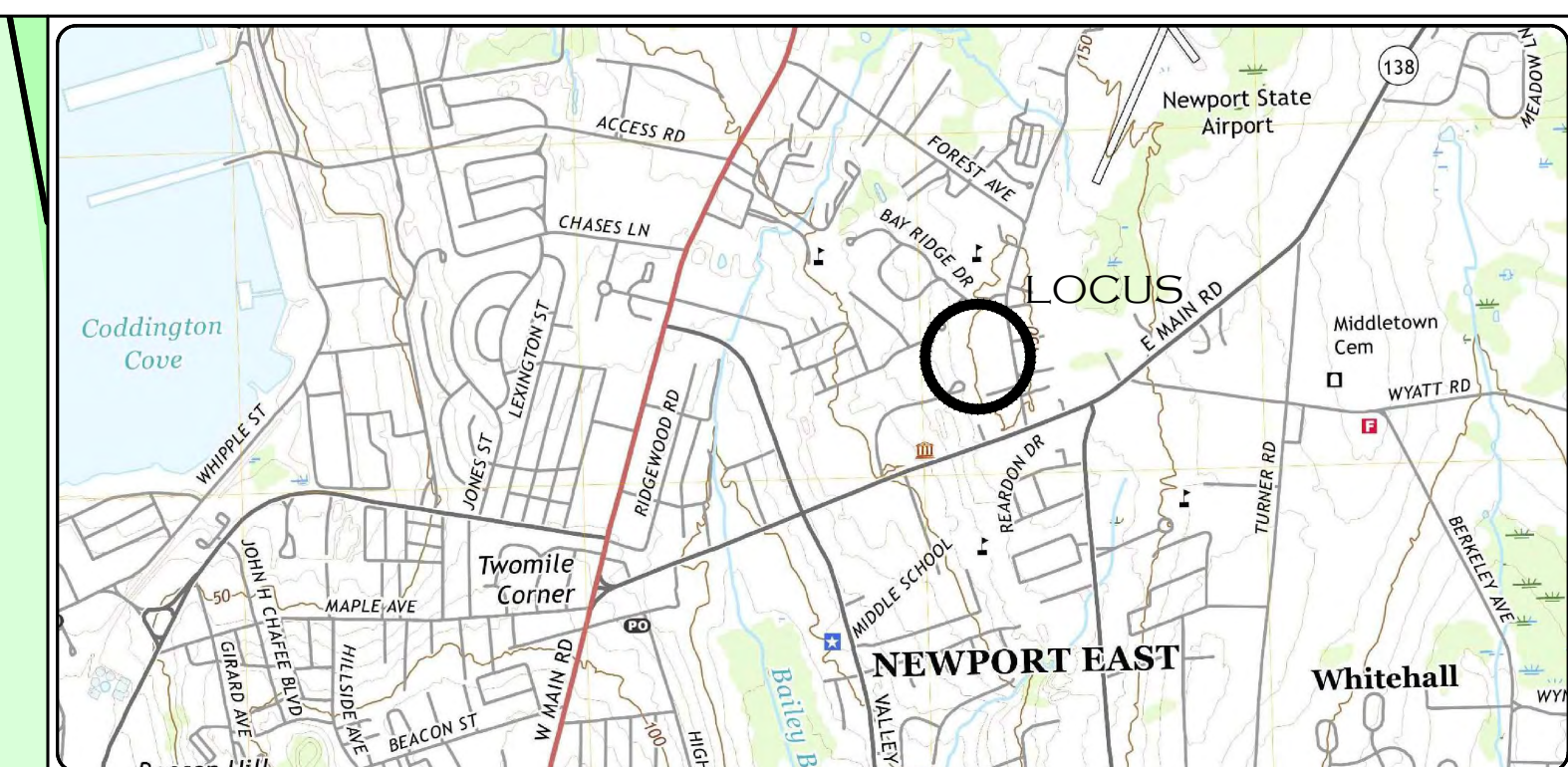
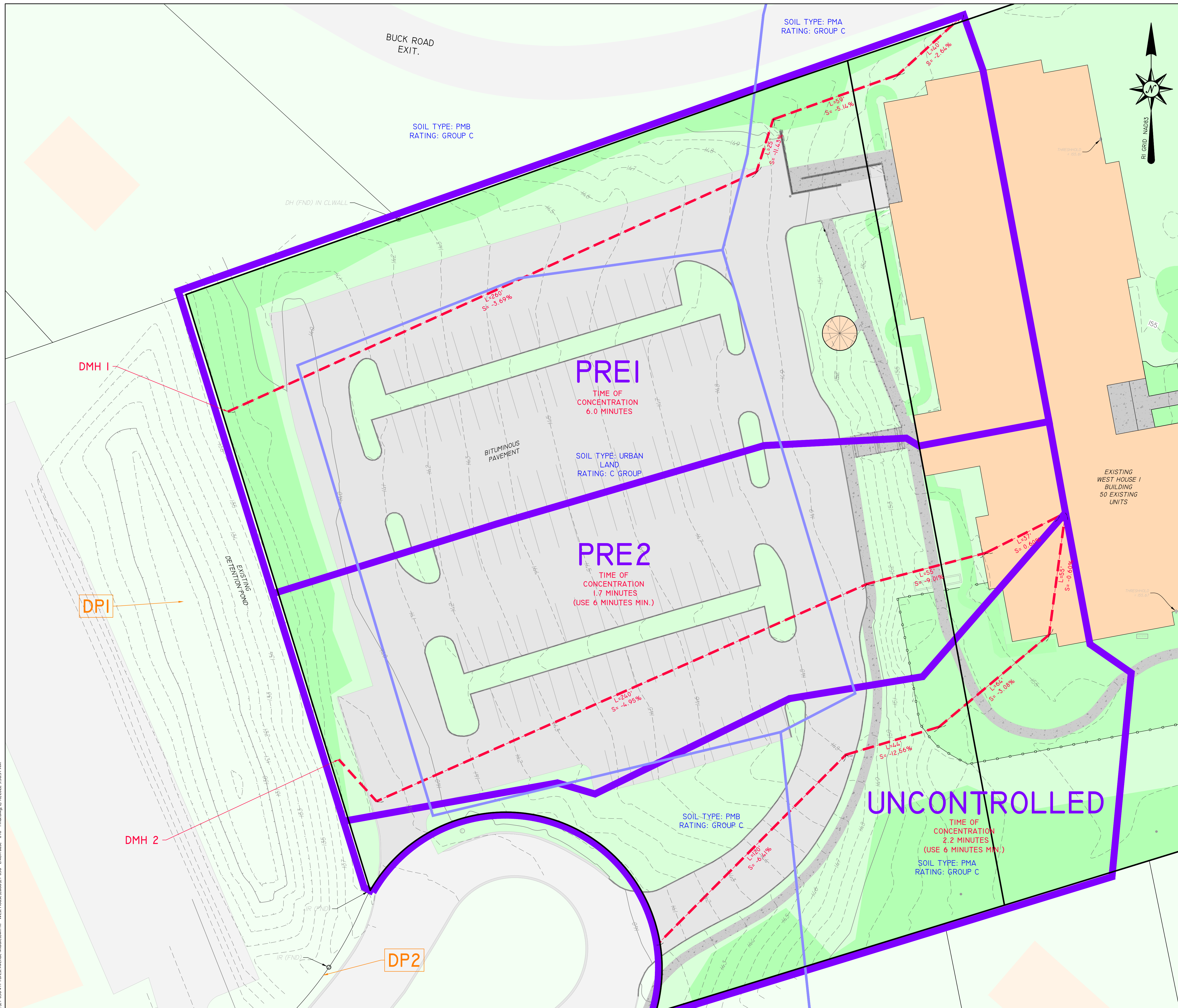
JOB # 21-038 SCALE: N.T.S. DRAWN BY: L.J.G. DATE: FEBRUARY 16, 2022

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SHEET  
10  
OF 12



- GENERAL NOTES:**
- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  - ZONING DISTRICT: OB - OFFICE BUSINESS
  - OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  - SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**WATERSHED ANALYSIS LEGEND:**

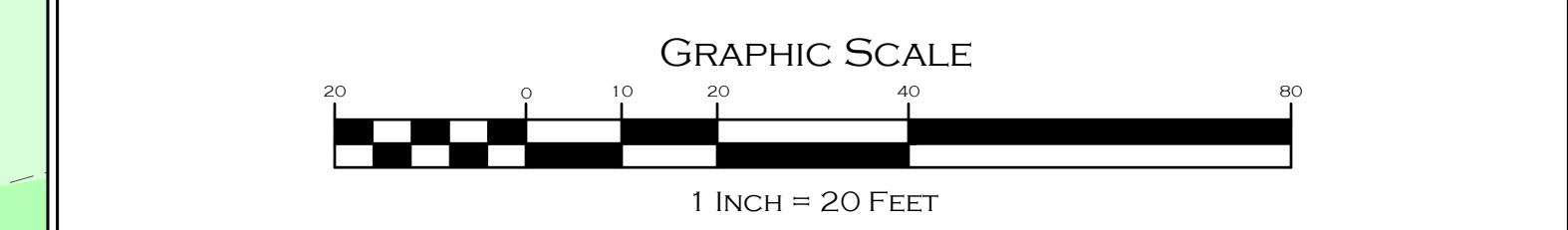
PRE WATERSHED AREA:	
POST WATERSHED AREA:	
SOIL GROUPS:	
TIME OF CONCENTRATION:	
FORESTED AREA:	
GRASS AREA:	
PAVEMENT AREA:	
BUILDING AREA:	

**WATERSHED CALCULATIONS:**

Pre Watershed Analysis				
	Roof	Pavement	Total (s.f.)	Total (acres)
Pre 1	7,775	29,476	37,251	0.86
Pre 2	2,398	27,775	30,173	0.69
UC	1,398	6,473	7,871	0.18
<b>Total</b>	<b>11,571.00</b>	<b>63,724.00</b>	<b>75,295.00</b>	<b>1.73</b>

Pre Watershed Analysis		
	Total Area	Impervious Area
To Basin	94,153	67,424
Uncontrolled	29,294	7,871
<b>Total</b>	<b>123,447</b>	<b>75,295</b>



**PRE WATERSHED ANALYSIS MAP**

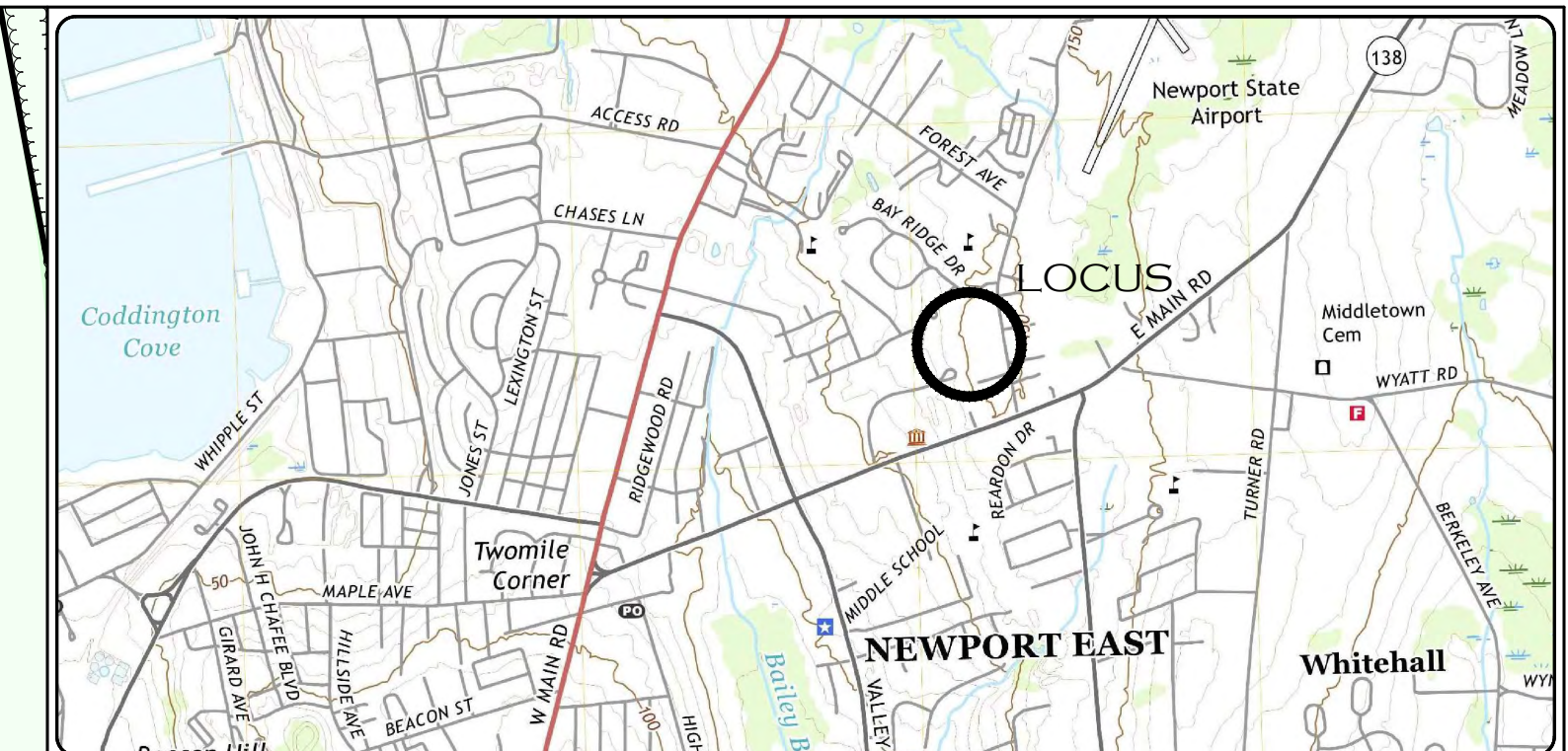
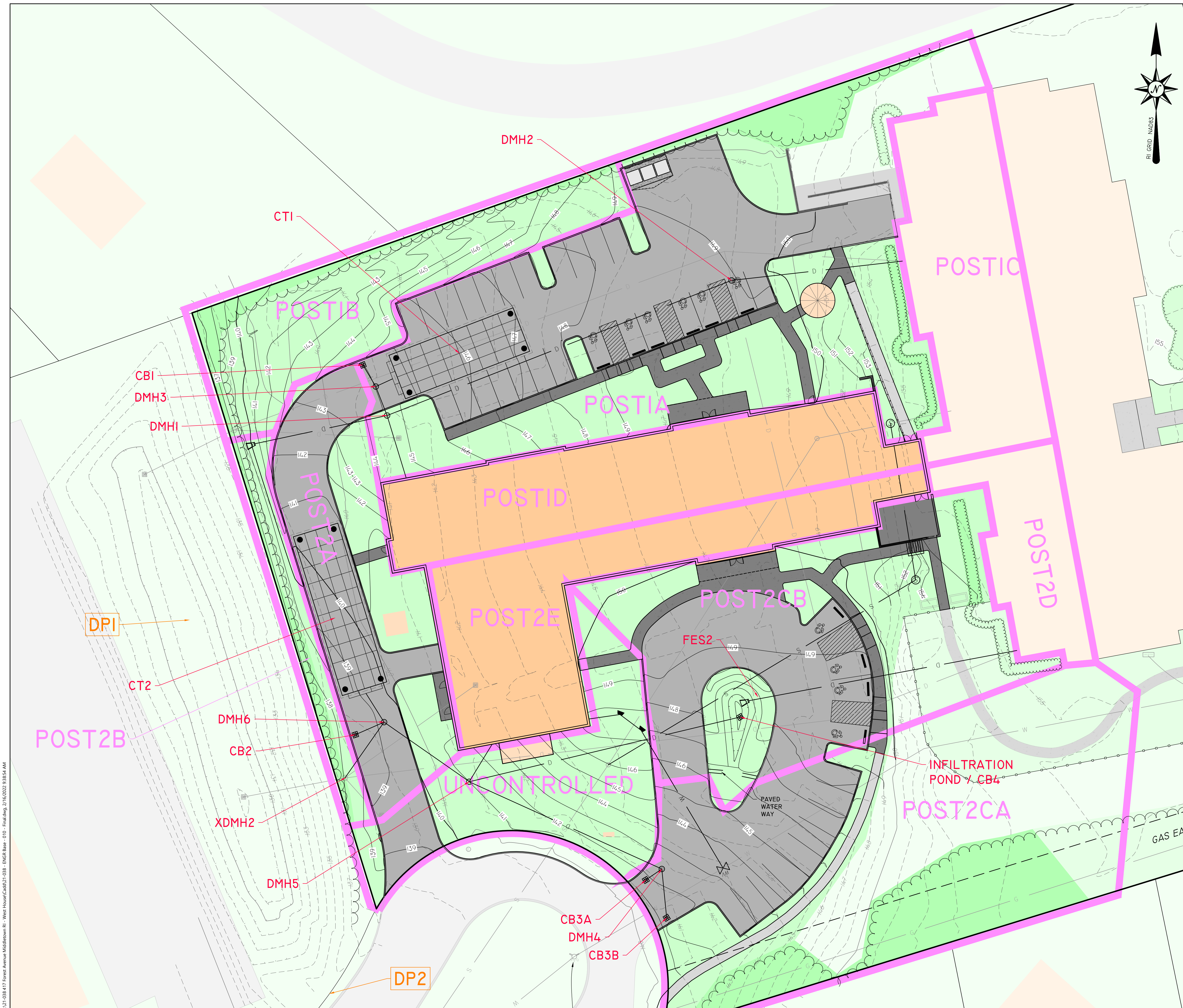
	<b>"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"</b>			
	417 FOREST AVENUE, MIDDLETOWN RI, 02842			
	ASSESSORS MAP 113 LOT 6			
	APPLICANT: THE WEST HOUSE CORPORATION C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886			
JOB #	SCALE:	DRAWN BY:	DATE:	
21-038	1" = 20'	LJG	FEBRUARY 16, 2022	
REVISED:				

	InSite Professional Complex, Suite 1 1539 Fall River Avenue Seekonk, MA 02771 Phone: (508) 336-4500 Fax: (508) 336-4558 Web Address: InsiteEngineers.com	<b>SHEET</b> <b>11</b> <b>OF 12</b>

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1/21/2022 4:17 PM Forest Avenue Middletown RI - West House/Cadd/21-038 - ENGR Base - 010 - Final.dwg 2/16/2022 9:38:51 AM



**WATERSHED ANALYSIS LEGEND:**

POST WATERSHED AREA:

FORESTED AREA:

GRASS AREA:

PAVEMENT AREA:

BUILDING AREA:

**WATERSHED CALCULATIONS:**

Post Watershed Analysis		
	Total Area	Impervious Area
To Basin	116,144	62,024
Uncontrolled	7,303	867
<b>Total</b>	<b>123,447</b>	<b>62,891</b>

Post Watershed Analysis				
	Roof	Pavement	Total (s.f.)	Total (acres)
Post 1A	0	14,271	14,271	0.33
Post 1B	0	3	3	0.00
Post 1C	7,808	0	7,808	0.18
Post 1D	9,079	0	9,079	0.21
Post 2A	0	5,169	5,169	0.12
Post 2B	0	0	0	0.00
Post 2CA	0	5,661	5,661	0.13
Post 2CB	0	7,934	7,934	0.18
Post 2D	3,782	0	3,782	0.09
Post 2E	8,317	0	8,317	0.19
UC	0	867	867	0.02
<b>Total</b>	<b>28,986.00</b>	<b>33,905.00</b>	<b>62,891.00</b>	<b>1.44</b>

**Water Quality: WQv = 1" (11)/12 [Feet<sup>3</sup>]**

Impervious Area (Ft <sup>2</sup> )	WQv (Ft <sup>3</sup> )	Additional Treatment	WQv Req (Ft <sup>3</sup> )	WQv Provided (Ft <sup>3</sup> )
75295.00	6274.58	33.54%	2104.71	4745

**Recharge: Rev = 1" F (1/12) [Feet<sup>3</sup>]**

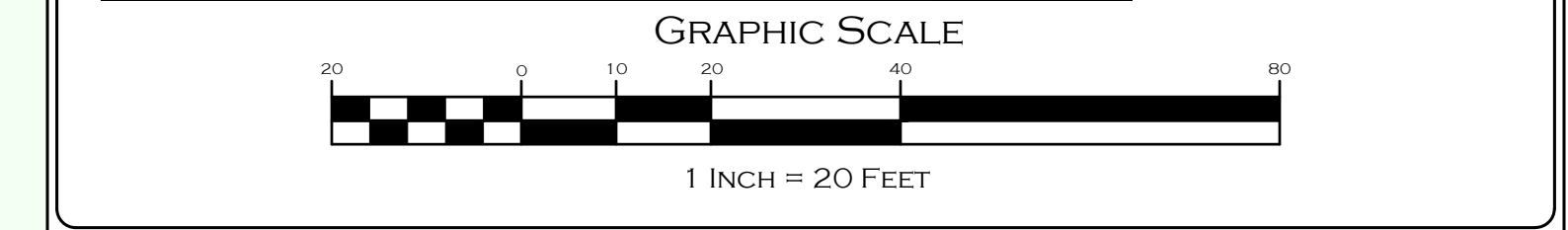
Impervious Area (Ft <sup>2</sup> )	Rev (Ft <sup>3</sup> )	Additional Treatment	Rev Req (Ft <sup>3</sup> )	Rev Provided (Ft <sup>3</sup> )
75295.00	1568.65	33.54%	526.18	4745

**Flow To DP1**

Area:	Pre (CFS)	Post (CFS)	Pre (CF)	Post (CF)	%Reduced
1	4.65	3.52	14,560	6,964	52
2	5.76	4.58	18,194	9,187	50
10	9.34	8.15	30,157	19,032	37
25	12.01	10.91	39,307	28,568	27
50	14.65	13.71	48,535	38,631	20
100	17.51	19.18	58,585	49,951	15

**Offsite Flow**

Area:	Pre (CFS)	Post (CFS)	Pre (CF)	Post (CF)	%Reduced
1	5.5	3.69	17,250	7,533	56
2	6.92	4.83	21,805	7,231	67
10	11.55	8.65	37,007	20,578	44
25	15.05	11.62	48,758	30,739	37
50	18.53	14.61	60,672	41,453	32
100	22.29	20.31	73,695	53,498	27



**POST WATERSHED ANALYSIS MAP**

**"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"**  
 417 FOREST AVENUE, MIDDLETOWN RI, 02842  
 ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
 C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038    SCALE: 1" = 20'    DRAWN BY: LJJ    DATE: FEBRUARY 16, 2022

REVISED:

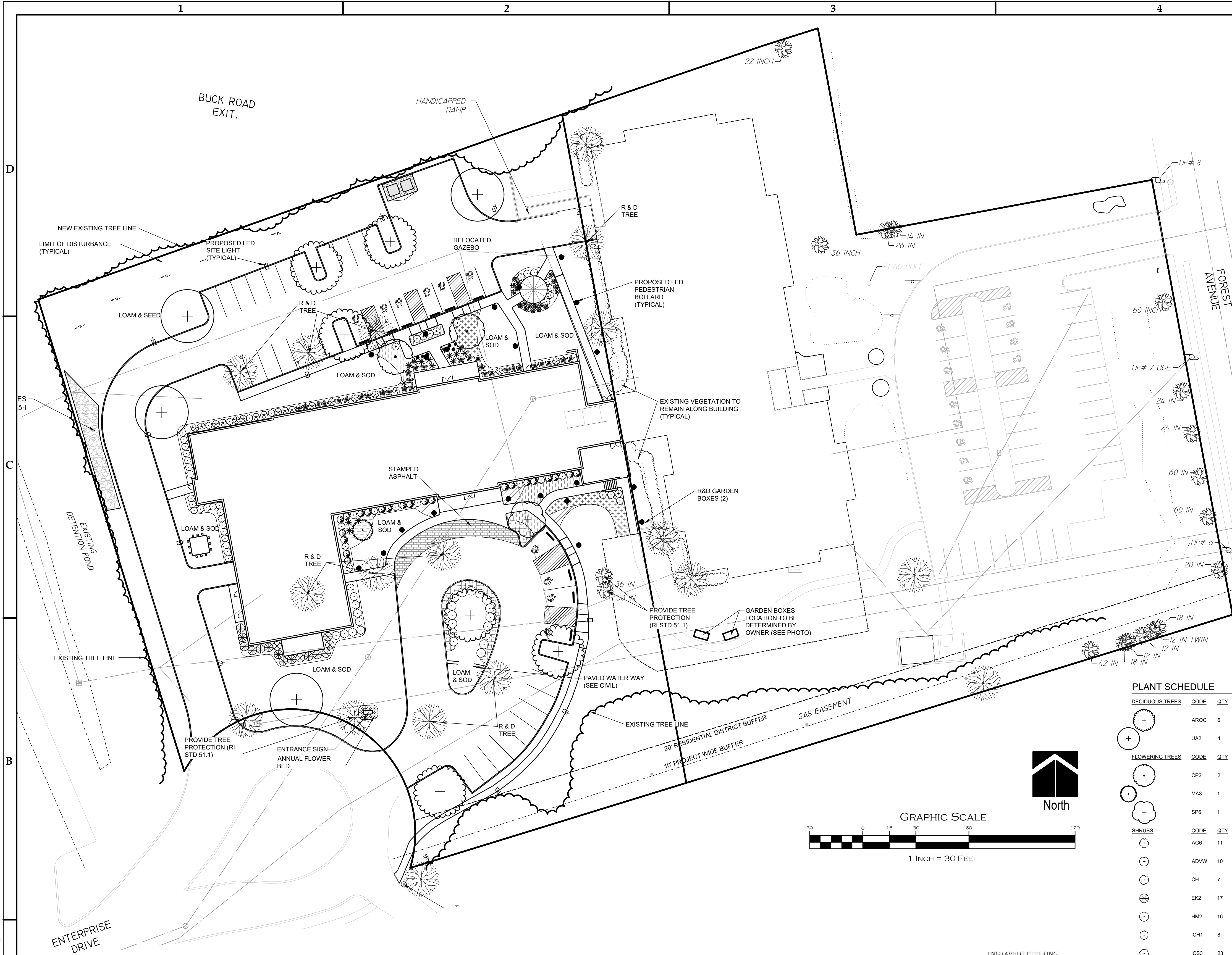
**PAUL D. CARLSON**  
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**SHEET 12 OF 12**

1/21/2022 4:17 Forest Avenue Middletown RI - West House/Cadd/21-038 - ENGR Base - 010 - Final.dwg 2/16/2022 9:38:54 AM



4' x 8' wood garden box

**MIDDLETOWN LANDSCAPE PLANNING DATA**  
**Code of Ordinances - Appendix A July 30, 2021**  
**Subdivision Regulations - Section 521 Commercial Development**

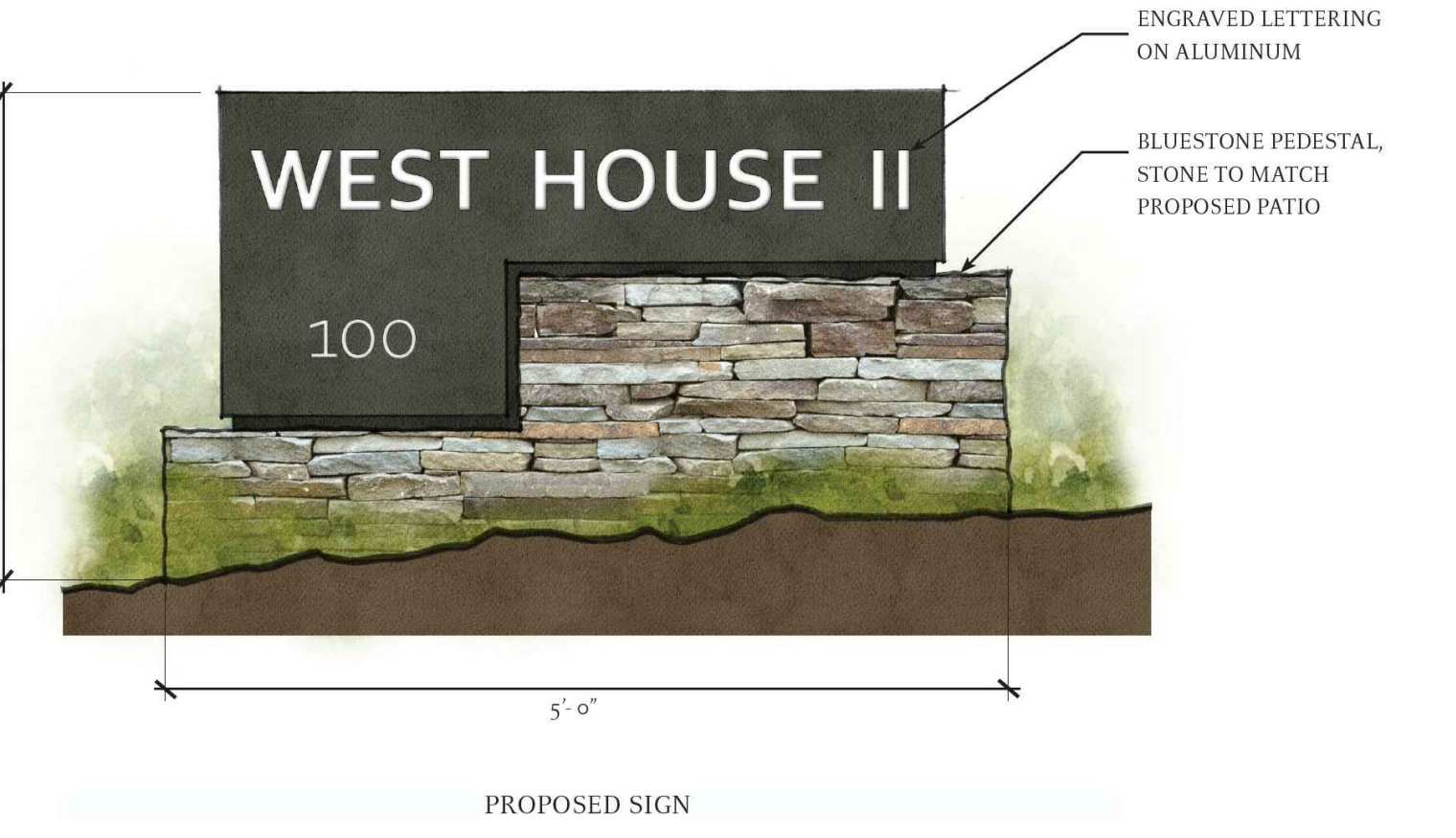
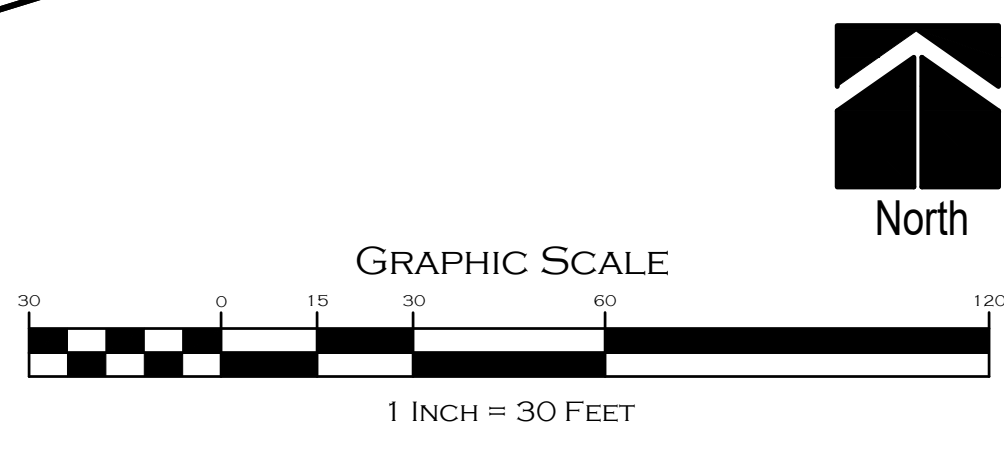
CRITERIA	REQUIRED	PROPOSED	REGULATION
BICYCLE RACKS	MINIMUM 1 BICYCLE RACK PER 5 AUTOMOBILE PARKING SPACES	37 PARKING SPACES PROPOSED = 8 BICYCLE RACKS REQUIRED 0 PROVIDED	521.1 E.4
AMOUNT OF LANDSCAPING REQUIRED	MINIMUM OF 25% OF PROJECT AREA	45% PROVIDED (200,690 SF TOTAL AREA X 25% = 50,172 SF REQ'D WITH 90,600 SF PROVIDED)	521.3 B
SCREENING ALONG PROPERTY LINES	USE OF STONE WALLS, BERMS, FENCES OR COMBINATION OF ITEMS	SEE PLAN - EXISTING TREE LINE SCREENING	521.3 C
PROJECT-WIDE BUFFERS	10 FOOT WIDE BUFFER ALONG ALL PROPERTY LINES	10 FOOT WIDE BUFFER ALONG ALL PROPERTY LINES	521.3 D.1
RESIDENTIAL DISTRICT BUFFERS	20 FOOT WIDE BUFFER INCLUDING 6 FOOT HIGH SCREENING	20 FOOT WIDE BUFFER WITH 6 FOOT HIGH EXISTING VEGETATIVE SCREENING	521.3 D.2
BUFFER BETWEEN BUILDINGS AND PARKING LOTS AND DRIVEWAYS	10 FEET WIDE WITH MINIMUM 5 FOOT PLANTING STRIP	12 FEET TO 46 FEET WIDE	521.3 D.3
PLANT SPECIES	PLANTINGS SHALL BE NONINVASIVE	PLANTINGS ARE NONINVASIVE	521.3 E
STREET TREES	TREES PLANTED ALONG STREET SIDE PROPERTY LINES AND ALONG ANY PRIVATE STREETS AND INTERNAL DRIVEWAYS LOCATED BETWEEN SIDEWALK AND CURB. MAXIMUM 30 FEET ON CENTER WITH MINIMUM CALIPER OF 4 INCHES	STREET TREES AT 30 FEET ON CENTER (COMBINATION OF EXISTING AND PROPOSED TREES)	521.3 F1
PARKING LOT TREES	1 TREE PER EVERY 5 SPACES WITH MINIMUM CALIPER OF 4 INCHES. TREES MUST BE SURROUNDED BY MINIMUM 25 SQUARE FEET OF UNPAVED AREA	37 PARKING SPACES PROPOSED = 8 TREES REQUIRED. 8 TREES PROVIDED	521.3 F2

**Code of Ordinances - Appendix A - Article 15 Multifamily Dwellings**

CRITERIA	REQUIRED	PROPOSED	REGULATION
OFF STREET PARKING	NO ROWS OF PARKING SPACES SHALL EXCEED 100 FEET WITHOUT A LANDSCAPE SEPARATION OF AT LEAST 10 FEET. THERE SHALL BE A SEPARATION OF AT LEAST 10 FEET BETWEEN ROWS	N/A	1507 (C)

**PLANT SCHEDULE**

DECIDUOUS TREES	CODE	QTY	BOTANICAL / COMMON NAME	B&B	CALIPER	
+	AROC	6	Acer rubrum 'October Glory' TM / October Glory Maple	B & B	4" Cal	
+	UA2	4	Ulmus parvifolia 'Alee' / Upright Chinese Elm	B & B	4" Cal	
FLOWERING TREES	CODE	QTY	BOTANICAL / COMMON NAME	B&B	CALIPER	
+	CP2	2	Cornus florida 'Cherokee Princess' / Cherokee Princess Dogwood	B & B	1.5" Cal	
+	MA3	1	Magnolia x 'Ann' / Ann Magnolia	B&B; 7'-8' HT.		
+	SP6	1	Stewartia pseudocamellia / Japanese Stewartia	B & B	2.5" Cal	
SHRUBS	CODE	QTY	BOTANICAL / COMMON NAME	CONT/B&B	SIZE	
+	AG6	11	Azalea Glenn Dale Hybrid 'Delaware Valley White' / Delaware Valley White Azalea	CONT	3 gal	
+	ADVW	10	Azalea Glenn Dale Hybrid 'Delaware Valley White' / Glen Dale Azalea	CONT	5 gal	
+	CH	7	Clethra alnifolia 'Hummingbird' / Summersweet	CONT	3 gal	
+	EK2	17	Euonymus kiautschovicus 'Manhattan' / Manhattan Euonymus	3' - 4'; B&B		
+	HM2	16	Hydrangea macrophylla 'Nikko Blue' / Nikko Blue Hydrangea	CONT	3 gal	
+	ICH1	8	Ilex crenata 'Heleni' / Helen Japanese Holly	CONT	5 gal	
+	ICS3	23	Ilex crenata 'Steeds' / Steeds Japanese Holly Mature Height 6'-8'	B & B	4' - 5' HT.	
+	IN2	4	Ilex glabra 'Nordic' / Nordic Inkberry	CONT	5 gal	
+	KLE	18	Kalmia latifolia 'Elf' / Dwarf Mountain Laurel	CONT	3 gal	
+	LF	30	Leucothoe fontanesiana 'Nana' / Dwarf Drooping Leucothoe	CONT	3 gal	
+	PA3	22	Potentilla fruticosa 'Abbotswood' / Abbotswood Potentilla	CONT	3 gal	
PERENNIALS	CODE	QTY	BOTANICAL / COMMON NAME	CONT/B&B	SIZE	
+	ACV	6	Astilbe chinensis 'Veronica Klose' / Chinese Astilbe	1 gal		
+	HF4	15	Hosta x 'Frances Williams' / Plantain Lily	CONT	1 gal	
+	LH2	18	Lavandula angustifolia 'Hidcote Blue' / Hidcote Blue Lavender	1 gal		
GROUND COVERS	CODE	QTY	BOTANICAL / COMMON NAME	CONT/FLAT	SIZE	SPACING
+	RF4	29	Rosa x 'Flower Carpet Pink' / Rose	1 gal		36" o.c.
+	VC2	695	Vincetoxicum / Common Periwinkle	1 gal		18" o.c.
PERENNIALS	CODE	QTY	BOTANICAL / COMMON NAME	CONT/FLAT	SIZE	SPACING
+	HO3	125	Heimericallis x 'Stella de Oro' / Stella de Oro Daylily	1 gal		24" o.c.



**LANDSCAPE PLAN**  
1" = 30'

**Diane C. Soule & Associates, ASLA**  
 Landscape Architecture  
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 Smithfield, Rhode Island 02917  
 www.dianesouleandassociates.com  
 401.231.0736  
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 CHURCH COMMUNITY HOUSING  
 50 WASHINGTON SQUARE  
 NEWPORT, RI 02840  
 P: (401) 846-5114

**WEST HOUSE II - SENIOR AFFORDABLE HOUSING**  
 417 FOREST AVENUE  
 MIDDLETOWN, RI



**SCHEMATIC DESIGN - LIHTC APPLICATION**

REVISION SCHEDULE

NO.	ISSUE	DATE

JOB #: 2133  
 DATE: 12/17/2021  
 SCALE:  
 1" = 30'

**LANDSCAPE PLAN**

**L001**

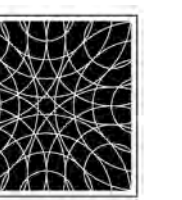
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# WEST HOUSE II - SENIOR AFFORDABLE HOUSING

417 FOREST AVENUE  
MIDDLETOWN, RI

PRELIMINARY PLAN

01/19/2022



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50 WASHINGTON SQUARE  
NEWPORT, RI 02840  
TEL: 401.846.5114  
FAX: 401.849.7930  
CONTACT: CHRISTIAN BELDEN

ARCHITECT:  
UNION STUDIO ARCHITECTURE & COMMUNITY DESIGN  
140 UNION STREET  
PROVIDENCE, RI 02903  
TEL: 401.272.4724  
FAX: 401.272.4825  
CONTACT: ALANNA JAWORSKI

CONTRACTOR:

STRUCTURAL:

MECHANICAL, ELECTRICAL & PLUMBING:

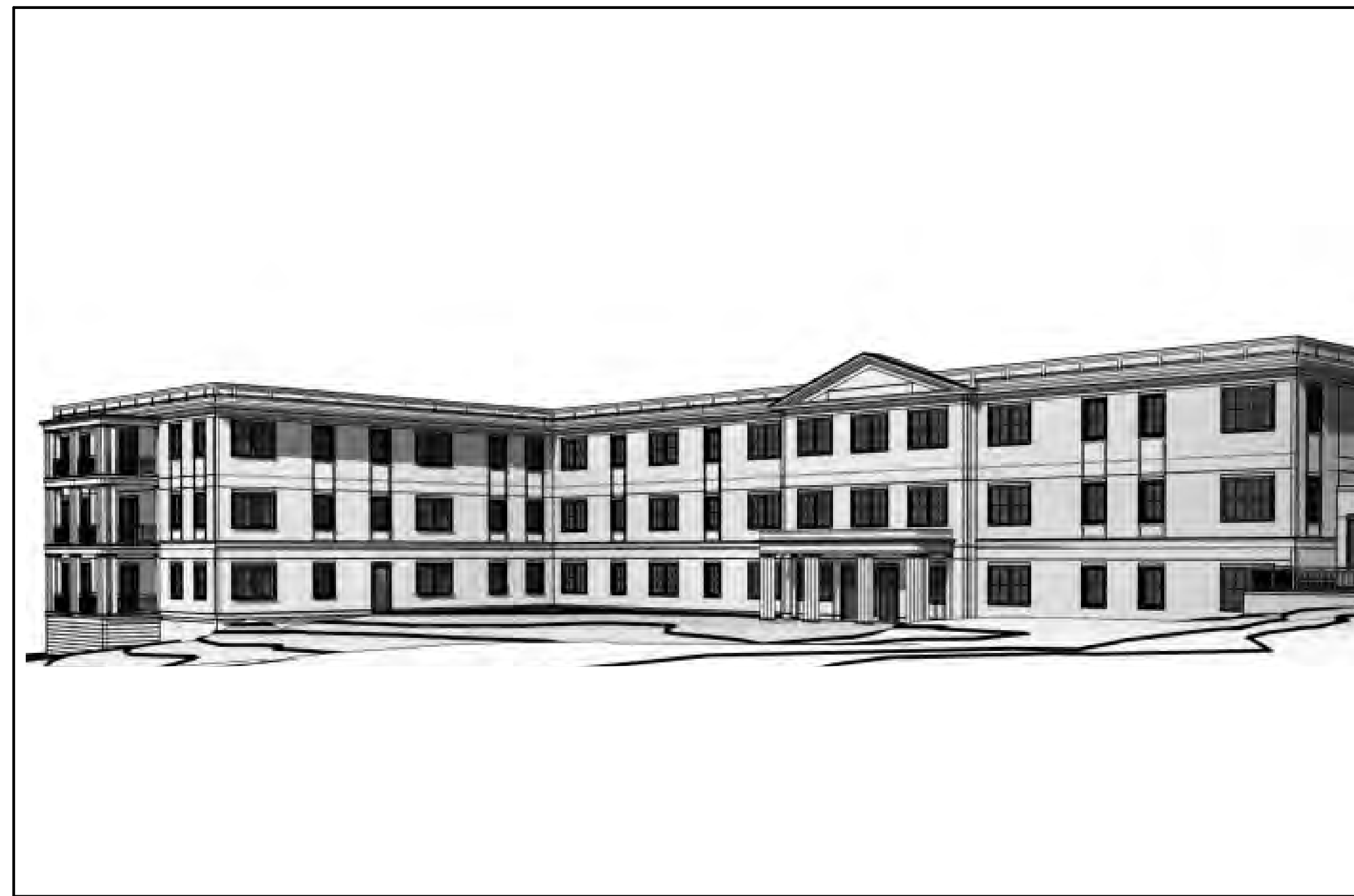
FIRE PROTECTION:

CIVIL:  
INSITE ENGINEERING SERVICES LLC  
1539 FALL RIVER AVENUE, SUITE 1  
SEEKONK, MA 02771  
TEL: 508.336.4500  
FAX: 508.336.4558  
CONTACT: LOUIS GENTILE

LANDSCAPE:  
DIANE C. SOULE & ASSOCIATES  
422 FARNUM PIKE  
SMITHFIELD, RI 02917  
TEL: 401.231.0736  
CONTACT: DIANE C. SOULE



WEST HOUSE II - SENIOR AFFORDABLE HOUSING



PERSPECTIVE

WEST HOUSE II - AFFORDABLE SENIOR HOUSING						
AREA DESIGNATION	# OF UNITS	# OF BEDROOMS	# OF BATHROOMS	GROSS SQUARE FOOTAGE	NET LIVABLE SQUARE FOOTAGE	TYPE
<b>RESIDENTIAL</b>						
Unit Type A-1 15 Units to be Fully Accessible	30	1	1		579 sf ea	FLAT
<b>Subtotal Unit Type A-1</b>	<b>30</b>	<b>30</b>	<b>30</b>		<b>17,360 sf</b>	
Unit Type A-2	3	1	1		590 sf ea	FLAT
<b>Subtotal Unit Type A-2</b>	<b>3</b>	<b>3</b>	<b>3</b>		<b>1,769 sf</b>	
Unit Type A-3	3	1	1		595 sf ea	FLAT
<b>Subtotal Unit Type A-3</b>	<b>3</b>	<b>3</b>	<b>3</b>		<b>1,785 sf</b>	
Unit Type A-4	2	1	1		600 sf ea	FLAT
<b>Subtotal Unit Type A-4</b>	<b>2</b>	<b>2</b>	<b>2</b>		<b>1,200 sf</b>	
Unit Type A-5	2	1	1		594 sf ea	FLAT
<b>Subtotal Unit Type A-5</b>	<b>2</b>	<b>2</b>	<b>2</b>		<b>1,188 sf</b>	
Unit Type B-1 5 Units to be Fully Accessible	7	2	1		861 sf ea	FLAT
<b>Subtotal Unit Type B-1</b>	<b>7</b>	<b>14</b>	<b>7</b>		<b>6,024 sf</b>	
Unit Type B-2	2	2	1		883 sf ea	FLAT
<b>Subtotal Unit Type B-2</b>	<b>2</b>	<b>4</b>	<b>2</b>		<b>1,766 sf</b>	
Unit Type B-3	3	2	1		878 sf ea	FLAT
<b>Subtotal Unit Type B-3</b>	<b>3</b>	<b>6</b>	<b>3</b>		<b>2,635 sf</b>	
Unit Type B-4	2	2	1		859 sf ea	FLAT
<b>Subtotal Unit Type B-4</b>	<b>2</b>	<b>4</b>	<b>2</b>		<b>1,717 sf</b>	
<b>Total Residential</b>	<b>54</b>	<b>68</b>	<b>34</b>		<b>35,445 sf</b>	
<b>COMMUNITY</b>						
Mall Room, Sitting, Halls / Circulation, Stairways					9,570 sf	
Common Laundry					661 sf	
<b>Total Community</b>					<b>10,231 sf</b>	
<b>MANAGEMENT</b>						
Office					191 sf	
<b>Total Commercial</b>					<b>191 sf</b>	
<b>OTHER</b>						
Covered Entry Porches					424 sf	
Covered Porches					643 sf	
Maintenance Garage					542 sf	
Storage & Utilities (Unfinished Basement)					7,114 sf	
<b>Total Other</b>					<b>8,723 sf</b>	
<b>Total Gross SF</b>					<b>52,165 sf</b>	
<b>Total Gross SF = RI Housing Construction Cost Calculus for Maintenance Garage (*2/3), Storage &amp; Utilities (Unfinished Basement) (*1/2), Covered Porches (*1/2) &amp; Entry Porches (*1/2)</b>					<b>56,619 sf</b>	

DRAWING LIST	
NUMBER	NAME
0 - COVER	
G000	TITLE SHEET
3 - ARCHITECTURAL	
A100	BASEMENT PLAN
A101	FIRST FLOOR PLAN
A102	SECOND FLOOR PLAN
A103	THIRD FLOOR PLAN
A104	ROOF PLAN
A105	ENLARGED APARTMENT PLANS
A201	EXTERIOR ELEVATIONS
A301	BUILDING SECTIONS
A401	LIGHTING PLAN



VICINITY MAP

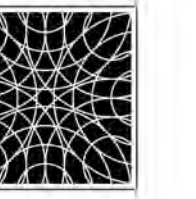
ARCHITECTURAL SYMBOLS LEGEND	
SYMBOL	DESCRIPTION
EL. 0'-0"	DATUM POINT
FLOOR LEVEL 0'-0"	ELEVATION MARKER
1/2 SECTION	BUILDING SECTION
1/4 SECTION	AREA OF DETAIL
1/8 SECTION	DETAIL SECTION
1/4 SECTION	WALL SECTION
A - A	MATCH LINE
A1, A2, A3	INTERIOR ELEVATION
A4, A5	EXTERIOR ELEVATION
A1	WINDOW TYPE
108	DOOR NUMBER
KITCHEN 108	ROOM NAME AND NUMBER
1	KEYNOTE NUMBER
1	WALL TYPE
NEW CONSTRUCTION	NEW CONSTRUCTION
REVISION NUMBER AND CLOUD REFERENCE	REVISION NUMBER AND CLOUD REFERENCE
12	ROOF PITCH
℄	CENTERLINE

APPLICABLE CODES	
<b>BUILDING CODE:</b>	RHODE ISLAND STATE BUILDING CODE SBC-1, INCORPORATING INTERNATIONAL BUILDING CODE, 2015 EDITION
<b>PLUMBING CODE:</b>	RHODE ISLAND STATE PLUMBING CODE SBC-3, INCORPORATING INTERNATIONAL PLUMBING CODE, 2015 EDITION
<b>MECHANICAL CODE:</b>	RHODE ISLAND STATE MECHANICAL CODE SBC-4, INCORPORATING INTERNATIONAL MECHANICAL CODE, 2015 EDITION
<b>ELECTRICAL CODE:</b>	RHODE ISLAND STATE BUILDING CODE SBC-5, INCORPORATING INTERNATIONAL ELECTRICAL CODE, 2017 EDITION
<b>GAS CODE:</b>	RHODE ISLAND STATE FUEL GAS CODE, INCORPORATING INTERNATIONAL FUEL GAS CODE, 2015 EDITION
<b>ENERGY CODE:</b>	RHODE ISLAND STATE BUILDING CODE SBC-8, INCORPORATING INTERNATIONAL ENERGY CONSERVATION CODE, 2015 EDITION
<b>ACCESSIBILITY CODE:</b>	ANSI A117.1-2009 AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES, 2010 EDITION
<b>FIRE CODE:</b>	RHODE ISLAND FIRE CODE, INCORPORATING NFPA 1 - FIRE CODE, 2018 EDITION AND: RHODE ISLAND FIRE ALARM CODE, INCORPORATING NFPA 72, 2019 EDITION
<b>LIFE SAFETY CODE:</b>	RHODE ISLAND LIFE SAFETY CODE, INCORPORATING NFPA 101, 2018 EDITION AND: SRC-1 RHODE ISLAND STATE REHABILITATION BUILDING AND FIRE CODE FOR EXISTING BUILDINGS AND STRUCTURES

BUILDING CODE DATA	
USE/OCCUPANCY:	RESIDENTIAL GROUP R-2 + ACCESSORY USE (STORAGE GROUP S-2)
TYPE OF CONSTRUCTION:	5B, WOOD FRAMED (FULLY SPRINKLERED)
STORIES:	3 STORIES ABOVE GRADE (PARTIAL BASEMENT)
BUILDING SIZE:	52,165 GSF TOTAL
FIRE SPRINKLER SYSTEM:	NFPA 13
FIRE ALARM:	FULLY AND MUNICIPALLY CONNECTED
CLIMATE ZONE:	5

RHODE ISLAND HOUSING DESIGN & CONSTRUCTION GUIDELINES	
	EACH DWELLING UNIT AND OTHER PORTIONS OF THE BUILDING WILL BE DESIGN TO CONFORM TO THE CURRENT RHODE ISLAND HOUSING DESIGN AND CONSTRUCTION GUIDELINES. AT THIS SCHEMATIC DESIGN PHASE IT IS ANTICIPATED THAT NO WAIVERS FROM THE GUIDELINES WILL BE REQUIRED.

ZONING REGULATORY REQUIREMENTS				
DISTRICTS				
TOWN: Middletown, RI				
ZONING DISTRICT: 09B, Office Business				
OVERLAY DISTRICT: N/A				
PROPERTY USE	REQUIRED	EXISTING	PROVIDED	NOTES
Office parks, light industrial, professional office buildings	Affordable Senior Housing	Affordable Senior Housing		USE VARIANCE GRANTED
<b>LOT SIZE AND COVERAGE</b>				
MINIMUM LOT SIZE (sf):	40,000		200,689	
% BUILDING COVERAGE:	30%		21%	
MAXIMUM BUILDING FOOTPRINT (sf):	35,000	44,973	42,603	DIMENSIONAL VARIANCE GRANTED
<b>DIMENSIONAL</b>				
MINIMUM LOT FRONTAGE (feet):	150		203.26	
MIN FRONT YARD SETBACK (feet):	25		38.94	
REAR YARD SETBACK (feet):	40		99.37	
SIDE YARD SETBACK (feet):	25		52.73	
BUILDING HEIGHT (feet):	35		40	DIMENSIONAL VARIANCE GRANTED
<b>PARKING</b>				
REQUIRED SPACES (1.0 PER UNIT):	104	39	77	DIMENSIONAL VARIANCE GRANTED
<b>MULTI-FAMILY DWELLINGS</b>				
ALLOWABLE DENSITY:	6,000 sf / Studio or 1 Bedroom 8,000 sf / 2-Bedroom	200,689	200,689	DIMENSIONAL VARIANCE GRANTED
OPEN SPACE REQUIREMENT:	Ratio of open space divided by floor area = 1.5	110,039 (proposed open space) / 124,037 (proposed floor area)	0.88	DIMENSIONAL VARIANCE GRANTED
OFF-STREET PARKING:	25 feet (from wall of any principal bldg) 80 lined feet without building jog		19'-5"	DIMENSIONAL VARIANCE GRANTED
BUILDING DESIGN AND LOCATION:			83' - 10"	DIMENSIONAL VARIANCE GRANTED



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PRELIMINARY  
PLAN

REVISION SCHEDULE

NO.	ISSUE	DATE

JOB #: 2133

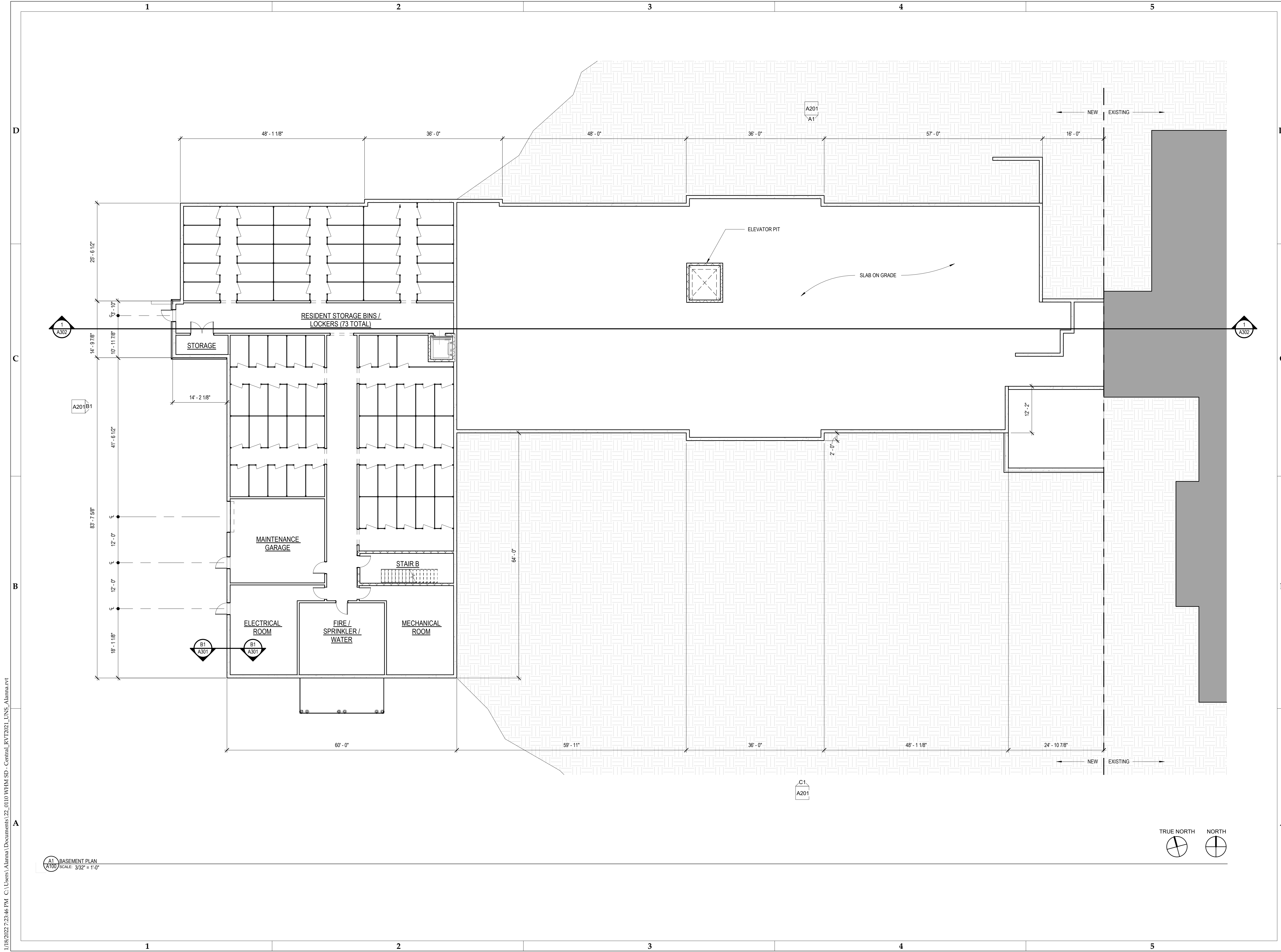
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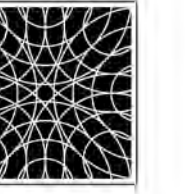
BASEMENT PLAN

A100



A1 BASEMENT PLAN  
A100 SCALE: 3/32" = 1'-0"

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REVISION SCHEDULE

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JOB #: 2133

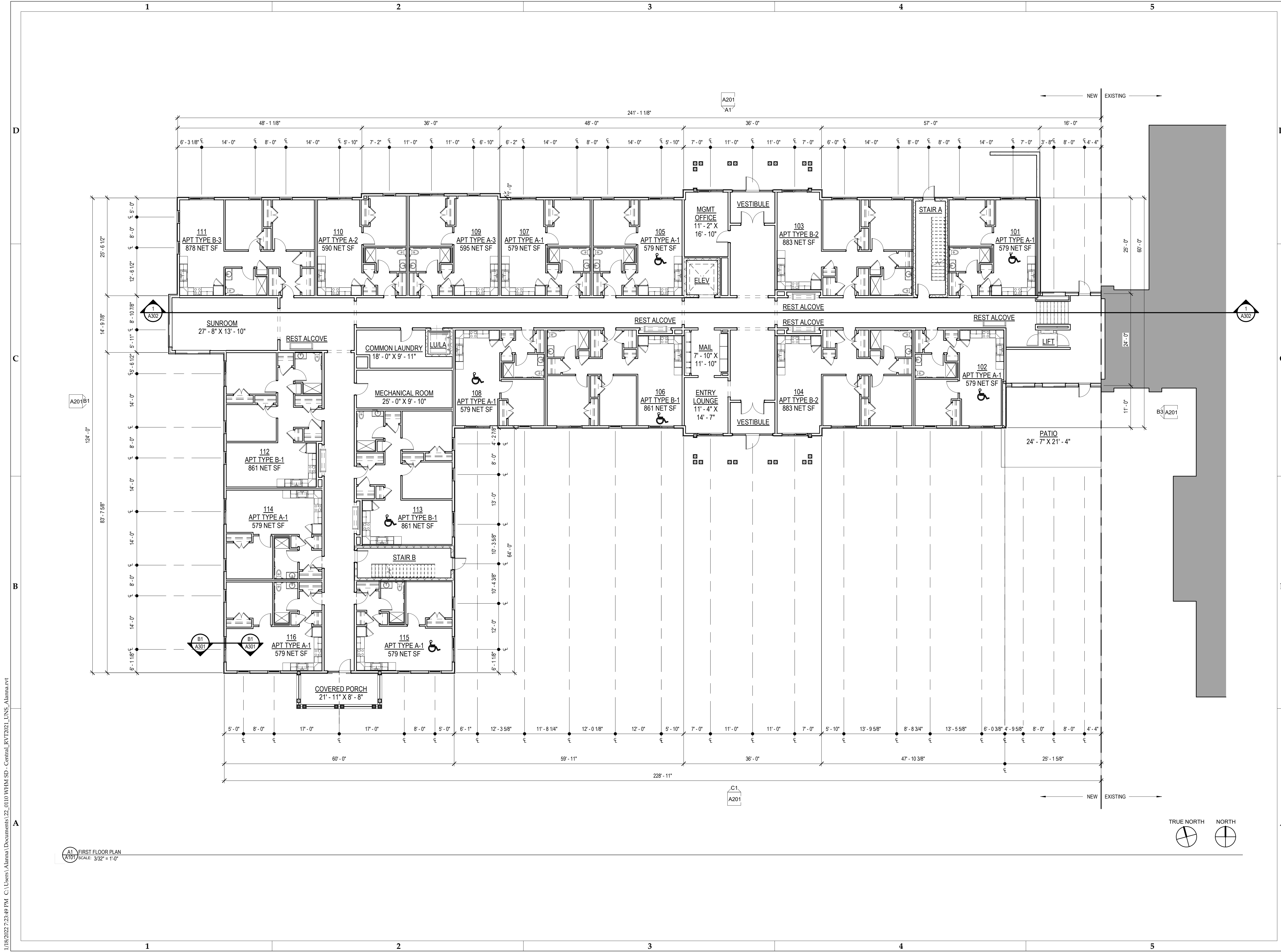
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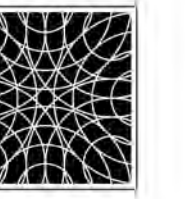
FIRST FLOOR  
PLAN

A101



A1 FIRST FLOOR PLAN  
A101 SCALE: 3/32" = 1'-0"

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PRELIMINARY  
PLAN

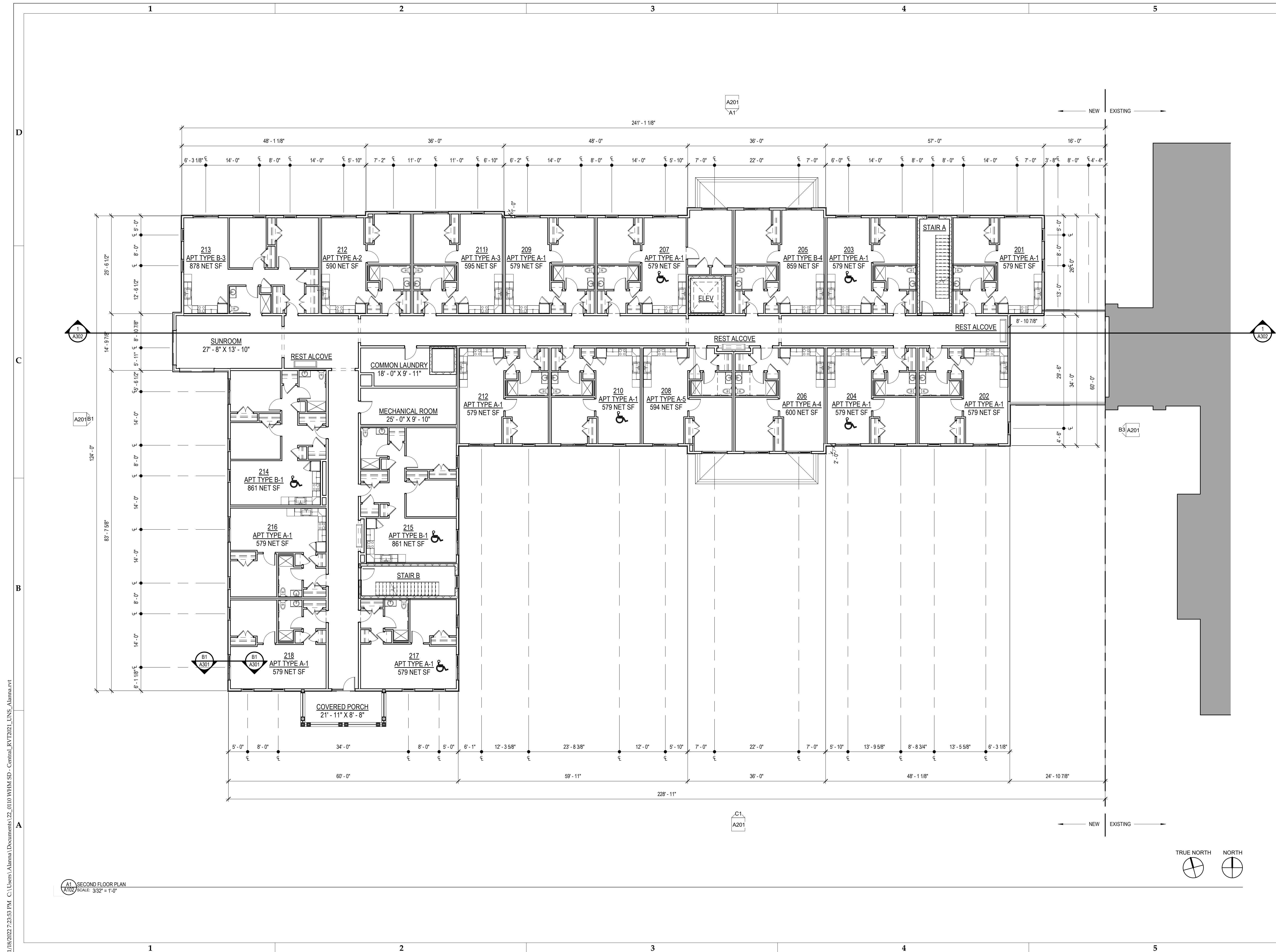
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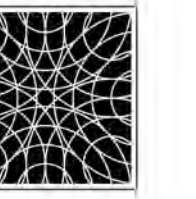
SECOND FLOOR  
PLAN

A102



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A1 SECOND FLOOR PLAN  
A102 SCALE: 3/32" = 1'-0"



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JOB #: 2133

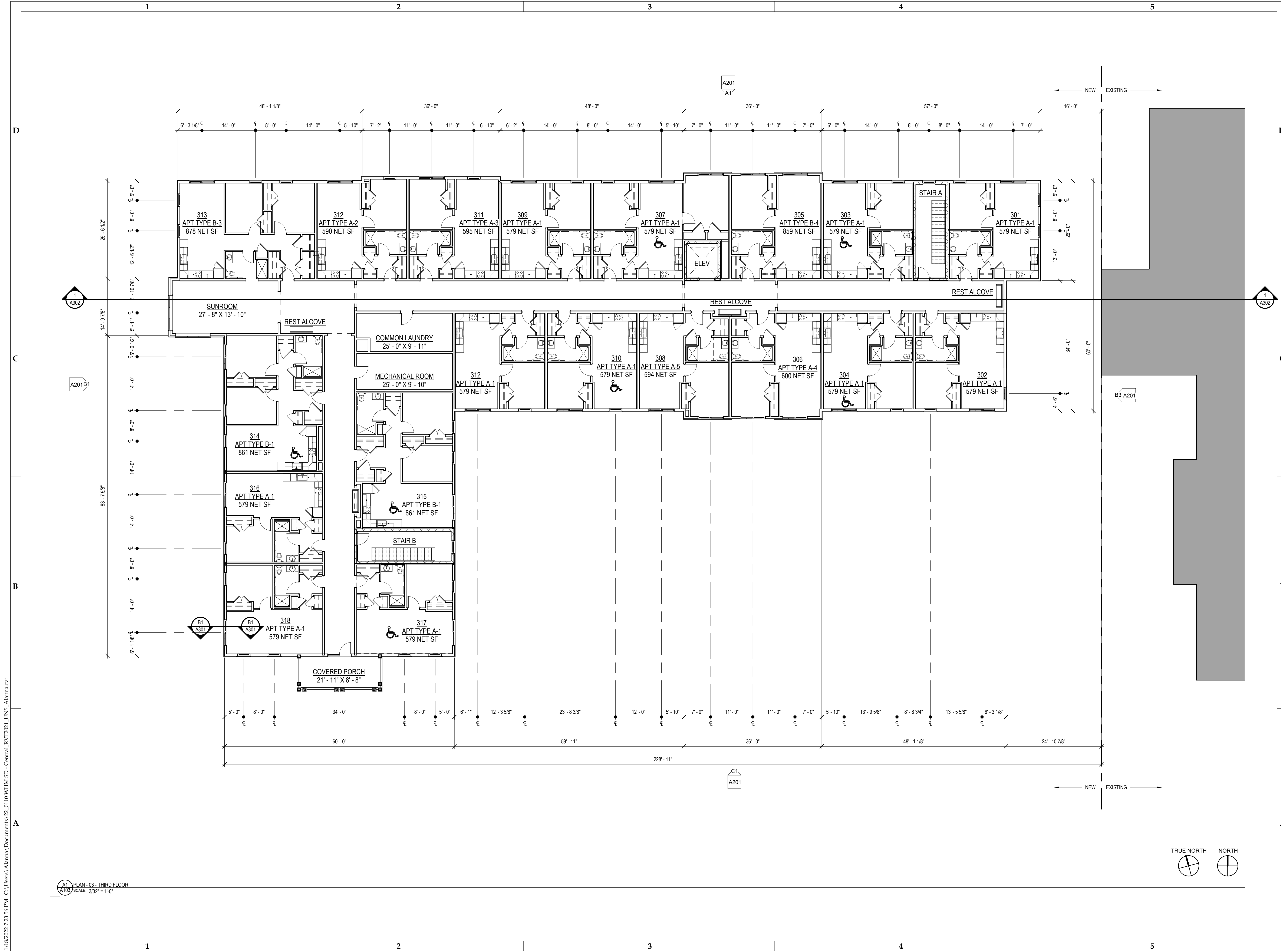
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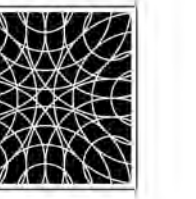
THIRD FLOOR  
PLAN

A103



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A1 PLAN - 03 - THIRD FLOOR  
SCALE: 3/32" = 1'-0"



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PLAN

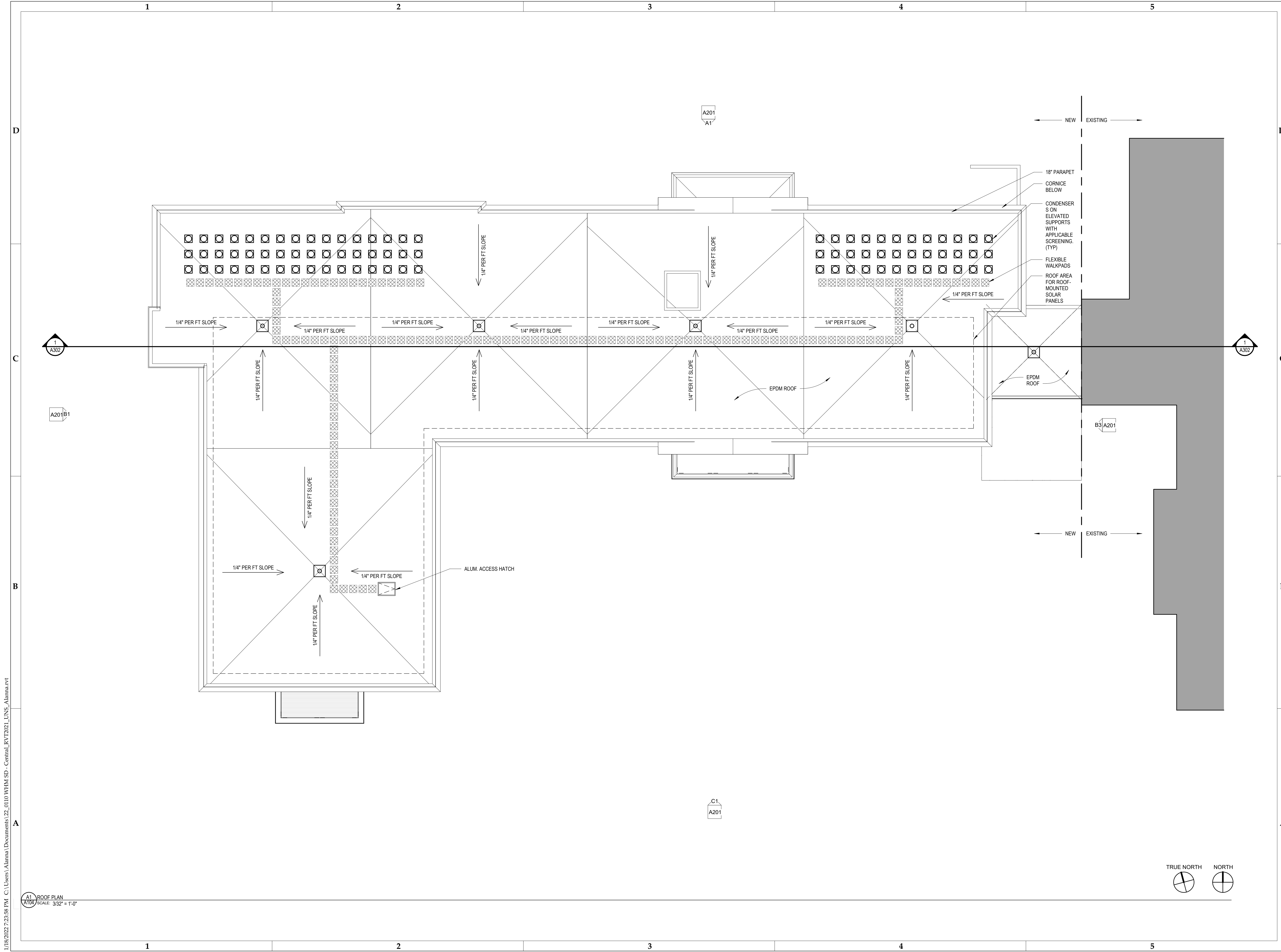
REVISION SCHEDULE		
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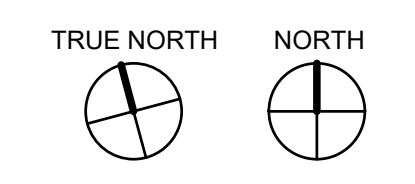
ROOF PLAN

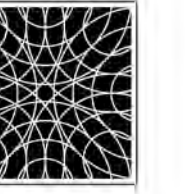
A104



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A1 ROOF PLAN  
A104 SCALE: 3/32" = 1'-0"





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ARCHITECTURE & COMMUNITY DESIGN

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401.272.4724 401.272.4825  
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OWNER:

CHURCH COMMUNITY HOUSING  
50 WASHINGTON SQUARE  
NEWPORT, RI 02840

WEST HOUSE II - SENIOR  
AFFORDABLE HOUSING  
417 FOREST AVENUE  
MIDDLETOWN, RI



PRELIMINARY  
PLAN

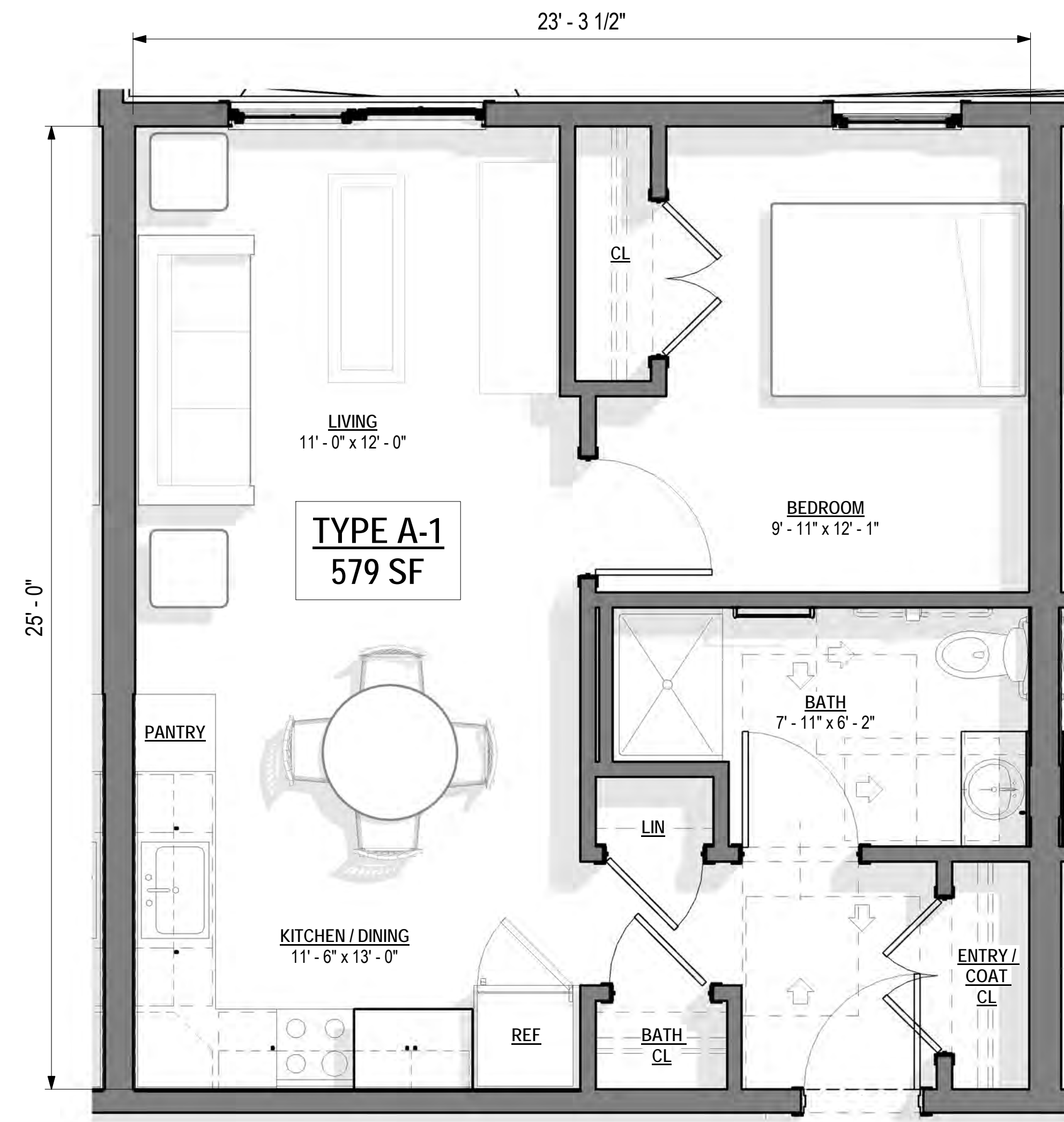
REVISION SCHEDULE		
NO.	ISSUE	DATE

JOB #: 2133  
DATE: 01/19/2022  
SCALE: 3/8" = 1'-0"

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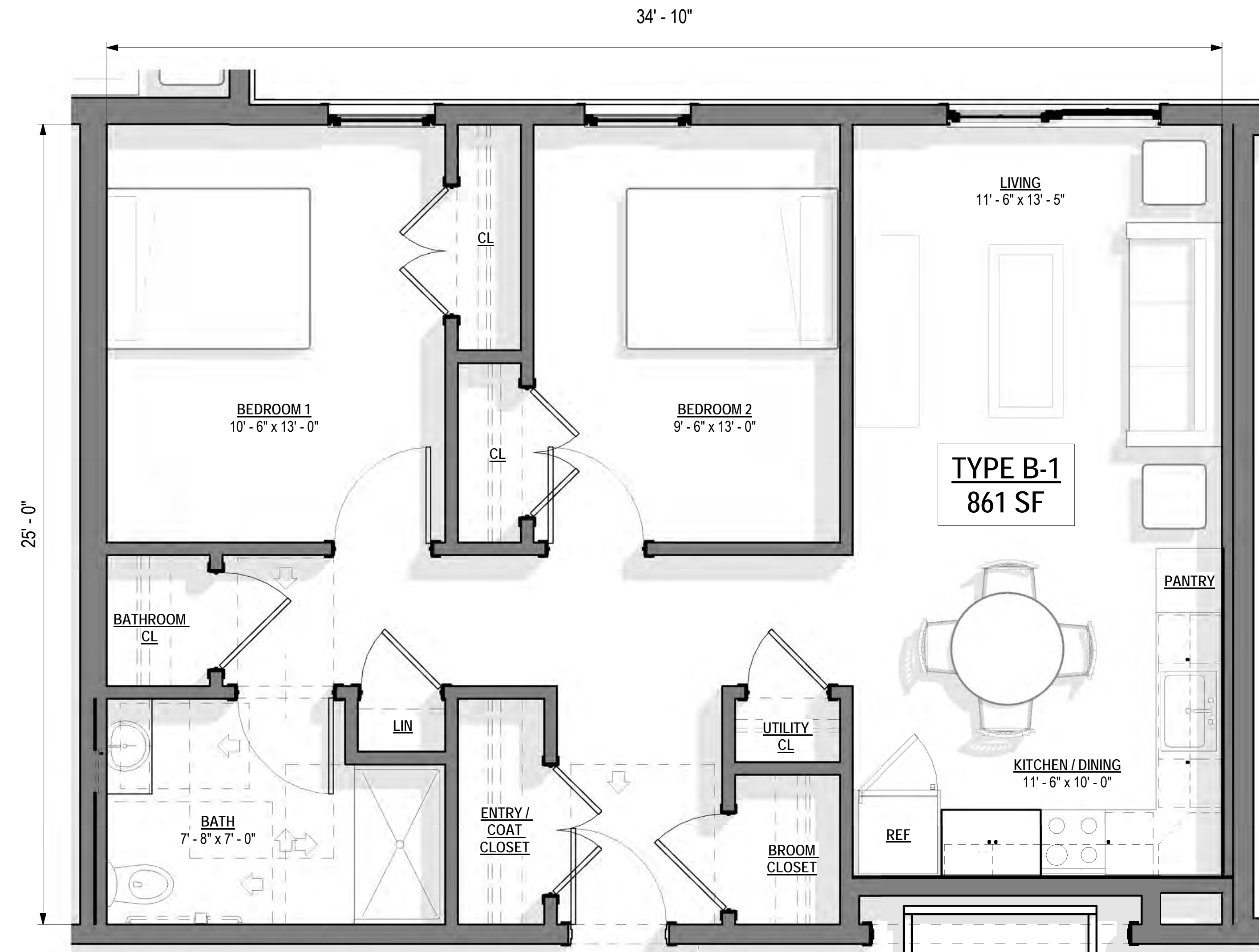
ENLARGED  
APARTMENT  
PLANS

A105



B1 UNIT PLAN - TYPE A-1, 1-BR  
A105 SCALE: 3/8" = 1'-0"

UNIT TYPES A-2, A-3, A-4 & A-5 - SIMILAR. SEE TABULATION TABLE FOR SPECIFIC SQUARE FOOTAGES FOR EACH SIM TYPE.



B3 UNIT PLAN - TYPE B-1, 2-BR  
A105 SCALE: 3/8" = 1'-0"

UNIT TYPES B-2, B-3 & B-4 - SIMILAR. SEE TABULATION TABLE FOR SPECIFIC SQUARE FOOTAGES FOR EACH SIM TYPE.



C1 SOUTH ELEVATION  
A201 SCALE: 3/32" = 1'-0"

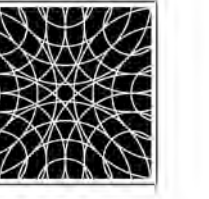


B1 WEST ELEVATION  
A201 SCALE: 3/32" = 1'-0"

B3 EAST ELEVATION  
A201 SCALE: 3/32" = 1'-0"



A1 NORTH ELEVATION  
A201 SCALE: 3/32" = 1'-0"



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CCHC

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50 WASHINGTON SQUARE  
NEWPORT, RI 02840

WEST HOUSE II - SENIOR  
AFFORDABLE HOUSING  
417 FOREST AVENUE  
MIDDLETOWN, RI



PRELIMINARY  
PLAN

REVISION SCHEDULE

NO.	ISSUE	DATE

JOB #: 2133  
DATE: 01/19/2022  
SCALE: 3/32" = 1'-0"

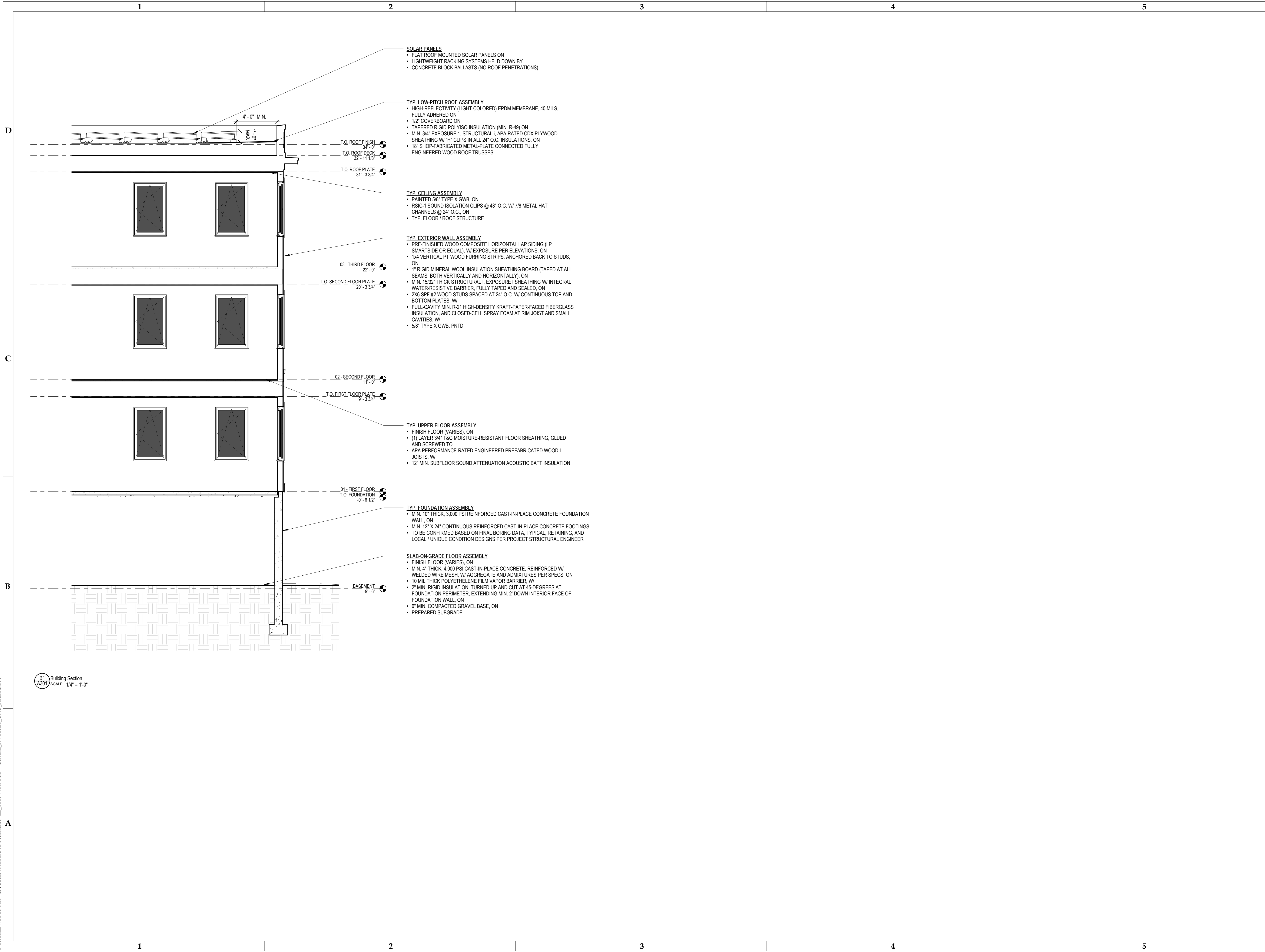
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EXTERIOR  
ELEVATIONS

A201

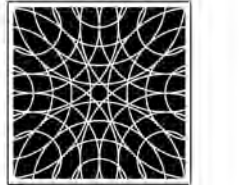
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1/18/2022 7:24:20 PM C:\Users\Alanna\Documents\22\_0110 WHM SD - Central\_RVT2021\_UNSt\_Alanna.rvt



- SOLAR PANELS**
- FLAT ROOF MOUNTED SOLAR PANELS ON
  - LIGHTWEIGHT RACKING SYSTEMS HELD DOWN BY
  - CONCRETE BLOCK BALLASTS (NO ROOF PENETRATIONS)
- TYP. LOW-PITCH ROOF ASSEMBLY**
- HIGH-REFLECTIVITY (LIGHT COLORED) EPDM MEMBRANE, 40 MILS, FULLY ADHERED ON
  - 1/2" COVERBOARD ON
  - TAPERED RIGID POLYISO INSULATION (MIN. R-49) ON
  - MIN. 3/4" EXPOSURE 1, STRUCTURAL I, APA-RATED CDX PLYWOOD SHEATHING W/ 4" CLIPS IN ALL 24" O.C. INSULATIONS, ON
  - 18" SHOP-FABRICATED METAL-PLATE CONNECTED FULLY ENGINEERED WOOD ROOF TRUSSES
- TYP. CEILING ASSEMBLY**
- PAINTED 5/8" TYPE X GWB, ON
  - RSI-C-1 SOUND ISOLATION CLIPS @ 48" O.C. W/ 7/8" METAL HAT CHANNELS @ 24" O.C., ON
  - TYP. FLOOR / ROOF STRUCTURE
- TYP. EXTERIOR WALL ASSEMBLY**
- PRE-FINISHED WOOD COMPOSITE HORIZONTAL LAP SIDING (LP SMARTSIDE OR EQUAL), W/ EXPOSURE PER ELEVATIONS, ON
  - 1x4 VERTICAL PT WOOD FURRING STRIPS, ANCHORED BACK TO STUDS, ON
  - 1" RIGID MINERAL WOOL INSULATION SHEATHING BOARD (TAPED AT ALL SEAMS, BOTH VERTICALLY AND HORIZONTALLY), ON
  - MIN. 15/32" THICK STRUCTURAL I, EXPOSURE 1 SHEATHING W/ INTEGRAL WATER-RESISTIVE BARRIER, FULLY TAPED AND SEALED, ON
  - 2X6 SPF #2 WOOD STUDS SPACED AT 24" O.C. W/ CONTINUOUS TOP AND BOTTOM PLATES, W/
  - FULL-CAVITY MIN. R-21 HIGH-DENSITY KRAFT-PAPER-FACED FIBERGLASS INSULATION, AND CLOSED-CELL SPRAY FOAM AT RIM JOIST AND SMALL CAVITIES, W/
  - 5/8" TYPE X GWB, PNTD
- TYP. UPPER FLOOR ASSEMBLY**
- FINISH FLOOR (VARIES), ON
  - (1) LAYER 3/4" 13G MOISTURE-RESISTANT FLOOR SHEATHING, GLUED AND SCREWED TO
  - APA PERFORMANCE-RATED ENGINEERED PREFABRICATED WOOD I-JOISTS, W/
  - 12" MIN. SUBFLOOR SOUND ATTENUATION ACOUSTIC BATT INSULATION
- TYP. FOUNDATION ASSEMBLY**
- MIN. 10" THICK, 3,000 PSI REINFORCED CAST-IN-PLACE CONCRETE FOUNDATION WALL, ON
  - MIN. 12" X 24" CONTINUOUS REINFORCED CAST-IN-PLACE CONCRETE FOOTINGS
  - TO BE CONFIRMED BASED ON FINAL BORING DATA, TYPICAL, RETAINING, AND LOCAL / UNIQUE CONDITION DESIGNS PER PROJECT STRUCTURAL ENGINEER
- SLAB-ON-GRADE FLOOR ASSEMBLY**
- FINISH FLOOR (VARIES), ON
  - MIN. 4" THICK, 4,000 PSI CAST-IN-PLACE CONCRETE, REINFORCED W/ WELDED WIRE MESH, W/ AGGREGATE AND ADMIXTURES PER SPECS, ON
  - 10 MIL THICK POLYETHYLENE FILM VAPOR BARRIER, W/
  - 2" MIN. RIGID INSULATION, TURNED UP AND CUT AT 45-DEGREES AT FOUNDATION PERIMETER, EXTENDING MIN. 2' DOWN INTERIOR FACE OF FOUNDATION WALL, ON
  - 6" MIN. COMPACTED GRAVEL BASE, ON
  - PREPARED SUBGRADE

B1 Building Section  
A301 SCALE: 1/4" = 1'-0"



**UNION STUDIO**  
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**OWNER:**

CHURCH COMMUNITY HOUSING  
50 WASHINGTON SQUARE  
NEWPORT, RI 02840

**WEST HOUSE II - SENIOR  
AFFORDABLE HOUSING**

417 FOREST AVENUE  
MIDDLETOWN, RI



**PRELIMINARY  
PLAN**

REVISION SCHEDULE		
NO.	ISSUE	DATE

JOB #: 2133  
DATE: 01/19/2022  
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**BUILDING  
SECTIONS**

**A301**

Symbol	Qty	Label	Arrangement	Lum. Lumens	LF	Description	Lum. Watts	Total Watts	MDG Rating
11	P2	SINGLE		4499	0.850	MR770-LED45-WW-M8-S1-12V-LFP-T2	45	495	82-00-01
21	B2	SINGLE		1055	0.850	PRL-14L-200-WW-Q2-S-UVV	10	210	81-00-00

ALL POLE FIXTURES ARE SHOWN MOUNTED AT 16 FEET ABOVE FINISHED GRADE

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
FC Beyond Prop Line at Grade	Illuminance	FC	0.00	0.2	0.0	N.A.	N.A.
North Sidewalk FC at Grade	Illuminance	FC	1.94	4.9	0.0	N.A.	N.A.
Paved Area FC at Grade	Illuminance	FC	0.90	4.1	0.0	N.A.	N.A.
South Paved Area FC at Grade	Illuminance	FC	0.19	2.1	0.0	N.A.	N.A.
South Sidewalk FC at Grade	Illuminance	FC	2.06	4.7	0.0	N.A.	N.A.

ALL VALUES SHOWN ARE HORIZONTAL MAINTAINED FOOTCANDLES AT FINISHED GRADE (F.O.N.).  
 FIXTURE DISTRIBUTION TEMPLATES ARE SHOWN AT 0.25 MPC FOR REFERENCE USE ONLY.  
 VALUES DO NOT INCLUDE CONTRIBUTION FROM ADJACENT PROPERTIES OR DECORATIVE LIGHTING NOT SHOWN.  
 FOOTCANDLE VALUES DO NOT INCLUDE OBSTRUCTIONS FROM TREES, SHRUBS, LANDSCAPING, VEHICLES OR FENCING.



**WHM / UNS 2133 - SOLAR FIXTURE SITE LIGHTING PHOTOMETRIC PLAN**

PLEASE NOTE THAT THE RESULTS SHOWN ON THIS PLAN REPRESENT THE OPTIMUM RESULTS AND DO NOT NECESSARILY REFLECT THE VARIABLES YOU MAY GET IN A REAL WORLD SITUATION. FIXTURE CONFIGURATION, ENVIRONMENTAL CONDITIONS SUCH AS TOTAL SUN HOUR EXPOSURE, OVERCAST WEATHER AND MAXIMUM HOURS OF USE, CAN ALL AFFECT THE ACTUAL FIELD INSTALLED RESULTS. THE OVERALL LIGHTING RESULTS WILL ALSO CHANGE BASED ON THE DIMMING PROFILE CHOSEN UPON INSTALLATION, REGARDING THE NUMBER OF SUN HOURS AND PERCENT OF OUTPUT DURING DIMMING.



Site pole



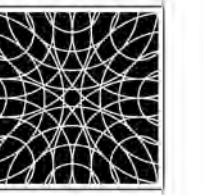
Bollard



Patio & Step Lighting



Entry Sign Light



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OWNER:

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50 WASHINGTON SQUARE  
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WEST HOUSE II - SENIOR  
AFFORDABLE HOUSING  
417 FOREST AVENUE  
MIDDLETOWN, RI

PRELIMINARY  
PLAN

REVISION SCHEDULE		
NO.	ISSUE	DATE

JOB #: 2133

DATE: 01/19/2022

SCALE:

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LIGHTING PLAN

A401



**MIDDLETOWN**  
Rhode Island

## **BUILDING/ZONING**

**TOWN OF MIDDLETOWN**

350 East Main Road, Middletown, RI 02842

(401) 847-5769 | MiddletownRI.com

October 20, 2021

---

### **CERTIFICATE OF ZONING COMPLIANCE**

This is to certify that the property located at: 417 Forest Ave Middletown, RI

Plat: 113 Lot: 6

Property Owner: West House Corporation The

Zoning District: OB (Office Buisness)

Use of this property as a: Low or moderate income housing for elderly persons.

Is a permitted by Special Use permit granted Oct.24<sup>th</sup>, 1995 by the Town of Middletown Zoning.

Chris N. Costa

Building/Zoning Official

# Municipal Lien Certificate - Middletown RI

Per RIGL §44-7-11(a); valid for recording through: 12/19/2021

Date of certificate: 10/20/2021

Tax Payer WEST HOUSE CORPORATION THE

Penalty as of: 10/20/2021

ATTN: PHOENIX PROP MGMT INC

Parcel: 113-6

250 CENTERVILLE RD #E11

Location: 417 FOREST AVE

WARWICK RI 02886-4353

Place Recording stamp here

Receivable	Account #	Type	Detail	Original Bill	Amount Due	Penalty Due	Total Due
2017 RP Tax Roll	R-1997-00276	Real	113-6 at 417 FOREST AVE	47,167.34	0.00	0.00	0.00
2017 RP Tax Roll	R-1997-00276	SW-100	113-6 at 417 FOREST AVE	15,342.16	0.00	0.00	0.00
2017 RP Tax Roll	R-1997-00276	SW-400	113-6 at 417 FOREST AVE	4.19	0.00	0.00	0.00
2017 RP Tax Roll	R-1997-00276	SW-500	113-6 at 417 FOREST AVE	36.17	0.00	0.00	0.00
2018 RP Tax Roll	R-1997-00276	Real	113-6 at 417 FOREST AVE	50,707.02	0.00	0.00	0.00
2018 RP Tax Roll	R-1997-00276	SW-100	113-6 at 417 FOREST AVE	15,101.88	0.00	0.00	0.00
2018 RP Tax Roll	R-1997-00276	SW-400	113-6 at 417 FOREST AVE	3.98	0.00	0.00	0.00
2018 RP Tax Roll	R-1997-00276	SW-500	113-6 at 417 FOREST AVE	36.03	0.00	0.00	0.00
2019 RP Tax Roll	R-1997-00276	Real	113-6 at 417 FOREST AVE	50,734.88	0.00	0.00	0.00
2019 RP Tax Roll	R-1997-00276	SW-100	113-6 at 417 FOREST AVE	14,638.77	0.00	0.00	0.00
2019 RP Tax Roll	R-1997-00276	SW-400	113-6 at 417 FOREST AVE	34.25	0.00	0.00	0.00
2019 RP Tax Roll	R-1997-00276	SW-500	113-6 at 417 FOREST AVE	36.31	0.00	0.00	0.00
2020 RP Tax Roll	R-1997-00276	Real	113-6 at 417 FOREST AVE	50,734.88	0.00	0.00	0.00
2020 RP Tax Roll	R-1997-00276	SW-100	113-6 at 417 FOREST AVE	19,213.10	0.00	0.00	0.00
2020 RP Tax Roll	R-1997-00276	SW-400	113-6 at 417 FOREST AVE	34.25	0.00	0.00	0.00
2020 RP Tax Roll	R-1997-00276	SW-500	113-6 at 417 FOREST AVE	36.40	0.00	0.00	0.00
2021 RP Tax Roll	R-1997-00276	Real	113-6 at 417 FOREST AVE	65,672.15	49,254.10	0.00	49,254.10
2021 RP Tax Roll	R-1997-00276	SW-100	113-6 at 417 FOREST AVE	15,471.24	11,603.44	0.00	11,603.44
2021 RP Tax Roll	R-1997-00276	SW-400	113-6 at 417 FOREST AVE	13.71	10.27	0.00	10.27
2021 RP Tax Roll	R-1997-00276	SW-500	113-6 at 417 FOREST AVE	38.57	28.92	0.00	28.92

**Total: 60,896.73**

Requested by- CHURCH COMMUNITY HOUSING

PLEASE NOT THAT PENALTY TO ACCRUE DAILY; CONTACT THE TAX COLLECTIONS OFFICE FOR CURRENT AMOUNTS.

Failure to include herein any charges or tax that constitutes a lien on the above mentioned property as of the date of certificate does not affect the validity of the tax or change the subsequent collection thereof.

GEORGE M. DURGIN  
TAX ASSESSOR

**QUITCLAIM DEED**

417 Forest Avenue (a/k/a 170 Enterprise Center), Middletown, Rhode Island

RI Waterman Properties, Inc., a Rhode Island corporation having a place of business at c/o Fleet National Bank, Managed Assets Division, 40 Westminster Street, Providence, Rhode Island 02903, for consideration paid of \$1,050,000, hereby GRANTS to The West House Corporation, with an address at 50 Washington Square, Newport, Rhode Island 02840, WITH QUITCLAIM COVENANTS, the property commonly known as 417 Forest Avenue (a/k/a 170 Enterprise Center), Middletown, Rhode Island, as more particularly described on the attached Exhibit "A".

No withholding is required pursuant to R.I.O.L. §44-30-71.3, as grantor is a Rhode Island corporation, said corporate existence being evidenced by the attached Rhode Island Secretary of State Certificate of Good Standing recorded herewith.

For grantor's title, see Foreclosure Deed dated January 25, 1995 and recorded with the Middletown Records of Land Evidence on February 10, 1995 in Book 364 at Page 327.

WITNESS THE EXECUTION hereof as an instrument under seal this 3rd day of June, 1996.

RI WATERMAN PROPERTIES, INC.

By: *Louise A. Vanden*  
Name: Louise A. Vanden  
Title: Vice President

By: *Charles J. Burge*  
Name: Charles J. Burge  
Title: Vice President

2940002  
6/5/96  
001632  
RECORDED AT THE OFFICE OF THE CLERK OF THE SUPREME COURT OF THE STATE OF RHODE ISLAND


STATE OF RHODE ISLAND  
COUNTY OF PROVIDENCE, ss

In Providence in said County and State on the 3rd day of June, 1996, before me personally appeared Louise A. Vanden, Vice President of RI Waterman Properties, Inc., to me known and known by me to be the person executing the foregoing instrument on behalf of said Corporation and she acknowledged said instrument, by her so executed to be her free act and deed in such capacity and the free act and deed of said RI Waterman Properties, Inc.

*Robert W. Buffoni*  
Notary Public  
My Commission Expires: 4-4-97

STATE OF RHODE ISLAND  
COUNTY OF PROVIDENCE, ss

In Providence in said County and State on the 3rd day of June, 1996, before me personally appeared Charles J. Burger, Vice President of RI Waterman Properties, Inc., to me known and known by me to be the person executing the foregoing instrument on behalf of said Corporation and he acknowledged said instrument, by him so executed to be his free act and deed in such capacity and the free act and deed of said RI Waterman Properties, Inc.

  
\_\_\_\_\_, Notary Public  
My Commission Expires: 4-4-97

#3001011 1 - KEYDCA - 4 2011000 - 0000/10

Exhibit "A"

417 Forest Avenue (a/k/a 170 Enterprise Center)  
Middletown, Rhode Island

All of that certain land or parcel of land, with the buildings and improvements thereon, located in the Town of Middletown, and bounded and described as follows:

BEGINNING at a point marked by an iron pin in the westerly side of Forest Avenue at the intersection of the northerly property line of Richard Curran, et ux, with said westerly side of Forest Avenue; thence running south  $89^{\circ} 28' 14''$  west along a stone wall a distance of 352.03 feet to a point marked by an iron rod, bounded SOUTHERLY partly by land of Richard Curran, et ux, and partly by land of Leon A. Dymerski; thence continuing south,  $89^{\circ} 28' 14''$  west a distance of 134.54 feet to a point, bounded SOUTHERLY by land now or formerly of Gilbane Properties, Inc.; thence turning and running northerly, northwesterly and southwesterly  $173^{\circ} 14' 14''$  in an arc having a radius of 70 feet, a distance of 211.65 feet, bounded WESTERLY, SOUTHERLY AND SOUTHEASTERLY by land now or formerly of Gilbane Properties, Inc.; thence turning and running southwesterly  $11^{\circ} 00' 23''$  in an arc, having a radius of 160 feet, a distance of 30.74 feet, bounded SOUTHEASTERLY by land now or formerly of Gilbane Properties, Inc.; thence turning and running north  $39^{\circ} 23' 35''$  west a distance of 50 feet, bounded SOUTHWESTERLY by land now or formerly of Gilbane Properties, Inc.; thence turning and running north  $06^{\circ} 51' 02''$  west, a distance of 262.55 feet, to a point in a stone wall, bounded SOUTHWESTERLY by land now or formerly of Gilbane Properties, Inc.; thence turning and running north  $83^{\circ} 08' 58''$  east along a stone wall a distance of 48.54 feet to a point, bounded NORTHERLY by land now or formerly of Saint Lucy's Church; thence turning and running north  $87^{\circ} 06' 11''$  east along a stone wall a distance of 140.74 feet, bounded NORTHERLY by land now or formerly of Saint Lucy's Church; thence turning and running north  $87^{\circ} 00' 27''$  east along a stone wall a distance of 181.55 feet to a point, bounded NORTHERLY by land now or formerly of Franklin and Hinda Simon; thence turning and running north  $87^{\circ} 42' 08''$  east along a stone wall a distance of 150.90 feet, to a point, bounded NORTHERLY partly by land now or formerly of Frank and Hinda Simon and partly by land now or formerly of David and Marie Carnegie; thence turning and running north  $88^{\circ} 57' 34''$  east along said stone wall a distance of 33.27 feet to a point; bounded NORTHERLY by land now or formerly of David and Marie Carnegie; thence turning and running south  $06^{\circ} 04' 44''$  west a distance of 118.77 feet to a point, bounded EASTERLY by land now or formerly of Charles A. Ryerson, III; thence turning and running south  $83^{\circ} 55' 16''$  east a distance of 170 feet to a point in the westerly line of Forest Avenue, bounded NORTHERLY by said land now or formerly of Charles A. Ryerson, III; thence turning and running south  $06^{\circ} 04' 44''$  west along said westerly line of Forest Avenue a distance of 250.08 feet to the point or place of beginning; containing 5.088 acres, more or less.

TOGETHER with the benefit of all covenants and easements of record.

BE ALL said measurements more or less or however otherwise the same may be bounded or described.

BEING the same premises designated as Lot 1 on that certain plan of land entitled, "Plan of Land in MIDDLETOWN, R.I. prepared for GILBANE PROPERTIES, INC. Scale 1" = 80' August 27, 1984", by Vanasse/Hangen Engineering, Inc., which said plan is on file in the Middletown Land Evidence Records.

Excepting therefrom, the following parcel:

BEGINNING at the northwesterly corner of the parcel herein described; thence continuing N 83° 08' 58" E a distance of 48.54 feet, bounded northerly by land now or formerly of Saint Lucy's Church Corporation; thence continuing N 87° 06' 11" E to the northeasterly corner of the parcel herein described, a distance of 39.74 feet, bounded northerly by land now or formerly of Saint Lucy's Church Corporation; thence turning and running S 0° 31' 48" for a distance of 279.38 feet to the northerly line of Enterprise Center Avenue, bounded easterly by land now or formerly of the Borrower; thence turning and running in a southwesterly direction along a curve forming the northerly line of Enterprise Center Avenue for distance of 8.23 feet to a point; thence continuing in a southwesterly direction along said curve forming the northerly line of Enterprise Center Avenue to a point; thence turning and running N 39° 23' 35" W for a distance of 50 feet; thence turning and running N 06° 51' 02" W for a distance of 262.55 feet to the point and place of beginning, the last two courses being bounded southwesterly and westerly respectively by land now or formerly of Gilbane Properties, Inc.

BEING all said measurements more or less or however otherwise the same may be bound or described.

CONTAINING approximately .48 acres more or less.

BEING the area entitled "transferred area" which equals .48 acre on that certain plan entitled "PLAN OF LAND TRANSFER assessors plat 113 lot 15 Middletown, Rhode Island for GILBANE PROPERTIES" by David E. Small, P.E., R.L.S. August 1988 Scale 1" = 40' Job No. 1335 which plan is recorded in the Middletown Land Evidence Records.

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237

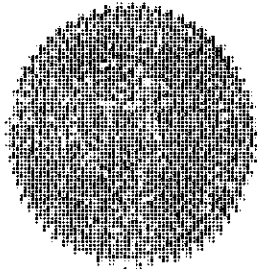


State of Rhode Island and Providence Plantations  
 Office of The Secretary of State  
 100 North Main Street  
 Providence, Rhode Island  
 02909-1335

I, James R. Langevin, Secretary of the State of Rhode Island and Providence Plantations, HEREBY CERTIFY that  
 RI Waterman Properties, Inc.

a Delaware corporation, qualified to do business in Rhode Island on the nineteenth day of March A.D., 19 91 ; and

I FURTHER CERTIFY that said corporation is now of record and in good standing in this office.



IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seal of the State of Rhode Island this twenty-third day of May A.D., 19 96

James R. Langevin  
 Secretary of State

By Kelley E. Pascatillo  
 Acting Deputy Secretary of State

Form CER-1

Corporations U.C.C. 277-3040 • Notary/Trademarks 277-1487  
 FAX 277-1309 • TDD 277-2311

238

Received for record in Middletown, R.I. June 5<sup>th</sup> 1996 at 2:01 P.M. and recorded in Land Evidence Book No. 388 Pg. 334-338  
 Witness Barbara L. Nash  
 (016 05) Town Clerk

## DEVELOPMENT IMPACT STATEMENT

Impact statement. The applicant shall submit to the Planning Board an impact statement, prepared with the assistance of qualified consultants, which shall evaluate the potential impact of the development upon:

(a) Traffic and parking conditions on site and within the surrounding area

CCHC has developed over 900 units of Affordable Housing in its 52 years of existence. Included in this portfolio are 8 Elderly Affordable Housing developments comprising 294 units. CCHC's experience is that Elderly Affordable Housing developments such as the one proposed here require significantly less parking and generate significantly fewer vehicle trips than other types of developments. For example, the existing 50-unit development West House only has 12-15 cars parked in its parking lot at any given time. This low parking demand, averaging .3 spaces per unit is consistent at the other 7 Elderly Affordable Housing developments in CCHC's portfolio. This can be confirmed by viewing satellite images of Harbor House, Anthony House, Belleville House, Mumford Manor, Forest Farm, Pemberton Apartments and West House. For the total 104 units of housing (50 in West House and 54 proposed here in West House II) the true parking need is approximately 31 spaces. We are proposing 77 spaces (including the 39 in existing lot fronting Forest Ave. With such minimal parking demand, the # of daily vehicle trips is also very minimal. Any neighbor of our Elderly Housing developments will attest to how quiet they are and how little traffic they produce.

(b) Municipal utilities and services, including water supply, sewage disposal, storm drains, police, fire protection, emergency services, schools, and other town services;

The 54 unit proposed addition will be connected to public water and sewer. Storm water management is addressed on the engineering plans and will be permitted through an Underground Injection Control permit from DEM. As an elderly housing development for persons 55 years of age and older no children will reside here. With respect to police, fire, emergency and other town services the Town has the data from West House, the existing 50-unit elderly housing development to show minimal a user of these town services such a development is.

(c) The physical and ecological characteristics of the site and surrounding land, including wetlands, floodplain, vegetation, wildlife habitat, and other environmental conditions;

The site was originally developed as an office building in the Gilbane Office Park. The existing building was purchased and converted to the 50-unit Elderly Housing Development that currently exists, known as West House. Because the property was originally for an Office Building the amount of parking provided far exceeds the needs of West House. As is evident from the aerial photo on page 2 of the Union Studios Master Plan set, the front parking lot (Forest Ave) is never even half full. The much larger parking lot in the rear of the building only ever has one or two cars (property management staff). The 54 unit addition is proposed within the existing rear parking area. The proposed site plan includes a significant reduction in impervious surface area (16.46%, from 75,295 s.f. of impervious down to 62,891 s.f.- Insight Engineering sheet 12 of 12: Post Watershed Analysis Map) and is not located in a wetland or floodplain.

Existing vegetation will be retained and as a result any minimal wildlife habitat that exists will be preserved and enhanced by the additional vegetated area being provided.

- (d) The character of the community, including scenic, historic and archaeological conditions; scale, placement, lighting, parking, and use of open space.

The site was originally developed as an office building in the Gilbane Office Park. The existing building was purchased and converted to the 50-unit Elderly Housing Development that currently exists, known as West House. The entire property is well screened and buffered with trees and other vegetation from the adjacent Buck Road extension residential area. The proposed scale and orientation is specifically to ensure the new building is not as tall as the existing building and impedes the views of existing West House residents as little as possible. The proposed building should not be visible from Forest Avenue because the existing West House building will block it from view. As previously mentioned the proposed plan reduces the impervious surface area by 16.46 percent, replaced with landscaped area/open space. Parking is twice as much as needed but significantly less than required by Town regulations. There are no other scenic, historic, or archaeological considerations.



January 4, 2021

Mr. Christian Belden  
Church Community Housing Corporation  
50 Washington Square  
Newport, RI 02840

***Letter of Eligibility: West House II, 417 Forest Ave, Middletown, RI, Plat-113, Lot 6***

Dear Mr. Belden:

RIHousing has received your application for a letter of eligibility to pursue a Comprehensive Permit in the town of Middletown. You have represented that you propose to construct a fifty-four (54) unit rental Development comprised of forty (40) one-bedroom units and fourteen (14) two-bedroom units.

The affordable units will be financed in part with low-income housing tax credits (“LIHTC”) and rented to households earning a maximum of 60% of the Area Median Income (“AMI”). Under the LIHTC program, the rent and incomes allowable under the program will be governed by the applicable HUD published information for the Newport County (Newport, Middletown, Portsmouth) MSA.

Under the requirements for affordability and monitoring, under R.I.G.L. 45-53, the construction or rehabilitation of qualifying low- and moderate-income housing units must be assisted by a state, federal or municipal subsidy program that will be documented in a long-term deed restriction recorded with the Town of Middletown. The LIHTC program qualifies as such assistance.

After preliminary review of the plans and financial assumptions for the proposed fifty-four unit rental Development for households earning 60% of the AMI, all to be located at Plat 113, Lot 6 in Middletown, RIHousing has determined that:

- This project appears to be eligible for a municipal subsidy under Article 17(1702 Eligibility) Municipal Government Subsidy of the Town of Middletown.
- In conformance with R.I.G.L. 45-53-3(5) RIHousing performed an on-site inspection of the site and has reviewed pertinent information supplied by the applicant.
- The initial project proforma was reviewed and the project appears to be feasible based on projected overall development costs and potential sources.
- The applicant, Church Community Housing Corporation, has provided evidence of site control.

West House II  
January 4, 2021

Based upon the review of the submitted information and supporting materials and based on the representations in your request, *Church Community Housing Corporation is eligible to pursue a Comprehensive Permit application in the town of Middletown to develop Plat 113, Lot 6.*

Modifications to the development proposal resulting from local review do not require a revised letter of eligibility.

Thank you for your commitment to providing affordable housing opportunities to low- and moderate-income Rhode Island families.

Sincerely,

*Anne Berman* 1/5/2022

Anne Berman  
Director of Real Estate Development

cc: Ron Wolanski, AICP, Middletown Director of Planning & Economic Development



State of Rhode Island  
Department of State | Office of the Secretary of State  
Nellie M. Gorbea, Secretary of State

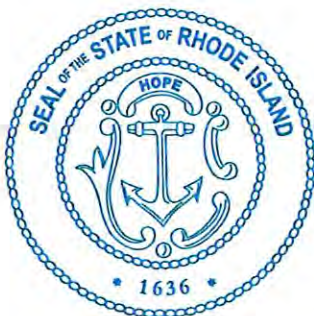
### CERTIFICATE OF GOOD STANDING

I, Nellie M. Gorbea, Secretary of State and custodian of the seal and corporate records of the State of Rhode Island, hereby certify that:

#### Church Community Housing Corporation

is a Rhode Island Non-Profit Corporation organized on **October 17, 1969**. I further certify that revocation proceedings are not pending; articles of dissolution have not been filed; all annual reports are of record and the corporation is active and in good standing with this office.

This certificate is not to be considered as a notice of the corporation's financial condition or business practices; such information is not available from this office.



SIGNED and SEALED on  
September 30, 2021

Secretary of State

Certificate Number: 21090153120

Verify this Certificate at: <http://business.sos.ri.gov/CorpWeb/Certificates/Verify.aspx>

Processed by: klynch



THE CITY OF NEWPORT, RHODE ISLAND - AMERICA'S FIRST RESORT  
DEPARTMENT OF UTILITIES

November 30, 2021

Julia A. Forgue, PE  
Director

Christopher Chutz  
Project Manager  
Church Community Housing Corporation  
50 Washington Square  
Newport, RI 02840

RE: Water Service Availability  
417 Forest Ave.  
Middletown, RI  
Assessor's Plat 113 Lot 6

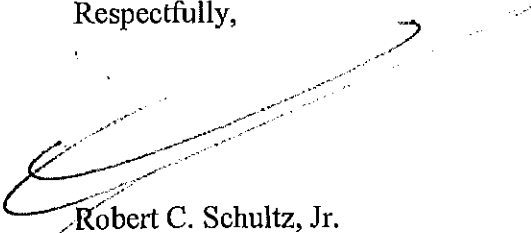
Dear Mr. Chutz,

The Department of Utilities has reviewed the referenced request pertaining to the proposed development on the referenced parcel located in Middletown, RI. This letter serves as verification that the Newport Water System can support the additional water demand.

Please be advised that this letter does **not** constitute approval of any aspect of the water service connections including the size and location. An application for water service connection is required to be submitted for review and approval.

If you should have any questions/concerns please feel free to call my office at (401) 845-5600.

Respectfully,



Robert C. Schultz, Jr.  
Acting Director of Utilities

Enclosures

cc: Joseph Roque, Distribution & Collection Supervisor  
Kyle Kluth, Meter Foreman



**MIDDLETOWN**  
Rhode Island

## **PUBLIC WORKS**

**TOWN OF MIDDLETOWN**

350 East Main Road, Middletown, RI 02842  
(401) 842-6500 | MiddletownRI.com

**DATE:** December 17, 2021

**TO:** Chris Chutz, Church Community Housing

**FROM:** Robert A. Hanley, Jr., DPW Director  
*RAHJR.*

**Cc:**

**RE:** 417 Forest Ave. AP 113 Lot 6

The intent of this letter is to issue a Conditional Approval to connect to the Town Public Sewer System at 417 Forest Ave. subject to the following:

1. The design and installation of the service connection shall be in accordance with Town Rules & Regulations. Any additional engineering, design and construction requirements as determined by the Town. Review by RIDEM regarding sewer system capacity if applicable. Review by Middletown Town Council if applicable.
2. Sewer Permit Inspection Fee(s).



December 8, 2021

Christopher Chutz, Project Manager  
Church Community Housing Corporation  
50 Washington Square, Newport, RI 02840

**RE: 417 Forst Ave Middletown RI 02842**

It is a pleasure to inform you that your inquiry requesting a letter of availability for clean, reliable natural gas for the above referenced project is acknowledged.

Please note that there is gas availability in the area of your project.

**This letter is not to be construed as final approval for gas service to the project.**

Final approval is only considered when a finalized load letter as well as a site utility plan (AUTOCAD) and plan to scale are received showing a desired outside location. This location must have a minimum 3' clearance all around the installation from any operable windows, doors, vents or sources of ignition (electrical)

If I can be of further assistance to you regarding this matter, please contact me direct at (401) 784-7153.

Sincerely,

Thomas Dion  
Lead Account Manager  
401-784-7153



12/08/2021

Christopher Chutz  
417 Forest Ave  
Middletown, RI 02842

Attention: Christopher Chutz

RE: Electric Service for New Development at 417 Forest Ave in Middletown, RI.

Dear Chris,

This letter is a follow up to your request in regards to the installation of new electric service to the 417 Forest Ave in Middletown, RI for a New Subdivision.

National Grid has agreed to provide electrical service to this property subject to the Terms and Conditions for Distribution Service, Appendix B, Policy 3 – Line Extension Policy for Commercial and Industrial Customers. Please note the “Customer Responsibilities” in this document, specifically, those outlined in Section III. Please also note that a payment may be required from the customer requesting electric service as described in section IV.

You may review this document starting on page 145 at:

[http://www.nationalgridus.com/narragansett/non\\_html/rates\\_tariff.pdf#page=73](http://www.nationalgridus.com/narragansett/non_html/rates_tariff.pdf#page=73)

Subsequent to all of these customer responsibilities being satisfied, National Grid will proceed to schedule the installation of this service.

Should you have any question, please feel free to contact me at 781-907-3494.

Sincerely,

**Jessica Dunbar**  
Commercial Account Representative  
Customer Order Fulfillment  
National Grid  
40 Sylvan Rd  
Waltham, MA 02451



DATE: 12/13/21

Re: Proposed

New Build

417 Forest Ave

Middletown , RI 02842

Dear, Christopher Chutz,

Pursuant to your request for the availability of {CATV} to service the above referenced project. Cox Communications does, have sufficient signal to provide service in the area .

Cox Communications is a Full Service Broadband Provider of Digital Telephone, Digital Video and High Speed Internet Access.  
Cox welcomes the opportunity to work with you on your project.

As the Project Engineer in your area, I will be happy to meet to discuss the planning, design and construction phases of the project.

If the incoming utilities are to be underground:

We would appreciate being contacted by the developer as soon as possible to install a 3" conduit systems from the riser pole into the building to electrical room or where the services for each unit will be feed from. The 3" conduit needs to be rigid PVC, heavy wall, listed and labeled electrical grade schedule 40

Cox does expect the conduit to be installed at no expense to us. If you have any questions or require additional information, please feel free to contact me.

Thank you,  
Chris Fitzpatrick  
Construction Planner II  
Cox Communications  
9 James P. Murphy Highway  
West Warwick RI 02893  
Cell: 401 265 0225

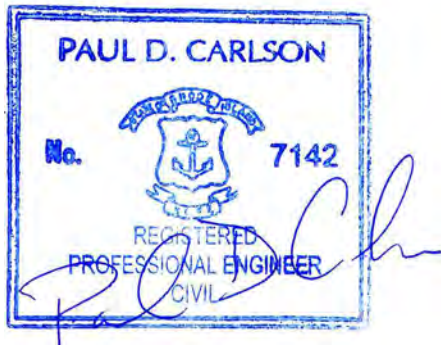
# Operation and Maintenance Plan

## ***“WEST HOUSE II – AFFORDABLE SENIOR HOUSING”***

417 Forest Avenue  
Middletown, RI 02842

---

February 8, 2022



Prepared for:

**Church Community Housing Corporation**  
50 Washington Square  
Newport, RI 02840

Prepared by:



**InSite Engineering Services, LLC**  
InSite Professional Complex – Suite #1  
1539 Fall River Avenue  
Seekonk, MA 02771

### Future Owners and Operator of Project

Unless and until another party accepts responsibility, the Town of Middletown and RIDEM shall presume that the owner of the BMP is the landowner of the property on which the BMP is located, unless there is a legally binding agreement with another entity that accepts responsibility for the operation and maintenance.

To ensure compliance with Standard 11 of the RI Stormwater Design and Installation Standards Manual shall include the continuing conditions set forth below.

(1) All stormwater BMPs shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority.

(2) The responsible party shall:

- (a) maintain an operation and maintenance log (rolling log in which the responsible party records all operation and maintenance activities for the past three years) for the last three years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
- (b) make this log available to Town of Middletown, and RIDEM upon request; and
- (c) allow members and agents of the Town, or RIDEM to enter and inspect the premises to evaluate and ensure that the responsibility party complies with the Operation and Maintenance Plan requirements for each BMP.

An essential component of a successful stormwater system is the ongoing operation and maintenance of the various components of the stormwater drainage, control, and conveyance systems. Failure to provide effective maintenance can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater practices.

There are two key components to adequately maintaining a stormwater management infrastructure:

- Periodic and scheduled inspections, and
- Maintenance scheduling and performance.

### Inspections

Inspections shall be performed on a regular basis and scheduled based on the stormwater control type and characteristics. In addition, inspections shall occur after major rainfall events for those components deemed to be critically affected by the resulting runoff. Not all inspections can be conducted by direct human observation. For subsurface systems, video equipment may be required. There may be cases where other specialized equipment is necessary.

### Maintenance

Maintenance activities can be divided into two types: scheduled and corrective.

- Scheduled maintenance tasks are those that are typically accomplished on a regular basis and can generally be scheduled without referencing the attached **INSPECTION REPORTS**.
  - vegetation maintenance (such as mowing) and routine maintenance of lawns, gardens, and other landscaped areas shall occur as necessary to maintain the property in a neat and orderly fashion. Clippings and/or mulch shall not be placed/washed into the drainage infrastructure.
  - trash and debris removal
  - storage of materials and waste products shall be inside or under cover. Fertilizers, herbicides and pesticides, if stored on site, shall be stored properly contained and under cover. Storage of salt or deicing chemicals, if any, shall be on impervious area, covered and protected from runoff.
- Corrective tasks consist of items such as that are done on an as-needed basis. These tasks are typically scheduled based on inspection results or in response to complaints. Corrective maintenance sometimes calls for more specialized expertise and equipment than scheduled tasks.
  - sediment removal,
  - and outlet structure repairs

### Illicit Discharges

During construction, and from that point forward all illicit connections from the property shall be cut and capped. The proposed site stormwater management system shall be checked for signs of illicit discharge during regular operation and maintenance activities. This will include but not be limited to checking for connections other than stormwater to the drainage system. Should connections other than stormwater be found, they will be immediately removed.

### Documentation

The Owner is responsible to prepare inspection and maintenance records of the stormwater management facilities summarizing all maintenance and repairs. Records are to include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Records shall be kept on file indefinitely and be made available upon request to the approving/ regulatory authority.

### Infiltration Basin

- ❖ Infiltration facilities should be inspected annually to ensure that design infiltration rates are being met.
- ❖ If sediment or organic debris build-up has limited the infiltration capabilities (infiltration basins) to below the design rate, the top 6 inches should be removed and the surface roto-tilled to a depth of 12 inches. The basin bottom should be restored according to original design specifications.
- ❖ Any oil or grease found at the time of the inspection should be cleaned with oil absorption pads and disposed of in an approved location.
- ❖ Inspect facility for signs of wetness or damage to structures and note any eroded areas.
- ❖ If dead or dying grass on the bottom is observed, check to ensure that water percolates 2-3 days following storms. Mow and remove litter and debris. Stabilize eroded banks and repair undercut and eroded areas at inflow and outflow structures. Vegetation along the maintenance access roads should be mowed annually.

### Deep Sump Catch Basins

- ❖ Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Once 50% of the sump volume is filled, the catch basin may not be able to retain additional sediment.
- ❖ Inspect or clean deep sumps at least four times per year and at the end of the foliage and snow removal seasons. Sediments must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.
- ❖ Clamshell buckets are typically used to remove sediment; however, vacuum trucks are preferable as they remove more trapped sediment than clamshells. Vacuuming is also a speedier process and is less likely to damage the hood within the deep sump catch basin.
- ❖ Always consider the safety of the staff cleaning deep sump catch basins. Cleaning a deep sump catch basin within a road with active traffic or even within a parking lot is dangerous and a police detail may be necessary to safeguard workers.

### Cultec Infiltration System

- ❖ Infiltration practices shall never serve as a sediment control device during site construction phase.
- ❖ An observation well shall be installed in every infiltration trench or chamber system, consisting of an anchored 4- to 6-inch diameter perforated PVC pipe with a lockable cap installed flush with the ground surface.
- ❖ Infiltration practices shall be inspected annually and after storms equal to or greater than the 1-year, 24-hour Type III storm event.
- ❖ If sediment or organic debris build-up has limited the underground infiltration system capabilities to below the design rate, the infiltration trenches shall be restored according to original design specifications.

### Stormwater Pipes, Inlets and Outfalls

1. All stormwater inlets and outfalls shall be inspected twice per year.
2. Trash, leaves, debris and sediment shall be removed from inlets and outfalls as needed to keep them free flowing.
3. If stormwater pipes have become partially obstructed with trash, leaves, debris or sediment, the pipelines shall be cleaned by water jet truck and the material disposed of in accordance with Local, state and Federal regulations.

### Winter Maintenance Program

Ensure structures are not blocked by ice, snow, debris or trash during winter months. This project site does not feature snow storage areas. Snow is to be removed from the site as it accumulates. Small snow storms may be contained on site in upland areas where snowmelt can filter in to the soil.

- a. Do not dump snow into any waterbody, including river and pond.
- b. Dump snow at the end of impervious surface so that snow melt water can filter into the soil, leaving behind sand and debris which will be removed in the springtime.

### Long Term Pollution Prevention

Storm water runoff is collected and conveyed towards and into stormwater system components. Maintaining paved areas free of sediment, trash, debris, oil, etc. will assist in minimizing pollutants entering the system. The following are good housekeeping practices;

1. Solid waste containment:
  - a. Trash and recycling receptacles must be provided with regular collection at site.
2. Parking Lot Sweeping
  - a. Parking lot sweeping is required.
  - b. Parking lot is to be swept in the spring after snowmelt.
  - c. Parking lot is to be swept in the fall to remove fallen leaves and debris.
3. Deicing and Salt Storage
  - a. Sand and deicing chemicals should be stored under cover so as to prevent their exposure to stormwater.
  - b. If deicing materials are required it is recommended to use Sand(SiO<sub>2</sub>).
4. Snow Disposal
  - a. Do not dump snow into any waterbody, including the river and pond.
  - b. Dump snow at the end of impervious surface so that the snow melt water can filter into the soil, leaving behind sand and debris which will be removed in the springtime.
5. Landscape Maintenance
  - a. The Owner will refer to the notes section of the Detail and Notes Sheet for details on selection of soil and grass when installing and maintaining landscaping.

- b. Owner shall inspect height of grass on monthly basis. Mowing shall occur when height of grass reaches 6". Mow high, and keep mower blades sharp. Lawn shall not be cut shorter than 4 to 6 inches.
- c. Starter fertilizer shall not be applied when rain is expected and is only applied to fix eroded areas.
- d. Any erosion or scour areas found during the inspection shall be remedied immediately.

The Owner shall keep a written record of inspection dates and findings, maintenance operations, and all repairs. An inspection/maintenance checklist shall be used in the specified inspections. Records of inspections and maintenance shall be kept for at least three years, and available on reasonable notice for inspection by the Town, or RIDEM.

This document is in conjunction with the design plan of "West House II – Affordable Senior Housing" project dated February 8, 2022. Estimated yearly maintenance cost = \$1000

## Infiltration System Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
<b>1. Debris Cleanout (Annual)</b>		
Trench/chamber or basin surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
<b>2. Sediment Traps or Forebays (Annual)</b>		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
<b>3. Dewatering (Annual)</b>		
Trench/chamber or basin dewateres between storms		
<b>4. Sediment Cleanout of Trench/Chamber or Basin (Annual)</b>		
No evidence of sedimentation in trench/chamber or basin		
Sediment accumulation doesn't yet require cleanout		
<b>5. Inlets (Annual)</b>		
Good condition		

No evidence of erosion		
<b>6. Outlet/Overflow Spillway (Annual)</b>		
Good condition, no need for repair		
No evidence of erosion		
<b>7. Aggregate Repairs (Annual)</b>		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench/Chamber or basin does not need rehabilitation		

Comments:

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Actions to be Taken:

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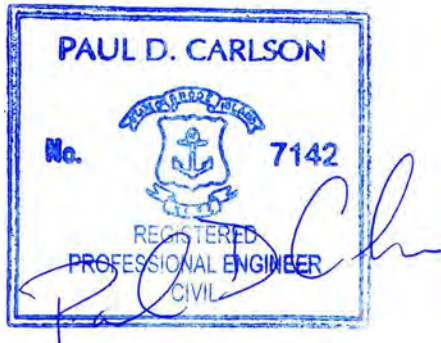
# STORMWATER MANAGEMENT REPORT

## *“WEST HOUSE II – AFFORDABLE SENIOR HOUSING”*

417 Forest Avenue  
Middletown, RI 02842

---

February 8, 2022



Prepared for:

**Church Community Housing Corporation**  
50 Washington Square  
Newport, RI 02840

Prepared by:



**InSite Engineering Services, LLC**  
InSite Professional Complex – Suite #1  
1539 Fall River Avenue  
Seekonk, MA 02771



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## 1.0 PROJECT NARRATIVE

### 1.1 Introduction

InSite Engineering Services has prepared this Stormwater Management report for the Proposed “West House II – Affordable Senior Housing” at 417 Forest Avenue, Middletown, Rhode Island. This report summarizes the design criteria used for the stormwater management system for the addition to be constructed.

West House II is a three-story addition to the existing West House senior affordable housing development in Middletown, Rhode Island. The project will offer 54 additional senior affordable apartments (40 one-bedroom and 14 two-bedroom units) to the existing development (50 existing one-bedroom units), in a community that is in great need of housing for its aging population on fixed incomes where property values and taxes continue to rise.

The apartments will be age restricted to 55 years. Targeted tenants Church Community Housing would like to serve may not always be dependent on others for their daily needs but may still require some assistance and supervision during the day. Living amongst other peers and having daily interaction in a variety of existing amenity spaces including the community room, dining room, sunroom, chapel, lounge or coffee shop, as well as through a variety of other provided services will encourage sociability, activity, independence and good health. It will also help to expand the already vibrant community of residents of West House.

The West House II site meets the requirements of a Redevelopment per the State of Rhode Island Stormwater Design and Installation Standards Manual. Calculations provided herein show the percentage of existing total impervious area of the site is 61%. The Site and has been designed to meet the Stormwater Standards to the best extent practicable in accordance with the guidelines of the Middletown Rules and Regulations as well as the State of Rhode Island Stormwater Design and Installation Standards Manual.

Site constrictions for this site included existing underground utilities, and existing West House Building elevations. The existing stormwater systems will be upgraded to provided water quality treatment elements not present in the existing system. This Stormwater Management report is intended to be used in conjunction with the Site plans “West House II – Affordable Senior Housing.” project.

Further, the Project will have a positive impact on the economic and health and safety of the residents of Middletown. The proposed redevelopment will allow West House to increase the number of apartments available.

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## 2.0 EXISTING SITE CONDITIONS

### 2.1 Property Description

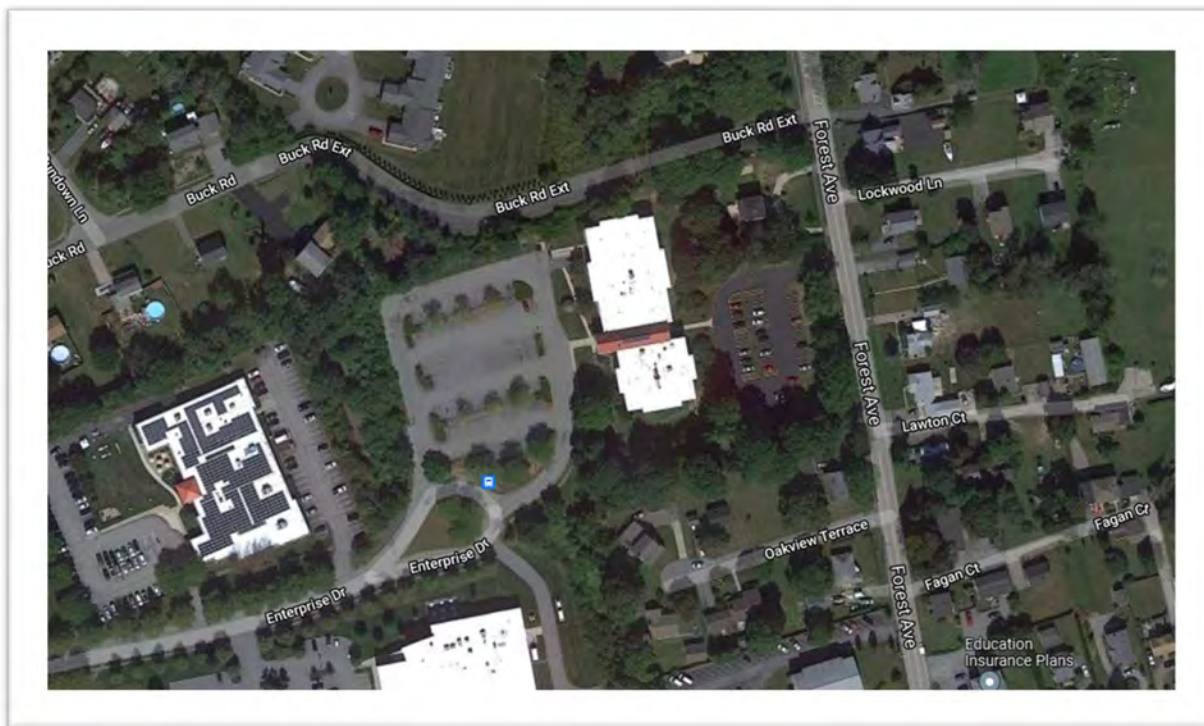
The subject site ("Site") known as West House II. The site is situated in Middletown, Rhode Island, with the existing entrance to West House on Forest Avenue (the east side of the site), and the proposed new entrance to West House II off the cul-de-sac at Enterprise Drive at the southwest corner of the site. Both streets connect to Route 138, East Main Road at the south. The site is bounded by some residential properties to the north and east (across Forest Avenue), and commercial/office business space to the west and south. The proposed location for the West House II addition is on the west side of West House located within an existing parking lot. There is an existing thickly vegetated border along the north and west property lines.

The site lies within the OB (Office Business) zoning district. The proposed plan to expand the affordable senior housing is not a permitted use in the Town of Middletown Zoning Ordinance. The project has received Master plan approval from the Town of Middletown and the Preliminary application will be submitted for the February planning board agenda

A gas easement crosses the site west of the existing building from the Cul-de-Sac of Enterprise drive to Forest Ave. Utilities tie into Forest Avenue to the west, and Enterprise Drive southwest of the property.

The existing site topography along the east side of the building is flat terrain ranging in elevation of one hundred fifty-five (155) at the building to elevation one hundred fifty-three (153) along the property adjacent to Forest Ave. The west side of the building has steep sloping terrain ranging from elevation one hundred fifty-five (155) at the building to elevation one hundred thirty-seven (137) at Enterprise Drive.

Existing stormwater management west of existing building consists of overland surface flowing directly to the detention pond and controlled in part by a number of catch basins. Stormwater east of the existing building is controlled by catch basins that direct the water away from the detention pond to the west.



*Figure 1: Aerial Photo - West House - Forest Ave, Middletown, RI*

## 2.2 Soil Classification

The SCS Soil Maps were consulted to reveal a soil classification of Urban (UR) soils for the site. InSite Engineering Services conducted on-site soil examinations to identify underlying soil types. These tests confirm soils similar to surrounding soil type Pittstown silt loam 0 to 3 percent slopes (PmA) and Pittstown silt loam 3 to 8 percent slopes (PmB) of HSG “C” series soils on the subject site. Refer to the soil map for Soil and Water Features from the Rhode Island Soil Survey a cooperative effort of the United States Department of Agriculture (USDA), Soil Conservation Service, and the Rhode Island Agricultural Experiment Station.

**Pittstown silt loam (PmA), Hydrologic Group C** – This nearly level, moderately well drained soil is on the crests of glacial upland hills and drumlins. Areas are oval and range mostly from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is 20 inches thick. It is dark yellowish brown and olive brown silt loam that is mottled in the lower part. The substratum is olive gray, mottled channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Newport soils and poorly drained Stissing soils. Also included are small areas of soils with stones on the surface. Included areas make up about 10 per cent of this map unit.

The permeability of this soil is moderate in the surface layer and subsoil and slow in the substratum. Available water capacity is moderate, and runoff is slow. This soil has a seasonal high water table at a depth of about 20 inches from late fall through mid spring. The soil is very strongly acid through medium acid.

**Pittstown silt loam (PmB), Hydrologic Group C** – This gently sloping, moderately well drained soil is on side slopes of glacial upland hills and drumlins. Areas are oval and range mostly from 5 to 100 acres.

Typically the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is 20 inches thick. It is dark yellowish brown and olive brown silt loam that is mottled in the lower part. The substratum is olive gray, mottled channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Newport soils and poorly drained Stissing soils. Also included are small areas of nearly level soils, that have slopes of more than 8 percent, and stony soils. Included areas make up about 10 percent of this map unit.

The permeability of this soil is moderate in the surface layer and subsoil and slow in the substratum. Available water capacity is moderate, and runoff is medium. This soil has a seasonal high water table at a depth of about 20 inches from late fall through midspring. The soil is very strongly acid through medium acid.



Figure 2: USGS Soils Map - Forest Ave, Middletown, RI

## 2.3 Flood Zone Classification

Referencing the National Flood Insurance Program, Flood Insurance Map, Community Panel Number 44005C0093J. September 4, 2013, the parcel does not lie within a special flood hazard zone (see Figures below).

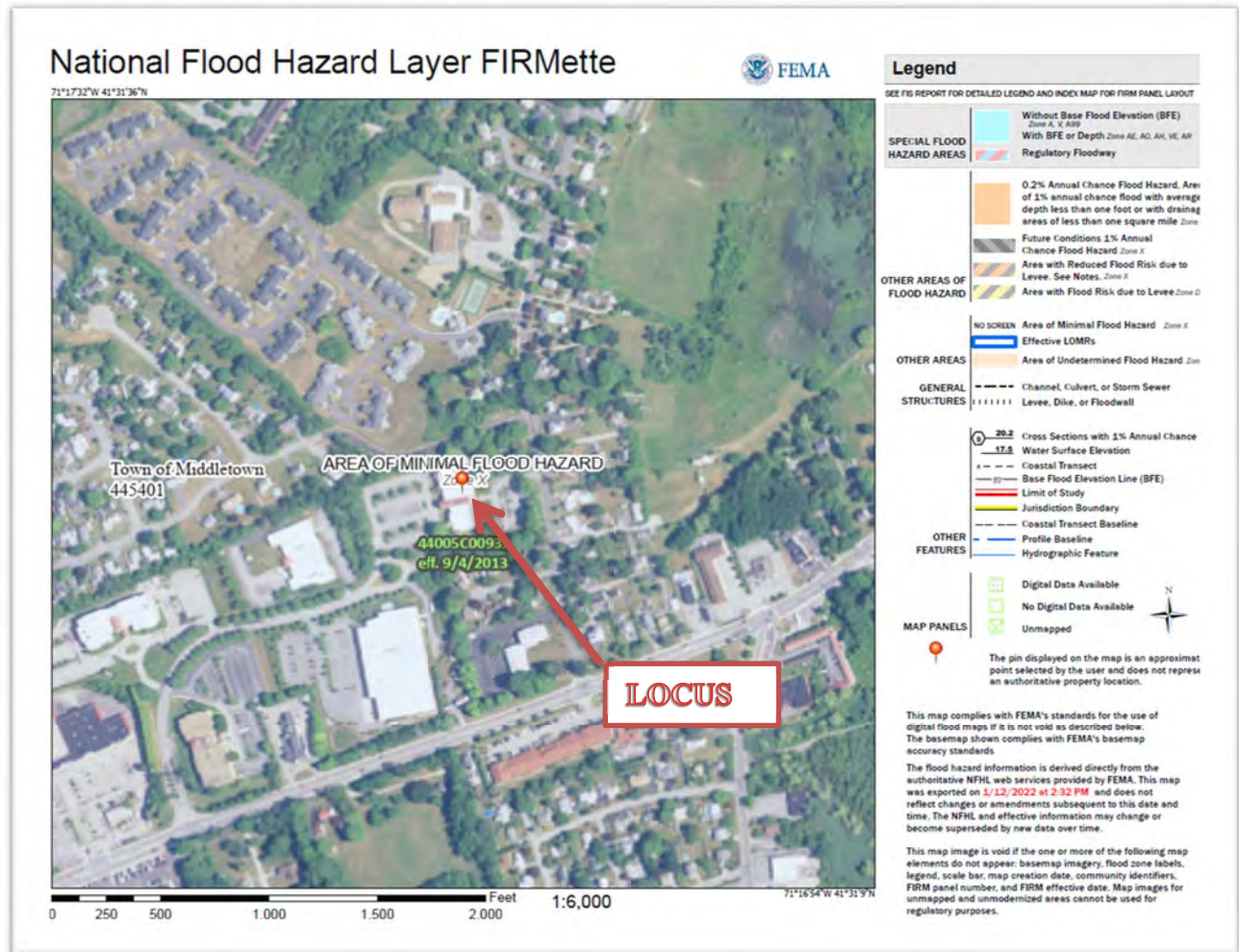


Figure 3: FEMA Flood Map - Forest Ave, Middletown, RI

## 2.4 Groundwater Classification

Groundwater on the Site falls within a single category. The recharge area that contributes to Bailey Brook (ID Number RI0007035R-01) is classified by RIDEM as "GA".

## 2.5 Surface Water

The Environmental Resource Map indicates the nearest surface water body is the Bailey Brook to the west.

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## 3.0 PROPOSED SITE CONDITIONS

### 3.1 Site Plan

West House II proposes re-development of the site as follows:

- Re-development of parking lots and Access Driveways
- Addition to the main building as affordable senior housing apartments.
- Construction of stormwater management system of culvic chambers to provide water quality
- New driveway and expanded parking areas
- Grading of site
- Expanded and new utility installations

### 3.2 Stormwater Management Considerations

The comprehensive drainage design is separated into three predevelopment Subcatchment areas and eleven (11) post development Subcatchment areas. The total drainage area analyzed is approximately 123,448 sf (2.83 ac). Runoff from impervious areas is to mimic existing conditions by being directed on towards the existing detention area on the westrn side of the property. Runoff from the westerly parking lot is managed in a system of Cultec units.

For both the Pre-construction and Post Construction scenarios, the times of concentrations (TOC) for the longest overland flow path within each area were determined using the TR-55 Method. Each flow path is represented individually on the subarea calculation sheets. A weighted curve number CN was derived for each subarea based on proposed land usage and soil types. The respective pre-construction rates of runoff were interpreted as allowable release rates for post-construction design.

#### 3.2.1 Methodology

The stormwater system was designed using a computerization of the Soil Conservation Service (SCS) method, for the computation of runoff hydrographs and peak discharge rates. All stormwater management computations and detention pond modeling has been performed with the *Hydrocad V 10.0* Stormwater modeling software.

The rainfall duration intensity curves were developed from 24-hour rainfall intensities were obtained from the U.S. Weather Bureau, for the Middletown, RI area. The drainage analysis is based on the SCS method with a rainfall distribution Type III, for the 1-year, 10-year, and 100-year design frequency storms.

1 year	=	2.8 inches
10 year	=	4.9 inches
100 year	=	8.6 inches

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### 3.2.2 Watershed Description – Pre-Development Conditions

The pre-development watershed consists of three (3) Subcatchment areas. They are labeled as Subcatchment PRE1 (PRE1), Subcatchment PRE2 (PRE 2) and Subcatchment Uncontrolled (Uncontrolled) Refer to Appendix 'B' for the Existing Conditions Watershed Map. Design Point 1 (DP1) of these watersheds is to the detention pond to the west. Design Point 2 (DP2) is to a point directly off site on Enterprise Avenue.

Subcatchment PRE1 (PRE1) – this Subcatchment consists of the northern area of the lot that is directed overland toward the detention pond.

Subcatchment PRE2 (PRE 2) – this Subcatchment consists of the southern area of the lot that is directed overland towards the detention pond.

Subcatchment Uncontrolled (Uncontrolled) - This Subcatchment depicts the area that does not drain towards the detention pond, instead runoff flows towards enterprise drive to the southwest of the site.

The peak discharge runoff rate is in cubic feet per second (cfs). Refer to Appendix 'A' – Pre-Development Drainage Analysis for the hydrographs and supporting data and calculations.

### 3.2.3 Watershed Description – Post Development Conditions

Under post-development conditions, the site watershed was analyzed as eleven (11) Subcatchment. Comparatively equal in total area to the existing conditions watershed area. They are labelled as Subcatchment Post 1A (POST1A), Subcatchment Post 1B (POST1B), Subcatchment Post 1C (POST1C), Subcatchment Post 1D (POST1D), Subcatchment Post 2A (POST2A), Subcatchment Post 2B (POST2B), Subcatchment Post 2CA (POST2CA), Subcatchment Post 2CB (POST2CB), Subcatchment Post 2D (POST2D), Subcatchment Post 2E (POST2E), and Subcatchment Uncontrolled (Uncontrolled)

Design Point 1 (DP1) of these watersheds is to the detention pond to the west. Design Point 2 (DP2) is to a point directly off site on Enterprise Avenue.

Subcatchment Post 1A (POST1A) – this subcatchment consists of the area directed towards Cultec units A and the detention pond.

Subcatchment Post 1B (POST1B) – this subcatchment consists of the area directed towards the detention pond.

Subcatchment Post 1C (POST1C) – this subcatchment consists of the area directed towards the detention pond.

Subcatchment Post 1D (POST1D) – this subcatchment consists of the area directed towards the detention pond.

Subcatchment Post 2A (POST2A) – this subcatchment consists of the area directed towards Cultec units B and the detention pond.

Subcatchment Post 2B (POST2B) – this subcatchment consists of the area directed towards the detention pond.

Subcatchment Post 2CA (POST2CA) – this subcatchment consists of the area directed towards Cultec units B and the detention pond.

Subcatchment Post 2CB (POST2CB) – this subcatchment consists of the area directed towards Cultec units B and the detention pond.

Subcatchment Post 2D (POST2D) – this subcatchment consists of the area directed towards Cultec units B and the detention pond.

Subcatchment Post 2E (POST2E) – this subcatchment consists of the area directed towards Cultec units B and the detention pond.

Subcatchment Uncontrolled (Uncontrolled) - This Subcatchment depicts the area that does not drain towards the detention pond, instead runoff flows towards enterprise drive to the southwest of the site.

The Post Watershed Analysis Map (see Appendix B) shows the limits of each subcatchment area.

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## 4.0 STORMWATER MANAGEMENT STANDARDS

This proposed stormwater management system complies to the best extent possible with the current regulations of the Rhode Island Department of Environmental Management (RIDEM). Total Pre-Construction impervious area is 75,294 s.f. The total area of the combined lots is 123,448 s.f. The percentage of total impervious area of the site is 61%. Since 61% is greater than 40% the site is considered Redevelopment. Compliance and applicability of the eleven (11) Stormwater Management Standards are discussed below.

For redevelopment sites with 40% or more existing impervious surface coverage, only Standards 2, 3, and 7-11 must be addressed. Specifically, recharge and stormwater quality shall be managed in accordance with one or more of the following techniques:

- Reduce existing impervious area by at least 50% of the redevelopment area; or
- Implement other LID techniques to the maximum extent practicable to provide recharge and water quality management for at least 50% of the redevelopment area; or
- Use on-site structural BMPs to provide recharge and water quality management for at least 50% of redevelopment area;

The West House II site will implement a combination of the above techniques.

The following eleven (11) standards and proposed stormwater management measures are listed below.

### 4.1 Minimum Standard 1: LID Site Planning and Design Strategies (Not Required for Redevelopment)

LID site planning and design strategies must be used to the maximum extent practicable in order to reduce the generation of the water runoff volume for both new and redevelopment projects.

*Although the site meets the redevelopment standard and is not required to provide LID Site Planning and Design Strategies; Criteria was utilized in the site planning process. The full list of approved LID methods and/or procedures were explored at the site. LID methods proposed for this site are bioretention areas which provide parking lot landscaping by breaking up impervious areas.*

## 4.2 Minimum Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub watershed to maintain baseflow at pre-development recharge levels to the maximum extent practicable in accordance with the requirements and exemptions described in Section 3.3.2 of the Rhode Island Stormwater Management Standards.

For redevelopment sites with 40% or more existing impervious coverage standard 2 must be addressed. Recharge and Water Quality shall be managed in accordance with the acceptable technique of utilizing on-site structural BMP's to provide recharge and water quality management for at least 50% of redevelopment area.

The objective of the groundwater recharge standard is to protect water table levels, stream baseflow, wetlands, and soil moisture levels. Infiltrating stormwater may also provide significant water quality benefits such as reduction of bacteria, nutrients, and metals when infiltrated into the soil profile.

*The Groundwater Recharge (Rev) volume of stormwater is based on the amount of impervious area and hydrologic soil group (HSG) as follows:*

$$R_{ev} = (1")F(I)/12$$

Where:

Rev = groundwater recharge volume (c.f.)

F = recharge factor

I = impervious area (s.f.)

*The Total amount of impervious area for the site is 75,295 s.f.*

*The redevelopment area has a 16.47% reduction in impervious area. In total a minimum of 50% of the redevelopment area is to be treated. An additional 33.53% of the existing area must be treated to have a combined treatment of 50% of the development area.  $0.34 (75,295) = 25,600$  s.f.*

*Total impervious to be treated = 25,600 s.f.*

$$R_{ev} = (1") * 0.25 * (25,600)/12 = 526 \text{ c.f.}$$

*The total Rev provided for this site is 4,745 c.f. as tabulated below*

Total Rev Provided				
BMP	Length (ft.)	Width (ft.)	Height to Inv. (ft.)	Rev Provided (c.f.)
Cultec Field A	73.5	20.83	2.0	2296.5075
Cultec Field B	59.5	20.83	2.0	1859.0775
Infiltration Pond	~	~	~	590
			Total	4745.585

### 4.3 Minimum Standard 3: Water Quality

For redevelopment sites with 40% or more existing impervious coverage standard 3 must be addressed. Recharge and Water Quality shall be managed in accordance with the acceptable technique of utilizing on-site structural BMP's to provide recharge and water quality management for at least 50% of redevelopment area.

Stormwater runoff must be treated before discharge. The amount that must be treated from each rainfall event is known as the required water quality volume (WQ<sub>v</sub>) and is the portion of runoff containing the majority of the pollutants. The water quality volume is calculated using the following equation:

*A minimum (WQ<sub>v</sub>) volume of 0.2 watershed inches (0.2" over entire disturbed area) is required.*

*The Total amount of impervious area for the site is 75,295 s.f.*

*The minimum WQ<sub>v</sub> for this area is*

$$75,295 (.2") (1/12) = 1255 \text{ c.f.}$$

*The redevelopment area has a 16.47% reduction in impervious area. In total a minimum of 50% of the redevelopment area is to be treated. An additional 33.53% of the existing area must be treated to have a combined treatment of 50% of the development area.  $0.34 (75,295) = 25,600$  s.f.*

*Total impervious to be treated = 25,600 s.f.*

The required WQ<sub>v</sub> for this site is

$$WQ_v = (1")(I_{\text{imp area}})(1/12)$$

$$WQ_v = (1") (25,600) (1/12) = 2,104 \text{ c.f.}$$

*The total WQ<sub>v</sub> provided for this site is 4,745 c.f. as tabulated below*

Total WQv Provided				
BMP	Length (ft.)	Width (ft.)	Height to Inv. (ft.)	WQv Provided (c.f.)
Cultec Field A	73.5	20.83	2.0	2296.51
Cultec Field B	59.5	20.83	2.0	1859.08
Infiltration Pond	~	~	~	590
			Total	4745.59

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#### 4.4 Minimum Standard 4: Conveyance and Natural Channel Protection (Not Required for Redevelopment)

Open drainage and pipe conveyance systems must be designed to provide adequate passage for flows leading to, from, and through stormwater management facilities for at least the peak flow from the 10-year, 24-hour Type III design storm event. Protection for natural channels downstream must be supplied by providing 24-hour extended detention of the one-year, 24-hour Type III design storm event runoff volume.

*The site is a Redevelopment which is not required to meet Standard 4, however Cultec infiltrator units have been designed to provide Twenty-four hour extended detention of the one year, design storm event. Similarly, the conveyance system has been designed to provide adequate passage for flows leading to, from, and through stormwater management facilities for at least the peak flow from the 10-year, 24-hour Type III design storm event. The stormwater system reduces the frequency and magnitude of overbank flooding and protects downstream and abutting structures from flooding.*

#### 4.5 Minimum Standard 5: Overbank Flood Protection (Not Required for Redevelopment)

Larger storm events also can cause flood damage and other impacts. These impacts can be significantly reduced by storing and releasing stormwater runoff in a gradual manner that ensures pre-development peak discharges are not exceeded. Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1-year, 10-year, and 100-year, 24-hour Type III design storm events.

*The stormwater system was designed using a computerization of the Soil Conservation Service (SCS) method, for the computation of runoff hydrographs and peak discharge rates. All stormwater management computations and pond modeling has been performed using the **Hydrocad V 10.0** Stormwater modeling software.*

*The rainfall duration intensity curves were developed from 24-hour rainfall intensities were obtained from the U.S. Weather Bureau, for the Middletown, RI area. The drainage analysis is based on the SCS method with a rainfall distribution Type III, for the 1-year, 10-year, and 100-year design frequency storms,*

*1 year = 2.8 inches  
10 year = 4.9 inches  
100 year = 8.6 inches*

*Evaluation of the contributing area(s), size, soil type(s), slope, and ground cover provide the necessary information required to develop rainfall event hydrographs. Rainfall event hydrographs are time/volume mathematical representations of how stormwater runoff volume is generated from different size storm events over a period of 24 hours for a specific*

watershed area. Each hydrograph depicts a bell-shaped curve where the area under the curve represents the volume of stormwater flow in cubic feet.

Hydrographs were developed for the watersheds of existing-and proposed conditions. The peak discharge rate was determined for each storm event. The site was designed to reduce the stormwater rates flowing offsite for the 1-year, 10-year, and 100-year storm. There is an increase in the stormwater rate to design point 1 for the 100-year storm, however the volume of water to design point one is reduced by approximately 15%. The site was designed to reduce the stormwater volumes for the 1-year, 10-year, and 100-year storm events. The modified curve number method was also utilized in hydroCAD to ensure that Post condition peak flows were all zero (0) cfs for the 1-year, 10-year, and 100-year storm events.

Table 1: "West House II" Watershed Areas			
Existing Conditions		Proposed Conditions	
Watershed Name	Total Area (s.f.)	Watershed Name	Total Area (s.f.)
Pre 1	56,958	Post 1A	27,741
Pre 2	37,195	Post 1B	8,779
Uncontrolled	29,294	Post 1C	7,810
		Post 1D	9,130
		Post 2A	9,029
		Post 2B	2,494
		Post 2CA	22,346
		Post 2CB	16,448
		Post 2D	3,820
		Post 2E	8,547
		Uncontrolled	7,303
<b>Total:</b>	<b>123,447</b>	<b>Total:</b>	<b>123,447</b>

Table 2: "West House II": <b>Design Point 1 - Detention Pond</b>			
Comparison of Pre- and Post- Development Peak Discharge Rates			
Frequency Storm (Year)	Existing Peak Discharge (cfs)	Proposed Peak Discharge (cfs)	Peak Discharge Difference (cfs)
1	4.65	3.52	-1.13
10	9.34	8.15	-1.19
100	17.51	19.18	1.67

Table 3: "West House II": <b>Design Point 2 - Total Off Site Flow</b>
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Comparison of Pre- and Post- Development Peak Discharge Rates			
Frequency Storm (Year)	Existing Peak Discharge (cfs)	Proposed Peak Discharge (cfs)	Peak Discharge Difference (cfs)
1	5.50	3.69	1.81
10	11.55	8.65	2.90
100	22.29	20.31	1.98

Table 4: "West House II": <b>Design Point 1 - Detention Pond</b>			
Comparison of Pre- and Post- Development Volume of Runoff			
Frequency Storm (Year)	Existing Volume (c.f.)	Proposed Volume (c.f.)	% Reduced
1	14,560	6,964	52
10	30,157	19,032	37
100	58,585	49,951	15

Table 5: "West House II": <b>Design Point 2 - Total Off Site Flow</b>			
Comparison of Pre- and Post- Development Peak Discharge Rates			
Frequency Storm (Year)	Existing Volume (c.f.)	Proposed Volume (c.f.)	% Reduced
1	17,250	7,533	56
10	37,007	20,578	44
100	73,695	53,498	27

Table 6: "West House II": <b>1.2" Peak Flow (cfs)</b>		
Sub watershed (Design Point)	PRE (CFS)	Proposed Volume (c.f.)
DP-1	N.A.	0
DP-2	N.A.	0
TOTALS:	N.A.	0

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#### **4.6 Minimum Standard 6: Redevelopment and Infill Projects**

The purpose of this minimum standard is to establish the alternative requirements for projects or portions of a project where existing impervious areas will be redeveloped or where the site qualifies as infill. In no case on a redevelopment or infill project shall the levels of stormwater treatment and recharge be less than the levels prior to initiation of the proposed project.

*The West House II project is a redevelopment project. The project will meet all of the requirements of Standard 6. Stormwater treatment and recharge will be greater than existing levels. The West House II development is not an infill project.*

#### **4.7 Minimum Standard 7: Pollution Prevention**

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff. These measures shall be outlined in a stormwater pollution prevention plan. The intent of this standard is to prevent, to the maximum extent practicable, pollutants from coming into contact with stormwater runoff.

*A Stormwater Pollution Prevention Plan has been prepared to address this Standard as required.*

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#### 4.8 Minimum Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

*The West House II site is not a land use with higher potential pollutant loads (LUHPPL). Standard 8 is not applicable for this project.*

#### 4.9 Minimum Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules (setbacks vary depending on the capacity of the OWTS, the type of conveyance system, and the sensitivity of the receiving waters). The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site, including stormwater best management practices and any pipes intended to transport stormwater to ground water, surface water, or municipal separate storm sewer system (MS4). Illicit discharges to the stormwater management system, i.e., illicit connections, are discharges not entirely comprised of stormwater that are not specifically authorized by a National Pollutant Discharge Elimination System (NPDES) or RIPDES permit. The objective of this standard is to prevent pollutants from being discharged into MS4s and Waters of the State, and to safeguard the environment and public health, safety, and welfare.

*The owner shall be responsible for the prohibition of illicit discharges on site. Discharges from sub-drains and French drains are not tied to any stormwater management system. The site has a connection to the existing sewer system.*

#### 4.10 Minimum Standard 10: Construction Activity Soil Erosion, Runoff, Sedimentation, and Pollution Prevention Control Measure Requirements

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities.

The site shall be developed in a manner to minimize land disturbances in accordance with State of Rhode Island Soil Erosion and Sediment Control Manual issued 2009 and amended 2015. The following specific construction strategies, techniques and erosion control measures are more specifically described as follows:

##### 1. Avoid and Protect Sensitive Areas and Natural Features

Areas of existing and remaining vegetation and areas that are to be protected during construction are delineated on the plans. The proposed activities are consistent with Minimum Standard 1, Low Impact Development (LID) Site Planning and Design Strategies and have been designed to maximize the protection of natural drainage areas and jurisdictional wetland buffers. The site has been designed to avoid the impacts, preserved wetland buffers by preserving naturally vegetated riparian buffers.

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## 2. Minimize Area of Disturbance

Limits of Disturbance (LOD) are clearly marked on all SESC plans. The amount of land area for the project site has been minimized. The project has been designed to control the peak runoff and flows under the post construction design. The site has been designed in accordance with Minimum Standard 1, Low Impact Development Site Planning and Design Strategies, Section 3.3.1.3., Appendix A Checklist 1.D. and Chapter Four – LID Site Planning and Design Strategies, Section 4.5.1.

## 3. Minimize the Disturbance of Steep Slopes

The site development will minimize the steep slopes on the property. Retaining walls have been utilized to minimize steep slopes. The site design will comply with Minimum Standard 1, Low Impact Development Site Planning and Design Strategies, Section 3.3.1.3 and Appendix A Checklist 1.D. Locating Sites in Less Sensitive Areas, and Chapter Four – LID Site Planning and Design Strategies, Section 4.5.1 Avoid the Impacts.

## 4. Preserve Topsoil

The site operator will preserve and stockpile existing topsoil. The topsoil will be reused on site. The topsoil will be amended, and an open meadow grass mix will be utilized throughout the site.

## 5. Stabilize Soils

The site will be stabilized immediately whenever clearing, grading, excavating activities have permanently ceased within the site. Hydro seed will be used throughout the site. Any disturbed soils exposed prior to October 15th will be seeded by that date. Any areas that do not have adequate vegetative stabilization by November 15th will be stabilized using degradable mulches that will cover and protect soil surfaces. If construction continues within the site during the period from October 15th through April 15th, care will be taken to ensure that only the area required for that day's work is exposed, and all erodible soil will be stabilized within 5 working days.

## 6. Protect Storm Drain Inlets

The site operator will install inlet protection measures at each of the catchbasins to remove sediment from discharge prior to entry into the storm drain inlet. The operator will clean and/or remove and replace, the protection measures as sediment accumulates. Accumulated sediment adjacent to the inlet protection measures will be removed by the end of the same workday in which it is found.

## 7. Protect Storm Drain Outlets

Haybales and riprap will be used at the outfall to protect and prevent scour and erosion at discharge points.

## 8. Establish Temporary Controls for the Protection of Post- Construction Stormwater Control Measures

Straw wattles will be installed to protect infiltration areas as they are installed and throughout the construction phase of the project so that they will function properly when they are brought online. The erosion and sediment control plan identifies areas where infiltration measures are proposed, and the site contractor shall restrict construction activity within the infiltration to prevent compaction of the area.

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## 9. Establish Sediment Barriers

Straw wattles will be installed along the perimeter areas of the site. The site contractor will maintain the sediment barriers and will be completed in accordance with the maintenance requirements specified by the product manufacturer or the Rhode Island Soil Erosion and Sediment Control Handbook.

## 10. Divert or Manage Run-on from Up-gradient Areas

Straw wattles will be used to limit stormwater flow from coming onto the project area, and to divert and slow on-site stormwater flow from exposed soils to limit erosion, runoff, and the discharge of pollutants from the site.

## 11. Properly Design Constructed Stormwater Conveyance Channels

The pipes and culverts have been sized to handle the peak flow from the 10-year, 24-hour Type III design storm.

## 12. Retain Sediment On-Site

The SESC Plan states different stormwater practices that control erosion, control run-off, and control sediment. The combination of practices must be designed to prevent discharges of sediment. The plans shall include inlet protection, construction entrances, and containment of stockpiled materials.

## 13. Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows

The Construction Plan identifies the discharge points and location of sedimentation basins, culverts, underground infiltration systems and infiltration ponds that control both peak flow rates and total runoff volume that will minimize flooding, channel erosion, and stream bank erosion.

## 14. Construction Activity Pollution Prevention Control Measures

The SESC Plan describes all the pollution prevention measures that will be implemented to control pollutants in stormwater. The operator shall install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants in accordance with the SESC Plan requirements outlined in the Rhode Island Soil Erosion and Sediment Control Handbook

## 15. Control Measure Installation, Inspections, Maintenance, and Corrective Actions

The installation of straw wattles will be completed by the time each phase of earth-disturbance has begun. The site will be inspected by the engineer or owner at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff. If an inspection reveals a problem, the operator will work to fix the problem immediately after discovering the problem, and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance. If new straw wattles or haybales are needed, the operator will install and make operational by no later than seven (7) calendar days from the time of discovery

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Site specific areas of concern are:

- \* Installation of closed drainage system, manholes, catch basins
- \* Slope stabilization
- \* Construction of construction entrances driveway
- \* Prevention of erosion and sediments adjacent properties
- \* At the Engineer's discretion, and following final grading of the surrounding slopes, a line of staked straw waddle shall be installed near the property line to prevent eroded soils from depositing in the drainage systems and on adjacent properties, and a line of silt fence shall be installed as shown on the plans.

#### **4.11 Minimum Standard 11: Stormwater Management System Operation and Maintenance**

The stormwater management system, including all structural stormwater controls and conveyances, must have an operation and maintenance plan to ensure that it continues to function as designed.

*The West House II. as the owner, will be responsible for the operation and maintenance of the stormwater management system and all its appurtenances. The owner will keep a written record of inspection dates and findings, maintenance operations, and all repairs. Refer to the Stormwater Management System Operation and Maintenance (Standard 11) section of this report for the maintenance program. A separate Operation and Maintenance Plan will be recorded and maintained on site.*

*O&M Access and Safety:*

- *Access to ALL Stormwater management systems should be safe and efficient*
- *All egress and ingress routes should be maintained to design standard below:*
- *Access routes should be inspected and maintained*
- *Obstacles preventing maintenance personnel and / or equipment access should be removed*
- *Walkways should be clear of obstructions and maintained to design standards*
- *Roadways should be maintained to accommodate the size and weight of vehicles that use the roadways*
- *Gravel or ground cover should be added if erosion occurs (for example, as a result of vehicle or pedestrian traffic)*
- *All fences should be maintained to preserve their functionality and appearance*
- *Collapsed fences should be restored to an upright position*
- *Jagged edges and damaged fences should be repaired or replaced*

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## 5.0 CONCLUSIONS

*The proposed "West House II" project will incorporate a drainage system comprising the use of BMP's such as Cultec Infiltration Units to provide water quality treatment. The use of these BMP's result in:*

- *An equal or less peak discharge rate for the 1-year, 10-year, and 100-year design frequency storms.*
- *Compliance with the Rhode Island Stormwater Design and Installation Standards Manual to the maximum extent possible*
- *80% TSS Removal*
- *No detrimental effects of the water quality due to the infiltrators ability to retain and/or remove nutrients or act as a natural pollution filter.*
- *No decrease in flood storage capacity that would impair the ability to protect life and/or property.*

*It is the opinion of this engineer that the proposed "West House II" stormwater management program is in compliance to the extent practicable with the latest Rhode Island Stormwater Design and Installation Standards Manual.*

# APPENDICES



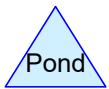
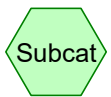
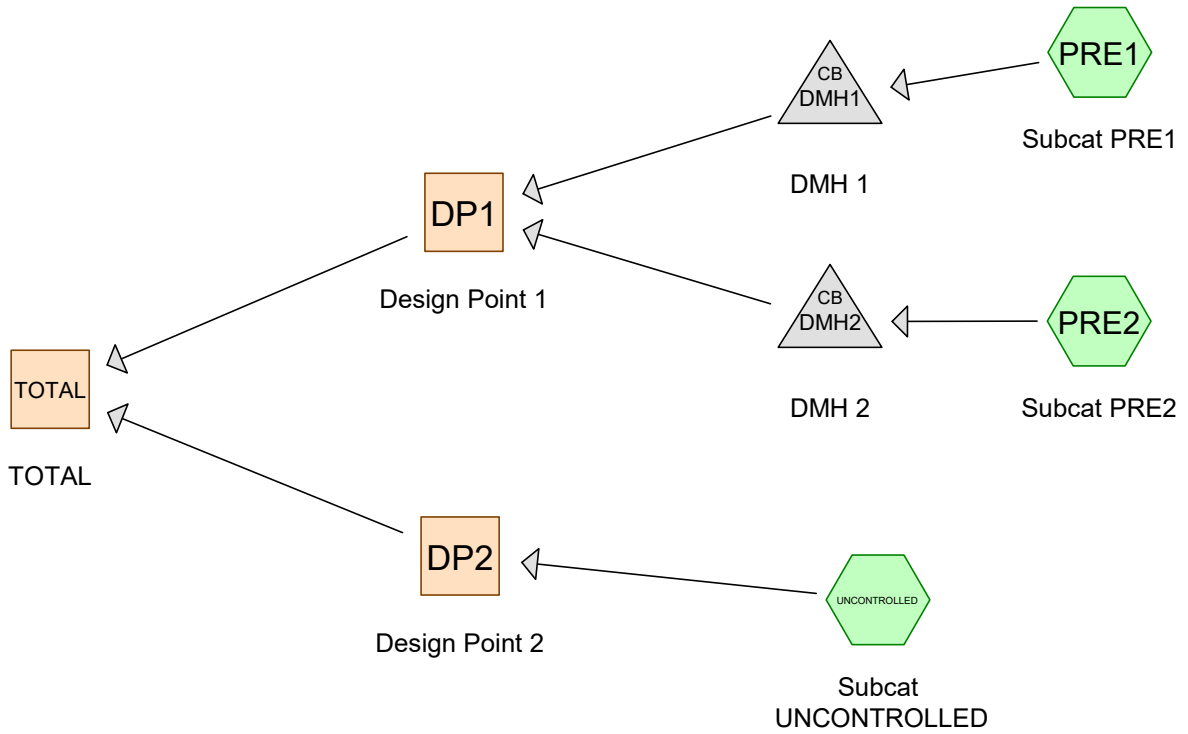
*APPENDIX A:*  
1, 10, & 100-Year Storm Calculations  
(Pre and Post Construction)  
1.2” Water Quality Storm Event  
(Modified Curve Number)

Drainage Diagram  
Area Listing  
Storm Event Summary Sheet  
Area Summaries  
Times of Concentration  
Outlet Structure (Post only)  
Basin Routing (Post only)  
Basin Volumes (Post only)



# PRE-CONSTRUCTION ANALYSIS







**21-038 - 417 Forest Avenue - Pre Watershed Analysis - October 12, 2021**

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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
33,430	74	>75% Grass cover, Good, HSG C (PRE1, PRE2, UNCONTROLLED)
63,724	98	Paved parking, HSG C (PRE1, PRE2, UNCONTROLLED)
11,570	98	Roofs, HSG C (PRE1, PRE2, UNCONTROLLED)
14,724	70	Woods, Good, HSG C (PRE1, PRE2, UNCONTROLLED)
<b>123,448</b>	<b>88</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
123,448	HSG C	PRE1, PRE2, UNCONTROLLED
0	HSG D	
0	Other	
<b>123,448</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	33,430	0	0	33,430	>75% Grass cover, Good
0	0	63,724	0	0	63,724	Paved parking
0	0	11,570	0	0	11,570	Roofs
0	0	14,724	0	0	14,724	Woods, Good
<b>0</b>	<b>0</b>	<b>123,448</b>	<b>0</b>	<b>0</b>	<b>123,448</b>	<b>TOTAL AREA</b>

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PRE1: Subcat PRE1** Runoff Area=56,958 sf 65.40% Impervious Runoff Depth=1.72"  
 Flow Length=384' Tc=6.0 min CN=89 Runoff=2.63 cfs 8,164 cf

**Subcatchment PRE2: Subcat PRE2** Runoff Area=37,196 sf 81.12% Impervious Runoff Depth=2.06"  
 Flow Length=332' Tc=6.0 min CN=93 Runoff=2.02 cfs 6,395 cf

**Subcatchment UNCONTROLLED: Subcat** Runoff Area=29,294 sf 26.87% Impervious Runoff Depth=1.10"  
 Flow Length=283' Tc=6.0 min CN=80 Runoff=0.85 cfs 2,690 cf

**Reach DP1: Design Point 1** Inflow=4.65 cfs 14,560 cfs  
 Outflow=4.65 cfs 14,560 cfs

**Reach DP2: Design Point 2** Inflow=0.85 cfs 2,690 cfs  
 Outflow=0.85 cfs 2,690 cfs

**Reach TOTAL: TOTAL** Inflow=5.50 cfs 17,250 cfs  
 Outflow=5.50 cfs 17,250 cfs

**Pond DMH1: DMH 1** Peak Elev=140.98' Inflow=2.63 cfs 8,164 cfs  
 Outflow=2.63 cfs 8,164 cfs

**Pond DMH2: DMH 2** Peak Elev=138.93' Inflow=2.02 cfs 6,395 cfs  
 Outflow=2.02 cfs 6,395 cfs

**Total Runoff Area = 123,448 sf Runoff Volume = 17,250 cf Average Runoff Depth = 1.68"**  
**39.01% Pervious = 48,154 sf 60.99% Impervious = 75,294 sf**

**Summary for Subcatchment PRE1: Subcat PRE1**

Runoff = 2.63 cfs @ 12.09 hrs, Volume= 8,164 cf, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
12,933	74	>75% Grass cover, Good, HSG C
29,476	98	Paved parking, HSG C
7,775	98	Roofs, HSG C
6,775	70	Woods, Good, HSG C
56,958	89	Weighted Average
19,708		34.60% Pervious Area
37,251		65.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	40	0.0264	0.16		<b>Sheet Flow, Grass 1</b> Grass: Short n= 0.150 P2= 3.30"
0.6	59	0.0555	1.65		<b>Shallow Concentrated Flow, Grass 2</b> Short Grass Pasture Kv= 7.0 fps
0.2	25	0.1143	2.37		<b>Shallow Concentrated Flow, Grass 3</b> Short Grass Pasture Kv= 7.0 fps
1.1	260	0.0369	3.90		<b>Shallow Concentrated Flow, Pavemnt 1</b> Paved Kv= 20.3 fps
6.0	384	Total			

**Summary for Subcatchment PRE2: Subcat PRE2**

Runoff = 2.02 cfs @ 12.09 hrs, Volume= 6,395 cf, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
5,733	74	>75% Grass cover, Good, HSG C
27,775	98	Paved parking, HSG C
2,398	98	Roofs, HSG C
1,290	70	Woods, Good, HSG C
37,196	93	Weighted Average
7,023		18.88% Pervious Area
30,173		81.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	37	0.0060	1.57		<b>Shallow Concentrated Flow, Roof 1</b> Paved Kv= 20.3 fps
0.4	55	0.0901	2.10		<b>Shallow Concentrated Flow, Grass 1</b> Short Grass Pasture Kv= 7.0 fps
0.9	240	0.0495	4.52		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
1.7	332	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 2,690 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
14,764	74	>75% Grass cover, Good, HSG C
6,473	98	Paved parking, HSG C
1,398	98	Roofs, HSG C
6,660	70	Woods, Good, HSG C
29,294	80	Weighted Average
21,423		73.13% Pervious Area
7,871		26.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	55	0.0060	1.57		<b>Shallow Concentrated Flow, Roof 1</b> Paved Kv= 20.3 fps
0.9	64	0.0308	1.23		<b>Shallow Concentrated Flow, Grass 1</b> Short Grass Pasture Kv= 7.0 fps
0.3	44	0.1256	2.48		<b>Shallow Concentrated Flow, Grass 2</b> Short Grass Pasture Kv= 7.0 fps
0.4	120	0.0641	5.14		<b>Shallow Concentrated Flow, Paved 1</b> Paved Kv= 20.3 fps
2.2	283	Total, Increased to minimum Tc = 6.0 min			

### Summary for Reach DP1: Design Point 1

Inflow Area = 94,154 sf, 71.61% Impervious, Inflow Depth = 1.86" for 1-Year Newport - Middletown event  
Inflow = 4.65 cfs @ 12.09 hrs, Volume= 14,560 cf  
Outflow = 4.65 cfs @ 12.09 hrs, Volume= 14,560 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Summary for Reach DP2: Design Point 2

Inflow Area = 29,294 sf, 26.87% Impervious, Inflow Depth = 1.10" for 1-Year Newport - Middletown event  
Inflow = 0.85 cfs @ 12.09 hrs, Volume= 2,690 cf  
Outflow = 0.85 cfs @ 12.09 hrs, Volume= 2,690 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 123,448 sf, 60.99% Impervious, Inflow Depth = 1.68" for 1-Year Newport - Middletown event  
Inflow = 5.50 cfs @ 12.09 hrs, Volume= 17,250 cf  
Outflow = 5.50 cfs @ 12.09 hrs, Volume= 17,250 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Summary for Pond DMH1: DMH 1**

Inflow Area = 56,958 sf, 65.40% Impervious, Inflow Depth = 1.72" for 1-Year Newport - Middletown event  
 Inflow = 2.63 cfs @ 12.09 hrs, Volume= 8,164 cf  
 Outflow = 2.63 cfs @ 12.09 hrs, Volume= 8,164 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 2.63 cfs @ 12.09 hrs, Volume= 8,164 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 140.98' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	140.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.63 cfs @ 12.09 hrs HW=140.98' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 2.63 cfs @ 3.37 fps)

**Summary for Pond DMH2: DMH 2**

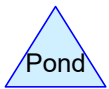
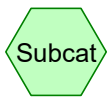
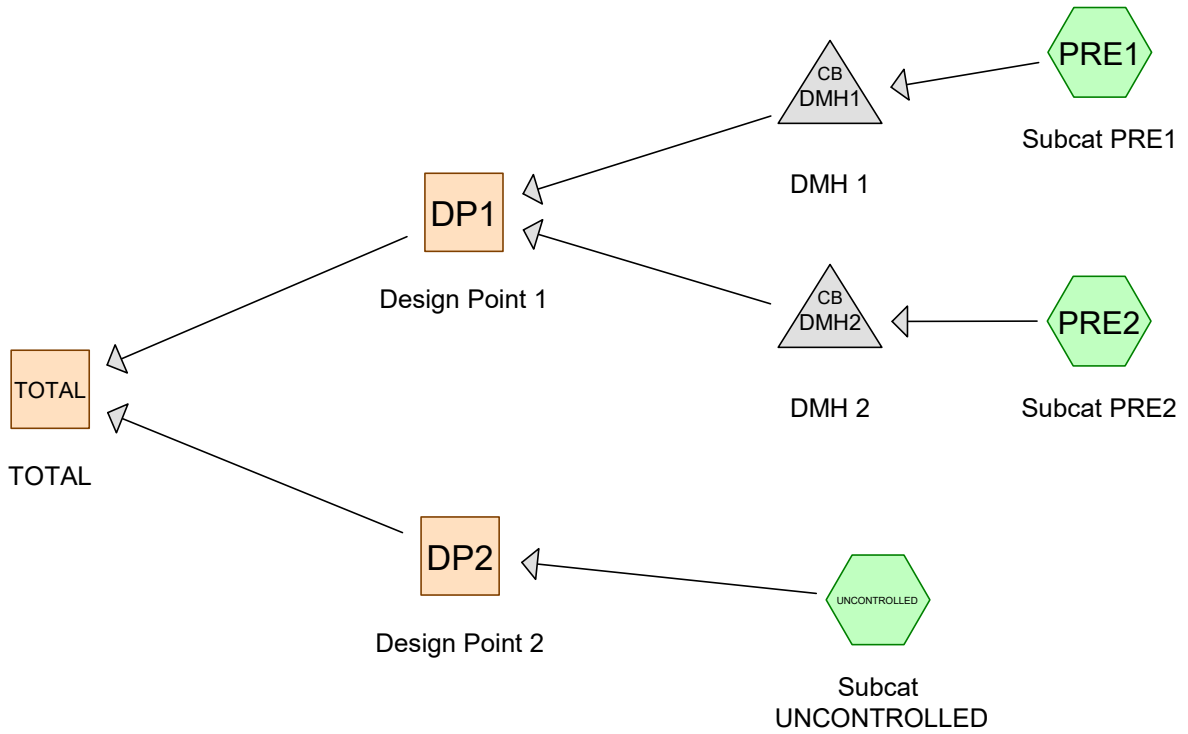
Inflow Area = 37,196 sf, 81.12% Impervious, Inflow Depth = 2.06" for 1-Year Newport - Middletown event  
 Inflow = 2.02 cfs @ 12.09 hrs, Volume= 6,395 cf  
 Outflow = 2.02 cfs @ 12.09 hrs, Volume= 6,395 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 2.02 cfs @ 12.09 hrs, Volume= 6,395 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 138.93' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	138.14'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.01 cfs @ 12.09 hrs HW=138.93' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 2.01 cfs @ 3.03 fps)





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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
33,430	74	>75% Grass cover, Good, HSG C (PRE1, PRE2, UNCONTROLLED)
63,724	98	Paved parking, HSG C (PRE1, PRE2, UNCONTROLLED)
11,570	98	Roofs, HSG C (PRE1, PRE2, UNCONTROLLED)
14,724	70	Woods, Good, HSG C (PRE1, PRE2, UNCONTROLLED)
<b>123,448</b>	<b>88</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
123,448	HSG C	PRE1, PRE2, UNCONTROLLED
0	HSG D	
0	Other	
<b>123,448</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	33,430	0	0	33,430	>75% Grass cover, Good
0	0	63,724	0	0	63,724	Paved parking
0	0	11,570	0	0	11,570	Roofs
0	0	14,724	0	0	14,724	Woods, Good
<b>0</b>	<b>0</b>	<b>123,448</b>	<b>0</b>	<b>0</b>	<b>123,448</b>	<b>TOTAL AREA</b>

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PRE1: Subcat PRE1** Runoff Area=56,958 sf 65.40% Impervious Runoff Depth=3.68"  
 Flow Length=384' Tc=6.0 min CN=89 Runoff=5.48 cfs 17,450 cf

**Subcatchment PRE2: Subcat PRE2** Runoff Area=37,196 sf 81.12% Impervious Runoff Depth=4.10"  
 Flow Length=332' Tc=6.0 min CN=93 Runoff=3.86 cfs 12,708 cf

**Subcatchment UNCONTROLLED: Subcat** Runoff Area=29,294 sf 26.87% Impervious Runoff Depth=2.81"  
 Flow Length=283' Tc=6.0 min CN=80 Runoff=2.21 cfs 6,850 cf

**Reach DP1: Design Point 1** Inflow=9.34 cfs 30,157 cf  
 Outflow=9.34 cfs 30,157 cf

**Reach DP2: Design Point 2** Inflow=2.21 cfs 6,850 cf  
 Outflow=2.21 cfs 6,850 cf

**Reach TOTAL: TOTAL** Inflow=11.55 cfs 37,007 cf  
 Outflow=11.55 cfs 37,007 cf

**Pond DMH1: DMH 1** Peak Elev=142.60' Inflow=5.48 cfs 17,450 cf  
 Outflow=5.48 cfs 17,450 cf

**Pond DMH2: DMH 2** Peak Elev=139.68' Inflow=3.86 cfs 12,708 cf  
 Outflow=3.86 cfs 12,708 cf

**Total Runoff Area = 123,448 sf Runoff Volume = 37,007 cf Average Runoff Depth = 3.60"**  
**39.01% Pervious = 48,154 sf 60.99% Impervious = 75,294 sf**

**Summary for Subcatchment PRE1: Subcat PRE1**

Runoff = 5.48 cfs @ 12.09 hrs, Volume= 17,450 cf, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
12,933	74	>75% Grass cover, Good, HSG C
29,476	98	Paved parking, HSG C
7,775	98	Roofs, HSG C
6,775	70	Woods, Good, HSG C
56,958	89	Weighted Average
19,708		34.60% Pervious Area
37,251		65.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	40	0.0264	0.16		<b>Sheet Flow, Grass 1</b> Grass: Short n= 0.150 P2= 3.30"
0.6	59	0.0555	1.65		<b>Shallow Concentrated Flow, Grass 2</b> Short Grass Pasture Kv= 7.0 fps
0.2	25	0.1143	2.37		<b>Shallow Concentrated Flow, Grass 3</b> Short Grass Pasture Kv= 7.0 fps
1.1	260	0.0369	3.90		<b>Shallow Concentrated Flow, Pavemnt 1</b> Paved Kv= 20.3 fps
6.0	384	Total			

**Summary for Subcatchment PRE2: Subcat PRE2**

Runoff = 3.86 cfs @ 12.08 hrs, Volume= 12,708 cf, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
5,733	74	>75% Grass cover, Good, HSG C
27,775	98	Paved parking, HSG C
2,398	98	Roofs, HSG C
1,290	70	Woods, Good, HSG C
37,196	93	Weighted Average
7,023		18.88% Pervious Area
30,173		81.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	37	0.0060	1.57		<b>Shallow Concentrated Flow, Roof 1</b> Paved Kv= 20.3 fps
0.4	55	0.0901	2.10		<b>Shallow Concentrated Flow, Grass 1</b> Short Grass Pasture Kv= 7.0 fps
0.9	240	0.0495	4.52		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
1.7	332	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 6,850 cf, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
14,764	74	>75% Grass cover, Good, HSG C
6,473	98	Paved parking, HSG C
1,398	98	Roofs, HSG C
6,660	70	Woods, Good, HSG C
29,294	80	Weighted Average
21,423		73.13% Pervious Area
7,871		26.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	55	0.0060	1.57		<b>Shallow Concentrated Flow, Roof 1</b> Paved Kv= 20.3 fps
0.9	64	0.0308	1.23		<b>Shallow Concentrated Flow, Grass 1</b> Short Grass Pasture Kv= 7.0 fps
0.3	44	0.1256	2.48		<b>Shallow Concentrated Flow, Grass 2</b> Short Grass Pasture Kv= 7.0 fps
0.4	120	0.0641	5.14		<b>Shallow Concentrated Flow, Paved 1</b> Paved Kv= 20.3 fps
2.2	283	Total, Increased to minimum Tc = 6.0 min			

### Summary for Reach DP1: Design Point 1

Inflow Area = 94,154 sf, 71.61% Impervious, Inflow Depth = 3.84" for 10-Year Newport - Middletown even  
Inflow = 9.34 cfs @ 12.08 hrs, Volume= 30,157 cf  
Outflow = 9.34 cfs @ 12.08 hrs, Volume= 30,157 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Summary for Reach DP2: Design Point 2

Inflow Area = 29,294 sf, 26.87% Impervious, Inflow Depth = 2.81" for 10-Year Newport - Middletown even  
Inflow = 2.21 cfs @ 12.09 hrs, Volume= 6,850 cf  
Outflow = 2.21 cfs @ 12.09 hrs, Volume= 6,850 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 123,448 sf, 60.99% Impervious, Inflow Depth = 3.60" for 10-Year Newport - Middletown even  
Inflow = 11.55 cfs @ 12.09 hrs, Volume= 37,007 cf  
Outflow = 11.55 cfs @ 12.09 hrs, Volume= 37,007 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Summary for Pond DMH1: DMH 1**

Inflow Area = 56,958 sf, 65.40% Impervious, Inflow Depth = 3.68" for 10-Year Newport - Middletown even  
 Inflow = 5.48 cfs @ 12.09 hrs, Volume= 17,450 cf  
 Outflow = 5.48 cfs @ 12.09 hrs, Volume= 17,450 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 5.48 cfs @ 12.09 hrs, Volume= 17,450 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 142.60' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	140.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=5.47 cfs @ 12.09 hrs HW=142.59' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 5.47 cfs @ 6.96 fps)

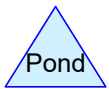
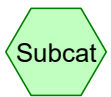
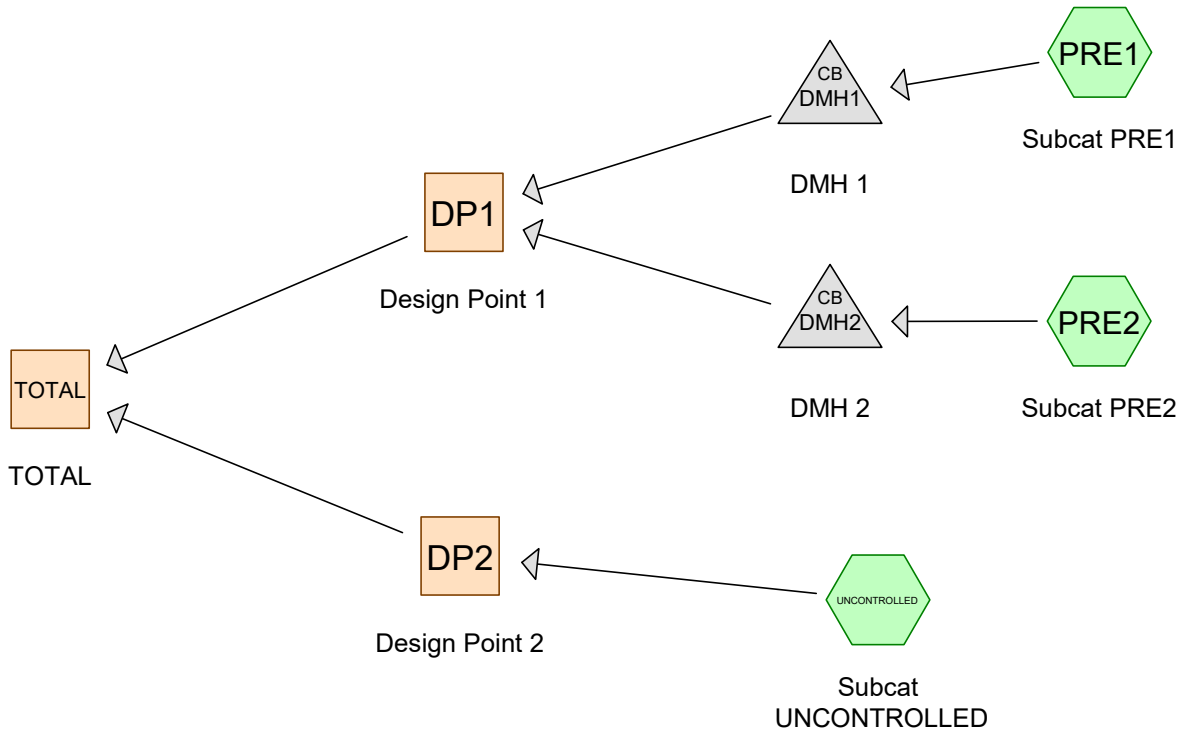
**Summary for Pond DMH2: DMH 2**

Inflow Area = 37,196 sf, 81.12% Impervious, Inflow Depth = 4.10" for 10-Year Newport - Middletown even  
 Inflow = 3.86 cfs @ 12.08 hrs, Volume= 12,708 cf  
 Outflow = 3.86 cfs @ 12.08 hrs, Volume= 12,708 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 3.86 cfs @ 12.08 hrs, Volume= 12,708 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 139.68' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	138.14'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=3.86 cfs @ 12.08 hrs HW=139.68' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 3.86 cfs @ 4.91 fps)





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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
33,430	74	>75% Grass cover, Good, HSG C (PRE1, PRE2, UNCONTROLLED)
63,724	98	Paved parking, HSG C (PRE1, PRE2, UNCONTROLLED)
11,570	98	Roofs, HSG C (PRE1, PRE2, UNCONTROLLED)
14,724	70	Woods, Good, HSG C (PRE1, PRE2, UNCONTROLLED)
<b>123,448</b>	<b>88</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
123,448	HSG C	PRE1, PRE2, UNCONTROLLED
0	HSG D	
0	Other	
<b>123,448</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	33,430	0	0	33,430	>75% Grass cover, Good
0	0	63,724	0	0	63,724	Paved parking
0	0	11,570	0	0	11,570	Roofs
0	0	14,724	0	0	14,724	Woods, Good
<b>0</b>	<b>0</b>	<b>123,448</b>	<b>0</b>	<b>0</b>	<b>123,448</b>	<b>TOTAL AREA</b>

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PRE1: Subcat PRE1** Runoff Area=56,958 sf 65.40% Impervious Runoff Depth=7.28"  
 Flow Length=384' Tc=6.0 min CN=89 Runoff=10.45 cfs 34,537 cf

**Subcatchment PRE2: Subcat PRE2** Runoff Area=37,196 sf 81.12% Impervious Runoff Depth=7.76"  
 Flow Length=332' Tc=6.0 min CN=93 Runoff=7.05 cfs 24,048 cf

**Subcatchment UNCONTROLLED: Subcat** Runoff Area=29,294 sf 26.87% Impervious Runoff Depth=6.19"  
 Flow Length=283' Tc=6.0 min CN=80 Runoff=4.78 cfs 15,110 cf

**Reach DP1: Design Point 1** Inflow=17.51 cfs 58,585 cf  
 Outflow=17.51 cfs 58,585 cf

**Reach DP2: Design Point 2** Inflow=4.78 cfs 15,110 cf  
 Outflow=4.78 cfs 15,110 cf

**Reach TOTAL: TOTAL** Inflow=22.29 cfs 73,695 cf  
 Outflow=22.29 cfs 73,695 cf

**Pond DMH1: DMH 1** Peak Elev=148.14' Inflow=10.45 cfs 34,537 cf  
 Outflow=10.45 cfs 34,537 cf

**Pond DMH2: DMH 2** Peak Elev=142.12' Inflow=7.05 cfs 24,048 cf  
 Outflow=7.05 cfs 24,048 cf

**Total Runoff Area = 123,448 sf Runoff Volume = 73,695 cf Average Runoff Depth = 7.16"**  
**39.01% Pervious = 48,154 sf 60.99% Impervious = 75,294 sf**

**Summary for Subcatchment PRE1: Subcat PRE1**

Runoff = 10.45 cfs @ 12.08 hrs, Volume= 34,537 cf, Depth= 7.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
12,933	74	>75% Grass cover, Good, HSG C
29,476	98	Paved parking, HSG C
7,775	98	Roofs, HSG C
6,775	70	Woods, Good, HSG C
56,958	89	Weighted Average
19,708		34.60% Pervious Area
37,251		65.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	40	0.0264	0.16		<b>Sheet Flow, Grass 1</b> Grass: Short n= 0.150 P2= 3.30"
0.6	59	0.0555	1.65		<b>Shallow Concentrated Flow, Grass 2</b> Short Grass Pasture Kv= 7.0 fps
0.2	25	0.1143	2.37		<b>Shallow Concentrated Flow, Grass 3</b> Short Grass Pasture Kv= 7.0 fps
1.1	260	0.0369	3.90		<b>Shallow Concentrated Flow, Pavemnt 1</b> Paved Kv= 20.3 fps
6.0	384	Total			

**Summary for Subcatchment PRE2: Subcat PRE2**

Runoff = 7.05 cfs @ 12.08 hrs, Volume= 24,048 cf, Depth= 7.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
5,733	74	>75% Grass cover, Good, HSG C
27,775	98	Paved parking, HSG C
2,398	98	Roofs, HSG C
1,290	70	Woods, Good, HSG C
37,196	93	Weighted Average
7,023		18.88% Pervious Area
30,173		81.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	37	0.0060	1.57		<b>Shallow Concentrated Flow, Roof 1</b> Paved Kv= 20.3 fps
0.4	55	0.0901	2.10		<b>Shallow Concentrated Flow, Grass 1</b> Short Grass Pasture Kv= 7.0 fps
0.9	240	0.0495	4.52		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
1.7	332	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 4.78 cfs @ 12.09 hrs, Volume= 15,110 cf, Depth= 6.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
14,764	74	>75% Grass cover, Good, HSG C
6,473	98	Paved parking, HSG C
1,398	98	Roofs, HSG C
6,660	70	Woods, Good, HSG C
29,294	80	Weighted Average
21,423		73.13% Pervious Area
7,871		26.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	55	0.0060	1.57		<b>Shallow Concentrated Flow, Roof 1</b> Paved Kv= 20.3 fps
0.9	64	0.0308	1.23		<b>Shallow Concentrated Flow, Grass 1</b> Short Grass Pasture Kv= 7.0 fps
0.3	44	0.1256	2.48		<b>Shallow Concentrated Flow, Grass 2</b> Short Grass Pasture Kv= 7.0 fps
0.4	120	0.0641	5.14		<b>Shallow Concentrated Flow, Paved 1</b> Paved Kv= 20.3 fps
2.2	283	Total, Increased to minimum Tc = 6.0 min			

### Summary for Reach DP1: Design Point 1

Inflow Area = 94,154 sf, 71.61% Impervious, Inflow Depth = 7.47" for 100-Year Newport - Middletown event  
Inflow = 17.51 cfs @ 12.08 hrs, Volume= 58,585 cf  
Outflow = 17.51 cfs @ 12.08 hrs, Volume= 58,585 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Summary for Reach DP2: Design Point 2

Inflow Area = 29,294 sf, 26.87% Impervious, Inflow Depth = 6.19" for 100-Year Newport - Middletown eve  
Inflow = 4.78 cfs @ 12.09 hrs, Volume= 15,110 cf  
Outflow = 4.78 cfs @ 12.09 hrs, Volume= 15,110 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 123,448 sf, 60.99% Impervious, Inflow Depth = 7.16" for 100-Year Newport - Middletown eve  
Inflow = 22.29 cfs @ 12.08 hrs, Volume= 73,695 cf  
Outflow = 22.29 cfs @ 12.08 hrs, Volume= 73,695 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Summary for Pond DMH1: DMH 1**

Inflow Area = 56,958 sf, 65.40% Impervious, Inflow Depth = 7.28" for 100-Year Newport - Middletown eve  
 Inflow = 10.45 cfs @ 12.08 hrs, Volume= 34,537 cf  
 Outflow = 10.45 cfs @ 12.08 hrs, Volume= 34,537 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 10.45 cfs @ 12.08 hrs, Volume= 34,537 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 148.14' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	140.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=10.43 cfs @ 12.08 hrs HW=148.11' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 10.43 cfs @ 13.28 fps)

**Summary for Pond DMH2: DMH 2**

Inflow Area = 37,196 sf, 81.12% Impervious, Inflow Depth = 7.76" for 100-Year Newport - Middletown eve  
 Inflow = 7.05 cfs @ 12.08 hrs, Volume= 24,048 cf  
 Outflow = 7.05 cfs @ 12.08 hrs, Volume= 24,048 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 7.05 cfs @ 12.08 hrs, Volume= 24,048 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

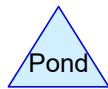
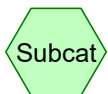
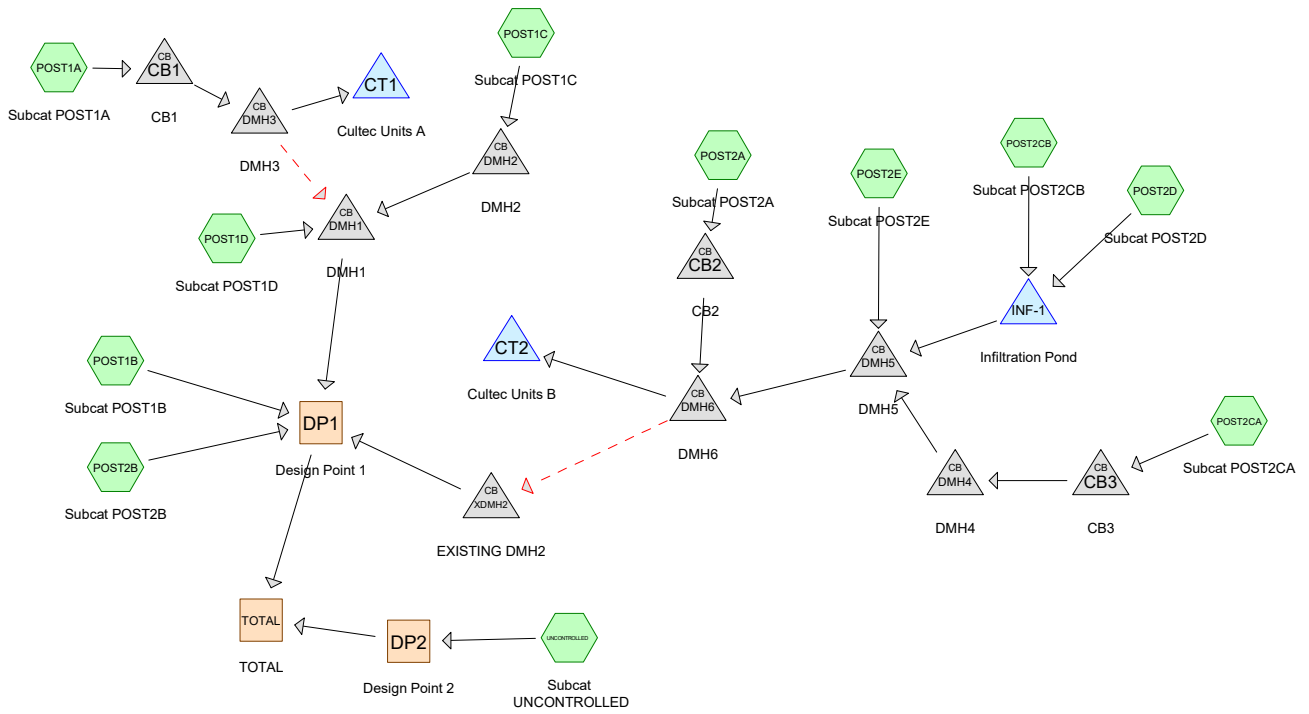
Peak Elev= 142.12' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	138.14'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=7.04 cfs @ 12.08 hrs HW=142.11' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 7.04 cfs @ 8.97 fps)

# POST-CONSTRUCTION ANALYSIS





Routing Diagram for 21-038 - 417 Forest Avenue - Post Watershed Analysis - February 8, 2022

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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
50,146	74	>75% Grass cover, Good, HSG C (POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED)
33,919	98	Paved parking, HSG C (POST1A, POST1B, POST2A, POST2CA, POST2CB, POST2E, UNCONTROLLED)
28,986	98	Roofs, HSG C (POST1A, POST1C, POST1D, POST2D, POST2E)
10,397	70	Woods, Good, HSG C (POST1A, POST1B, POST2B, POST2CA, UNCONTROLLED)
<b>123,448</b>	<b>86</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
123,448	HSG C	POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED
0	HSG D	
0	Other	
<b>123,448</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	50,146	0	0	50,146	>75% Grass cover, Good
0	0	33,919	0	0	33,919	Paved parking
0	0	28,986	0	0	28,986	Roofs
0	0	10,397	0	0	10,397	Woods, Good
<b>0</b>	<b>0</b>	<b>123,448</b>	<b>0</b>	<b>0</b>	<b>123,448</b>	<b>TOTAL AREA</b>

Time span=0.01-48.00 hrs, dt=0.01 hrs, 4800 points x 3  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment POST1A: Subcat POST1A</b>	Runoff Area=27,741 sf 51.44% Impervious Runoff Depth=1.49" Tc=6.0 min CN=86 Runoff=1.11 cfs 3,450 cf
<b>Subcatchment POST1B: Subcat POST1B</b>	Runoff Area=8,779 sf 0.04% Impervious Runoff Depth=0.74" Tc=6.0 min CN=73 Runoff=0.16 cfs 539 cf
<b>Subcatchment POST1C: Subcat POST1C</b>	Runoff Area=7,810 sf 99.97% Impervious Runoff Depth=2.57" Tc=6.0 min CN=98 Runoff=0.49 cfs 1,672 cf
<b>Subcatchment POST1D: Subcat POST1D</b>	Runoff Area=9,130 sf 99.45% Impervious Runoff Depth=2.57" Tc=6.0 min CN=98 Runoff=0.57 cfs 1,955 cf
<b>Subcatchment POST2A: Subcat POST2A</b>	Runoff Area=9,029 sf 57.25% Impervious Runoff Depth=1.64" Tc=6.0 min CN=88 Runoff=0.40 cfs 1,235 cf
<b>Subcatchment POST2B: Subcat POST2B</b>	Runoff Area=2,494 sf 0.00% Impervious Runoff Depth=0.69" Tc=6.0 min CN=72 Runoff=0.04 cfs 144 cf
<b>Subcatchment POST2CA: Subcat</b>	Runoff Area=22,346 sf 25.34% Impervious Runoff Depth=1.04" Tc=6.0 min CN=79 Runoff=0.61 cfs 1,945 cf
<b>Subcatchment POST2CB: Subcat</b>	Runoff Area=16,448 sf 48.24% Impervious Runoff Depth=1.49" Tc=6.0 min CN=86 Runoff=0.66 cfs 2,046 cf
<b>Subcatchment POST2D: Subcat POST2D</b>	Runoff Area=3,820 sf 99.00% Impervious Runoff Depth=2.57" Tc=6.0 min CN=98 Runoff=0.24 cfs 818 cf
<b>Subcatchment POST2E: Subcat POST2E</b>	Runoff Area=8,547 sf 97.46% Impervious Runoff Depth=2.46" Tc=6.0 min CN=97 Runoff=0.52 cfs 1,752 cf
<b>Subcatchment UNCONTROLLED: Subcat</b>	Runoff Area=7,305 sf 11.87% Impervious Runoff Depth=0.93" Tc=6.0 min CN=77 Runoff=0.18 cfs 569 cf
<b>Reach DP1: Design Point 1</b>	Inflow=3.52 cfs 6,964 cf Outflow=3.52 cfs 6,964 cf
<b>Reach DP2: Design Point 2</b>	Inflow=0.18 cfs 569 cf Outflow=0.18 cfs 569 cf
<b>Reach TOTAL: TOTAL</b>	Inflow=3.69 cfs 7,533 cf Outflow=3.69 cfs 7,533 cf
<b>Pond CB1: CB1</b>	Peak Elev=141.69' Inflow=1.11 cfs 3,450 cf 12.0" Round Culvert n=0.013 L=11.0' S=0.0082 '/' Outflow=1.11 cfs 3,450 cf
<b>Pond CB2: CB2</b>	Peak Elev=136.85' Inflow=0.40 cfs 1,235 cf 12.0" Round Culvert n=0.013 L=14.0' S=0.0121 '/' Outflow=0.40 cfs 1,235 cf

<b>Pond CB3: CB3</b>	Peak Elev=138.39' Inflow=0.61 cfs 1,945 cf 12.0" Round Culvert n=0.013 L=22.0' S=0.0227 'l' Outflow=0.61 cfs 1,945 cf
<b>Pond CT1: Cultec Units A</b>	Peak Elev=139.68' Storage=1,044 cf Inflow=0.52 cfs 2,974 cf Outflow=0.07 cfs 2,975 cf
<b>Pond CT2: Cultec Units B</b>	Peak Elev=134.99' Storage=1,682 cf Inflow=0.72 cfs 4,489 cf Outflow=0.09 cfs 4,490 cf
<b>Pond DMH1: DMH1</b>	Peak Elev=138.66' Inflow=1.65 cfs 4,103 cf 18.0" Round Culvert n=0.013 L=60.0' S=0.0100 'l' Outflow=1.65 cfs 4,103 cf
<b>Pond DMH2: DMH2</b>	Peak Elev=143.69' Inflow=0.49 cfs 1,672 cf 12.0" Round Culvert n=0.013 L=165.0' S=0.0140 'l' Outflow=0.49 cfs 1,672 cf
<b>Pond DMH3: DMH3</b>	Peak Elev=141.43' Inflow=1.11 cfs 3,450 cf Primary=0.52 cfs 2,974 cf Secondary=0.60 cfs 476 cf Outflow=1.11 cfs 3,450 cf
<b>Pond DMH4: DMH4</b>	Peak Elev=137.96' Inflow=0.61 cfs 1,945 cf 12.0" Round Culvert n=0.013 L=95.0' S=0.0095 'l' Outflow=0.61 cfs 1,945 cf
<b>Pond DMH5: DMH5</b>	Peak Elev=137.33' Inflow=2.00 cfs 5,433 cf 18.0" Round Culvert n=0.013 L=46.0' S=0.0065 'l' Outflow=2.00 cfs 5,433 cf
<b>Pond DMH6: DMH6</b>	Peak Elev=136.45' Inflow=2.40 cfs 6,668 cf Primary=0.72 cfs 4,489 cf Secondary=1.68 cfs 2,179 cf Outflow=2.40 cfs 6,668 cf
<b>Pond INF-1: Infiltration Pond</b>	Peak Elev=145.60' Storage=184 cf Inflow=0.90 cfs 2,864 cf Discarded=0.02 cfs 1,128 cf Primary=0.87 cfs 1,735 cf Outflow=0.89 cfs 2,864 cf
<b>Pond XDMH2: EXISTING DMH2</b>	Peak Elev=133.43' Inflow=1.68 cfs 2,179 cf 24.0" Round Culvert n=0.013 L=26.0' S=0.0115 'l' Outflow=1.68 cfs 2,179 cf

**Total Runoff Area = 123,448 sf Runoff Volume = 16,125 cf Average Runoff Depth = 1.57"**  
**49.04% Pervious = 60,543 sf 50.96% Impervious = 62,905 sf**

**Summary for Subcatchment POST1A: Subcat POST1A**

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 3,450 cf, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
12,212	74	>75% Grass cover, Good, HSG C
14,271	98	Paved parking, HSG C
0	98	Roofs, HSG C
1,258	70	Woods, Good, HSG C
27,741	86	Weighted Average
13,470		48.56% Pervious Area
14,271		51.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1B: Subcat POST1B**

Runoff = 0.16 cfs @ 12.10 hrs, Volume= 539 cf, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
5,911	74	>75% Grass cover, Good, HSG C
3	98	Paved parking, HSG C
2,865	70	Woods, Good, HSG C
8,779	73	Weighted Average
8,776		99.96% Pervious Area
3		0.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1C: Subcat POST1C**

Runoff = 0.49 cfs @ 12.08 hrs, Volume= 1,672 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
2	74	>75% Grass cover, Good, HSG C
7,808	98	Roofs, HSG C
7,810	98	Weighted Average
2		0.03% Pervious Area
7,808		99.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1D: Subcat POST1D**

Runoff = 0.57 cfs @ 12.08 hrs, Volume= 1,955 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
50	74	>75% Grass cover, Good, HSG C
9,079	98	Roofs, HSG C
9,130	98	Weighted Average
50		0.55% Pervious Area
9,079		99.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2A: Subcat POST2A**

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 1,235 cf, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
3,860	74	>75% Grass cover, Good, HSG C
5,169	98	Paved parking, HSG C
9,029	88	Weighted Average
3,860		42.75% Pervious Area
5,169		57.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2B: Subcat POST2B**

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 144 cf, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
1,543	74	>75% Grass cover, Good, HSG C
951	70	Woods, Good, HSG C
2,494	72	Weighted Average
2,494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CA: Subcat POST2CA**

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
11,371	74	>75% Grass cover, Good, HSG C
5,661	98	Paved parking, HSG C
5,313	70	Woods, Good, HSG C
22,346	79	Weighted Average
16,685		74.66% Pervious Area
5,661		25.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CB: Subcat POST2CB**

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 2,046 cf, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
8,514	74	>75% Grass cover, Good, HSG C
7,934	98	Paved parking, HSG C
16,448	86	Weighted Average
8,514		51.76% Pervious Area
7,934		48.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2D: Subcat POST2D**

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 818 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
38	74	>75% Grass cover, Good, HSG C
3,782	98	Roofs, HSG C
3,820	98	Weighted Average
38		1.00% Pervious Area
3,782		99.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2E: Subcat POST2E**

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 1,752 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
217	74	>75% Grass cover, Good, HSG C
13	98	Paved parking, HSG C
8,317	98	Roofs, HSG C
8,547	97	Weighted Average
217		2.54% Pervious Area
8,330		97.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 0.18 cfs @ 12.10 hrs, Volume= 569 cf, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Newport - Middletown Rainfall=2.80"

Area (sf)	CN	Description
6,428	74	>75% Grass cover, Good, HSG C
867	98	Paved parking, HSG C
10	70	Woods, Good, HSG C
7,305	77	Weighted Average
6,438		88.13% Pervious Area
867		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

### Summary for Reach DP1: Design Point 1

Inflow Area = 28,212 sf, 59.87% Impervious, Inflow Depth = 2.96" for 1-Year Newport - Middletown event  
Inflow = 3.52 cfs @ 12.09 hrs, Volume= 6,964 cf  
Outflow = 3.52 cfs @ 12.09 hrs, Volume= 6,964 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach DP2: Design Point 2

Inflow Area = 7,305 sf, 11.87% Impervious, Inflow Depth = 0.93" for 1-Year Newport - Middletown event  
Inflow = 0.18 cfs @ 12.10 hrs, Volume= 569 cf  
Outflow = 0.18 cfs @ 12.10 hrs, Volume= 569 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 35,517 sf, 50.00% Impervious, Inflow Depth = 2.55" for 1-Year Newport - Middletown event  
Inflow = 3.69 cfs @ 12.09 hrs, Volume= 7,533 cf  
Outflow = 3.69 cfs @ 12.09 hrs, Volume= 7,533 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond CB1: CB1**

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 1.49" for 1-Year Newport - Middletown event  
 Inflow = 1.11 cfs @ 12.09 hrs, Volume= 3,450 cf  
 Outflow = 1.11 cfs @ 12.09 hrs, Volume= 3,450 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.11 cfs @ 12.09 hrs, Volume= 3,450 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.69' @ 12.09 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.91' S= 0.0082 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.11 cfs @ 12.09 hrs HW=141.69' TW=141.43' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 1.11 cfs @ 1.94 fps)

**Summary for Pond CB2: CB2**

Inflow Area = 9,029 sf, 57.25% Impervious, Inflow Depth = 1.64" for 1-Year Newport - Middletown event  
 Inflow = 0.40 cfs @ 12.09 hrs, Volume= 1,235 cf  
 Outflow = 0.40 cfs @ 12.09 hrs, Volume= 1,235 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.40 cfs @ 12.09 hrs, Volume= 1,235 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 136.85' @ 12.09 hrs

Flood Elev= 138.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 136.50' / 136.33' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.40 cfs @ 12.09 hrs HW=136.85' TW=136.45' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 0.40 cfs @ 1.60 fps)

**Summary for Pond CB3: CB3**

Inflow Area = 22,346 sf, 25.34% Impervious, Inflow Depth = 1.04" for 1-Year Newport - Middletown event  
 Inflow = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf  
 Outflow = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.39' @ 12.09 hrs

Flood Elev= 141.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>12.0" Round Culvert</b> L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 138.00' / 137.50' S= 0.0227 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.61 cfs @ 12.09 hrs HW=138.39' TW=137.96' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 0.61 cfs @ 2.13 fps)

### Summary for Pond CT1: Cultec Units A

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 1.29" for 1-Year Newport - Middletown event  
 Inflow = 0.52 cfs @ 12.09 hrs, Volume= 2,974 cf  
 Outflow = 0.07 cfs @ 13.97 hrs, Volume= 2,975 cf, Atten= 86%, Lag= 112.6 min  
 Discarded = 0.07 cfs @ 13.97 hrs, Volume= 2,975 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 139.68' @ 13.97 hrs Surf.Area= 1,240 sf Storage= 1,044 cf  
 Flood Elev= 141.50' Surf.Area= 1,240 sf Storage= 2,565 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 129.9 min ( 974.5 - 844.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	138.40'	1,071 cf	<b>20.83'W x 59.50'L x 3.54'H Field A</b> 4,390 cf Overall - 1,714 cf Embedded = 2,676 cf x 40.0% Voids
#2A	138.90'	1,714 cf	<b>Cultec R-330XLHD</b> x 32 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		2,784 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 120.00'

**Discarded OutFlow** Max=0.07 cfs @ 13.97 hrs HW=139.68' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.07 cfs)

### Pond CT1: Cultec Units A - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

32 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 1,713.7 cf Chamber Storage

4,390.2 cf Field - 1,713.7 cf Chambers = 2,676.5 cf Stone x 40.0% Voids = 1,070.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,784.3 cf = 0.064 af

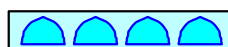
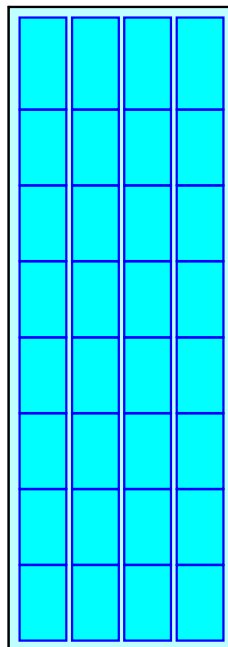
Overall Storage Efficiency = 63.4%

Overall System Size = 59.50' x 20.83' x 3.54'

32 Chambers

162.6 cy Field

99.1 cy Stone



**Summary for Pond CT2: Cultec Units B**

Inflow Area = 60,190 sf, 51.30% Impervious, Inflow Depth = 0.90" for 1-Year Newport - Middletown event  
 Inflow = 0.72 cfs @ 12.09 hrs, Volume= 4,489 cf  
 Outflow = 0.09 cfs @ 15.31 hrs, Volume= 4,490 cf, Atten= 88%, Lag= 193.4 min  
 Discarded = 0.09 cfs @ 15.31 hrs, Volume= 4,490 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 134.99' @ 15.31 hrs Surf.Area= 1,531 sf Storage= 1,682 cf  
 Flood Elev= 136.40' Surf.Area= 1,531 sf Storage= 3,116 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 175.8 min ( 1,010.6 - 834.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.40'	1,317 cf	<b>20.83'W x 73.50'L x 3.54'H Field A</b> 5,423 cf Overall - 2,131 cf Embedded = 3,292 cf x 40.0% Voids
#2A	133.90'	2,131 cf	<b>Cultec R-330XLHD x 40 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		3,448 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'

**Discarded OutFlow** Max=0.09 cfs @ 15.31 hrs HW=134.99' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.09 cfs)

### Pond CT2: Cultec Units B - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 2,131.0 cf Chamber Storage

5,423.2 cf Field - 2,131.0 cf Chambers = 3,292.2 cf Stone x 40.0% Voids = 1,316.9 cf Stone Storage

Chamber Storage + Stone Storage = 3,447.9 cf = 0.079 af

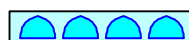
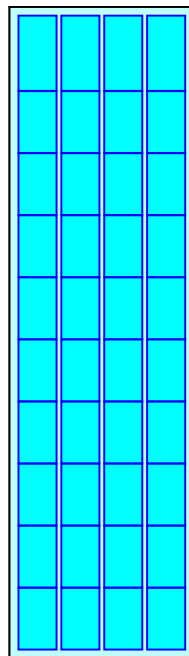
Overall Storage Efficiency = 63.6%

Overall System Size = 73.50' x 20.83' x 3.54'

40 Chambers

200.9 cy Field

121.9 cy Stone



**Summary for Pond DMH1: DMH1**

Inflow Area = 16,940 sf, 99.69% Impervious, Inflow Depth = 2.91" for 1-Year Newport - Middletown event  
 Inflow = 1.65 cfs @ 12.09 hrs, Volume= 4,103 cf  
 Outflow = 1.65 cfs @ 12.09 hrs, Volume= 4,103 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.65 cfs @ 12.09 hrs, Volume= 4,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.66' @ 12.09 hrs

Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>18.0" Round Culvert</b> L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=1.64 cfs @ 12.09 hrs HW=138.66' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 1.64 cfs @ 2.19 fps)

**Summary for Pond DMH2: DMH2**

Inflow Area = 7,810 sf, 99.97% Impervious, Inflow Depth = 2.57" for 1-Year Newport - Middletown event  
 Inflow = 0.49 cfs @ 12.08 hrs, Volume= 1,672 cf  
 Outflow = 0.49 cfs @ 12.08 hrs, Volume= 1,672 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.49 cfs @ 12.08 hrs, Volume= 1,672 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 143.69' @ 12.08 hrs

Flood Elev= 148.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	143.30'	<b>12.0" Round Culvert</b> L= 165.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 143.30' / 140.99' S= 0.0140 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.48 cfs @ 12.08 hrs HW=143.69' TW=138.66' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 0.48 cfs @ 1.69 fps)

**Summary for Pond DMH3: DMH3**

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 1.49" for 1-Year Newport - Middletown event  
 Inflow = 1.11 cfs @ 12.09 hrs, Volume= 3,450 cf  
 Outflow = 1.11 cfs @ 12.09 hrs, Volume= 3,450 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.52 cfs @ 12.09 hrs, Volume= 2,974 cf  
 Secondary = 0.60 cfs @ 12.09 hrs, Volume= 476 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.43' @ 12.09 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.90' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	141.30'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	139.65'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 139.65' / 139.53' S= 0.0086 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.52 cfs @ 12.09 hrs HW=141.43' TW=139.04' (Dynamic Tailwater)  
 ↑1=Culvert (Barrel Controls 0.52 cfs @ 2.39 fps)

**Secondary OutFlow** Max=0.59 cfs @ 12.09 hrs HW=141.43' TW=138.66' (Dynamic Tailwater)  
 ↑3=Culvert (Passes 0.59 cfs of 3.37 cfs potential flow)  
 ↑2=Sharp-Crested Rectangular Weir (Weir Controls 0.59 cfs @ 1.17 fps)

**Summary for Pond DMH4: DMH4**

Inflow Area = 22,346 sf, 25.34% Impervious, Inflow Depth = 1.04" for 1-Year Newport - Middletown event  
 Inflow = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf  
 Outflow = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.61 cfs @ 12.09 hrs, Volume= 1,945 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.96' @ 12.09 hrs

Flood Elev= 142.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	<b>12.0" Round Culvert</b> L= 95.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.50' / 136.60' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.61 cfs @ 12.09 hrs HW=137.96' TW=137.33' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 0.61 cfs @ 2.56 fps)

**Summary for Pond DMH5: DMH5**

Inflow Area = 51,161 sf, 50.25% Impervious, Inflow Depth = 1.27" for 1-Year Newport - Middletown event  
 Inflow = 2.00 cfs @ 12.09 hrs, Volume= 5,433 cf  
 Outflow = 2.00 cfs @ 12.09 hrs, Volume= 5,433 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 2.00 cfs @ 12.09 hrs, Volume= 5,433 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.33' @ 12.09 hrs

Flood Elev= 141.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.60'	<b>18.0" Round Culvert</b> L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.60' / 136.30' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=2.00 cfs @ 12.09 hrs HW=137.33' TW=136.45' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 2.00 cfs @ 3.43 fps)

**Summary for Pond DMH6: DMH6**

Inflow Area = 60,190 sf, 51.30% Impervious, Inflow Depth = 1.33" for 1-Year Newport - Middletown event  
 Inflow = 2.40 cfs @ 12.09 hrs, Volume= 6,668 cf  
 Outflow = 2.40 cfs @ 12.09 hrs, Volume= 6,668 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.72 cfs @ 12.09 hrs, Volume= 4,489 cf  
 Secondary = 1.68 cfs @ 12.09 hrs, Volume= 2,179 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 136.45' @ 12.09 hrs

Flood Elev= 139.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	<b>12.0" Round Culvert</b> L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.80' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	136.20'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 3.0' Crest Height
#3	Secondary	133.47'	<b>18.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.47' / 132.87' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=0.72 cfs @ 12.09 hrs HW=136.45' TW=134.07' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.72 cfs @ 3.04 fps)

**Secondary OutFlow** Max=1.68 cfs @ 12.09 hrs HW=136.45' TW=133.43' (Dynamic Tailwater)

↑**3=Culvert** (Passes 1.68 cfs of 10.04 cfs potential flow)

↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 1.68 cfs @ 1.67 fps)

### Summary for Pond INF-1: Infiltration Pond

Inflow Area = 20,268 sf, 57.80% Impervious, Inflow Depth = 1.70" for 1-Year Newport - Middletown event  
 Inflow = 0.90 cfs @ 12.09 hrs, Volume= 2,864 cf  
 Outflow = 0.89 cfs @ 12.10 hrs, Volume= 2,864 cf, Atten= 1%, Lag= 0.5 min  
 Discarded = 0.02 cfs @ 12.10 hrs, Volume= 1,128 cf  
 Primary = 0.87 cfs @ 12.10 hrs, Volume= 1,735 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 145.60' @ 12.10 hrs Surf.Area= 385 sf Storage= 184 cf  
 Flood Elev= 146.00' Surf.Area= 490 sf Storage= 358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 36.0 min ( 844.7 - 808.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	145.00'	358 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
145.00	225	0.0	0	0
146.00	490	100.0	358	358

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'
#2	Device 3	145.50'	<b>2.5" x 2.5" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area) Limited to weir flow at low heads
#3	Primary	142.50'	<b>12.0" Round Culvert</b> L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.50' / 136.60' S= 0.0472 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Discarded OutFlow** Max=0.02 cfs @ 12.10 hrs HW=145.60' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.02 cfs)

**Primary OutFlow** Max=0.87 cfs @ 12.10 hrs HW=145.60' TW=137.33' (Dynamic Tailwater)

↑**3=Culvert** (Passes 0.87 cfs of 4.82 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 0.87 cfs @ 1.05 fps)

**Summary for Pond XDMH2: EXISTING DMH2**

Inflow = 1.68 cfs @ 12.09 hrs, Volume= 2,179 cf  
 Outflow = 1.68 cfs @ 12.09 hrs, Volume= 2,179 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.68 cfs @ 12.09 hrs, Volume= 2,179 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

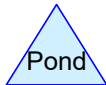
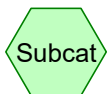
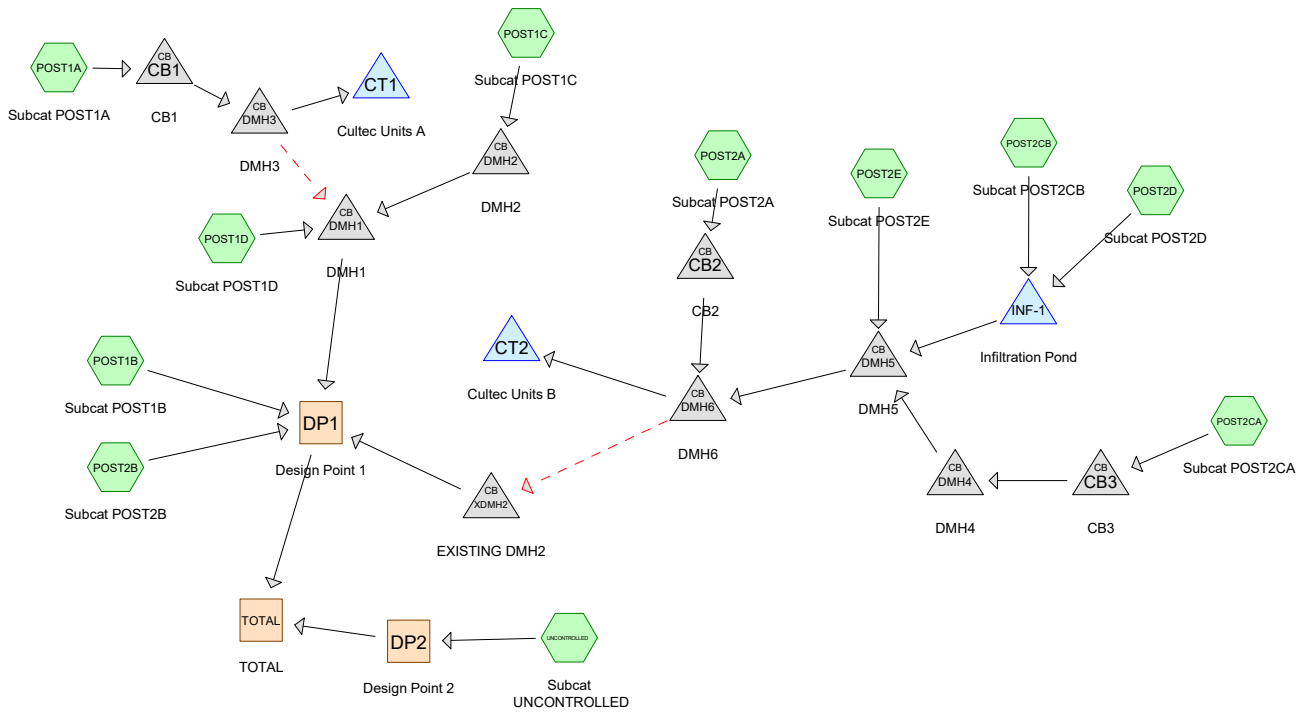
Peak Elev= 133.43' @ 12.09 hrs

Flood Elev= 138.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.87'	<b>24.0" Round Culvert</b> L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 132.87' / 132.57' S= 0.0115 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=1.68 cfs @ 12.09 hrs HW=133.43' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 1.68 cfs @ 3.50 fps)



Routing Diagram for 21-038 - 417 Forest Avenue - Post Watershed Analysis - February 8, 2022

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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
50,146	74	>75% Grass cover, Good, HSG C (POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED)
33,919	98	Paved parking, HSG C (POST1A, POST1B, POST2A, POST2CA, POST2CB, POST2E, UNCONTROLLED)
28,986	98	Roofs, HSG C (POST1A, POST1C, POST1D, POST2D, POST2E)
10,397	70	Woods, Good, HSG C (POST1A, POST1B, POST2B, POST2CA, UNCONTROLLED)
<b>123,448</b>	<b>86</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
123,448	HSG C	POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED
0	HSG D	
0	Other	
<b>123,448</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	50,146	0	0	50,146	>75% Grass cover, Good
0	0	33,919	0	0	33,919	Paved parking
0	0	28,986	0	0	28,986	Roofs
0	0	10,397	0	0	10,397	Woods, Good
<b>0</b>	<b>0</b>	<b>123,448</b>	<b>0</b>	<b>0</b>	<b>123,448</b>	<b>TOTAL AREA</b>

Time span=0.01-48.00 hrs, dt=0.01 hrs, 4800 points x 3  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment POST1A: Subcat POST1A</b>	Runoff Area=27,741 sf 51.44% Impervious Runoff Depth=3.37" Tc=6.0 min CN=86 Runoff=2.49 cfs 7,799 cf
<b>Subcatchment POST1B: Subcat POST1B</b>	Runoff Area=8,779 sf 0.04% Impervious Runoff Depth=2.20" Tc=6.0 min CN=73 Runoff=0.52 cfs 1,611 cf
<b>Subcatchment POST1C: Subcat POST1C</b>	Runoff Area=7,810 sf 99.97% Impervious Runoff Depth=4.66" Tc=6.0 min CN=98 Runoff=0.86 cfs 3,035 cf
<b>Subcatchment POST1D: Subcat POST1D</b>	Runoff Area=9,130 sf 99.45% Impervious Runoff Depth=4.66" Tc=6.0 min CN=98 Runoff=1.00 cfs 3,548 cf
<b>Subcatchment POST2A: Subcat POST2A</b>	Runoff Area=9,029 sf 57.25% Impervious Runoff Depth=3.57" Tc=6.0 min CN=88 Runoff=0.85 cfs 2,689 cf
<b>Subcatchment POST2B: Subcat POST2B</b>	Runoff Area=2,494 sf 0.00% Impervious Runoff Depth=2.12" Tc=6.0 min CN=72 Runoff=0.14 cfs 441 cf
<b>Subcatchment POST2CA: Subcat</b>	Runoff Area=22,346 sf 25.34% Impervious Runoff Depth=2.72" Tc=6.0 min CN=79 Runoff=1.63 cfs 5,057 cf
<b>Subcatchment POST2CB: Subcat</b>	Runoff Area=16,448 sf 48.24% Impervious Runoff Depth=3.37" Tc=6.0 min CN=86 Runoff=1.47 cfs 4,624 cf
<b>Subcatchment POST2D: Subcat POST2D</b>	Runoff Area=3,820 sf 99.00% Impervious Runoff Depth=4.66" Tc=6.0 min CN=98 Runoff=0.42 cfs 1,484 cf
<b>Subcatchment POST2E: Subcat POST2E</b>	Runoff Area=8,547 sf 97.46% Impervious Runoff Depth=4.55" Tc=6.0 min CN=97 Runoff=0.93 cfs 3,239 cf
<b>Subcatchment UNCONTROLLED: Subcat</b>	Runoff Area=7,305 sf 11.87% Impervious Runoff Depth=2.54" Tc=6.0 min CN=77 Runoff=0.50 cfs 1,546 cf
<b>Reach DP1: Design Point 1</b>	Inflow=8.15 cfs 19,032 cf Outflow=8.15 cfs 19,032 cf
<b>Reach DP2: Design Point 2</b>	Inflow=0.50 cfs 1,546 cf Outflow=0.50 cfs 1,546 cf
<b>Reach TOTAL: TOTAL</b>	Inflow=8.65 cfs 20,578 cf Outflow=8.65 cfs 20,578 cf
<b>Pond CB1: CB1</b>	Peak Elev=142.25' Inflow=2.49 cfs 7,799 cf 12.0" Round Culvert n=0.013 L=11.0' S=0.0082 '/' Outflow=2.49 cfs 7,799 cf
<b>Pond CB2: CB2</b>	Peak Elev=137.04' Inflow=0.85 cfs 2,689 cf 12.0" Round Culvert n=0.013 L=14.0' S=0.0121 '/' Outflow=0.85 cfs 2,689 cf

<b>Pond CB3: CB3</b>	Peak Elev=138.77' Inflow=1.63 cfs 5,057 cf 12.0" Round Culvert n=0.013 L=22.0' S=0.0227 'l' Outflow=1.63 cfs 5,057 cf
<b>Pond CT1: Cultec Units A</b>	Peak Elev=141.31' Storage=2,470 cf Inflow=0.81 cfs 5,668 cf Outflow=0.08 cfs 5,669 cf
<b>Pond CT2: Cultec Units B</b>	Peak Elev=136.25' Storage=3,016 cf Inflow=1.31 cfs 7,394 cf Outflow=0.09 cfs 7,395 cf
<b>Pond DMH1: DMH1</b>	Peak Elev=139.03' Inflow=3.54 cfs 8,714 cf 18.0" Round Culvert n=0.013 L=60.0' S=0.0100 'l' Outflow=3.54 cfs 8,714 cf
<b>Pond DMH2: DMH2</b>	Peak Elev=143.84' Inflow=0.86 cfs 3,035 cf 12.0" Round Culvert n=0.013 L=165.0' S=0.0140 'l' Outflow=0.86 cfs 3,035 cf
<b>Pond DMH3: DMH3</b>	Peak Elev=141.56' Inflow=2.49 cfs 7,799 cf Primary=0.81 cfs 5,668 cf Secondary=1.67 cfs 2,131 cf Outflow=2.49 cfs 7,799 cf
<b>Pond DMH4: DMH4</b>	Peak Elev=138.38' Inflow=1.63 cfs 5,057 cf 12.0" Round Culvert n=0.013 L=95.0' S=0.0095 'l' Outflow=1.63 cfs 5,057 cf
<b>Pond DMH5: DMH5</b>	Peak Elev=137.77' Inflow=4.43 cfs 12,971 cf 18.0" Round Culvert n=0.013 L=46.0' S=0.0065 'l' Outflow=4.43 cfs 12,971 cf
<b>Pond DMH6: DMH6</b>	Peak Elev=136.65' Inflow=5.28 cfs 15,661 cf Primary=1.31 cfs 7,394 cf Secondary=3.96 cfs 8,267 cf Outflow=5.28 cfs 15,661 cf
<b>Pond INF-1: Infiltration Pond</b>	Peak Elev=145.67' Storage=211 cf Inflow=1.89 cfs 6,109 cf Discarded=0.02 cfs 1,434 cf Primary=1.87 cfs 4,675 cf Outflow=1.89 cfs 6,109 cf
<b>Pond XDMH2: EXISTING DMH2</b>	Peak Elev=133.78' Inflow=3.96 cfs 8,267 cf 24.0" Round Culvert n=0.013 L=26.0' S=0.0115 'l' Outflow=3.96 cfs 8,267 cf

**Total Runoff Area = 123,448 sf Runoff Volume = 35,074 cf Average Runoff Depth = 3.41"**  
**49.04% Pervious = 60,543 sf 50.96% Impervious = 62,905 sf**

**Summary for Subcatchment POST1A: Subcat POST1A**

Runoff = 2.49 cfs @ 12.09 hrs, Volume= 7,799 cf, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
12,212	74	>75% Grass cover, Good, HSG C
14,271	98	Paved parking, HSG C
0	98	Roofs, HSG C
1,258	70	Woods, Good, HSG C
27,741	86	Weighted Average
13,470		48.56% Pervious Area
14,271		51.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1B: Subcat POST1B**

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 1,611 cf, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
5,911	74	>75% Grass cover, Good, HSG C
3	98	Paved parking, HSG C
2,865	70	Woods, Good, HSG C
8,779	73	Weighted Average
8,776		99.96% Pervious Area
3		0.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1C: Subcat POST1C**

Runoff = 0.86 cfs @ 12.08 hrs, Volume= 3,035 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
2	74	>75% Grass cover, Good, HSG C
7,808	98	Roofs, HSG C
7,810	98	Weighted Average
2		0.03% Pervious Area
7,808		99.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1D: Subcat POST1D**

Runoff = 1.00 cfs @ 12.08 hrs, Volume= 3,548 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
50	74	>75% Grass cover, Good, HSG C
9,079	98	Roofs, HSG C
9,130	98	Weighted Average
50		0.55% Pervious Area
9,079		99.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2A: Subcat POST2A**

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 2,689 cf, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
3,860	74	>75% Grass cover, Good, HSG C
5,169	98	Paved parking, HSG C
9,029	88	Weighted Average
3,860		42.75% Pervious Area
5,169		57.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2B: Subcat POST2B**

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 441 cf, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
1,543	74	>75% Grass cover, Good, HSG C
951	70	Woods, Good, HSG C
2,494	72	Weighted Average
2,494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CA: Subcat POST2CA**

Runoff = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
11,371	74	>75% Grass cover, Good, HSG C
5,661	98	Paved parking, HSG C
5,313	70	Woods, Good, HSG C
22,346	79	Weighted Average
16,685		74.66% Pervious Area
5,661		25.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CB: Subcat POST2CB**

Runoff = 1.47 cfs @ 12.09 hrs, Volume= 4,624 cf, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
8,514	74	>75% Grass cover, Good, HSG C
7,934	98	Paved parking, HSG C
16,448	86	Weighted Average
8,514		51.76% Pervious Area
7,934		48.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2D: Subcat POST2D**

Runoff = 0.42 cfs @ 12.08 hrs, Volume= 1,484 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
38	74	>75% Grass cover, Good, HSG C
3,782	98	Roofs, HSG C
3,820	98	Weighted Average
38		1.00% Pervious Area
3,782		99.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2E: Subcat POST2E**

Runoff = 0.93 cfs @ 12.08 hrs, Volume= 3,239 cf, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
217	74	>75% Grass cover, Good, HSG C
13	98	Paved parking, HSG C
8,317	98	Roofs, HSG C
8,547	97	Weighted Average
217		2.54% Pervious Area
8,330		97.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 1,546 cf, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-Year Newport - Middletown Rainfall=4.90"

Area (sf)	CN	Description
6,428	74	>75% Grass cover, Good, HSG C
867	98	Paved parking, HSG C
10	70	Woods, Good, HSG C
7,305	77	Weighted Average
6,438		88.13% Pervious Area
867		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

### Summary for Reach DP1: Design Point 1

Inflow Area = 28,212 sf, 59.87% Impervious, Inflow Depth = 8.10" for 10-Year Newport - Middletown even  
Inflow = 8.15 cfs @ 12.09 hrs, Volume= 19,032 cf  
Outflow = 8.15 cfs @ 12.09 hrs, Volume= 19,032 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach DP2: Design Point 2

Inflow Area = 7,305 sf, 11.87% Impervious, Inflow Depth = 2.54" for 10-Year Newport - Middletown even  
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 1,546 cf  
Outflow = 0.50 cfs @ 12.09 hrs, Volume= 1,546 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 35,517 sf, 50.00% Impervious, Inflow Depth = 6.95" for 10-Year Newport - Middletown even  
Inflow = 8.65 cfs @ 12.09 hrs, Volume= 20,578 cf  
Outflow = 8.65 cfs @ 12.09 hrs, Volume= 20,578 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond CB1: CB1**

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 3.37" for 10-Year Newport - Middletown even  
 Inflow = 2.49 cfs @ 12.09 hrs, Volume= 7,799 cf  
 Outflow = 2.49 cfs @ 12.09 hrs, Volume= 7,799 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 2.49 cfs @ 12.09 hrs, Volume= 7,799 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 142.25' @ 12.09 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.91' S= 0.0082 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=2.48 cfs @ 12.09 hrs HW=142.25' TW=141.56' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 2.48 cfs @ 3.16 fps)

**Summary for Pond CB2: CB2**

Inflow Area = 9,029 sf, 57.25% Impervious, Inflow Depth = 3.57" for 10-Year Newport - Middletown even  
 Inflow = 0.85 cfs @ 12.09 hrs, Volume= 2,689 cf  
 Outflow = 0.85 cfs @ 12.09 hrs, Volume= 2,689 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.85 cfs @ 12.09 hrs, Volume= 2,689 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.04' @ 12.09 hrs

Flood Elev= 138.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 136.50' / 136.33' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.85 cfs @ 12.09 hrs HW=137.04' TW=136.65' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 0.85 cfs @ 2.84 fps)

**Summary for Pond CB3: CB3**

Inflow Area = 22,346 sf, 25.34% Impervious, Inflow Depth = 2.72" for 10-Year Newport - Middletown even  
 Inflow = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf  
 Outflow = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.77' @ 12.09 hrs

Flood Elev= 141.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>12.0" Round Culvert</b> L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 138.00' / 137.50' S= 0.0227 ' S= 0.0227 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.63 cfs @ 12.09 hrs HW=138.77' TW=138.37' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 1.63 cfs @ 3.47 fps)

### Summary for Pond CT1: Cultec Units A

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 2.45" for 10-Year Newport - Middletown even  
 Inflow = 0.81 cfs @ 12.09 hrs, Volume= 5,668 cf  
 Outflow = 0.08 cfs @ 14.33 hrs, Volume= 5,669 cf, Atten= 90%, Lag= 134.8 min  
 Discarded = 0.08 cfs @ 14.33 hrs, Volume= 5,669 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 141.31' @ 14.33 hrs Surf.Area= 1,240 sf Storage= 2,470 cf  
 Flood Elev= 141.50' Surf.Area= 1,240 sf Storage= 2,565 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 310.8 min ( 1,139.2 - 828.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	138.40'	1,071 cf	<b>20.83'W x 59.50'L x 3.54'H Field A</b> 4,390 cf Overall - 1,714 cf Embedded = 2,676 cf x 40.0% Voids
#2A	138.90'	1,714 cf	<b>Cultec R-330XLHD x 32 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		2,784 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 120.00'

**Discarded OutFlow** Max=0.08 cfs @ 14.33 hrs HW=141.31' (Free Discharge)

↑1=Exfiltration ( Controls 0.08 cfs)

### Pond CT1: Cultec Units A - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

32 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 1,713.7 cf Chamber Storage

4,390.2 cf Field - 1,713.7 cf Chambers = 2,676.5 cf Stone x 40.0% Voids = 1,070.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,784.3 cf = 0.064 af

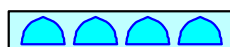
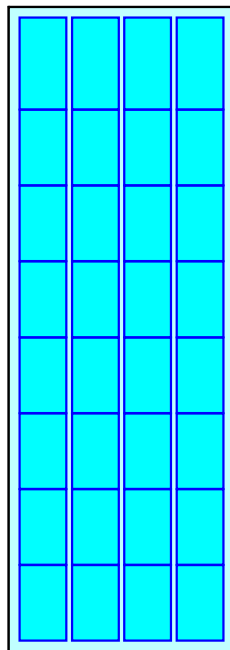
Overall Storage Efficiency = 63.4%

Overall System Size = 59.50' x 20.83' x 3.54'

32 Chambers

162.6 cy Field

99.1 cy Stone



**Summary for Pond CT2: Cultec Units B**

Inflow Area = 60,190 sf, 51.30% Impervious, Inflow Depth = 1.47" for 10-Year Newport - Middletown even  
 Inflow = 1.31 cfs @ 12.09 hrs, Volume= 7,394 cf  
 Outflow = 0.09 cfs @ 13.44 hrs, Volume= 7,395 cf, Atten= 93%, Lag= 81.0 min  
 Discarded = 0.09 cfs @ 13.44 hrs, Volume= 7,395 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 136.25' @ 13.44 hrs Surf.Area= 1,531 sf Storage= 3,016 cf  
 Flood Elev= 136.40' Surf.Area= 1,531 sf Storage= 3,116 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 337.3 min ( 1,158.6 - 821.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.40'	1,317 cf	<b>20.83'W x 73.50'L x 3.54'H Field A</b> 5,423 cf Overall - 2,131 cf Embedded = 3,292 cf x 40.0% Voids
#2A	133.90'	2,131 cf	<b>Cultec R-330XLHD x 40 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		3,448 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'

**Discarded OutFlow** Max=0.09 cfs @ 13.44 hrs HW=136.25' (Free Discharge)  
 ↑**1=Exfiltration** ( Controls 0.09 cfs)

### Pond CT2: Cultec Units B - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 2,131.0 cf Chamber Storage

5,423.2 cf Field - 2,131.0 cf Chambers = 3,292.2 cf Stone x 40.0% Voids = 1,316.9 cf Stone Storage

Chamber Storage + Stone Storage = 3,447.9 cf = 0.079 af

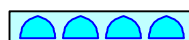
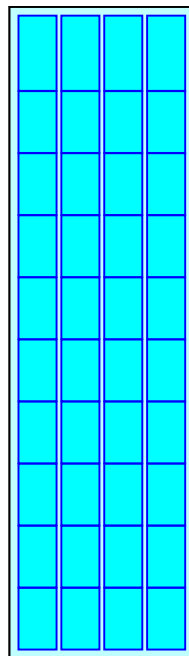
Overall Storage Efficiency = 63.6%

Overall System Size = 73.50' x 20.83' x 3.54'

40 Chambers

200.9 cy Field

121.9 cy Stone



**Summary for Pond DMH1: DMH1**

Inflow Area = 16,940 sf, 99.69% Impervious, Inflow Depth = 6.17" for 10-Year Newport - Middletown even  
 Inflow = 3.54 cfs @ 12.08 hrs, Volume= 8,714 cf  
 Outflow = 3.54 cfs @ 12.08 hrs, Volume= 8,714 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 3.54 cfs @ 12.08 hrs, Volume= 8,714 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 139.03' @ 12.08 hrs

Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>18.0" Round Culvert</b> L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=3.53 cfs @ 12.08 hrs HW=139.03' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 3.53 cfs @ 2.73 fps)

**Summary for Pond DMH2: DMH2**

Inflow Area = 7,810 sf, 99.97% Impervious, Inflow Depth = 4.66" for 10-Year Newport - Middletown even  
 Inflow = 0.86 cfs @ 12.08 hrs, Volume= 3,035 cf  
 Outflow = 0.86 cfs @ 12.08 hrs, Volume= 3,035 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.86 cfs @ 12.08 hrs, Volume= 3,035 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 143.84' @ 12.08 hrs

Flood Elev= 148.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	143.30'	<b>12.0" Round Culvert</b> L= 165.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 143.30' / 140.99' S= 0.0140 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.86 cfs @ 12.08 hrs HW=143.84' TW=139.03' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 0.86 cfs @ 1.98 fps)

**Summary for Pond DMH3: DMH3**

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 3.37" for 10-Year Newport - Middletown even  
 Inflow = 2.49 cfs @ 12.09 hrs, Volume= 7,799 cf  
 Outflow = 2.49 cfs @ 12.09 hrs, Volume= 7,799 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.81 cfs @ 12.09 hrs, Volume= 5,668 cf  
 Secondary = 1.67 cfs @ 12.09 hrs, Volume= 2,131 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.56' @ 12.09 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.90' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	141.30'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	139.65'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 139.65' / 139.53' S= 0.0086 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.81 cfs @ 12.09 hrs HW=141.56' TW=139.66' (Dynamic Tailwater)  
 ↑1=Culvert (Barrel Controls 0.81 cfs @ 2.62 fps)

**Secondary OutFlow** Max=1.67 cfs @ 12.09 hrs HW=141.56' TW=139.03' (Dynamic Tailwater)  
 ↑3=Culvert (Passes 1.67 cfs of 3.54 cfs potential flow)  
 ↑2=Sharp-Crested Rectangular Weir (Weir Controls 1.67 cfs @ 1.65 fps)

**Summary for Pond DMH4: DMH4**

Inflow Area = 22,346 sf, 25.34% Impervious, Inflow Depth = 2.72" for 10-Year Newport - Middletown even  
 Inflow = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf  
 Outflow = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.63 cfs @ 12.09 hrs, Volume= 5,057 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.38' @ 12.09 hrs

Flood Elev= 142.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	<b>12.0" Round Culvert</b> L= 95.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.50' / 136.60' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.63 cfs @ 12.09 hrs HW=138.37' TW=137.77' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 1.63 cfs @ 2.99 fps)

**Summary for Pond DMH5: DMH5**

Inflow Area = 51,161 sf, 50.25% Impervious, Inflow Depth = 3.04" for 10-Year Newport - Middletown even  
 Inflow = 4.43 cfs @ 12.09 hrs, Volume= 12,971 cf  
 Outflow = 4.43 cfs @ 12.09 hrs, Volume= 12,971 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 4.43 cfs @ 12.09 hrs, Volume= 12,971 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.77' @ 12.09 hrs

Flood Elev= 141.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.60'	<b>18.0" Round Culvert</b> L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.60' / 136.30' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=4.43 cfs @ 12.09 hrs HW=137.77' TW=136.65' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 4.43 cfs @ 4.12 fps)

**Summary for Pond DMH6: DMH6**

Inflow Area = 60,190 sf, 51.30% Impervious, Inflow Depth = 3.12" for 10-Year Newport - Middletown even  
 Inflow = 5.28 cfs @ 12.09 hrs, Volume= 15,661 cf  
 Outflow = 5.28 cfs @ 12.09 hrs, Volume= 15,661 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.31 cfs @ 12.09 hrs, Volume= 7,394 cf  
 Secondary = 3.96 cfs @ 12.09 hrs, Volume= 8,267 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 136.65' @ 12.09 hrs

Flood Elev= 139.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	<b>12.0" Round Culvert</b> L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.80' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	136.20'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 3.0' Crest Height
#3	Secondary	133.47'	<b>18.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.47' / 132.87' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=1.31 cfs @ 12.09 hrs HW=136.65' TW=134.95' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 1.31 cfs @ 3.44 fps)

**Secondary OutFlow** Max=3.96 cfs @ 12.09 hrs HW=136.65' TW=133.78' (Dynamic Tailwater)

↑**3=Culvert** (Passes 3.96 cfs of 10.48 cfs potential flow)

↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.96 cfs @ 2.24 fps)

### Summary for Pond INF-1: Infiltration Pond

Inflow Area = 20,268 sf, 57.80% Impervious, Inflow Depth = 3.62" for 10-Year Newport - Middletown even  
 Inflow = 1.89 cfs @ 12.09 hrs, Volume= 6,109 cf  
 Outflow = 1.89 cfs @ 12.09 hrs, Volume= 6,109 cf, Atten= 0%, Lag= 0.4 min  
 Discarded = 0.02 cfs @ 12.09 hrs, Volume= 1,434 cf  
 Primary = 1.87 cfs @ 12.09 hrs, Volume= 4,675 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 145.67' @ 12.09 hrs Surf.Area= 403 sf Storage= 211 cf  
 Flood Elev= 146.00' Surf.Area= 490 sf Storage= 358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 24.1 min ( 815.5 - 791.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	145.00'	358 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
145.00	225	0.0	0	0
146.00	490	100.0	358	358

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'
#2	Device 3	145.50'	<b>2.5" x 2.5" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area) Limited to weir flow at low heads
#3	Primary	142.50'	<b>12.0" Round Culvert</b> L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.50' / 136.60' S= 0.0472 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Discarded OutFlow** Max=0.02 cfs @ 12.09 hrs HW=145.67' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.02 cfs)

**Primary OutFlow** Max=1.86 cfs @ 12.09 hrs HW=145.67' TW=137.77' (Dynamic Tailwater)  
 ↑3=Culvert (Passes 1.86 cfs of 4.88 cfs potential flow)  
 ↑2=Orifice/Grate (Weir Controls 1.86 cfs @ 1.36 fps)

**Summary for Pond XDMH2: EXISTING DMH2**

Inflow = 3.96 cfs @ 12.09 hrs, Volume= 8,267 cf  
 Outflow = 3.96 cfs @ 12.09 hrs, Volume= 8,267 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 3.96 cfs @ 12.09 hrs, Volume= 8,267 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

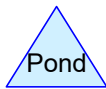
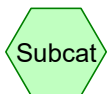
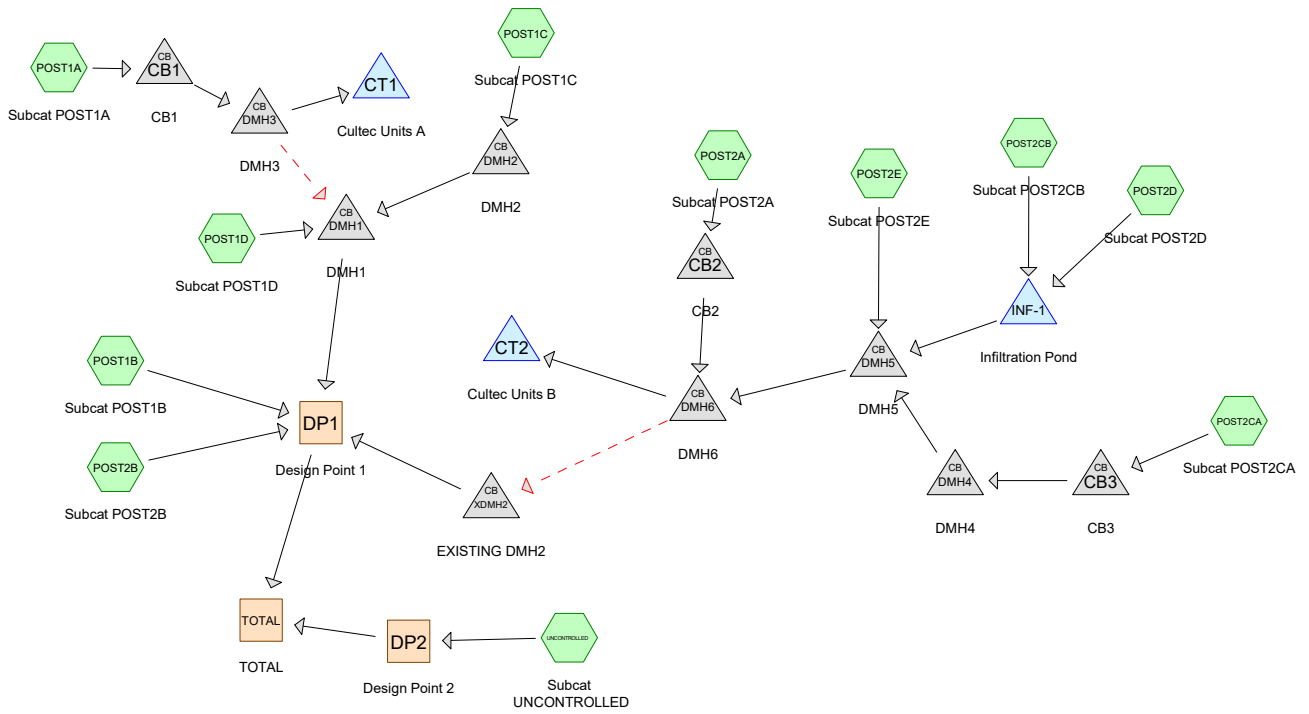
Peak Elev= 133.78' @ 12.09 hrs

Flood Elev= 138.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.87'	<b>24.0" Round Culvert</b> L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 132.87' / 132.57' S= 0.0115 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=3.96 cfs @ 12.09 hrs HW=133.78' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 3.96 cfs @ 4.16 fps)



Routing Diagram for 21-038 - 417 Forest Avenue - Post Watershed Analysis - February 8, 2022

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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
50,146	74	>75% Grass cover, Good, HSG C (POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED)
33,919	98	Paved parking, HSG C (POST1A, POST1B, POST2A, POST2CA, POST2CB, POST2E, UNCONTROLLED)
28,986	98	Roofs, HSG C (POST1A, POST1C, POST1D, POST2D, POST2E)
10,397	70	Woods, Good, HSG C (POST1A, POST1B, POST2B, POST2CA, UNCONTROLLED)
<b>123,448</b>	<b>86</b>	<b>TOTAL AREA</b>

**21-038 - 417 Forest Avenue - Post Watershed Analysis - February 8, 2022**

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
123,448	HSG C	POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED
0	HSG D	
0	Other	
<b>123,448</b>		<b>TOTAL AREA</b>

**21-038 - 417 Forest Avenue - Post Watershed Analysis - February 8, 2022**

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	50,146	0	0	50,146	>75% Grass cover, Good
0	0	33,919	0	0	33,919	Paved parking
0	0	28,986	0	0	28,986	Roofs
0	0	10,397	0	0	10,397	Woods, Good
<b>0</b>	<b>0</b>	<b>123,448</b>	<b>0</b>	<b>0</b>	<b>123,448</b>	<b>TOTAL AREA</b>

Time span=0.01-48.00 hrs, dt=0.01 hrs, 4800 points x 3  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment POST1A: Subcat POST1A</b>	Runoff Area=27,741 sf 51.44% Impervious Runoff Depth=6.91" Tc=6.0 min CN=86 Runoff=4.93 cfs 15,984 cf
<b>Subcatchment POST1B: Subcat POST1B</b>	Runoff Area=8,779 sf 0.04% Impervious Runoff Depth=5.35" Tc=6.0 min CN=73 Runoff=1.26 cfs 3,910 cf
<b>Subcatchment POST1C: Subcat POST1C</b>	Runoff Area=7,810 sf 99.97% Impervious Runoff Depth=8.36" Tc=6.0 min CN=98 Runoff=1.51 cfs 5,441 cf
<b>Subcatchment POST1D: Subcat POST1D</b>	Runoff Area=9,130 sf 99.45% Impervious Runoff Depth=8.36" Tc=6.0 min CN=98 Runoff=1.77 cfs 6,360 cf
<b>Subcatchment POST2A: Subcat POST2A</b>	Runoff Area=9,029 sf 57.25% Impervious Runoff Depth=7.16" Tc=6.0 min CN=88 Runoff=1.64 cfs 5,384 cf
<b>Subcatchment POST2B: Subcat POST2B</b>	Runoff Area=2,494 sf 0.00% Impervious Runoff Depth=5.22" Tc=6.0 min CN=72 Runoff=0.35 cfs 1,086 cf
<b>Subcatchment POST2CA: Subcat</b>	Runoff Area=22,346 sf 25.34% Impervious Runoff Depth=6.07" Tc=6.0 min CN=79 Runoff=3.59 cfs 11,301 cf
<b>Subcatchment POST2CB: Subcat</b>	Runoff Area=16,448 sf 48.24% Impervious Runoff Depth=6.91" Tc=6.0 min CN=86 Runoff=2.92 cfs 9,477 cf
<b>Subcatchment POST2D: Subcat POST2D</b>	Runoff Area=3,820 sf 99.00% Impervious Runoff Depth=8.36" Tc=6.0 min CN=98 Runoff=0.74 cfs 2,661 cf
<b>Subcatchment POST2E: Subcat POST2E</b>	Runoff Area=8,547 sf 97.46% Impervious Runoff Depth=8.24" Tc=6.0 min CN=97 Runoff=1.65 cfs 5,869 cf
<b>Subcatchment UNCONTROLLED: Subcat</b>	Runoff Area=7,305 sf 11.87% Impervious Runoff Depth=5.83" Tc=6.0 min CN=77 Runoff=1.13 cfs 3,547 cf
<b>Reach DP1: Design Point 1</b>	Inflow=19.18 cfs 49,951 cf Outflow=19.18 cfs 49,951 cf
<b>Reach DP2: Design Point 2</b>	Inflow=1.13 cfs 3,547 cf Outflow=1.13 cfs 3,547 cf
<b>Reach TOTAL: TOTAL</b>	Inflow=20.31 cfs 53,498 cf Outflow=20.31 cfs 53,498 cf
<b>Pond CB1: CB1</b>	Peak Elev=144.48' Inflow=4.93 cfs 15,984 cf 12.0" Round Culvert n=0.013 L=11.0' S=0.0082 '/' Outflow=4.93 cfs 15,984 cf
<b>Pond CB2: CB2</b>	Peak Elev=137.40' Inflow=1.64 cfs 5,384 cf 12.0" Round Culvert n=0.013 L=14.0' S=0.0121 '/' Outflow=1.64 cfs 5,384 cf

<b>Pond CB3: CB3</b>	Peak Elev=141.20' Inflow=3.59 cfs 11,301 cf 12.0" Round Culvert n=0.013 L=22.0' S=0.0227 '/ Outflow=3.59 cfs 11,301 cf
<b>Pond CT1: Cultec Units A</b>	Peak Elev=141.80' Storage=2,713 cf Inflow=1.27 cfs 7,047 cf Outflow=0.08 cfs 7,048 cf
<b>Pond CT2: Cultec Units B</b>	Peak Elev=489.50' Storage=3,448 cf Inflow=1.18 cfs 8,988 cf Outflow=0.79 cfs 8,988 cf
<b>Pond DMH1: DMH1</b>	Peak Elev=139.86' Inflow=7.07 cfs 20,738 cf 18.0" Round Culvert n=0.013 L=60.0' S=0.0100 '/ Outflow=7.07 cfs 20,738 cf
<b>Pond DMH2: DMH2</b>	Peak Elev=144.06' Inflow=1.51 cfs 5,441 cf 12.0" Round Culvert n=0.013 L=165.0' S=0.0140 '/ Outflow=1.51 cfs 5,441 cf
<b>Pond DMH3: DMH3</b>	Peak Elev=141.81' Inflow=4.93 cfs 15,984 cf Primary=1.27 cfs 7,047 cf Secondary=3.85 cfs 8,937 cf Outflow=4.93 cfs 15,984 cf
<b>Pond DMH4: DMH4</b>	Peak Elev=140.30' Inflow=3.59 cfs 11,301 cf 12.0" Round Culvert n=0.013 L=95.0' S=0.0095 '/ Outflow=3.59 cfs 11,301 cf
<b>Pond DMH5: DMH5</b>	Peak Elev=138.72' Inflow=8.87 cfs 27,687 cf 18.0" Round Culvert n=0.013 L=46.0' S=0.0065 '/ Outflow=8.87 cfs 27,687 cf
<b>Pond DMH6: DMH6</b>	Peak Elev=137.07' Inflow=10.51 cfs 33,071 cf Primary=1.18 cfs 8,988 cf Secondary=10.51 cfs 24,217 cf Outflow=10.51 cfs 33,071 cf
<b>Pond INF-1: Infiltration Pond</b>	Peak Elev=145.77' Storage=251 cf Inflow=3.66 cfs 12,138 cf Discarded=0.02 cfs 1,622 cf Primary=3.63 cfs 10,517 cf Outflow=3.65 cfs 12,138 cf
<b>Pond XDMH2: EXISTING DMH2</b>	Peak Elev=134.53' Inflow=10.51 cfs 24,217 cf 24.0" Round Culvert n=0.013 L=26.0' S=0.0115 '/ Outflow=10.51 cfs 24,217 cf
<b>Total Runoff Area = 123,448 sf Runoff Volume = 71,021 cf Average Runoff Depth = 6.90"</b>	
<b>49.04% Pervious = 60,543 sf 50.96% Impervious = 62,905 sf</b>	

**Summary for Subcatchment POST1A: Subcat POST1A**

Runoff = 4.93 cfs @ 12.08 hrs, Volume= 15,984 cf, Depth= 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
12,212	74	>75% Grass cover, Good, HSG C
14,271	98	Paved parking, HSG C
0	98	Roofs, HSG C
1,258	70	Woods, Good, HSG C
27,741	86	Weighted Average
13,470		48.56% Pervious Area
14,271		51.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1B: Subcat POST1B**

Runoff = 1.26 cfs @ 12.09 hrs, Volume= 3,910 cf, Depth= 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
5,911	74	>75% Grass cover, Good, HSG C
3	98	Paved parking, HSG C
2,865	70	Woods, Good, HSG C
8,779	73	Weighted Average
8,776		99.96% Pervious Area
3		0.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1C: Subcat POST1C**

Runoff = 1.51 cfs @ 12.08 hrs, Volume= 5,441 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
2	74	>75% Grass cover, Good, HSG C
7,808	98	Roofs, HSG C
7,810	98	Weighted Average
2		0.03% Pervious Area
7,808		99.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1D: Subcat POST1D**

Runoff = 1.77 cfs @ 12.08 hrs, Volume= 6,360 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
50	74	>75% Grass cover, Good, HSG C
9,079	98	Roofs, HSG C
9,130	98	Weighted Average
50		0.55% Pervious Area
9,079		99.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2A: Subcat POST2A**

Runoff = 1.64 cfs @ 12.08 hrs, Volume= 5,384 cf, Depth= 7.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
3,860	74	>75% Grass cover, Good, HSG C
5,169	98	Paved parking, HSG C
9,029	88	Weighted Average
3,860		42.75% Pervious Area
5,169		57.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2B: Subcat POST2B**

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 1,086 cf, Depth= 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
1,543	74	>75% Grass cover, Good, HSG C
951	70	Woods, Good, HSG C
2,494	72	Weighted Average
2,494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CA: Subcat POST2CA**

Runoff = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf, Depth= 6.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
11,371	74	>75% Grass cover, Good, HSG C
5,661	98	Paved parking, HSG C
5,313	70	Woods, Good, HSG C
22,346	79	Weighted Average
16,685		74.66% Pervious Area
5,661		25.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CB: Subcat POST2CB**

Runoff = 2.92 cfs @ 12.08 hrs, Volume= 9,477 cf, Depth= 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
8,514	74	>75% Grass cover, Good, HSG C
7,934	98	Paved parking, HSG C
16,448	86	Weighted Average
8,514		51.76% Pervious Area
7,934		48.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2D: Subcat POST2D**

Runoff = 0.74 cfs @ 12.08 hrs, Volume= 2,661 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
38	74	>75% Grass cover, Good, HSG C
3,782	98	Roofs, HSG C
3,820	98	Weighted Average
38		1.00% Pervious Area
3,782		99.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2E: Subcat POST2E**

Runoff = 1.65 cfs @ 12.08 hrs, Volume= 5,869 cf, Depth= 8.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
217	74	>75% Grass cover, Good, HSG C
13	98	Paved parking, HSG C
8,317	98	Roofs, HSG C
8,547	97	Weighted Average
217		2.54% Pervious Area
8,330		97.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 1.13 cfs @ 12.09 hrs, Volume= 3,547 cf, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Newport - Middletown Rainfall=8.60"

Area (sf)	CN	Description
6,428	74	>75% Grass cover, Good, HSG C
867	98	Paved parking, HSG C
10	70	Woods, Good, HSG C
7,305	77	Weighted Average
6,438		88.13% Pervious Area
867		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

### Summary for Reach DP1: Design Point 1

Inflow Area = 28,212 sf, 59.87% Impervious, Inflow Depth = 21.25" for 100-Year Newport - Middletown eve  
Inflow = 19.18 cfs @ 12.09 hrs, Volume= 49,951 cf  
Outflow = 19.18 cfs @ 12.09 hrs, Volume= 49,951 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach DP2: Design Point 2

Inflow Area = 7,305 sf, 11.87% Impervious, Inflow Depth = 5.83" for 100-Year Newport - Middletown eve  
Inflow = 1.13 cfs @ 12.09 hrs, Volume= 3,547 cf  
Outflow = 1.13 cfs @ 12.09 hrs, Volume= 3,547 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 35,517 sf, 50.00% Impervious, Inflow Depth = 18.08" for 100-Year Newport - Middletown eve  
Inflow = 20.31 cfs @ 12.09 hrs, Volume= 53,498 cf  
Outflow = 20.31 cfs @ 12.09 hrs, Volume= 53,498 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond CB1: CB1**

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 6.91" for 100-Year Newport - Middletown eve  
 Inflow = 4.93 cfs @ 12.08 hrs, Volume= 15,984 cf  
 Outflow = 4.93 cfs @ 12.08 hrs, Volume= 15,984 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 4.93 cfs @ 12.08 hrs, Volume= 15,984 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 144.48' @ 12.09 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.91' S= 0.0082 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=4.92 cfs @ 12.08 hrs HW=144.47' TW=141.75' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 4.92 cfs @ 6.26 fps)

**Summary for Pond CB2: CB2**

Inflow Area = 9,029 sf, 57.25% Impervious, Inflow Depth = 7.16" for 100-Year Newport - Middletown eve  
 Inflow = 1.64 cfs @ 12.08 hrs, Volume= 5,384 cf  
 Outflow = 1.64 cfs @ 12.08 hrs, Volume= 5,384 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.64 cfs @ 12.08 hrs, Volume= 5,384 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.40' @ 12.08 hrs

Flood Elev= 138.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 136.50' / 136.33' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.58 cfs @ 12.08 hrs HW=137.39' TW=137.07' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 1.58 cfs @ 2.14 fps)

**Summary for Pond CB3: CB3**

Inflow Area = 22,346 sf, 25.34% Impervious, Inflow Depth = 6.07" for 100-Year Newport - Middletown eve  
 Inflow = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf  
 Outflow = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.20' @ 12.09 hrs

Flood Elev= 141.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>12.0" Round Culvert</b> L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 138.00' / 137.50' S= 0.0227 ' S= 0.0227 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=3.58 cfs @ 12.09 hrs HW=141.19' TW=140.29' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 3.58 cfs @ 4.56 fps)

### Summary for Pond CT1: Cultec Units A

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 3.05" for 100-Year Newport - Middletown eve  
 Inflow = 1.27 cfs @ 12.07 hrs, Volume= 7,047 cf  
 Outflow = 0.08 cfs @ 12.15 hrs, Volume= 7,048 cf, Atten= 94%, Lag= 4.7 min  
 Discarded = 0.08 cfs @ 12.15 hrs, Volume= 7,048 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 141.80' @ 12.15 hrs Surf.Area= 1,240 sf Storage= 2,713 cf  
 Flood Elev= 141.50' Surf.Area= 1,240 sf Storage= 2,565 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 340.1 min ( 1,151.9 - 811.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	138.40'	1,071 cf	<b>20.83'W x 59.50'L x 3.54'H Field A</b> 4,390 cf Overall - 1,714 cf Embedded = 2,676 cf x 40.0% Voids
#2A	138.90'	1,714 cf	<b>Cultec R-330XLHD x 32 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		2,784 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 120.00'

**Discarded OutFlow** Max=0.08 cfs @ 12.15 hrs HW=141.80' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.08 cfs)

### Pond CT1: Cultec Units A - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

32 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 1,713.7 cf Chamber Storage

4,390.2 cf Field - 1,713.7 cf Chambers = 2,676.5 cf Stone x 40.0% Voids = 1,070.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,784.3 cf = 0.064 af

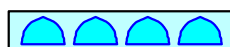
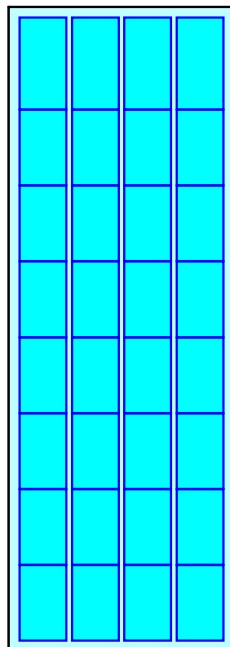
Overall Storage Efficiency = 63.4%

Overall System Size = 59.50' x 20.83' x 3.54'

32 Chambers

162.6 cy Field

99.1 cy Stone



**Summary for Pond CT2: Cultec Units B**

Inflow Area = 60,190 sf, 51.30% Impervious, Inflow Depth = 1.79" for 100-Year Newport - Middletown eve  
 Inflow = 1.18 cfs @ 11.96 hrs, Volume= 8,988 cf  
 Outflow = 0.79 cfs @ 12.07 hrs, Volume= 8,988 cf, Atten= 33%, Lag= 6.7 min  
 Discarded = 0.79 cfs @ 12.07 hrs, Volume= 8,988 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 489.50' @ 12.07 hrs Surf.Area= 1,531 sf Storage= 3,448 cf  
 Flood Elev= 136.40' Surf.Area= 1,531 sf Storage= 3,116 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 357.4 min ( 1,155.0 - 797.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.40'	1,317 cf	<b>20.83'W x 73.50'L x 3.54'H Field A</b> 5,423 cf Overall - 2,131 cf Embedded = 3,292 cf x 40.0% Voids
#2A	133.90'	2,131 cf	<b>Cultec R-330XLHD x 40 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		3,448 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'

**Discarded OutFlow** Max=0.74 cfs @ 12.07 hrs HW=463.68' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.74 cfs)

### Pond CT2: Cultec Units B - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 2,131.0 cf Chamber Storage

5,423.2 cf Field - 2,131.0 cf Chambers = 3,292.2 cf Stone x 40.0% Voids = 1,316.9 cf Stone Storage

Chamber Storage + Stone Storage = 3,447.9 cf = 0.079 af

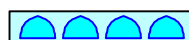
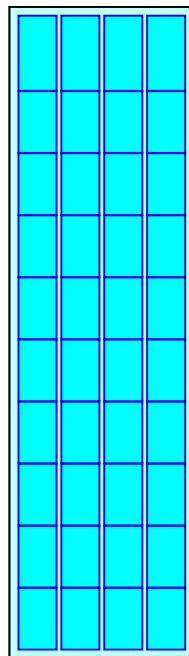
Overall Storage Efficiency = 63.6%

Overall System Size = 73.50' x 20.83' x 3.54'

40 Chambers

200.9 cy Field

121.9 cy Stone



**Summary for Pond DMH1: DMH1**

Inflow Area = 16,940 sf, 99.69% Impervious, Inflow Depth = 14.69" for 100-Year Newport - Middletown eve  
 Inflow = 7.07 cfs @ 12.09 hrs, Volume= 20,738 cf  
 Outflow = 7.07 cfs @ 12.09 hrs, Volume= 20,738 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 7.07 cfs @ 12.09 hrs, Volume= 20,738 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 139.86' @ 12.09 hrs

Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>18.0" Round Culvert</b> L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=7.07 cfs @ 12.09 hrs HW=139.86' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 7.07 cfs @ 4.00 fps)

**Summary for Pond DMH2: DMH2**

Inflow Area = 7,810 sf, 99.97% Impervious, Inflow Depth = 8.36" for 100-Year Newport - Middletown eve  
 Inflow = 1.51 cfs @ 12.08 hrs, Volume= 5,441 cf  
 Outflow = 1.51 cfs @ 12.08 hrs, Volume= 5,441 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.51 cfs @ 12.08 hrs, Volume= 5,441 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 144.06' @ 12.08 hrs

Flood Elev= 148.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	143.30'	<b>12.0" Round Culvert</b> L= 165.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 143.30' / 140.99' S= 0.0140 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.51 cfs @ 12.08 hrs HW=144.06' TW=139.84' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 1.51 cfs @ 2.35 fps)

**Summary for Pond DMH3: DMH3**

Inflow Area = 27,741 sf, 51.44% Impervious, Inflow Depth = 6.91" for 100-Year Newport - Middletown eve  
 Inflow = 4.93 cfs @ 12.08 hrs, Volume= 15,984 cf  
 Outflow = 4.93 cfs @ 12.08 hrs, Volume= 15,984 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.27 cfs @ 12.07 hrs, Volume= 7,047 cf  
 Secondary = 3.85 cfs @ 12.12 hrs, Volume= 8,937 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.81' @ 12.12 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.90' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	141.30'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	139.65'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 139.65' / 139.53' S= 0.0086 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.26 cfs @ 12.07 hrs HW=141.73' TW=141.38' (Dynamic Tailwater)  
 ↑1=Culvert (Barrel Controls 1.26 cfs @ 2.89 fps)

**Secondary OutFlow** Max=3.85 cfs @ 12.12 hrs HW=141.81' TW=139.78' (Dynamic Tailwater)  
 ↑3=Culvert (Inlet Controls 3.85 cfs @ 4.90 fps)  
 ↑2=Sharp-Crested Rectangular Weir (Passes 3.85 cfs of 4.64 cfs potential flow)

**Summary for Pond DMH4: DMH4**

Inflow Area = 22,346 sf, 25.34% Impervious, Inflow Depth = 6.07" for 100-Year Newport - Middletown eve  
 Inflow = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf  
 Outflow = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 3.59 cfs @ 12.09 hrs, Volume= 11,301 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 140.30' @ 12.09 hrs

Flood Elev= 142.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	<b>12.0" Round Culvert</b> L= 95.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.50' / 136.60' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=3.58 cfs @ 12.09 hrs HW=140.29' TW=138.71' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 3.58 cfs @ 4.56 fps)

**Summary for Pond DMH5: DMH5**

Inflow Area = 51,161 sf, 50.25% Impervious, Inflow Depth = 6.49" for 100-Year Newport - Middletown eve  
 Inflow = 8.87 cfs @ 12.09 hrs, Volume= 27,687 cf  
 Outflow = 8.87 cfs @ 12.09 hrs, Volume= 27,687 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 8.87 cfs @ 12.09 hrs, Volume= 27,687 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.72' @ 12.09 hrs

Flood Elev= 141.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.60'	<b>18.0" Round Culvert</b> L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.60' / 136.30' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=8.85 cfs @ 12.09 hrs HW=138.71' TW=137.07' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 8.85 cfs @ 5.01 fps)

**Summary for Pond DMH6: DMH6**

Inflow Area = 60,190 sf, 51.30% Impervious, Inflow Depth = 6.59" for 100-Year Newport - Middletown event  
 Inflow = 10.51 cfs @ 12.09 hrs, Volume= 33,071 cf  
 Outflow = 10.51 cfs @ 12.09 hrs, Volume= 33,071 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.18 cfs @ 11.96 hrs, Volume= 8,988 cf  
 Secondary = 10.51 cfs @ 12.09 hrs, Volume= 24,217 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.07' @ 12.09 hrs

Flood Elev= 139.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	<b>12.0" Round Culvert</b> L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.80' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	136.20'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 3.0' Crest Height
#3	Secondary	133.47'	<b>18.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.47' / 132.87' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=1.18 cfs @ 11.96 hrs HW=136.62' TW=136.29' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 1.18 cfs @ 3.26 fps)

**Secondary OutFlow** Max=10.49 cfs @ 12.09 hrs HW=137.07' TW=134.53' (Dynamic Tailwater)

↑**3=Culvert** (Passes 10.49 cfs of 10.70 cfs potential flow)

↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 10.49 cfs @ 3.16 fps)

**Summary for Pond INF-1: Infiltration Pond**

Inflow Area = 20,268 sf, 57.80% Impervious, Inflow Depth = 7.19" for 100-Year Newport - Middletown eve  
 Inflow = 3.66 cfs @ 12.08 hrs, Volume= 12,138 cf  
 Outflow = 3.65 cfs @ 12.09 hrs, Volume= 12,138 cf, Atten= 0%, Lag= 0.4 min  
 Discarded = 0.02 cfs @ 12.09 hrs, Volume= 1,622 cf  
 Primary = 3.63 cfs @ 12.09 hrs, Volume= 10,517 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 145.77' @ 12.09 hrs Surf.Area= 429 sf Storage= 251 cf  
 Flood Elev= 146.00' Surf.Area= 490 sf Storage= 358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 14.3 min ( 789.9 - 775.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	145.00'	358 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
145.00	225	0.0	0	0
146.00	490	100.0	358	358

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'
#2	Device 3	145.50'	<b>2.5" x 2.5" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area) Limited to weir flow at low heads
#3	Primary	142.50'	<b>12.0" Round Culvert</b> L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.50' / 136.60' S= 0.0472 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Discarded OutFlow** Max=0.02 cfs @ 12.09 hrs HW=145.77' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.02 cfs)

**Primary OutFlow** Max=3.63 cfs @ 12.09 hrs HW=145.77' TW=138.71' (Dynamic Tailwater)

↑**3=Culvert** (Passes 3.63 cfs of 4.97 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 3.63 cfs @ 1.69 fps)

**Summary for Pond XDMH2: EXISTING DMH2**

Inflow = 10.51 cfs @ 12.09 hrs, Volume= 24,217 cf  
 Outflow = 10.51 cfs @ 12.09 hrs, Volume= 24,217 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 10.51 cfs @ 12.09 hrs, Volume= 24,217 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

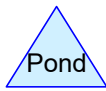
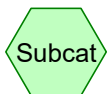
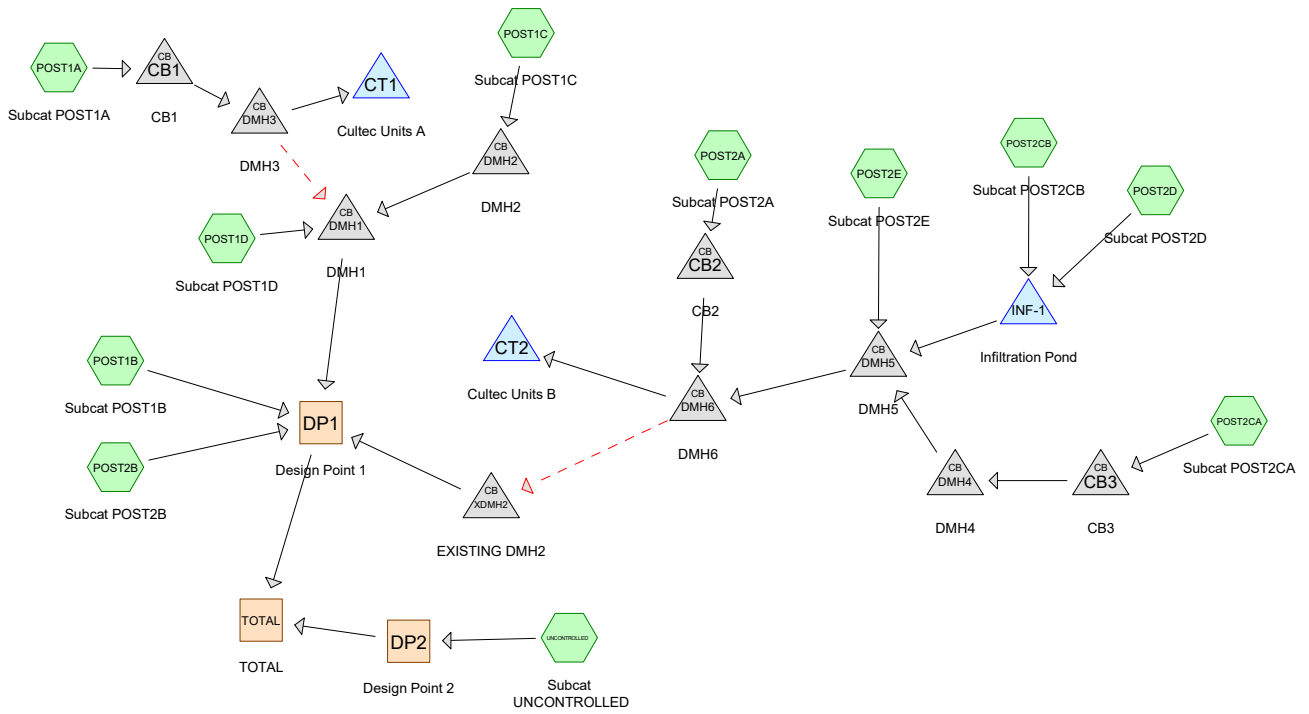
Peak Elev= 134.53' @ 12.09 hrs

Flood Elev= 138.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.87'	<b>24.0" Round Culvert</b> L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 132.87' / 132.57' S= 0.0115 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=10.49 cfs @ 12.09 hrs HW=134.53' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 10.49 cfs @ 5.10 fps)



**Routing Diagram for 21-038 - 417 Forest Avenue - 1.2 Inch Post Watershed Analysis**  
 Prepared by Insite Engineering Services LLC, Printed 2/8/2022  
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**21-038 - 417 Forest Avenue - 1.2 Inch Post Watershed Analysis**

Prepared by Insite Engineering Services LLC

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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
123,447	68	(POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED)
<b>123,447</b>	<b>68</b>	<b>TOTAL AREA</b>

**21-038 - 417 Forest Avenue - 1.2 Inch Post Watershed Analysis**

Prepared by Insite Engineering Services LLC

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
0	HSG D	
123,447	Other	POST1A, POST1B, POST1C, POST1D, POST2A, POST2B, POST2CA, POST2CB, POST2D, POST2E, UNCONTROLLED
<b>123,447</b>		<b>TOTAL AREA</b>

**21-038 - 417 Forest Avenue - 1.2 Inch Post Watershed Analysis**

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**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchmen Numbers
0	0	0	0	123,447	123,447		P
<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>123,447</b>	<b>123,447</b>	<b>TOTAL AREA</b>	

Time span=0.01-48.00 hrs, dt=0.01 hrs, 4800 points x 3  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment POST1A: Subcat POST1A</b>	Runoff Area=27,741 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 31 cf
<b>Subcatchment POST1B: Subcat POST1B</b>	Runoff Area=8,779 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 10 cf
<b>Subcatchment POST1C: Subcat POST1C</b>	Runoff Area=7,810 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 9 cf
<b>Subcatchment POST1D: Subcat POST1D</b>	Runoff Area=9,129 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 10 cf
<b>Subcatchment POST2A: Subcat POST2A</b>	Runoff Area=9,029 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 10 cf
<b>Subcatchment POST2B: Subcat POST2B</b>	Runoff Area=2,494 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 3 cf
<b>Subcatchment POST2CA: Subcat POST2CA</b>	Runoff Area=22,345 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 25 cf
<b>Subcatchment POST2CB: Subcat POST2CB</b>	Runoff Area=16,448 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 18 cf
<b>Subcatchment POST2D: Subcat POST2D</b>	Runoff Area=3,820 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 4 cf
<b>Subcatchment POST2E: Subcat POST2E</b>	Runoff Area=8,547 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 10 cf
<b>Subcatchment UNCONTROLLED: Subcat</b>	Runoff Area=7,305 sf 0.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=68 Runoff=0.00 cfs 8 cf
<b>Reach DP1: Design Point 1</b>	Inflow=0.00 cfs 32 cf Outflow=0.00 cfs 32 cf
<b>Reach DP2: Design Point 2</b>	Inflow=0.00 cfs 8 cf Outflow=0.00 cfs 8 cf
<b>Reach TOTAL: TOTAL</b>	Inflow=0.00 cfs 40 cf Outflow=0.00 cfs 40 cf
<b>Pond CB1: CB1</b>	Peak Elev=141.03' Inflow=0.00 cfs 31 cf 12.0" Round Culvert n=0.013 L=11.0' S=0.0082 '/' Outflow=0.00 cfs 31 cf
<b>Pond CB2: CB2</b>	Peak Elev=136.51' Inflow=0.00 cfs 10 cf 12.0" Round Culvert n=0.013 L=14.0' S=0.0121 '/' Outflow=0.00 cfs 10 cf

<b>Pond CB3: CB3</b>	Peak Elev=138.01' Inflow=0.00 cfs 25 cf 12.0" Round Culvert n=0.013 L=22.0' S=0.0227 '/' Outflow=0.00 cfs 25 cf
<b>Pond CT1: Cultec Units A</b>	Peak Elev=138.40' Storage=0 cf Inflow=0.00 cfs 31 cf Outflow=0.00 cfs 31 cf
<b>Pond CT2: Cultec Units B</b>	Peak Elev=133.40' Storage=0 cf Inflow=0.00 cfs 45 cf Outflow=0.00 cfs 45 cf
<b>Pond DMH1: DMH1</b>	Peak Elev=138.01' Inflow=0.00 cfs 19 cf 18.0" Round Culvert n=0.013 L=60.0' S=0.0100 '/' Outflow=0.00 cfs 19 cf
<b>Pond DMH2: DMH2</b>	Peak Elev=143.31' Inflow=0.00 cfs 9 cf 12.0" Round Culvert n=0.013 L=165.0' S=0.0140 '/' Outflow=0.00 cfs 9 cf
<b>Pond DMH3: DMH3</b>	Peak Elev=141.02' Inflow=0.00 cfs 31 cf Primary=0.00 cfs 31 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 31 cf
<b>Pond DMH4: DMH4</b>	Peak Elev=137.52' Inflow=0.00 cfs 25 cf 12.0" Round Culvert n=0.013 L=95.0' S=0.0095 '/' Outflow=0.00 cfs 25 cf
<b>Pond DMH5: DMH5</b>	Peak Elev=136.62' Inflow=0.00 cfs 35 cf 18.0" Round Culvert n=0.013 L=46.0' S=0.0065 '/' Outflow=0.00 cfs 35 cf
<b>Pond DMH6: DMH6</b>	Peak Elev=136.02' Inflow=0.00 cfs 45 cf Primary=0.00 cfs 45 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 45 cf
<b>Pond INF-1: Infiltration Pond</b>	Peak Elev=145.00' Storage=0 cf Inflow=0.00 cfs 23 cf Discarded=0.00 cfs 23 cf Primary=0.00 cfs 0 cf Outflow=0.00 cfs 23 cf
<b>Pond XDMH2: EXISTING DMH2</b>	Peak Elev=132.87' Inflow=0.00 cfs 0 cf 24.0" Round Culvert n=0.013 L=26.0' S=0.0115 '/' Outflow=0.00 cfs 0 cf

**Total Runoff Area = 123,447 sf Runoff Volume = 139 cf Average Runoff Depth = 0.01"**  
**100.00% Pervious = 123,447 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment POST1A: Subcat POST1A**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 31 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 27,741	68	
27,741		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1B: Subcat POST1B**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 10 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 8,779	68	
8,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1C: Subcat POST1C**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 9 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

	Area (sf)	CN	Description
*	7,810	68	
	7,810		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST1D: Subcat POST1D**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 10 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 9,129	68	
9,129		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2A: Subcat POST2A**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 10 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 9,029	68	
9,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2B: Subcat POST2B**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 3 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
*	2,494	68
2,494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CA: Subcat POST2CA**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 25 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 22,345	68	
22,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2CB: Subcat POST2CB**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 18 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 16,448	68	
16,448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2D: Subcat POST2D**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 4 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
*	3,820	68
3,820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment POST2E: Subcat POST2E**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 10 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 8,547	68	
8,547		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

**Summary for Subcatchment UNCONTROLLED: Subcat UNCONTROLLED**

Runoff = 0.00 cfs @ 15.58 hrs, Volume= 8 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1.2 Inch Newport - Middletown Rainfall=1.20"

Area (sf)	CN	Description
* 7,305	68	
7,305		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Direct</b>

### Summary for Reach DP1: Design Point 1

Inflow Area = 28,212 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
Inflow = 0.00 cfs @ 15.58 hrs, Volume= 32 cf  
Outflow = 0.00 cfs @ 15.58 hrs, Volume= 32 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

### Summary for Reach DP2: Design Point 2

Inflow Area = 7,305 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
Inflow = 0.00 cfs @ 15.58 hrs, Volume= 8 cf  
Outflow = 0.00 cfs @ 15.58 hrs, Volume= 8 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Reach TOTAL: TOTAL**

Inflow Area = 35,517 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
Inflow = 0.00 cfs @ 15.58 hrs, Volume= 40 cf  
Outflow = 0.00 cfs @ 15.58 hrs, Volume= 40 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

**Summary for Pond CB1: CB1**

Inflow Area = 27,741 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 31 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 31 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 31 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.03' @ 15.58 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.91' S= 0.0082 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=141.03' TW=141.02' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.00 cfs @ 0.23 fps)

**Summary for Pond CB2: CB2**

Inflow Area = 9,029 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 10 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 10 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 10 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 136.51' @ 15.58 hrs

Flood Elev= 138.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 136.50' / 136.33' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=136.51' TW=136.02' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.00 cfs @ 0.37 fps)

**Summary for Pond CB3: CB3**

Inflow Area = 22,345 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 25 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 25 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 25 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.01' @ 15.58 hrs

Flood Elev= 141.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>12.0" Round Culvert</b> L= 22.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 138.00' / 137.50' S= 0.0227 ' S= 0.0227 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=138.01' TW=137.52' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.00 cfs @ 0.61 fps)

**Summary for Pond CT1: Cultec Units A**

Inflow Area = 27,741 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 31 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 31 cf, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 15.58 hrs, Volume= 31 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 138.40' @ 0.01 hrs Surf.Area= 1,240 sf Storage= 0 cf  
 Flood Elev= 141.50' Surf.Area= 1,240 sf Storage= 2,565 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.0 min ( 1,125.4 - 1,125.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	138.40'	1,071 cf	<b>20.83'W x 59.50'L x 3.54'H Field A</b> 4,390 cf Overall - 1,714 cf Embedded = 2,676 cf x 40.0% Voids
#2A	138.90'	1,714 cf	<b>Cultec R-330XLHD x 32 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		2,784 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 120.00'

**Discarded OutFlow** Max=0.00 cfs @ 15.58 hrs HW=138.40' (Free Discharge)  
 ↑**1=Exfiltration** (Passes 0.00 cfs of 0.07 cfs potential flow)

### Pond CT1: Cultec Units A - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

32 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 1,713.7 cf Chamber Storage

4,390.2 cf Field - 1,713.7 cf Chambers = 2,676.5 cf Stone x 40.0% Voids = 1,070.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,784.3 cf = 0.064 af

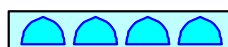
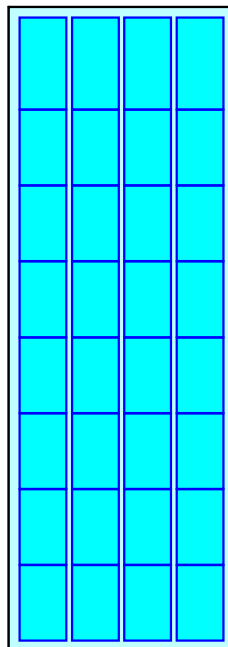
Overall Storage Efficiency = 63.4%

Overall System Size = 59.50' x 20.83' x 3.54'

32 Chambers

162.6 cy Field

99.1 cy Stone



### Summary for Pond CT2: Cultec Units B

Inflow Area = 60,189 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 45 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 45 cf, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 15.58 hrs, Volume= 45 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 133.40' @ 0.01 hrs Surf.Area= 1,531 sf Storage= 0 cf  
 Flood Elev= 136.40' Surf.Area= 1,531 sf Storage= 3,116 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.0 min ( 1,125.4 - 1,125.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.40'	1,317 cf	<b>20.83'W x 73.50'L x 3.54'H Field A</b> 5,423 cf Overall - 2,131 cf Embedded = 3,292 cf x 40.0% Voids
#2A	133.90'	2,131 cf	<b>Cultec R-330XLHD x 40 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		3,448 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.40'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'

**Discarded OutFlow** Max=0.00 cfs @ 15.58 hrs HW=133.40' (Free Discharge)

↑**1=Exfiltration** (Passes 0.00 cfs of 0.09 cfs potential flow)

### Pond CT2: Cultec Units B - Chamber Wizard Field A

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 4 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

4 Rows x 52.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.83' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

40 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 4 Rows = 2,131.0 cf Chamber Storage

5,423.2 cf Field - 2,131.0 cf Chambers = 3,292.2 cf Stone x 40.0% Voids = 1,316.9 cf Stone Storage

Chamber Storage + Stone Storage = 3,447.9 cf = 0.079 af

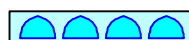
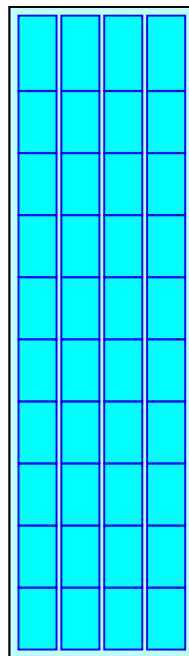
Overall Storage Efficiency = 63.6%

Overall System Size = 73.50' x 20.83' x 3.54'

40 Chambers

200.9 cy Field

121.9 cy Stone



**Summary for Pond DMH1: DMH1**

Inflow Area = 16,939 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 19 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 19 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 19 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 138.01' @ 15.58 hrs

Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	138.00'	<b>18.0" Round Culvert</b> L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=138.01' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.00 cfs @ 0.40 fps)

**Summary for Pond DMH2: DMH2**

Inflow Area = 7,810 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 9 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 9 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 9 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 143.31' @ 15.58 hrs

Flood Elev= 148.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	143.30'	<b>12.0" Round Culvert</b> L= 165.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 143.30' / 140.99' S= 0.0140 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=143.31' TW=138.01' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.00 cfs @ 0.38 fps)

**Summary for Pond DMH3: DMH3**

Inflow Area = 27,741 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 31 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 31 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 31 cf  
 Secondary = 0.00 cfs @ 0.01 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 141.02' @ 15.58 hrs

Flood Elev= 144.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	141.00'	<b>12.0" Round Culvert</b> L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 141.00' / 140.90' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	141.30'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	139.65'	<b>12.0" Round Culvert</b> L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 139.65' / 139.53' S= 0.0086 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=141.02' TW=138.40' (Dynamic Tailwater)  
 ↑1=Culvert (Barrel Controls 0.00 cfs @ 0.51 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.01 hrs HW=139.74' TW=138.00' (Dynamic Tailwater)  
 ↑3=Culvert (Passes 0.00 cfs of 0.03 cfs potential flow)  
 ↑2=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond DMH4: DMH4**

Inflow Area = 22,345 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 25 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 25 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 25 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 137.52' @ 15.58 hrs

Flood Elev= 142.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	<b>12.0" Round Culvert</b> L= 95.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.50' / 136.60' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=137.52' TW=136.62' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 0.00 cfs @ 0.45 fps)

**Summary for Pond DMH5: DMH5**

Inflow Area = 51,160 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 35 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 35 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 35 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 136.62' @ 15.58 hrs

Flood Elev= 141.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.60'	<b>18.0" Round Culvert</b> L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.60' / 136.30' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=136.62' TW=136.02' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 0.00 cfs @ 0.42 fps)

**Summary for Pond DMH6: DMH6**

Inflow Area = 60,189 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 45 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 45 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 15.58 hrs, Volume= 45 cf  
 Secondary = 0.00 cfs @ 0.01 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 136.02' @ 15.58 hrs

Flood Elev= 139.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	<b>12.0" Round Culvert</b> L= 15.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.80' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	136.20'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 3.0' Crest Height
#3	Secondary	133.47'	<b>18.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 133.47' / 132.87' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=0.00 cfs @ 15.58 hrs HW=136.02' TW=133.40' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.00 cfs @ 0.61 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.01 hrs HW=133.58' TW=132.87' (Dynamic Tailwater)

↑**3=Culvert** (Passes 0.00 cfs of 0.06 cfs potential flow)

↑**2=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond INF-1: Infiltration Pond**

Inflow Area = 20,268 sf, 0.00% Impervious, Inflow Depth = 0.01" for 1.2 Inch Newport - Middletown even  
 Inflow = 0.00 cfs @ 15.58 hrs, Volume= 23 cf  
 Outflow = 0.00 cfs @ 15.58 hrs, Volume= 23 cf, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 15.58 hrs, Volume= 23 cf  
 Primary = 0.00 cfs @ 0.01 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 145.00' @ 0.01 hrs Surf.Area= 225 sf Storage= 0 cf  
 Flood Elev= 146.00' Surf.Area= 490 sf Storage= 358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.0 min ( 1,125.4 - 1,125.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	145.00'	358 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
145.00	225	0.0	0	0
146.00	490	100.0	358	358

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 90.00'
#2	Device 3	145.50'	<b>2.5" x 2.5" Horiz. Orifice/Grate X 6.00 columns</b> X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area) Limited to weir flow at low heads
#3	Primary	142.50'	<b>12.0" Round Culvert</b> L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.50' / 136.60' S= 0.0472 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

**Discarded OutFlow** Max=0.00 cfs @ 15.58 hrs HW=145.00' (Free Discharge)

↑**1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 0.01 hrs HW=145.00' TW=136.60' (Dynamic Tailwater)

↑**3=Culvert** (Passes 0.00 cfs of 4.22 cfs potential flow)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**Summary for Pond XDMH2: EXISTING DMH2**

Inflow = 0.00 cfs @ 0.01 hrs, Volume= 0 cf  
 Outflow = 0.00 cfs @ 0.01 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.01 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.01-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 132.87' @ 0.01 hrs

Flood Elev= 138.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.87'	<b>24.0" Round Culvert</b> L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 132.87' / 132.57' S= 0.0115 ' S= 0.0115 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

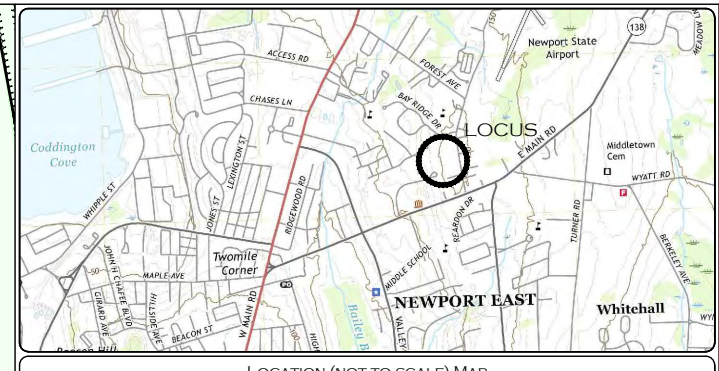
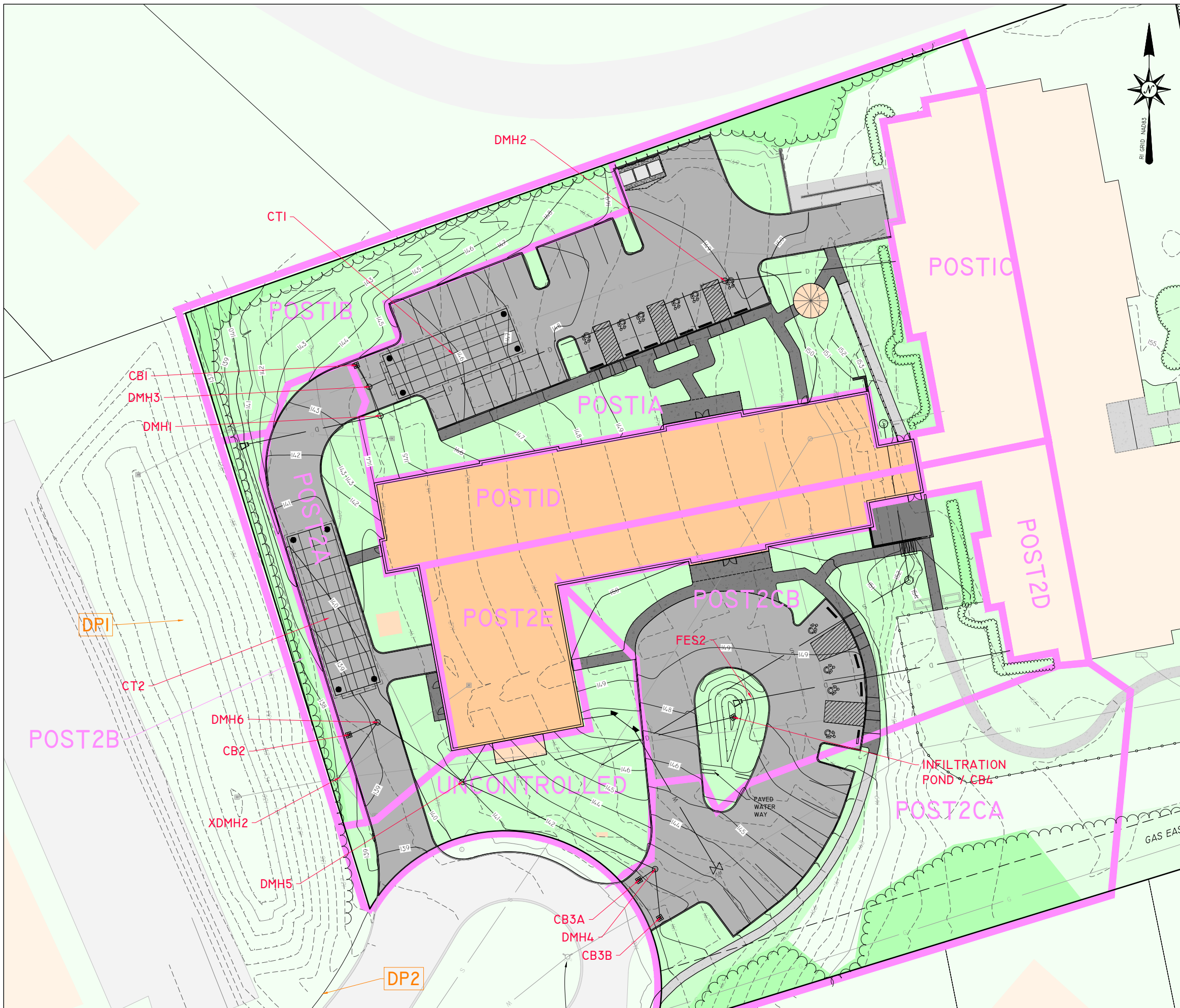
**Primary OutFlow** Max=0.00 cfs @ 0.01 hrs HW=132.87' TW=0.00' (Dynamic Tailwater)

↑1=Culvert ( Controls 0.00 cfs)

*APPENDIX B:*

## Watershed Maps





**WATERSHED ANALYSIS LEGEND:**

- POST WATERSHED AREA: [Purple Box]
- FORESTED AREA: [Green Box]
- GRASS AREA: [Light Green Box]
- PAVEMENT AREA: [Grey Box]
- BUILDING AREA: [Orange Box]

**WATERSHED CALCULATIONS:**

Post Watershed Analysis		
	Total Area	Impervious Area
To Basin	116,144	62,024
Uncontrolled	7,303	867
<b>Total</b>	<b>123,447</b>	<b>62,891</b>

Post Watershed Analysis				
	Roof	Pavement	Total (s.f.)	Total (acres)
Post 1A	0	14,271	14,271	0.33
Post 3B	0	3	3	0.00
Post 3C	7,808	0	7,808	0.18
Post 1D	9,079	0	9,079	0.21
Post 2A	0	5,169	5,169	0.12
Post 2B	0	0	0	0.00
Post 2CA	0	5,661	5,661	0.13
Post 2CB	0	7,934	7,934	0.18
Post 2D	3,782	0	3,782	0.09
Post 2E	8,317	0	8,317	0.19
UC	0	867	867	0.02
<b>Total</b>	<b>28,986.00</b>	<b>33,905.00</b>	<b>62,891.00</b>	<b>1.44</b>

**Water Quality: WQv = 1" (I)/12 [Feet<sup>3</sup>]**

Impervious Area (Ft <sup>2</sup> )	WQv (Ft <sup>3</sup> )	Additional Treatment	WQv Req (Ft <sup>3</sup> )	WQv Provided (Ft <sup>3</sup> )
75295.00	6274.58	33.54%	2104.71	4745

**Recharge: Rev = 1" F (I)/12 [Feet<sup>3</sup>]**

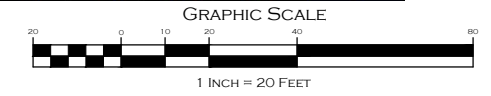
Impervious Area (Ft <sup>2</sup> )	Rev (Ft <sup>3</sup> )	Additional Treatment	Rev Req (Ft <sup>3</sup> )	Rev Provided (Ft <sup>3</sup> )
75295.00	1568.65	33.54%	526.18	4745

**Flow To DP1**

Area:	Pre (CFS)	Post (CFS)	Pre (CF)	Post (CF)	%Reduced
1	4.65	3.52	14,560	6,964	52
2	5.76	4.58	18,194	9,187	50
10	9.34	8.15	30,157	19,032	37
25	12.01	10.91	39,307	28,568	27
50	14.65	13.71	48,535	38,631	20
100	17.51	19.18	58,585	49,951	15

**Offsite Flow**

Area:	Pre (CFS)	Post (CFS)	Pre (CF)	Post (CF)	%Reduced
1	5.5	3.69	17,250	7,533	56
2	6.92	4.83	21,805	7,231	67
10	11.55	8.65	37,007	20,578	44
25	15.05	11.62	48,758	30,739	37
50	18.53	14.61	60,672	41,453	32
100	22.29	20.31	73,695	53,498	27



**POST WATERSHED ANALYSIS MAP**

PAUL D. CARLSON  
No. 7142  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
*P.D.C.*  
PROFESSIONAL SEAL

"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"  
417 FOREST AVENUE, MIDDLETOWN RI, 02842  
ASSESSORS MAP 113 LOT 6

APPLICANT: THE WEST HOUSE CORPORATION  
C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886

JOB # 21-038    SCALE: 1" = 20'    DRAWN BY: LJG    DATE: FEBRUARY 8, 2022

REVISED:

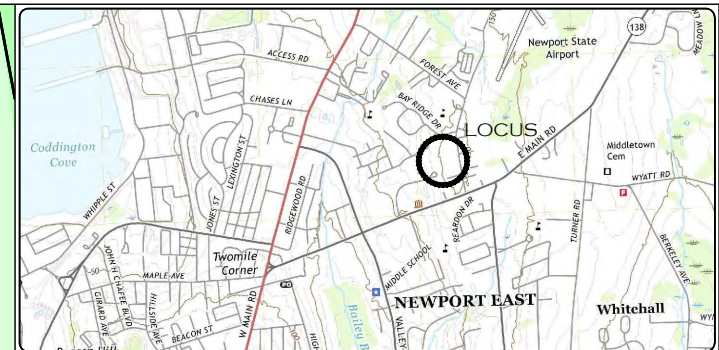
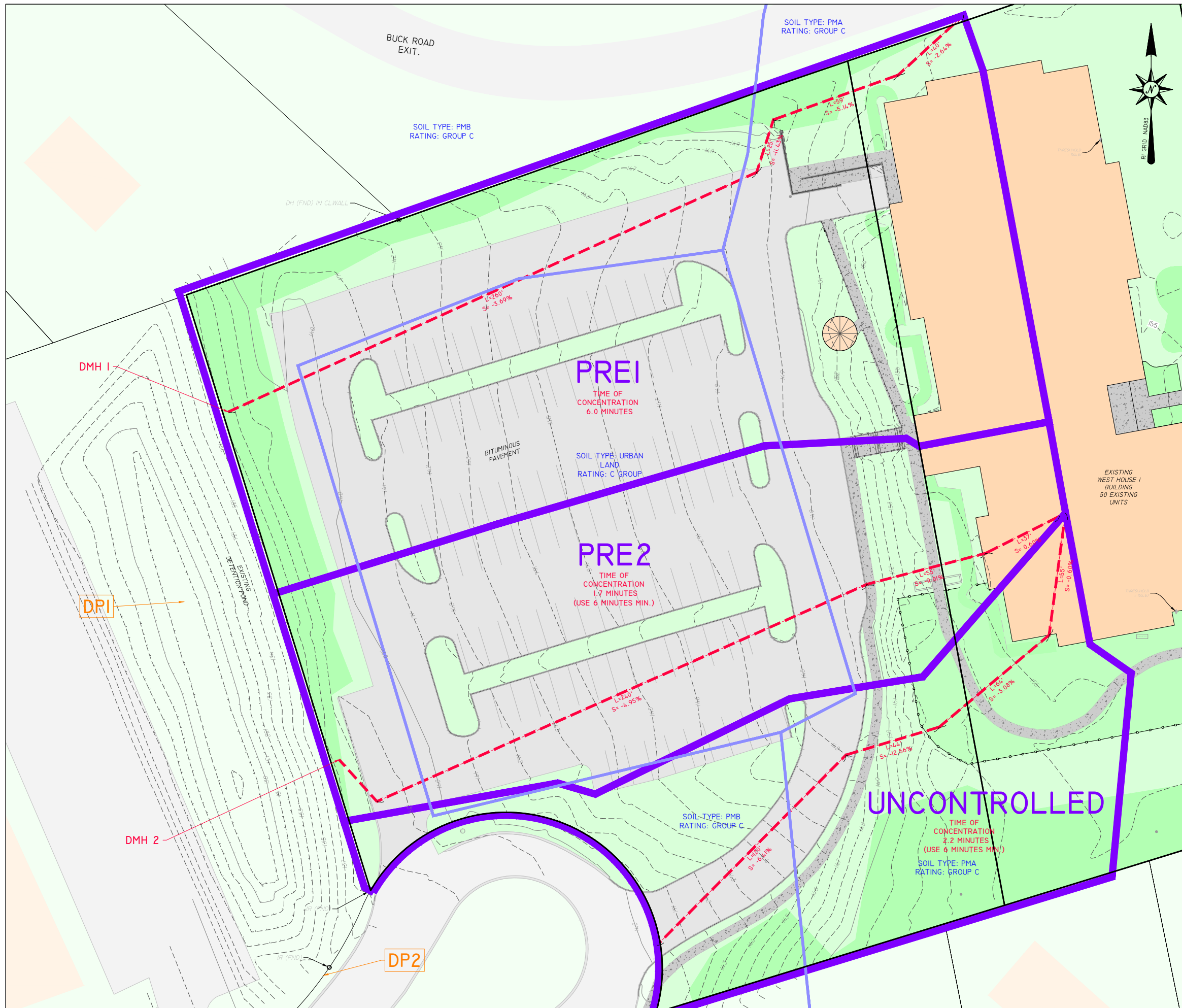
**INSITE** Engineering Services, LLC  
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1530 Fall River Avenue Seekonk, MA 02771  
Phone: (508) 336-4500 Fax: (508) 336-4558  
Web Address: InSiteEngineers.com

SHEET  
**2**  
OF 2

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- GENERAL NOTES:**
- LOT SHOWN IS DESIGNATED AS LOT 6 ON MIDDLETOWN ASSESSORS MAP 113
  - ZONING DISTRICT: OB - OFFICE BUSINESS
  - OWNER OF RECORD: - WEST HOUSE CORPORATION  
C/O PHOENIX PROP MGMT INC.  
WARWICK RI, 02886  
BOOK 0398 PAGE 234
  - SITE IS NOT LOCATED IN FEMA FLOOD ZONE (AREA OF MINIMAL FLOOD HAZARD) AS SHOWN ON FIRM PANEL 44005C 0093 J EFFECTIVE ON SEPTEMBER 4, 2013.

**WATERSHED ANALYSIS LEGEND:**

PRE WATERSHED AREA:	
POST WATERSHED AREA:	
SOIL GROUPS:	
TIME OF CONCENTRATION:	
FORESTED AREA:	
GRASS AREA:	
PAVEMENT AREA:	
BUILDING AREA:	

**WATERSHED CALCULATIONS:**

Pre Watershed Analysis				
	Roof	Pavement	Total (s.f.)	Total (acres)
Pre 1	7,775	29,476	37,251	0.86
Pre 2	2,398	27,775	30,173	0.69
UC	1,398	6,473	7,871	0.18
<b>Total</b>	<b>11,571.00</b>	<b>63,724.00</b>	<b>75,295.00</b>	<b>1.73</b>

Pre Watershed Analysis		
	Total Area	Impervious Area
To Basin	94,153	67,424
Uncontrolled	29,294	7,871
<b>Total</b>	<b>123,447</b>	<b>75,295</b>



**PRE WATERSHED ANALYSIS MAP**

	<b>"WEST HOUSE II - AFFORDABLE SENIOR HOUSING"</b>			
	417 FOREST AVENUE, MIDDLETOWN RI, 02842 ASSESSORS MAP 113 LOT 6			
APPLICANT: THE WEST HOUSE CORPORATION C/O PHOENIX PROPERTY MGMT. INC. WARWICK, RI 02886				
JOB # 21-038	SCALE: 1" = 20'	DRAWN BY: LJG	DATE: FEBRUARY 8, 2022	
REVISED:				

	InSite Professional Complex, Suite 1 1530 Fall River Avenue Seekonk, MA 02771 Phone: (508) 336-4500 Fax: (508) 336-4558 Web Address: InSiteEngineers.com	<b>SHEET</b> <b>1</b> <b>OF 2</b>