TOWN COUNCIL MEETING

Monday, December 05, 2022 at 6:00 PM

Town Hall - 41 South Main Street Randolph, MA 02368

AGENDA

This meeting is posted pursuant to the state statute authorizing temporary remote participation as described here: https://www.randolph-ma.gov/DocumentCenter/View/1493/remotemeetings22

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A. Call to Order - Roll Call - Pledge of Allegiance

B. Moment of Silent Prayer

C. Approval of Minutes

1. Minutes of Town Council Meeting of November 14, 2022

D. Announcements from the President

1. Announcement of appointment of second Resident Member to Project Review Authority (PRA) for Project at 16 Fencourt Ave

E. Presentations

F. Public Hearings

1. 6:15 PM: Special Permit Application and Site Plan and Design Review for a Proposed Development located at 16 Fencourt Avenue

2. 6:15 PM: Council Order 2022-050: Amendment of Section 147-9(D) of the General Ordinances of the Town of Randolph Concerning Violations, Penalties and Fines Relating to Trash and Refuse Disposal

G. Public Comments/Discussions

H. Motions, Orders, and Resolutions

I. Town Manager's Report

J. Old/Unfinished Business

K. New Business

1. Community Development Block Grant (CDBG) Presentation

2. Town of Randolph Complete Streets Policy

3. Council Order 2022-056: Request for the Town Council to Initiate An Amendment to Randolph Zoning Ordinance - Chapter 200 of the General Code of the Town of Randolph - Concerning Front Yard Setbacks As They Related To Adjacent Historic Structures Pursuant to M.G.L. ch. 40A, sec. 5

4. Council Order 2022-057: Amendment of Section 9-4 of the General Ordinances of the Town of Randolph Concerning the Community Preservation Committee

L. Correspondence

M. Committee Reports

N. Open Council Comments

O. Adjournment

Notification of Upcoming Meeting Dates

December 19

January 9 and 23

Randolph Town Council

DRAFT Meeting Minutes

Meeting Date: Monday, November 14, 2022 at 6:00 p.m., Remote Meeting via Zoom

Call to Order: Council President W. Alexopoulos called the meeting to order.

Roll Call – Council Members Present: Christos Alexopoulos, William Alexopoulos, Richard Brewer, Natacha Clerger, Ryan Egan, Jesse Gordon, Katrina Huff-Larmond, Kevin O'Connell (Councillor Burgess Absent)

Pledge of Allegiance: Pledge of Allegiance led by Councillor Christos Alexopoulos.

Moment of Silent Prayer: Moment of Silent Prayer held.

Announcements from the President:

New Business:

1. FY2023 Tax Classification Presentation

   Principal Assessor Janet Teal and Assessing Consultant Nate Cramer were in attendance to give a presentation on the FY2023 Tax Classification.

   The purpose of the presentation is for the Town Council to decide on the following:
   1. Select a single or split tax rate,
   2. Whether to adopt an open space discount,
   3. Whether to adopt a residential exemption, and
   4. Whether to adopt a small commercial exemption.

   The Presentation covered prior year tax rates, prior year shifts in the residential factor, and the projected average increases in tax bills depending on which shift is adopted by the Council this year.

   Council President Alexopoulos welcomed questions or comments from the Town Councillors.

   Councillor Gordon asked if we had a higher commercial base then could we be more flexible in a residential tax rate since the current tax base is at 11% for commercial and 89% for residential, and secondly, what can we do to get the commercial base up? Assessing Consultant Nate Cramer stated the town is on its way to increasing the commercial tax base. Additionally, the residential class is always the prominent revenue source in most towns.

   Councillor Gordon asked for a ballpark of how we compare to other towns on the CIP (commercial, industrial and personal property taxes), for example, is it true Milton is lower or Braintree is higher? Assessing Consultant Nate Cramer stated he could gather that information and forward it along.

Councillor Huff-Larmond asked if we should be looking in the direction of increasing commercial? Also, what does it mean by "we're almost there" when it comes to increasing our commercial property? I also want to keep in mind all of our residents in residential and commercial areas. Assessing Consultant Nate Cramer stated that by "almost there" he meant that there are projects in the pipeline that are going to be coming, but he is not trying to suggest that the Town has any goal of a certain percentage of commercial revenue.

Councillor O'Connell asked about the Lombardo's location and if we know what's going there? Council President Alexopoulos stated we don't have any information yet but we know that something is coming in that location within the next year.

Councillor Gordon asked if it's true that businesses base their prospective location on a town's tax rate? Principal Assessor Janet Teal stated that commercial rates may play a factor in where a business decides to locate itself. Town Manager Howard further explained that reports from various businesses have stated that working with the planning department has been great. There are many factors that play a role in a business determining where it should locate.

Councillor Huff-Larmond asked about how successful the resiliency fund has been in helping residents as it relates to their mortgage and taxes. Town Manager Howard stated that he will have to check with Liz LaRosee about the specifics. The funds can be used to pay late mortgage payments if you're behind, but you have to meet certain standards and essentially have to prove the need. It's also been used for utility bills. The Town will continue to assist residents where we can through that program.

Councillor O'Connell asked approximately how many open commercial spaces are available right now. Town Manager Howard stated the industrial parks are maxed out, and the businesses there currently are potentially looking to increase their square footage.

Councillor C. Alexopoulos: In the industrial parks we are maxed out, we might see a few retail locations that may be open, but aside from one building, we're busting at the seams. Looking at it from a business point of view, if we have a better tax rate versus communities, then they're able to save that money whether it's reinvesting it in their community or for their employees then that's something we should consider as well. It's something they can use to better their surroundings.

Councillor Gordon wanted to address what might be some myths regarding there being no commercial property available but what's incumbent on us is that we make more commercially zoned property. As Assessing Consultant Nate Cramer stated, we should have an economic development officer to let us know how we can expand these zones. Councillor Gordon also asked how often the Town is assessed. Councillor Gordon also wanted to address a potential myth that if home values go up then taxes go up and that's not necessarily true because if the home value goes up it's only relative amounts. In other words, what matters is how much your home value has gone up relative to other homes in Randolph. Is that right, or a misunderstanding?

Assessing Consultant Nate Cramer stated every single property is reassessed every year as of January 1, 2022. Every fifth year, the Town is audited by the Department of Revenue. As far as home values going up then taxes going up- you're right it's not necessarily true. It's based on the needs of the town and the budget that they adopt more than anything.

Council President Alexopoulos stated that every year our taxes go up by 2 ½%. The comment is always made that if you want your taxes to go down, then don't spend as much but then where do you want to make the cuts?

Councillor Gordon addressed an additional way to make your taxes go down which is through residential growth. In the context of the Highland Avenue construction, which a lot of people expressed that they didn't like because of the size of the building, the counter point is that that's the way to reduce the tax rate for everyone else. Nate Cramer stated a large project like that will definitely have an impact on the tax rate.

Council President stated there is an increase in the amount of taxes the town is able to collect. Unfortunately, it puts more of a burden on the residential rate payer than the commercial rate payer because the commercial percentage will decrease. So, it's good that you're able to bring in more tax revenue but the offset is less because you can't push it off to the commercial. There are pros and cons. The more residential units we put into town, the less of an ability we have to push that to commercial.

Council President Alexopoulos stated we have a week to review this and we'll vote on it during the next meeting on November 28, 2022.

Town Manager Howard stated that if anyone has any questions for Principal Assessor Janet Teal and Assessing Consultant Nate Cramer, please submit them sooner rather than later so they have enough time to gather the information and provide it before the next meeting.

1. Council Order 2022-053: FY2023 Reserve Fund

Council President Alexopoulos read Council Order 2022-053 into the record.

Town Manager Howard introduced Council Order 2022-053 to the Town Council. Town Manager Howard explained that over the last number of years there has been a levy that is left which is put into a Reserve Account to be used for unforeseen expenditures in most cases. One of the main concerns we have this year is the school building project will be going out to bid shortly. If we see a 30% increase as we've seen in other projects, we're going to want to be prepared. We've already done value engineering to shave costs off of the project, however if we reduce any more costs then we won't have a building we can be proud of.

Council President Alexopoulos further stated that we'll know more in January when the project goes out to bid but we're going to need as much help as we can get to try to offset some of the price increases. We also know that there are various schools with the same issues we're running into and there have been discussions at the state level to give the communities additional funds.

Councillor Huff-Larmond asked about whether there is any infrastructure money that we can use.

Town Manager Howard stated that the infrastructure money would not be able to be used for the schools based on various conversations he's had. There have been many communities that received funds from the state to build schools and the amount that was asked for versus what is actually needed since the pandemic is very different. There have been discussions at the legislative level to assist and it may come down to them to open up the books.

Councillor Huff-Larmond requested a list of the towns in a similar situation . Town Manager Howard stated he would get the list and provide it to her.

Adjournment:

Motion to adjourn was made by Council Vice President Clerger, seconded by Councillor Gordon.
Roll Call Vote: 8-0-0 (Burgess absent)
The meeting was adjourned at 7:28 PM.

TOWN OF RANDOLPH
APPLICATION FOR SPECIAL PERMIT

UNION CROSSING TRANSIT DISTRICT

The undersigned applicant hereby applies for a special permit under M.G.L. c. 40A, sec. 9 as follows:

1. **Applicant** (includes equitable owner or purchaser under a Purchase and Sales Agreement):

Name: *Taj Estates of Randolph II, LLC*

Address: *95 East Main Street, Suite 100, Westborough, MA 01581*

Telephone No. Days (508) 579-2780 Evenings:

A check in the amount of $5,250.00 representing the required Application Fee is submitted herewith.

2. **Owner,** if other than applicant:

Name: *Same*

Address:

Tel No.: Days Evenings

3. **Property:**

Street Address: *16 Fencourt Avenue, Randolph, MA*

Assessors Map: *64* Block: *A* Parcel: *22.00*

Registry of Deeds where deed, plan or both recorded: *Norfolk County*

Deed recording: Book *39214* Page *555*

Plan Recording: Plan *#1527 of 1987* Book *362*

Property is located in the *Union Crossing Transit District* zoning district.

There are no outstanding taxes or other amounts relating to the Property which are due from the Owner / Applicant to the Town of Randolph as of the date hereof.

4. **Nature of Relief Requested:**

Special Permit pursuant to Section 200-16.4 of the Zoning By-Law which authorizes the Town Council (formerly Board of Selectmen) to permit development within the Union Crossing Transit District.

Detailed explanation of request:

The Applicant proposes to raze the existing structure on the property (formerly the Randolph Senior Center) and to create a new, mixed-use (i.e. residential and commercial) development consisting of 107 one-and two bedroom apartments, together with 11,967 square feet of dedicated commercial retail space. The proposed development is illustrated on the plans and renderings submitted herewith.

5. **Evidence to Support Grant of Special Permit:**

For the reasons set forth below, the Special Permit requested will be in harmony with the intent and purpose of the Zoning By-Law:

The development of the property promotes the general welfare of the Town of Randolph by providing opportunity for both residential and commercial growth within an appropriate proximity to existing public transit. The development as proposed links transit, higher density market rate residential living and new commercial business opportunity, all within a village-style setting.

For the reasons set forth below, the proposed use is in an appropriate location and is not detrimental to the neighborhood and does not significantly alter the character of the zoning district:

The development is designed to take advantage of the transit district zoning created by the Town of Randolph. The neighborhood surrounding the property is residentially zoned and the more significant of the two proposed uses for the property is consistent with that zoning designation. The proposed use of the site is more in keeping with the residential character of the surrounding neighborhood than were the prior uses, namely an elementary school and a senior center.

For the reasons set forth below, the proposed use would not be detrimental or offensive to the adjoining zoning districts and neighboring properties due to the effects of lighting, odors, smoke, noise, sewage, refuse materials or other visual nuisances:

As is illustrated on the plans submitted herewith, the lighting to be installed on the property has been designed so as to be contained within the perimeter of the site. The proposed uses of the property will not result in the generation of smoke or other offensive odors. Sewage and refuse will be disposed of by conventional methods and will create no off-site impacts. Visually, the several buildings to be constructed will be finished in a modern colonial style and will not exceed allowed height restriction. The existing structure on the site, which is approximately seventy-five years old, would be razed and removed in its entirety, to be replaced with new construction, thereby

improving the aesthetics of the entire property.

For the reasons set forth below, the proposed use would not cause undue traffic congestion in the immediate area:

Given the proximity of the development to the nearby public transit and the level of expected utilization of the rail service by residents of the development, overall vehicle trips to and from the property by residents will be materially lessened. In addition, the nature of the proposed commercial use (i.e. day care facility) is such that any traffic impacts would be expected only during specific, limited times of the day (i.e. morning dropoff and afternoon pickup periods). Internal traffic flow on the site has been designed to allow easy access to and egress from the property for those non-residents who choose to utilize the day care facility. Traffic flow around the site benefits from the fact that Fencourt Avenue connects both to Union and Center Streets, the latter connection leading directly to a signalized intersection so as to allow easy movement in either easterly or westerly directions.

For the reasons set forth below, the Special Permit requested will meet the additional requirements of the Zoning By-Law, as follows:

The property is of appropriate size and is located within 1.25 miles of the Randolph / Holbrook Commuter Rail Station;

The property is under single ownership;

The Applicant has submitted a master plan for the development of the entire property as required;

The Applicant has provided for a mixed use residential and commercial development with a commercial use (namely a children's day care facility) which will serve the needs of both those who reside on the property and others who reside within a reasonable proximity to it;

The plans submitted by the Applicant show that the project will satisfy all applicable dimensional, lot coverage, lot area, height and density allowances / requirements;

The plans submitted by the Applicant show that the project will satisfy all open space requirements. Proposed parking on the property is designed to serve only the uses contained within the project as proposed. Applicant will seek to reduce the combined parking requirement for the property from 201 spaces to 183 spaces;

Safe and convenient access is provided to each of the structures proposed for development on the property.

If someone other than owner or equitable owner (purchaser on a Purchase and Sales Agreement) is the Applicant or will represent the Applicant, owner or equitable owner must designate such representative below:

Name of Representative: *Kevin M. Reilly, Esq.*

Address of Representative: *19 South Main Street, Randolph, MA 02368*

Tel No.: Days *(781) 961-7313* Evenings

Relationship of Representative to owner or equitable owner: *Legal Counsel*

I hereby authorize Kevin M. Reilly, Esq. to represent my interests before the Special Permit Granting Authority (SPGA) with respect to this Special Permit Application.

Taj Estates of Randolph II, LLC

By: _____
Mohiuddin Ahmed, its Manager

I hereby certify under the pains and penalties of perjury that the information contained in this Application is true and complete.

_____ 9/8/22
Signature of Applicant Date

_____ 9/8/22
Signature of Owner, if other than Applicant Date

Attach all other documentation as required by the Rules & Regulations

TAJ ESTATES OF RANDOLPH II, LLC
IMPACT STATEMENT RE: PROPOSED DEVELOPMENT
16 FENCOURT AVENUE, RANDOLPH, MA

The following is submitted in connection with the mixed-use development proposed by Taj Estates of Randolph II, LLC ("Applicant") for the above-referenced property and is intended to supplement the Application for Special Permit submitted herewith.

A. DEVELOPMENT IMPACT STATEMENT

Prior to the submission of the Application for Special Permit, the Applicant and its representatives met with representatives of the Town of Randolph, including the Town Manager and personnel from the Building Department and Department of Public Works, to discuss overall development of the site in question. As a result of the several meetings, the Applicant has made significant revisions to the planned site improvements, including but not limited to: (i) a reduction in building height, (ii) a change in the number and location of the buildings on the site and (iii) a redesign of the exterior appearance of the buildings.

Overall, the project, if approved, would result in the removal of the existing single-story structure and associated parking located on the site. The site was previously owned by the Town of Randolph and utilized as both an elementary school and a senior community center. It was purchased at a Town-sponsored auction by the Applicant in 2021.

The existing structure will be replaced by three (3) multi-level buildings which will house a total of one hundred seven (107) single and two-bedroom apartment units together with accessory commercial space.

Wetlands areas at the rear of the site will not be disturbed during the construction process. The apartment units will be connected to public water and sewer. Based upon information received from Town representatives, existing water and drain systems to which connection will be made are sufficient to serve the project, as proposed. Low water flow devices will be installed in the residential units and back flow preventers will be utilized in site construction.

B. ENVIRONMENTAL IMPACT

As previously indicated, the site of the proposed development is currently improved by a former municipal building, constructed in approximately 1940, together with associated paved parking. The site is relatively flat with a significant wetlands area to the rear. Vegetation common to the area is located in the wetlands area and on the northwesterly portion of the site. The wetlands area will not be disturbed. Trees located on the northwestern portion of the site which will be removed to accommodate development will be replaced in greater number as part of the overall Landscaping of the site.

The proposed development will have no significant adverse environmental impacts. The completed project will generate no dust, fumes or other forms of pollutants. The re-development of the paved area of the site will allow for better control of water runoff and control of the potential for any subsurface contamination. Overall runoff from the site will be no greater than at present and appropriate stormwater control measures will be incorporated into the design.

Given the current contours of the site, little to no earth removal will be required. Soils from any required cuts will be moved to other areas of the site and re-utilized in the overall grading process.

As stated, trees which are removed from the site will be replaced on a greater than 1:1 basis. Dense evergreen screening will be installed at the rear of the building located closest to the westerly property line of the property and the existing residential dwellings on Truelson Drive and Boothby Circle.

C. COMMUNITY IMPACT

The site of the proposed development is located within the Union Crossing Transit District ("UCTD"), a zoning overlay district located near and along the easterly boundary of the Town of Randolph. This District was created in August, 2018 by way of a Vote of the Randolph Town Council.

The purpose of the UCTD, as set forth in the Zoning By Laws of the Town of Randolph, is to "promote the general welfare by fostering a climate of economic viability and opportunity in proximity to public transit, including commuter rail and public bus service . . . "

Following the purchase of the site in 2020, the Applicant set about designing a project consistent with this purpose and within the allowances for development which are provided within the By Law. Thus, while the three buildings proposed by the Applicant on the site are taller and larger in overall size than the single-family homes located on streets adjacent to the site, those buildings do comport with the provisions of the By Law, as enacted.

A review of the plans illustrating the proposed development shows that there are two significant conditions which affect the property and its overall design as proposed by the Applicant. First, the presence of a significant wetlands area at the rear of the site limits the overall area which can be developed. Second, the limited frontage on Fencourt Avenue and the location of that frontage along a curve in the roadway restricts access to and egress from the site and impacts the overall parking layout and number.

Ideally, each of the proposed buildings on the site would be located in close proximity to Fencourt Avenue and parking for the several uses would be provided to the rear of those buildings. Unfortunately, the lack of street frontage prevents such a design and forces two of the buildings away from the street and more toward the perimeter of the site.

The buildings themselves are proposed as three-stories each and would feature gabled roofs. The accompanying materials illustrate the proposed color scheme of the buildings which is in keeping with a typical residential use. Exterior finishes will consist of fiber-cement siding and architectural-style roof shingles. Given that the buildings would house a mix of single and two-bedroom living units only, and based upon the experience of the Applicant with similar developments in other communities, the anticipated impact on Town services and schools would be modest.

Overall, the proposal submitted by the Applicant seeks to promote thoughtful development which is consistent with the intent and purpose of the so-called Housing Choice Initiative, namely Chapter 358 of the Acts of 2020, which was recently enacted by the Commonwealth of Massachusetts.

D. TRAFFIC IMPACT STATEMENT

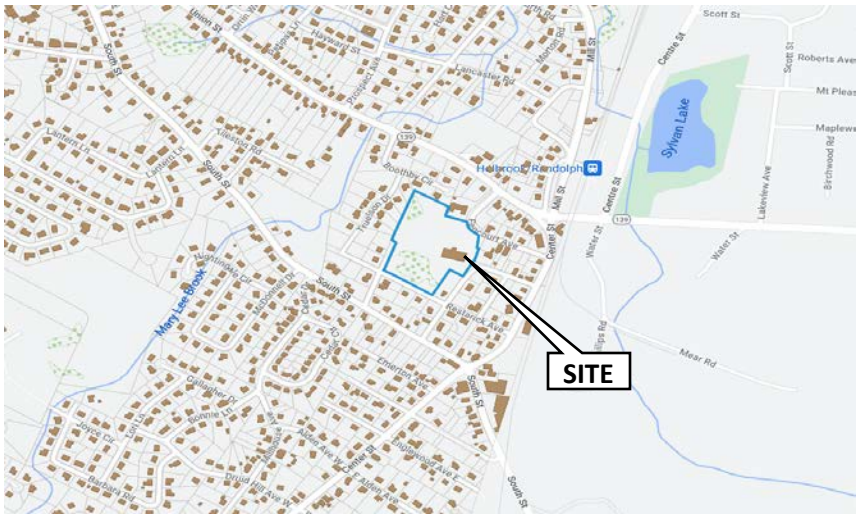
The site of the proposed development is located on Fencourt Avenue, a public way which runs between Union Street (Route 139) and Center Street. The site has approximately 142 feet of frontage along a curve in the layout of Fencourt Avenue. Access to and egress from the site will be by way of two driveways, each restricted to one-way travel and separated by a landscape island. Traffic flow within the site will be routed so as to accommodate both resident parking and drop off and pickup for the proposed commercial space which will house a daycare facility. The latter will be served by dedicated parking spaces and a dedicated drop off lane adjacent to the commercial space.

Traffic seeking to enter the site may approach by way of Fencourt Avenue from either the Union Street or Center Street. Given the proximity of the site to a nearby commuter rail station, overall vehicle trips by residents of the project will be reduced, thereby minimizing the possible disruption of travel on nearby roadways.

Traffic leaving the site will have the option of turning either right or left onto Fencourt Avenue. Right turns from the driveway will be encouraged so that vehicles might then make use of a signalized intersection at Center and Union Streets, thereby permitting easy access to either east or westbound travel on Route 139.

The site benefits from its location within one-quarter mile of the Randolph/Holbrook Rail Station. Residents of the development will enjoy easy walking access to rail and bus service, consistent with the rationale behind the creation of the UCTD overlay zoning.

STORMWATER MANAGEMENT REPORT



16 Fencourt Avenue
Randolph, MA

Prepared For:
Taj Estates of Randolph II, LLC
16 Fencourt Avenue
Randolph, MA 02368

Prepared By:

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING

Hardy + Man Design Group, PC
1285 Washington Street
Weymouth, MA 02189

September 16, 2022

COMMONWEALTH OF MASSACHUSETTS
CHI Y MAN
CIVIL
NO. 45441
REGISTERED PROFESSIONAL ENGINEER

09/19/2022

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Existing Site Conditions

The existing Lot is a 7.1± acres parcel of land located at Fencourt Avenue between the Union Street and Center Street. The parcel is currently containing an old office building which will be demolished. The existing parking spaces and paved roadways will be removed and redesigned.

The topography of the site slopes from the North edge of the lot towards multiple directions. The high point of the site is at elevation 142.5 (NAVD 88). The elevation drops to 133 at the entrance of the site and the boundary of the wetlands to the rear of the site. Please reference to the existing condition watershed map for the stormwater routes.

According to soil report information and multiple on-site soil test pits results, the type of soil for infiltration is Loamy Sand/Coarse Sand, infiltration rate of 2.41 in/hr is uses for stormwater analysis.

Methodology

This hydrologic analysis will utilize TR-55/TR-20 methodology and the analysis shall be performed for the 2, 10, 25 and 100-year design storms under pre-development and post-development conditions. The specified design storms shall be defined as a 24-hour storm using the most recent rainfall distribution recommended by the National Oceanic and Atmospheric Administration Atlas 14, as amended. See table below for the rainfall distribution used for this analysis.

	1-yr	2-yr	10-yr	25-yr	100-yr
Rainfall (inch)	2.80	3.20	4.70	5.50	6.70

Proposed Conditions

The applicant proposes the construction of three buildings, including one mix-use building with ground floor daycare center and upper floor residential units, two residential buildings. Appropriate roadway and parking lot will be constructed.

The proposed gross impervious coverage on the site will increase from 64,489 SF to 148,239 SF, resulting in 83,750 SF of new impervious area.

The proposed impervious areas consist of the buildings, parking areas, walkway, and drive aisles. Runoff from the proposed impervious areas will be collected and routed to a series of Catch Basins along the roadway and routed to (4) separate Infiltration Systems composed of 9,130 R-Tank SD systems. The proposed infiltration systems are proposing to provide treatment to the stormwater with appropriate pre-treatment process/structures.

The R-Tank systems and surrounding stone will provide a total 30,327 cubic feet of storage and were designed to decrease the existing peak flowrates and runoff volume for the 2-year, 10-year, 25-year, and 100-year rainfall events.

The following table depicts the peak runoff for the existing and proposed conditions for the four different storm events.

Peak Discharge Rates (cfs)

	2-year	10-year	25-year	100-year
Existing Conditions	**1.32**	**3.89**	**6.06**	**10.25**
Proposed Conditions	**1.07**	**2.00**	**3.61**	**6.65**

Erosion and Sedimentation Control Measures

Erosion control measures to be employed include a staked “Filter Sock” erosion control barrier as depicted in the site plan. The barrier shall be inspected daily and be kept in place until such time that disturbed areas are re-vegetated or paved and are no longer a potential source of siltation.

TSS Removal Calculation

TSS removal rate for Catch Basin = 25%

TSS removal rate for Stormceptor 450i = 80%

Typical Treatment Chain

BMP For Infiltration System #1, #2, #3, #4	Removal Rate	Remaining TSS	Total Removal Effectiveness
Catch Basin	**25%**	**75%**	**25%**
Stormceptor 450i	**80%**	**20%**	**80%**
Infiltration System	**100% (with Above Pre-treatment)**	**0%**	**100%**

Conclusion

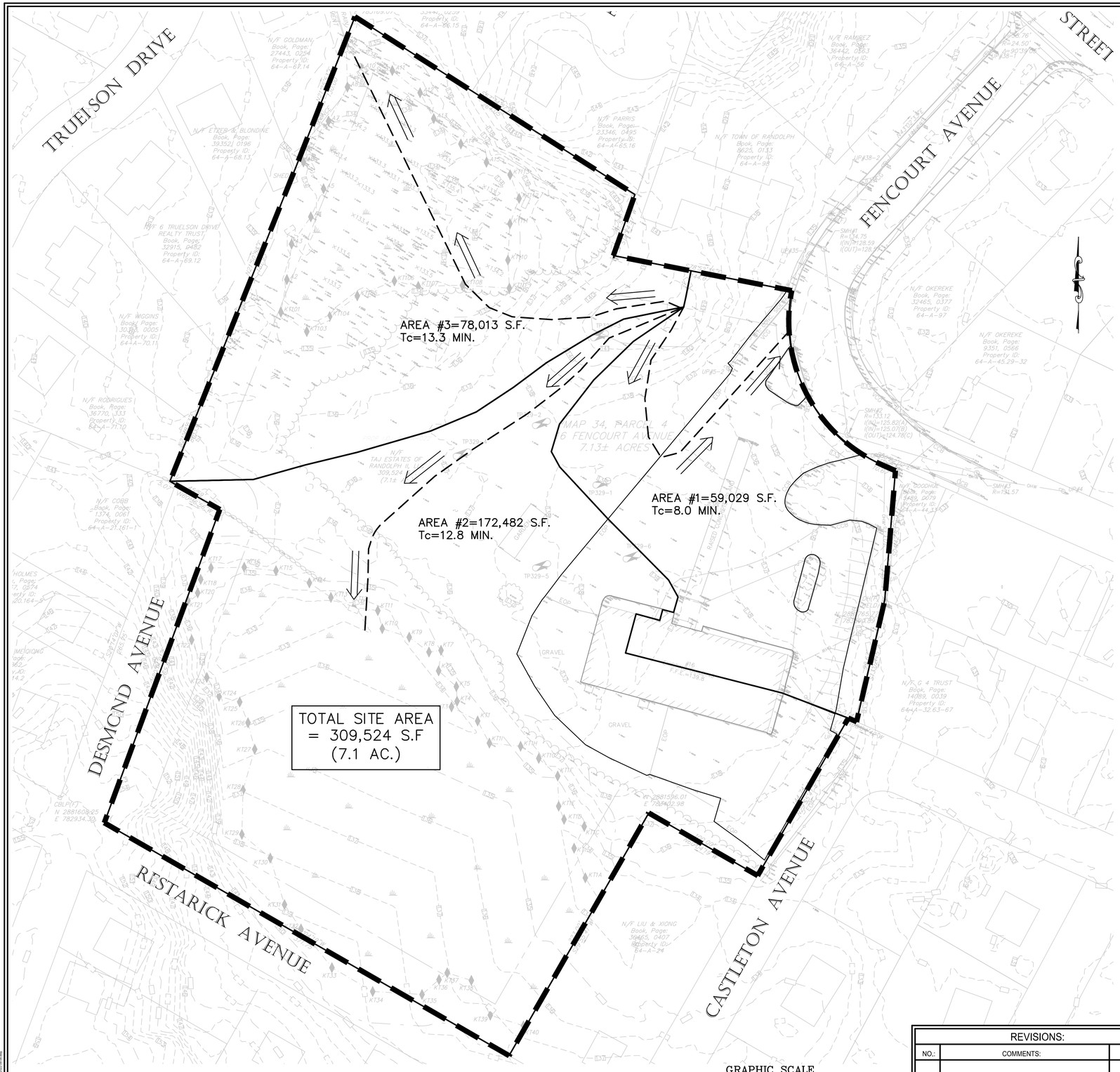
The stormwater management system will reduce the stormwater runoff flowrate by providing on-site infiltration systems. This R-Tank systems have been sized to decrease existing peak flowrates for the 2-year, 10-year, 25-year, and 100-year rainfall events.

During construction, the proposed erosion control measures protect sedimentation from construction activities from migrating from the site onto the public street and abutting properties.

The proposed stormwater management and erosion control design of the proposed development will meet the Town of Randolph Stormwater Regulations.

Pre-Development Calculations

2, 10, 25, and 100-Year Storms



PRE-DEVELOPMENT WATERSHEDS

	AREA (S.F.)
BUILDING/ROOF	9,908
BITUMINOUS AND CONCRETE PAVEMENT	54,581
GRASS/OPEN SPACE	245,035
TOTAL LOT AREA	309,524 S.F. (7.10 AC.)

PRE-DEVELOPMENT WATERSHEDS - AREAS

	IMPERVIOUS	GRASS/OPEN SPACE	TOTAL
AREA #1	36,006	23,023	59,029 S.F.
AREA #2	28,483	143,999	172,482 S.F.
AREA #3	0	78,013	78,013 S.F.
TOTAL AREA	64,489 S.F.	245,035 S.F.	309,524 S.F.

REVISIONS:		
NO.:	COMMENTS:	DATE:

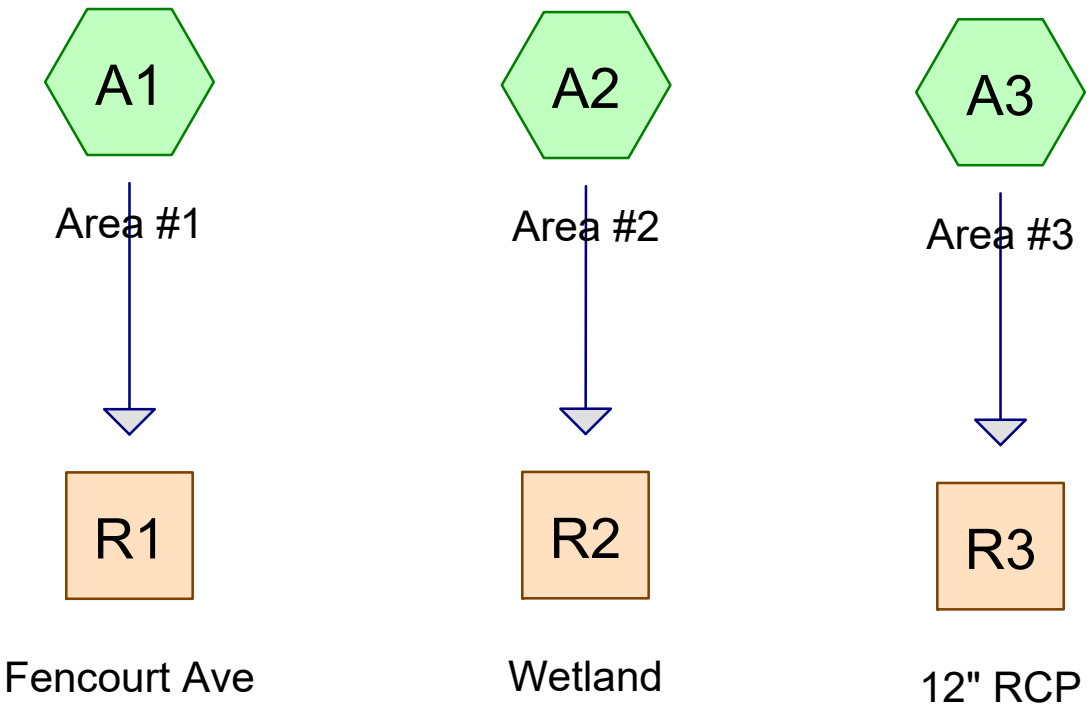
EXISTING WATERSHED MAP
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

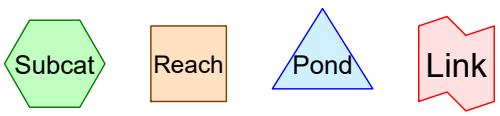
DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-09-2022
LATEST REVISION:
SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
EW-1





Routing Diagram for 16 Fencourt Avenue-existing 2yr storm
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

16 Fencourt Avenue-existing 2yr storm *Type III 24-hr 2 year Rainfall=3.20"*
Prepared by {enter your company name here} Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 A1: Area #1 Runoff Area=59,029 sf 61.00% Impervious Runoff Depth=0.93"
Flow Length=272' Tc=8.0 min CN=72 Runoff=1.27 cfs 0.105 af

Subcatchment A2: Area #2 Runoff Area=172,482 sf 16.51% Impervious Runoff Depth=0.09"
Flow Length=384' Tc=12.8 min UI Adjusted CN=48 Runoff=0.05 cfs 0.030 af

Subcatchment A3: Area #3 Runoff Area=78,013 sf 0.00% Impervious Runoff Depth=0.02"
Flow Length=384' Slope=0.0250 '/' Tc=13.3 min CN=43 Runoff=0.00 cfs 0.003 af

Reach R1: Fencourt Ave Inflow=1.27 cfs 0.105 af
Outflow=1.27 cfs 0.105 af

Reach R2: Wetland Inflow=0.05 cfs 0.030 af
Outflow=0.05 cfs 0.030 af

Reach R3: 12" RCP Inflow=0.00 cfs 0.003 af
Outflow=0.00 cfs 0.003 af

Total Runoff Area = 7.106 ac Runoff Volume = 0.138 af Average Runoff Depth = 0.23"
79.17% Pervious = 5.625 ac 20.83% Impervious = 1.480 ac

Summary for Subcatchment A1: Area #1

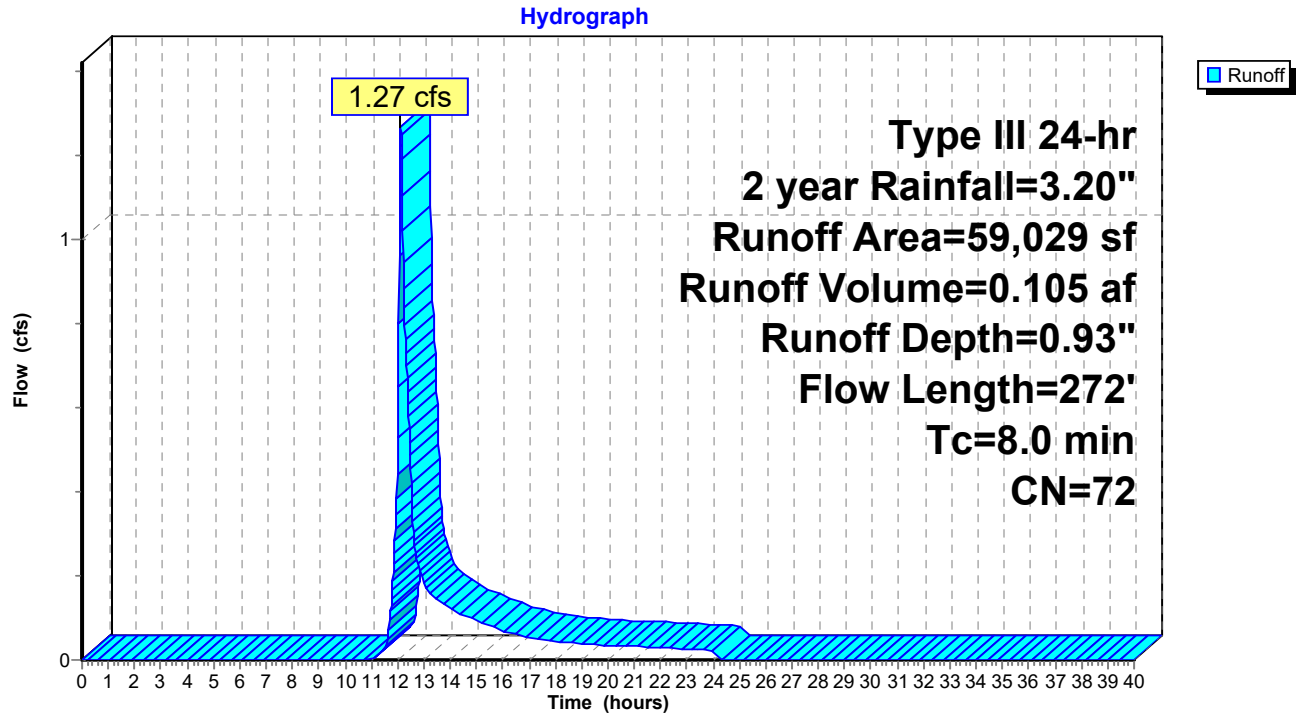
Runoff = 1.27 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 0.93"
Routed to Reach R1 : Fencourt Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Description
36,006	98	Unconnected pavement, HSG A
23,023	32	Woods/grass comb., Good, HSG A
59,029	72	Weighted Average
23,023		39.00% Pervious Area
36,006		61.00% Impervious Area
36,006		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.25		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
1.2	172	0.0140	2.40		**Shallow Concentrated Flow, Paved** Paved Kv= 20.3 fps
8.0	272	Total			

Subcatchment A1: Area #1



Summary for Subcatchment A2: Area #2

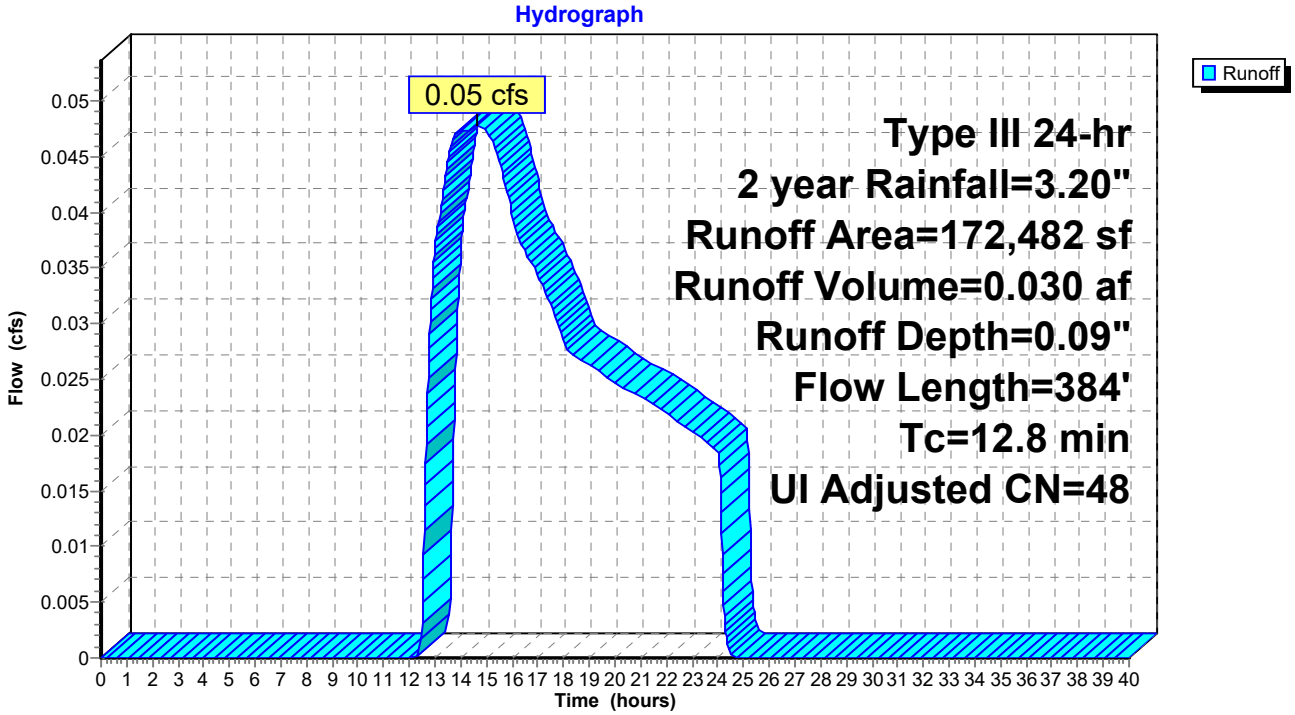
Runoff = 0.05 cfs @ 14.65 hrs, Volume= 0.030 af, Depth= 0.09"
Routed to Reach R2 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Adj	Description
143,999	43		Woods/grass comb., Fair, HSG A
28,483	98		Unconnected pavement, HSG A
172,482	52	48	Weighted Average, UI Adjusted
143,999			83.49% Pervious Area
28,483			16.51% Impervious Area
28,483			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0300	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.5	284	0.0230	1.06		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
12.8	384	Total			

Subcatchment A2: Area #2



Summary for Subcatchment A3: Area #3

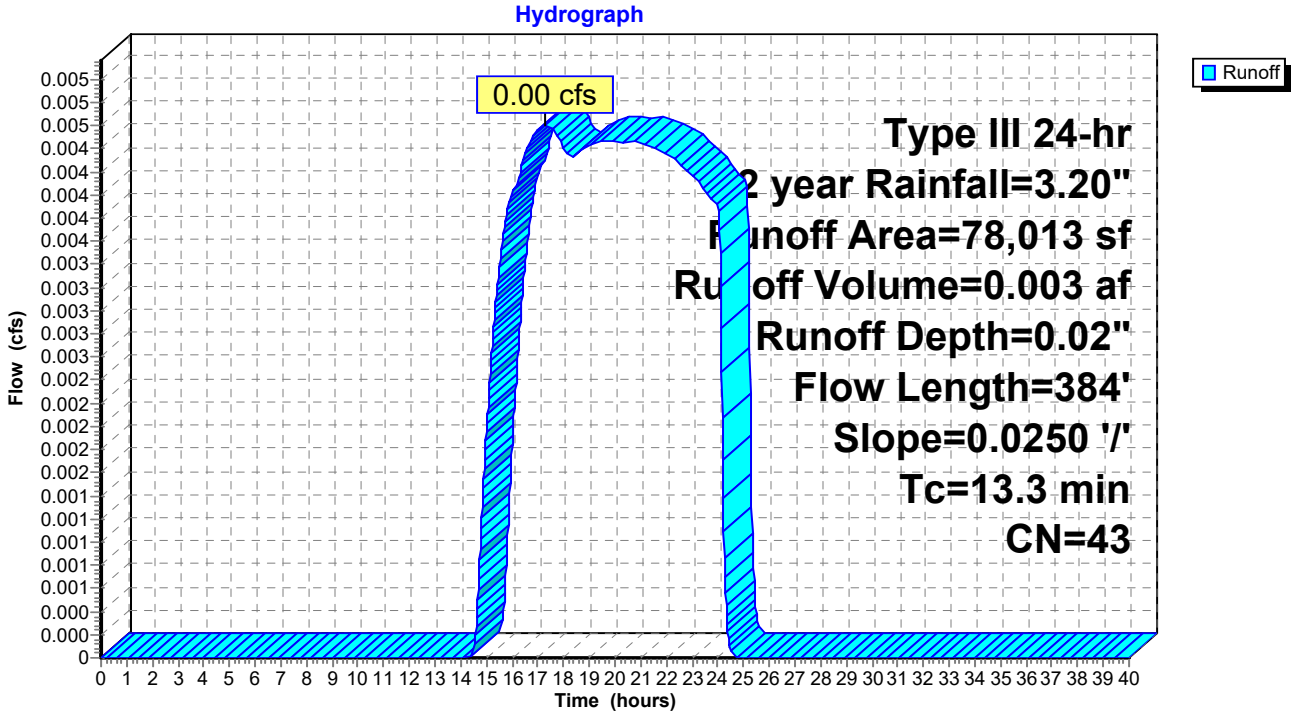
Runoff = 0.00 cfs @ 17.29 hrs, Volume= 0.003 af, Depth= 0.02"
Routed to Reach R3 : 12" RCP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Description
78,013	43	Woods/grass comb., Fair, HSG A
78,013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.3	284	0.0250	1.11		**Shallow Concentrated Flow, Weed and Marsh** Short Grass Pasture Kv= 7.0 fps
13.3	384	Total			

Subcatchment A3: Area #3



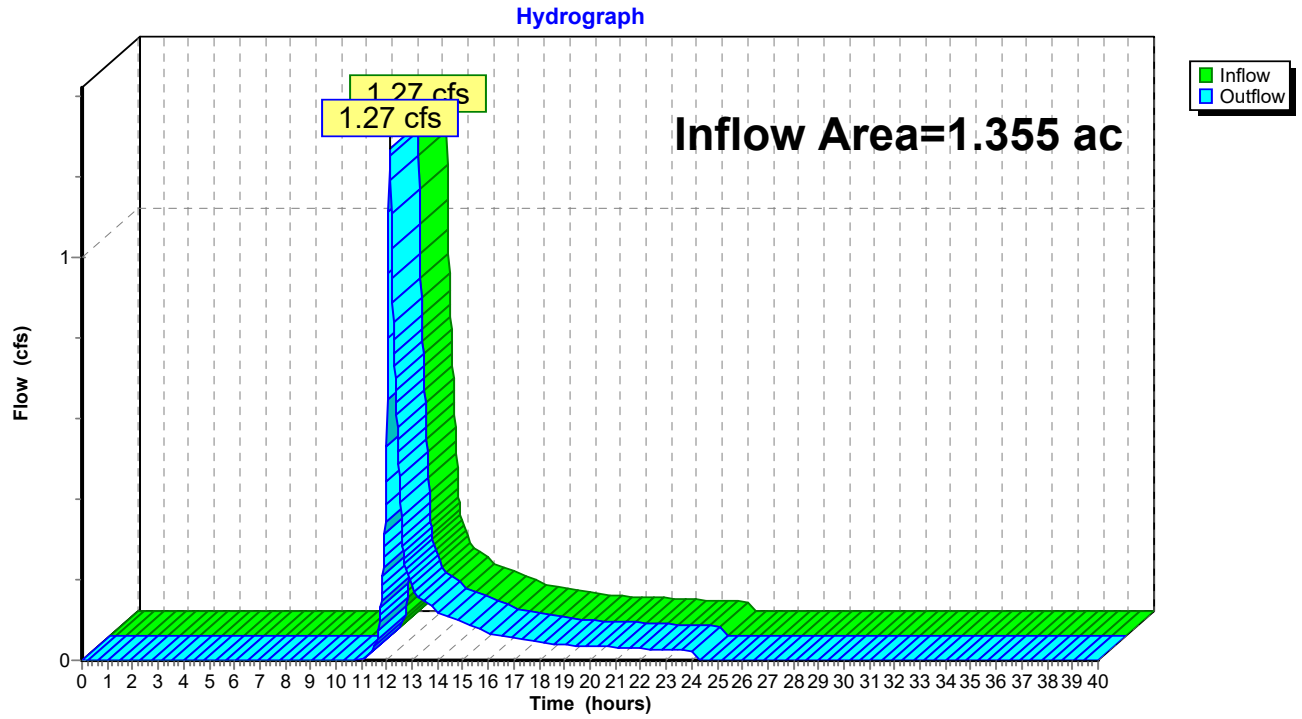
Summary for Reach R1: Fencourt Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, 61.00% Impervious, Inflow Depth = 0.93" for 2 year event
Inflow = 1.27 cfs @ 12.13 hrs, Volume= 0.105 af
Outflow = 1.27 cfs @ 12.13 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R1: Fencourt Ave



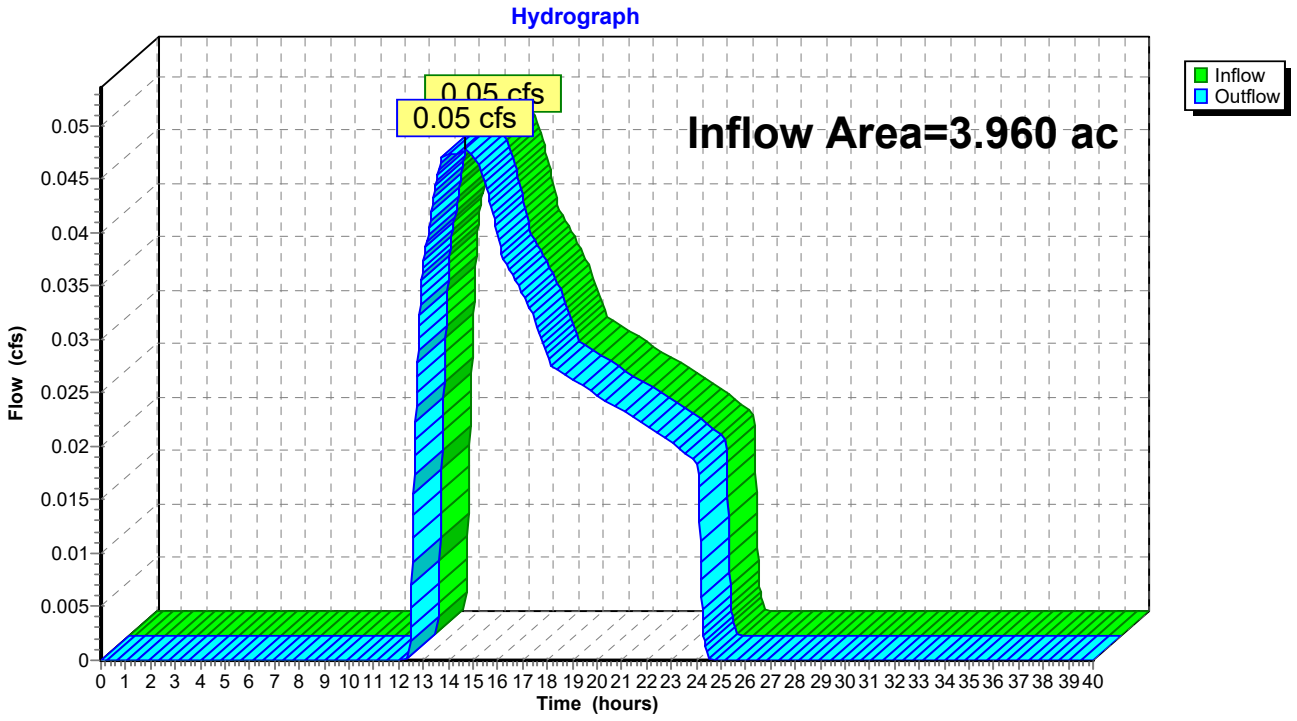
Summary for Reach R2: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.960 ac, 16.51% Impervious, Inflow Depth = 0.09" for 2 year event
Inflow = 0.05 cfs @ 14.65 hrs, Volume= 0.030 af
Outflow = 0.05 cfs @ 14.65 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R2: Wetland



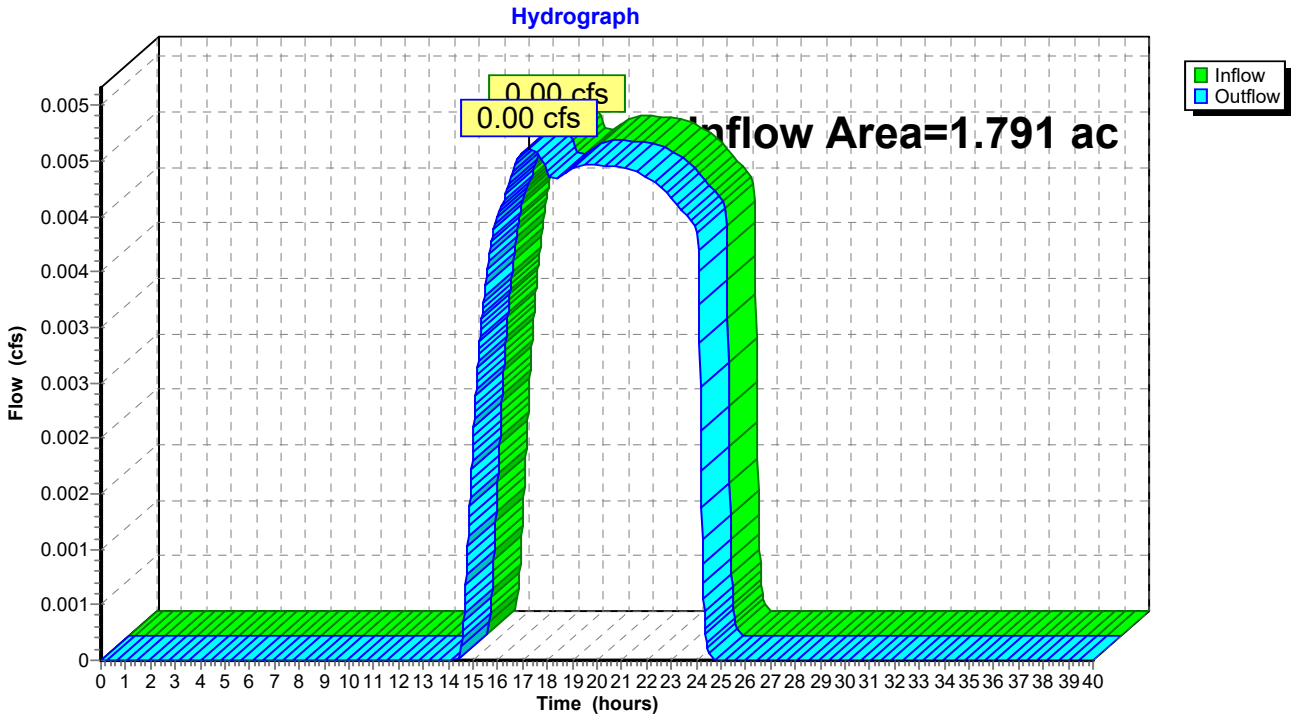
Summary for Reach R3: 12" RCP

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.791 ac, 0.00% Impervious, Inflow Depth = 0.02" for 2 year event
Inflow = 0.00 cfs @ 17.29 hrs, Volume= 0.003 af
Outflow = 0.00 cfs @ 17.29 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R3: 12" RCP



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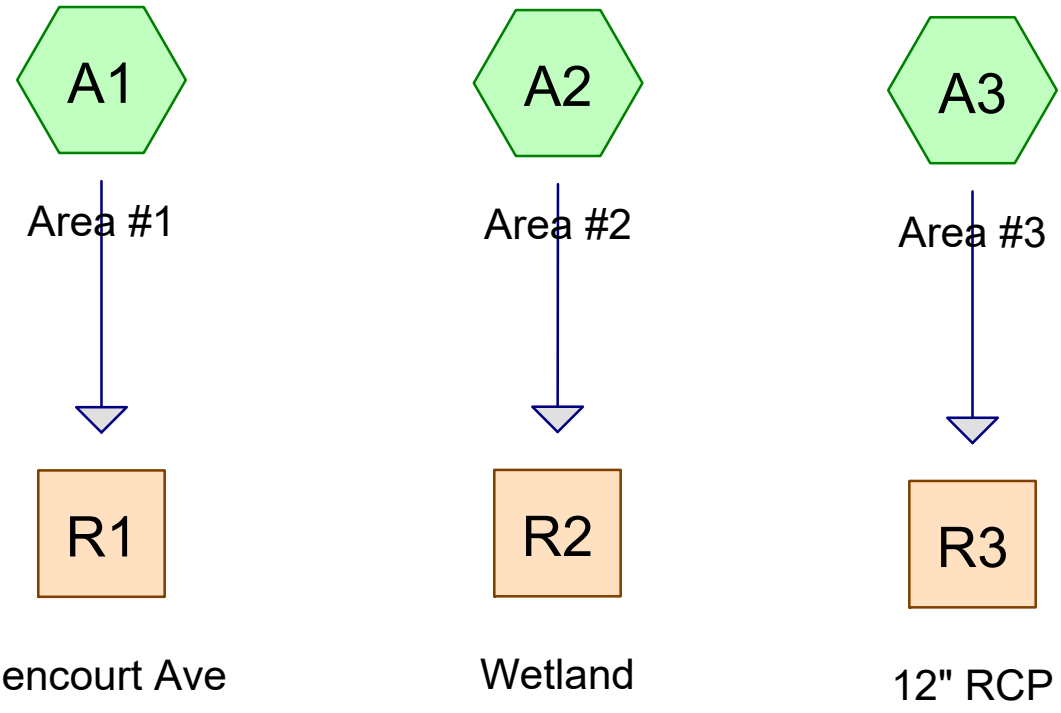
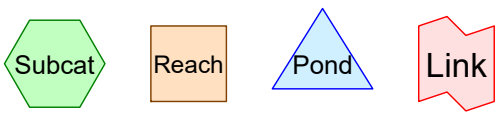




Routing Diagram for 16 Fencourt Avenue-existing 10yr storm
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

16 Fencourt Avenue-existing 10yr storm *Type III 24-hr 10 year Rainfall=4.70"*
Prepared by {enter your company name here} Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 A1: Area #1 Runoff Area=59,029 sf 61.00% Impervious Runoff Depth=1.97"
Flow Length=272' Tc=8.0 min CN=72 Runoff=2.87 cfs 0.222 af

Subcatchment A2: Area #2 Runoff Area=172,482 sf 16.51% Impervious Runoff Depth=0.48"
Flow Length=384' Tc=12.8 min UI Adjusted CN=48 Runoff=0.88 cfs 0.158 af

Subcatchment A3: Area #3 Runoff Area=78,013 sf 0.00% Impervious Runoff Depth=0.27"
Flow Length=384' Slope=0.0250 '/' Tc=13.3 min CN=43 Runoff=0.14 cfs 0.041 af

Reach R1: Fencourt Ave Inflow=2.87 cfs 0.222 af
Outflow=2.87 cfs 0.222 af

Reach R2: Wetland Inflow=0.88 cfs 0.158 af
Outflow=0.88 cfs 0.158 af

Reach R3: 12" RCP Inflow=0.14 cfs 0.041 af
Outflow=0.14 cfs 0.041 af

Total Runoff Area = 7.106 ac Runoff Volume = 0.422 af Average Runoff Depth = 0.71"
79.17% Pervious = 5.625 ac 20.83% Impervious = 1.480 ac

Summary for Subcatchment A1: Area #1

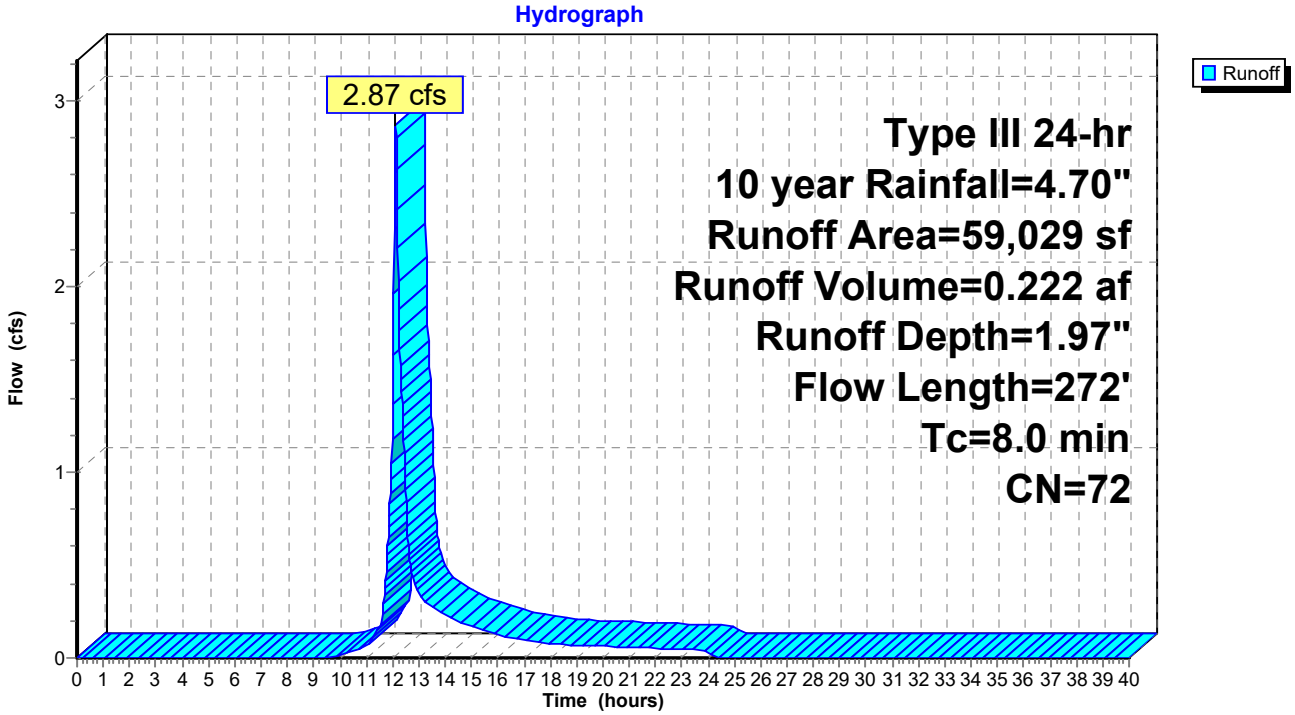
Runoff = 2.87 cfs @ 12.12 hrs, Volume= 0.222 af, Depth= 1.97"
Routed to Reach R1 : Fencourt Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
36,006	98	Unconnected pavement, HSG A
23,023	32	Woods/grass comb., Good, HSG A
59,029	72	Weighted Average
23,023		39.00% Pervious Area
36,006		61.00% Impervious Area
36,006		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.25		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
1.2	172	0.0140	2.40		**Shallow Concentrated Flow, Paved** Paved Kv= 20.3 fps
8.0	272	Total			

Subcatchment A1: Area #1



Summary for Subcatchment A2: Area #2

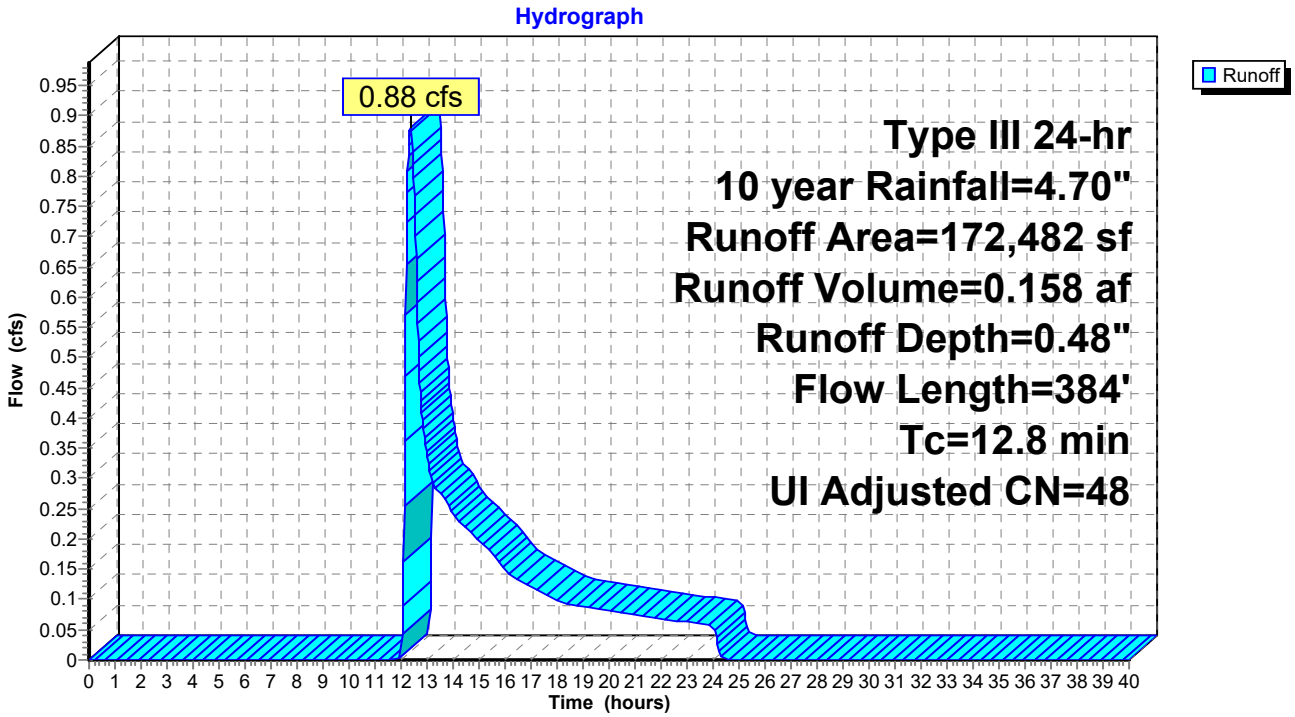
Runoff = 0.88 cfs @ 12.37 hrs, Volume= 0.158 af, Depth= 0.48"
Routed to Reach R2 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Adj	Description
143,999	43		Woods/grass comb., Fair, HSG A
28,483	98		Unconnected pavement, HSG A
172,482	52	48	Weighted Average, UI Adjusted
143,999			83.49% Pervious Area
28,483			16.51% Impervious Area
28,483			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0300	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.5	284	0.0230	1.06		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
12.8	384	Total			

Subcatchment A2: Area #2



Summary for Subcatchment A3: Area #3

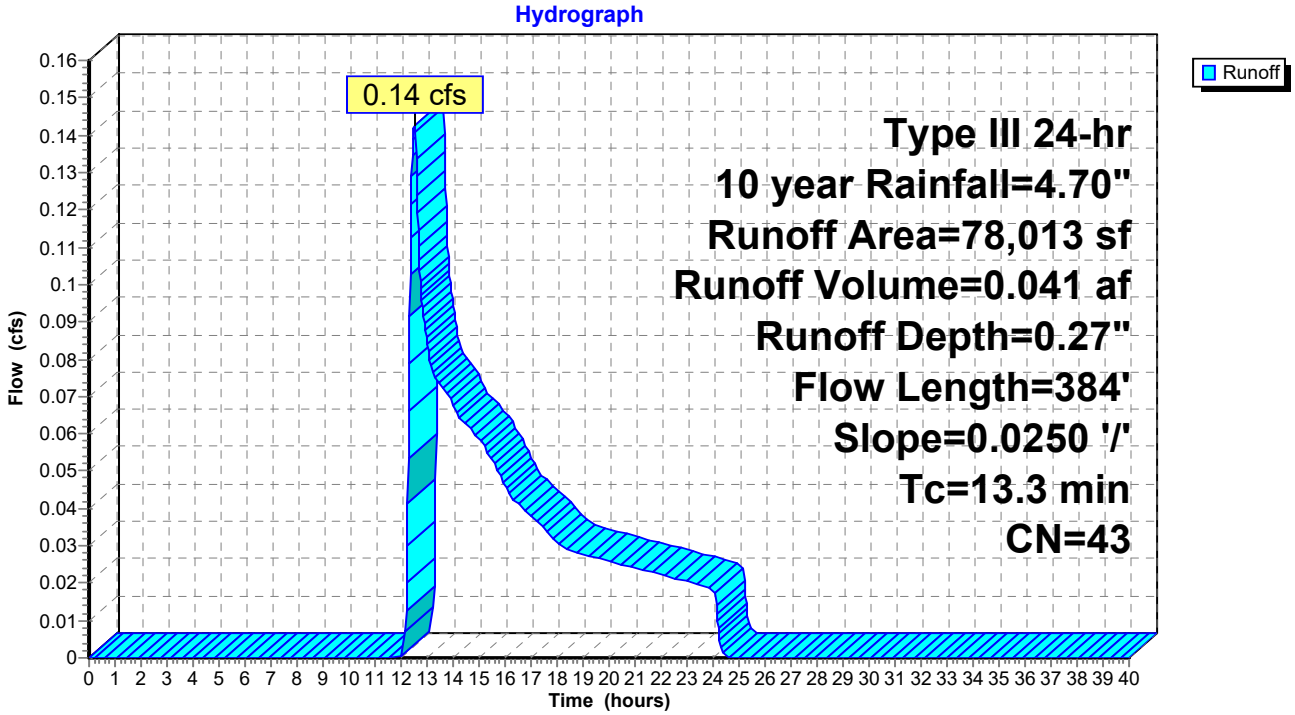
Runoff = 0.14 cfs @ 12.51 hrs, Volume= 0.041 af, Depth= 0.27"
Routed to Reach R3 : 12" RCP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
78,013	43	Woods/grass comb., Fair, HSG A
78,013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.3	284	0.0250	1.11		**Shallow Concentrated Flow, Weed and Marsh** Short Grass Pasture Kv= 7.0 fps
13.3	384	Total			

Subcatchment A3: Area #3



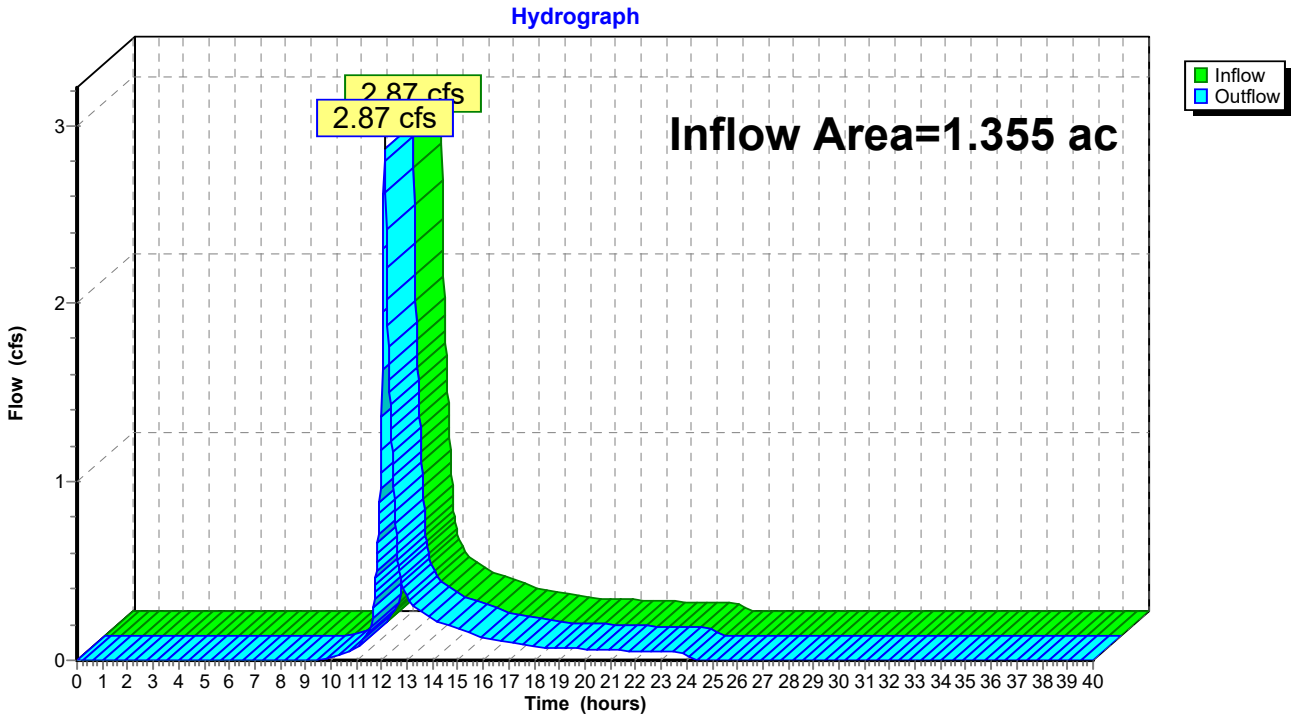
Summary for Reach R1: Fencourt Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, 61.00% Impervious, Inflow Depth = 1.97" for 10 year event
Inflow = 2.87 cfs @ 12.12 hrs, Volume= 0.222 af
Outflow = 2.87 cfs @ 12.12 hrs, Volume= 0.222 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R1: Fencourt Ave



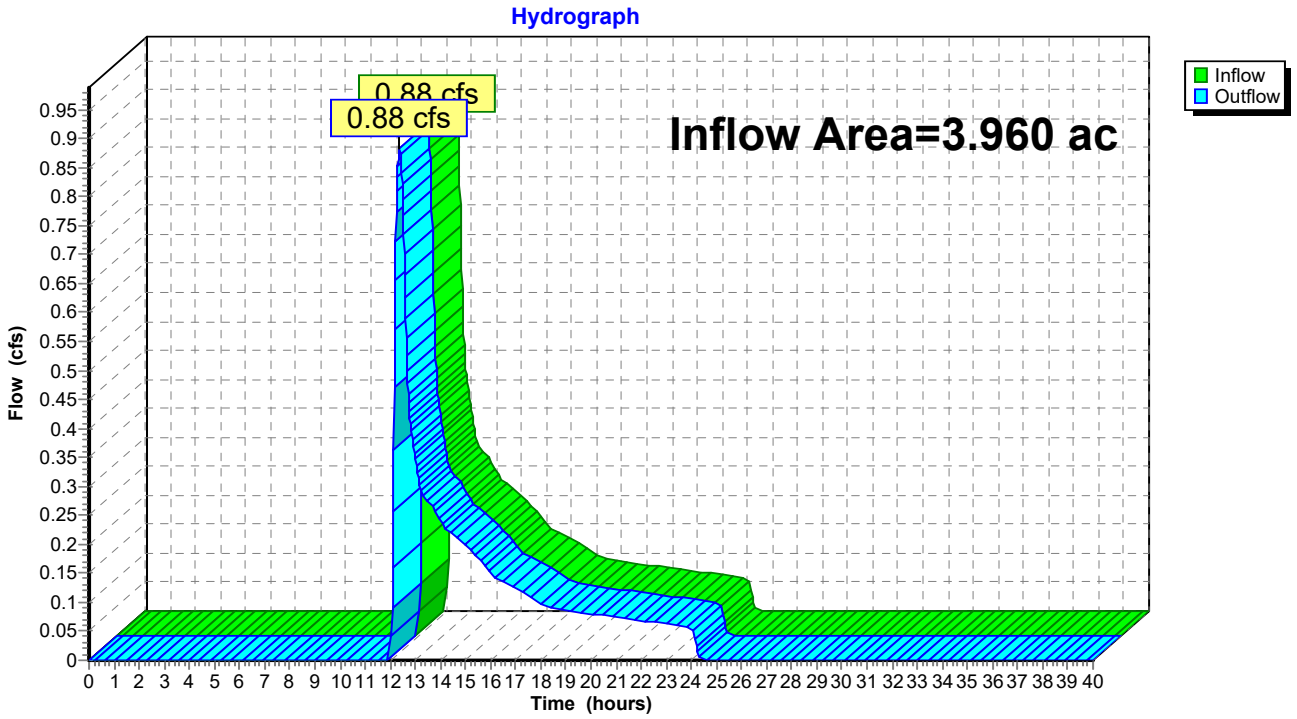
Summary for Reach R2: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.960 ac, 16.51% Impervious, Inflow Depth = 0.48" for 10 year event
Inflow = 0.88 cfs @ 12.37 hrs, Volume= 0.158 af
Outflow = 0.88 cfs @ 12.37 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R2: Wetland



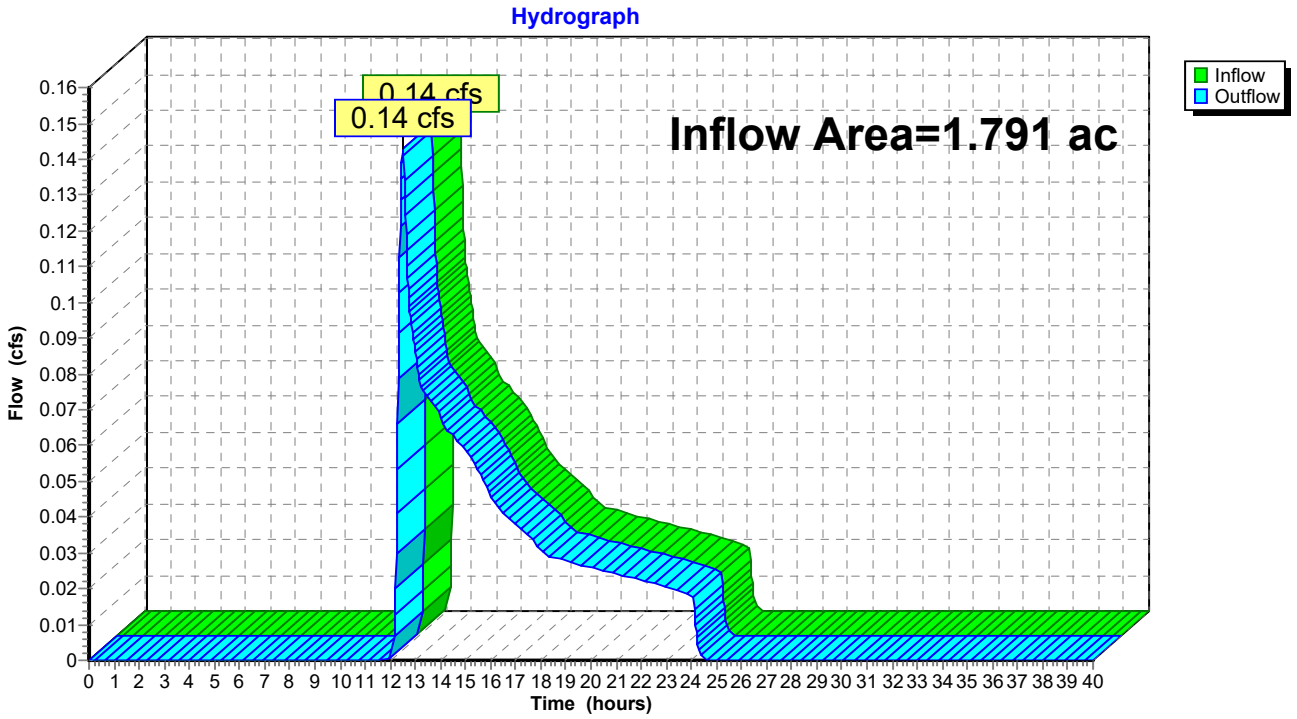
Summary for Reach R3: 12" RCP

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.791 ac, 0.00% Impervious, Inflow Depth = 0.27" for 10 year event
Inflow = 0.14 cfs @ 12.51 hrs, Volume= 0.041 af
Outflow = 0.14 cfs @ 12.51 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R3: 12" RCP



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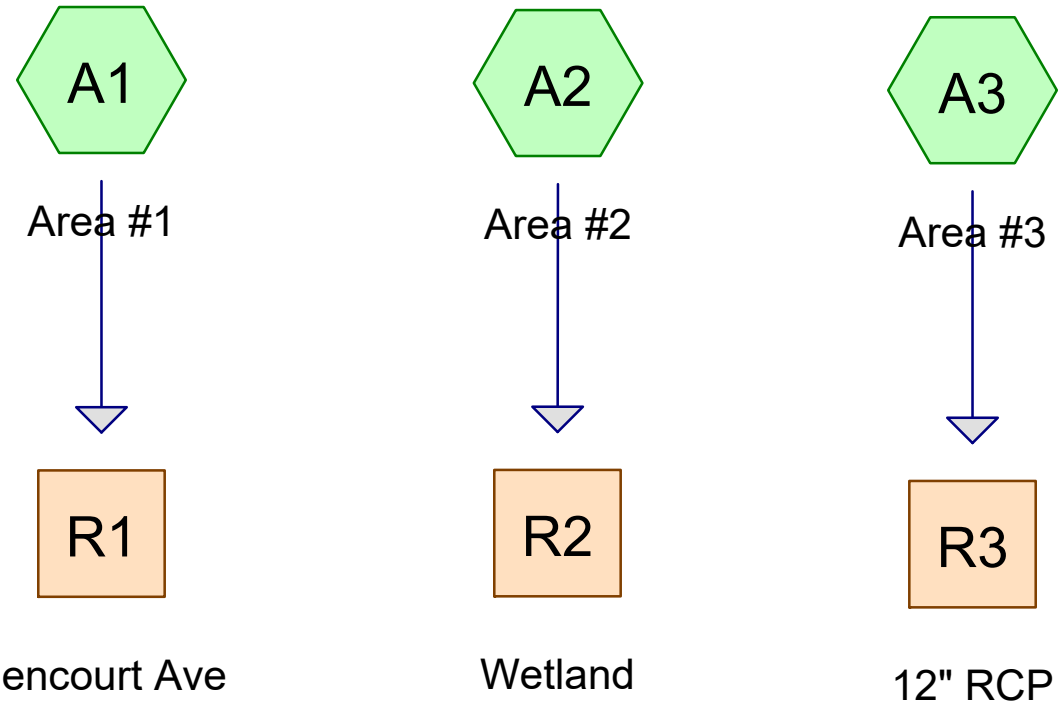
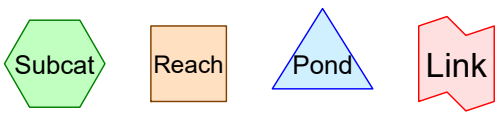




Routing Diagram for 16 Fencourt Avenue-existing 25yr storm
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

16 Fencourt Avenue-existing 25yr storm *Type III 24-hr 25 year Rainfall=5.50"*
Prepared by {enter your company name here} Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 A1: Area #1 Runoff Area=59,029 sf 61.00% Impervious Runoff Depth=2.59"
Flow Length=272' Tc=8.0 min CN=72 Runoff=3.81 cfs 0.292 af

Subcatchment A2: Area #2 Runoff Area=172,482 sf 16.51% Impervious Runoff Depth=0.78"
Flow Length=384' Tc=12.8 min UI Adjusted CN=48 Runoff=1.86 cfs 0.259 af

Subcatchment A3: Area #3 Runoff Area=78,013 sf 0.00% Impervious Runoff Depth=0.50"
Flow Length=384' Slope=0.0250 '/' Tc=13.3 min CN=43 Runoff=0.39 cfs 0.075 af

Reach R1: Fencourt Ave Inflow=3.81 cfs 0.292 af
Outflow=3.81 cfs 0.292 af

Reach R2: Wetland Inflow=1.86 cfs 0.259 af
Outflow=1.86 cfs 0.259 af

Reach R3: 12" RCP Inflow=0.39 cfs 0.075 af
Outflow=0.39 cfs 0.075 af

Total Runoff Area = 7.106 ac Runoff Volume = 0.626 af Average Runoff Depth = 1.06"
79.17% Pervious = 5.625 ac 20.83% Impervious = 1.480 ac

Summary for Subcatchment A1: Area #1

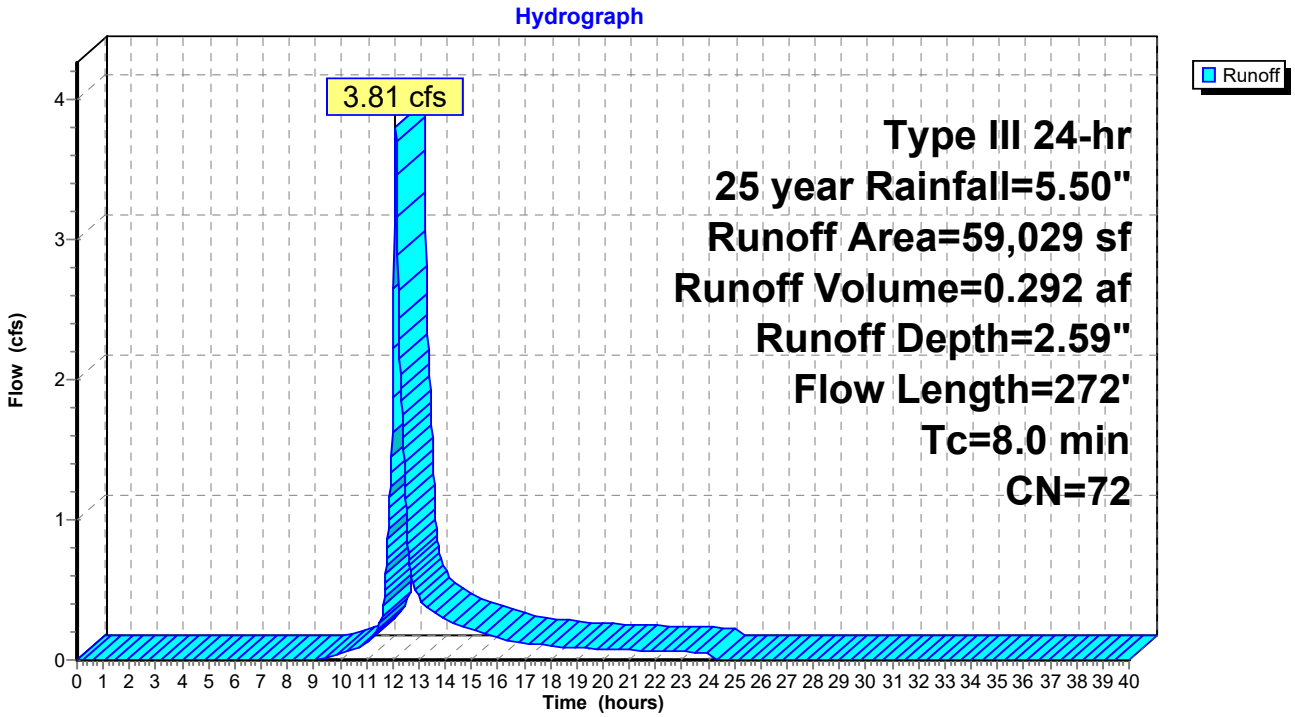
Runoff = 3.81 cfs @ 12.12 hrs, Volume= 0.292 af, Depth= 2.59"
Routed to Reach R1 : Fencourt Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

Area (sf)	CN	Description
36,006	98	Unconnected pavement, HSG A
23,023	32	Woods/grass comb., Good, HSG A
59,029	72	Weighted Average
23,023		39.00% Pervious Area
36,006		61.00% Impervious Area
36,006		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.25		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
1.2	172	0.0140	2.40		**Shallow Concentrated Flow, Paved** Paved Kv= 20.3 fps
8.0	272	Total			

Subcatchment A1: Area #1



Summary for Subcatchment A2: Area #2

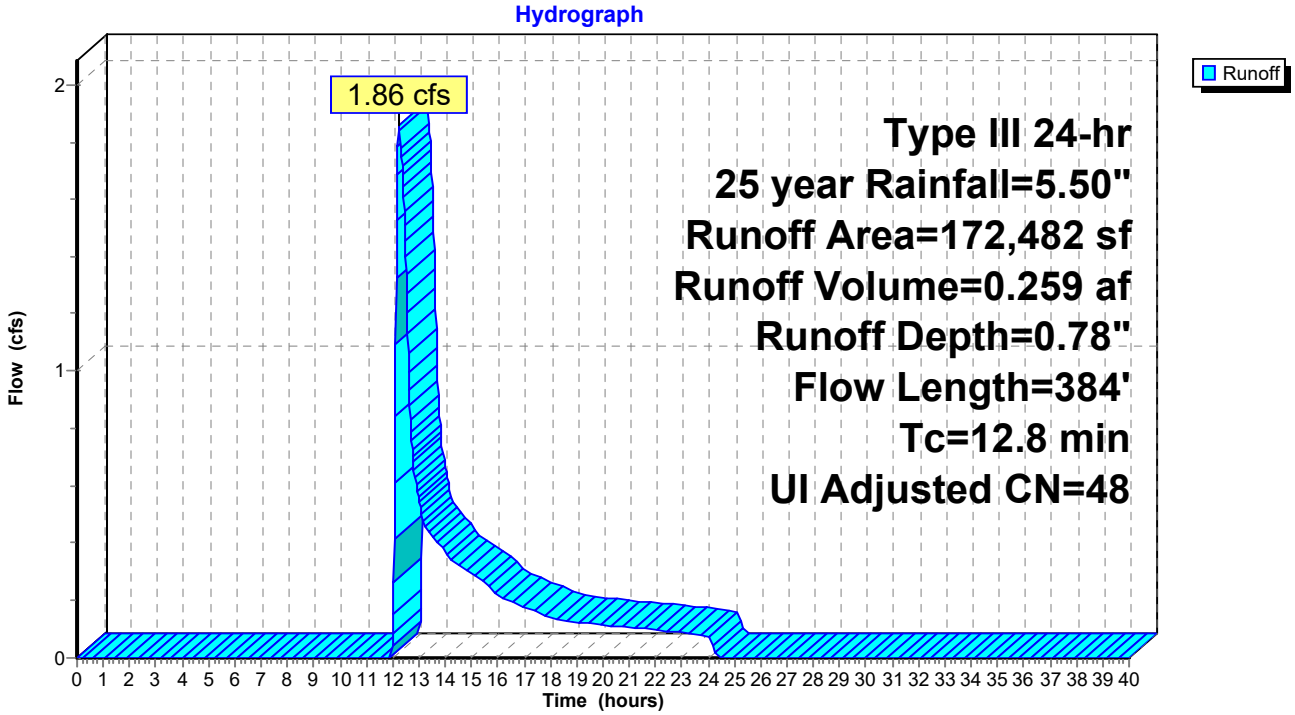
Runoff = 1.86 cfs @ 12.24 hrs, Volume= 0.259 af, Depth= 0.78"
Routed to Reach R2 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

Area (sf)	CN	Adj	Description
143,999	43		Woods/grass comb., Fair, HSG A
28,483	98		Unconnected pavement, HSG A
172,482	52	48	Weighted Average, UI Adjusted
143,999			83.49% Pervious Area
28,483			16.51% Impervious Area
28,483			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0300	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.5	284	0.0230	1.06		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
12.8	384	Total			

Subcatchment A2: Area #2



Summary for Subcatchment A3: Area #3

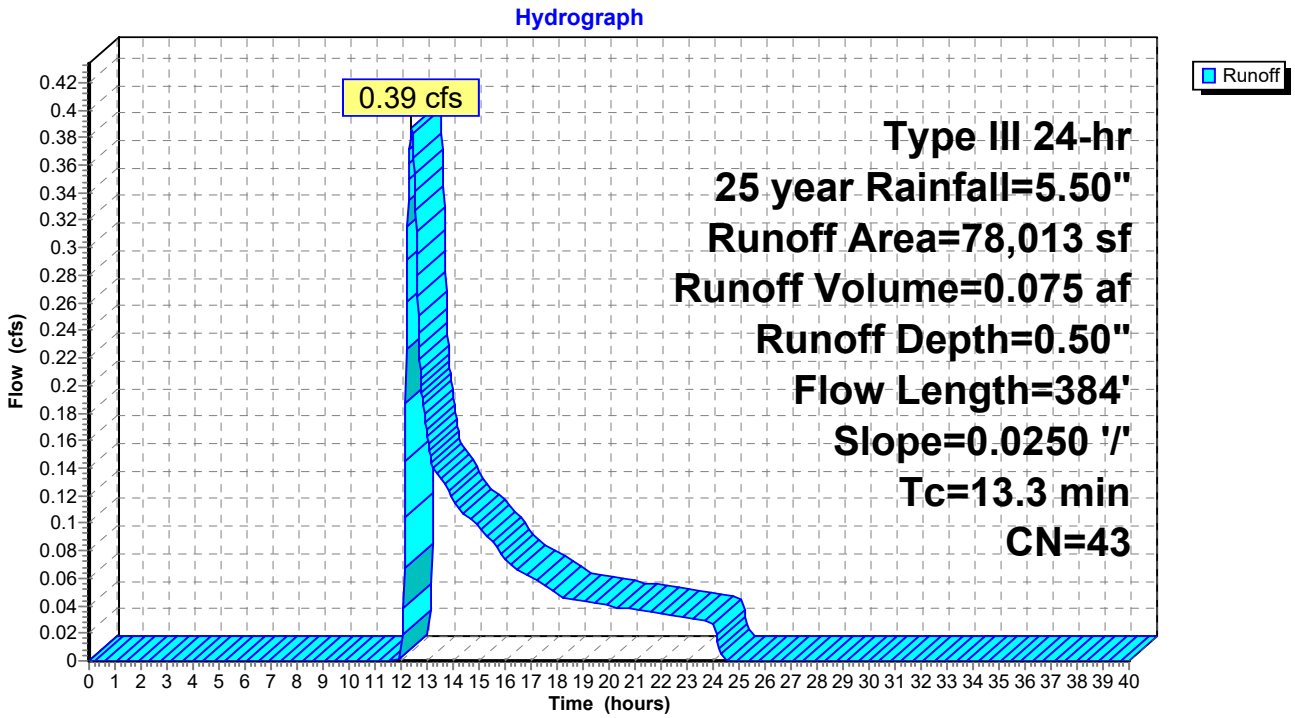
Runoff = 0.39 cfs @ 12.41 hrs, Volume= 0.075 af, Depth= 0.50"
Routed to Reach R3 : 12" RCP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

Area (sf)	CN	Description
78,013	43	Woods/grass comb., Fair, HSG A
78,013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.3	284	0.0250	1.11		**Shallow Concentrated Flow, Weed and Marsh** Short Grass Pasture Kv= 7.0 fps
13.3	384	Total			

Subcatchment A3: Area #3



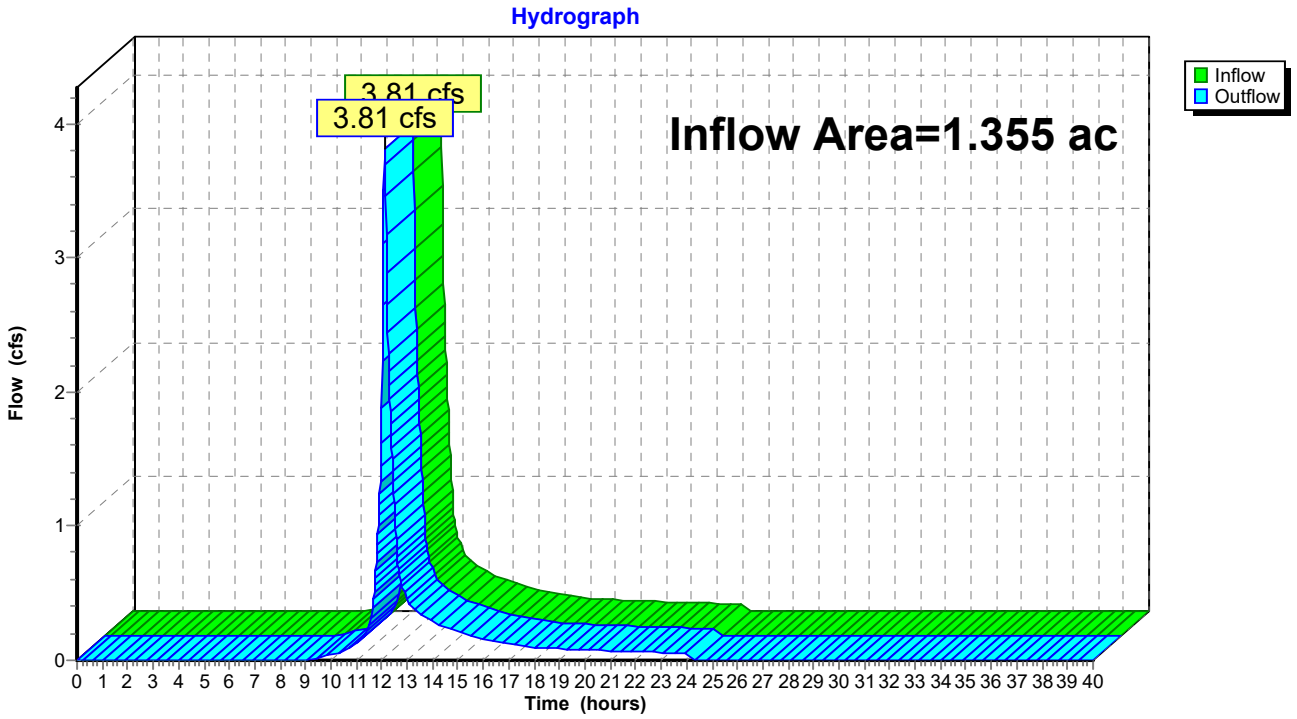
Summary for Reach R1: Fencourt Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, 61.00% Impervious, Inflow Depth = 2.59" for 25 year event
Inflow = 3.81 cfs @ 12.12 hrs, Volume= 0.292 af
Outflow = 3.81 cfs @ 12.12 hrs, Volume= 0.292 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R1: Fencourt Ave



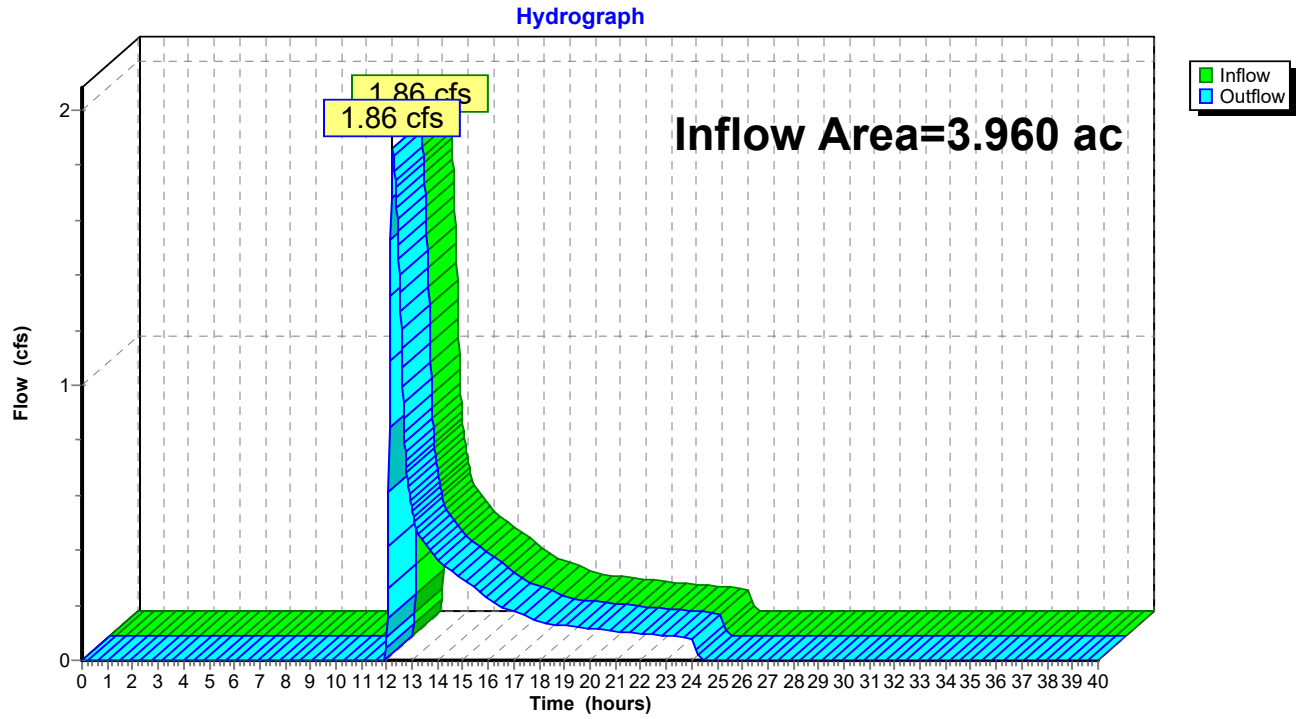
Summary for Reach R2: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.960 ac, 16.51% Impervious, Inflow Depth = 0.78" for 25 year event
Inflow = 1.86 cfs @ 12.24 hrs, Volume= 0.259 af
Outflow = 1.86 cfs @ 12.24 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R2: Wetland



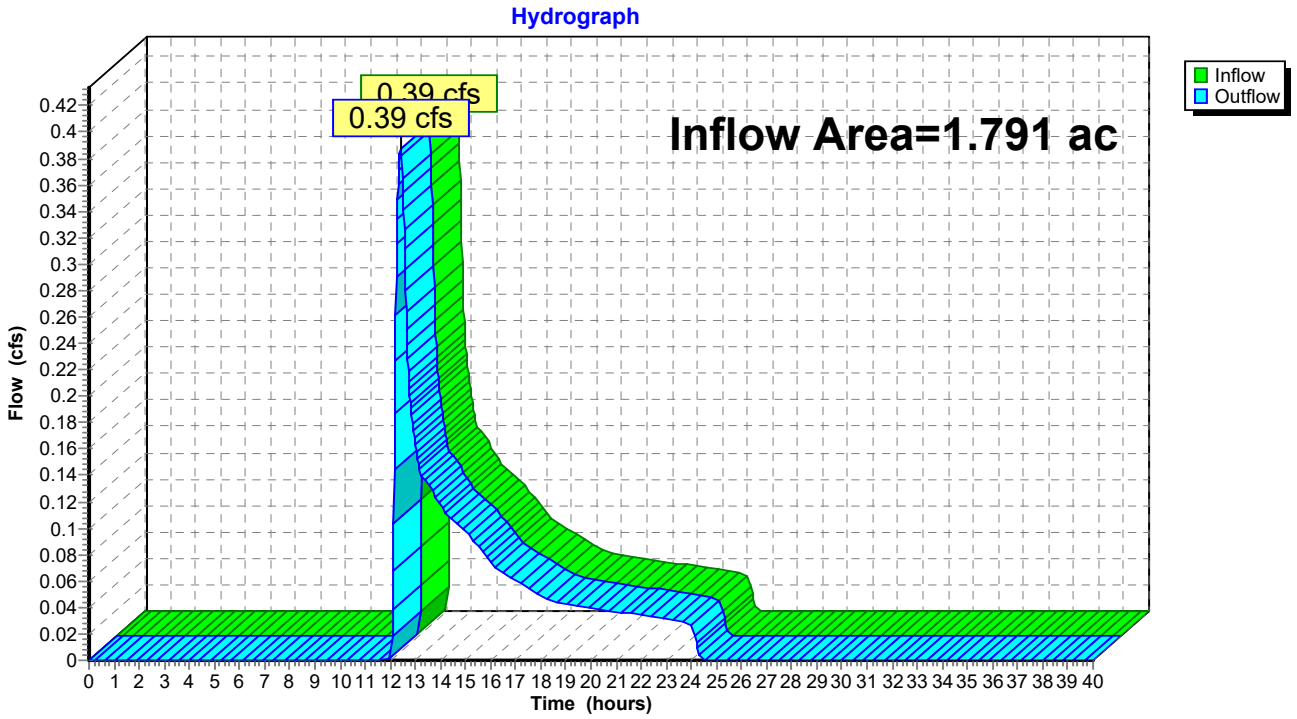
Summary for Reach R3: 12" RCP

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.791 ac, 0.00% Impervious, Inflow Depth = 0.50" for 25 year event
Inflow = 0.39 cfs @ 12.41 hrs, Volume= 0.075 af
Outflow = 0.39 cfs @ 12.41 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R3: 12" RCP



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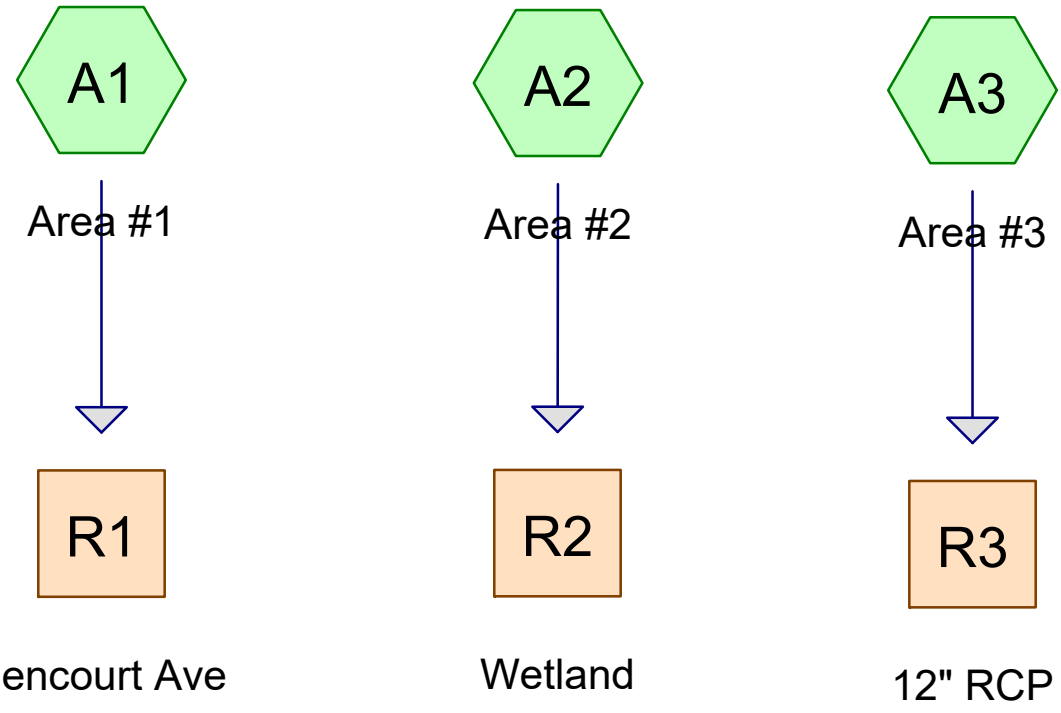
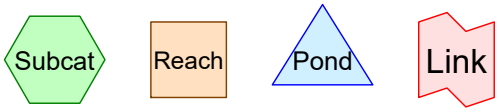




Routing Diagram for 16 Fencourt Avenue-existing 100yr storm
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

16 Fencourt Avenue-existing 100yr storm *Type III 24-hr 100 year Rainfall=6.70"*
Prepared by {enter your company name here} Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 A1: Area #1 Runoff Area=59,029 sf 61.00% Impervious Runoff Depth=3.57"
Flow Length=272' Tc=8.0 min CN=72 Runoff=5.29 cfs 0.404 af

Subcatchment A2: Area #2 Runoff Area=172,482 sf 16.51% Impervious Runoff Depth=1.34"
Flow Length=384' Tc=12.8 min UI Adjusted CN=48 Runoff=3.96 cfs 0.441 af

Subcatchment A3: Area #3 Runoff Area=78,013 sf 0.00% Impervious Runoff Depth=0.95"
Flow Length=384' Slope=0.0250 '/' Tc=13.3 min CN=43 Runoff=1.00 cfs 0.141 af

Reach R1: Fencourt Ave Inflow=5.29 cfs 0.404 af
Outflow=5.29 cfs 0.404 af

Reach R2: Wetland Inflow=3.96 cfs 0.441 af
Outflow=3.96 cfs 0.441 af

Reach R3: 12" RCP Inflow=1.00 cfs 0.141 af
Outflow=1.00 cfs 0.141 af

Total Runoff Area = 7.106 ac Runoff Volume = 0.986 af Average Runoff Depth = 1.67"
79.17% Pervious = 5.625 ac 20.83% Impervious = 1.480 ac

Summary for Subcatchment A1: Area #1

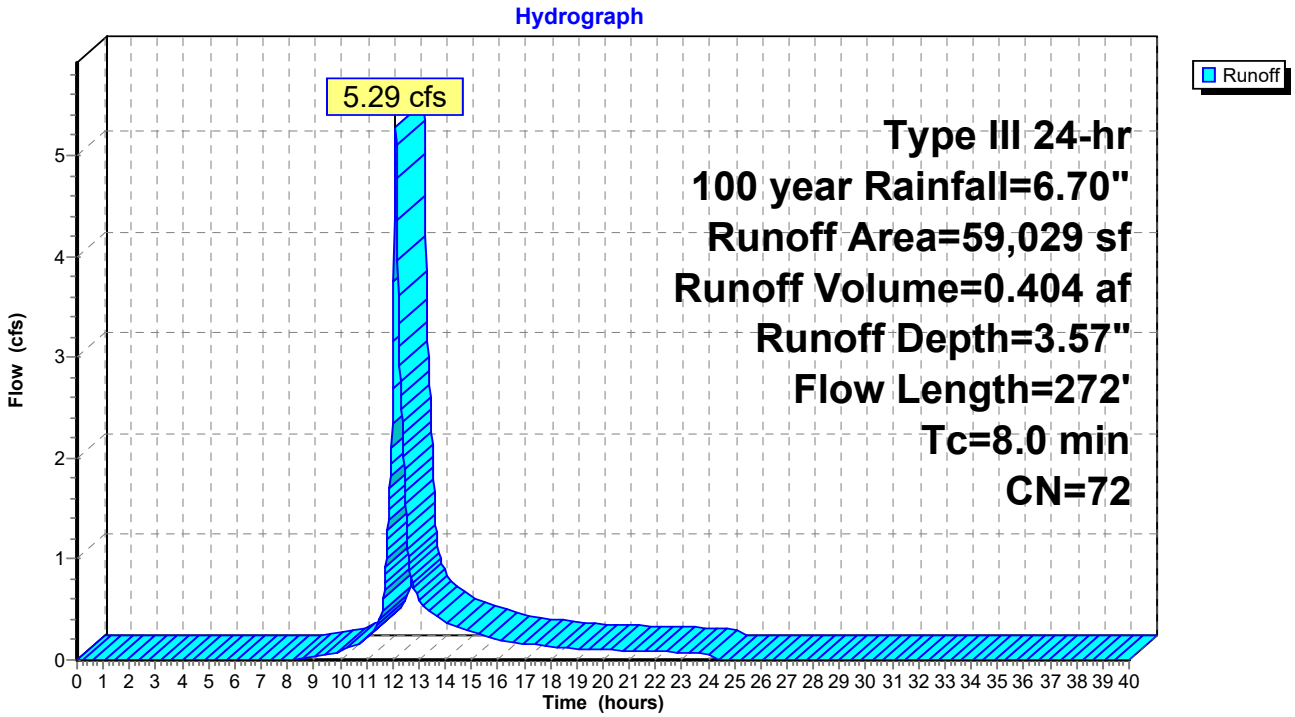
Runoff = 5.29 cfs @ 12.12 hrs, Volume= 0.404 af, Depth= 3.57"
Routed to Reach R1 : Fencourt Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Description
36,006	98	Unconnected pavement, HSG A
23,023	32	Woods/grass comb., Good, HSG A
59,029	72	Weighted Average
23,023		39.00% Pervious Area
36,006		61.00% Impervious Area
36,006		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.25		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
1.2	172	0.0140	2.40		**Shallow Concentrated Flow, Paved** Paved Kv= 20.3 fps
8.0	272	Total			

Subcatchment A1: Area #1



Summary for Subcatchment A2: Area #2

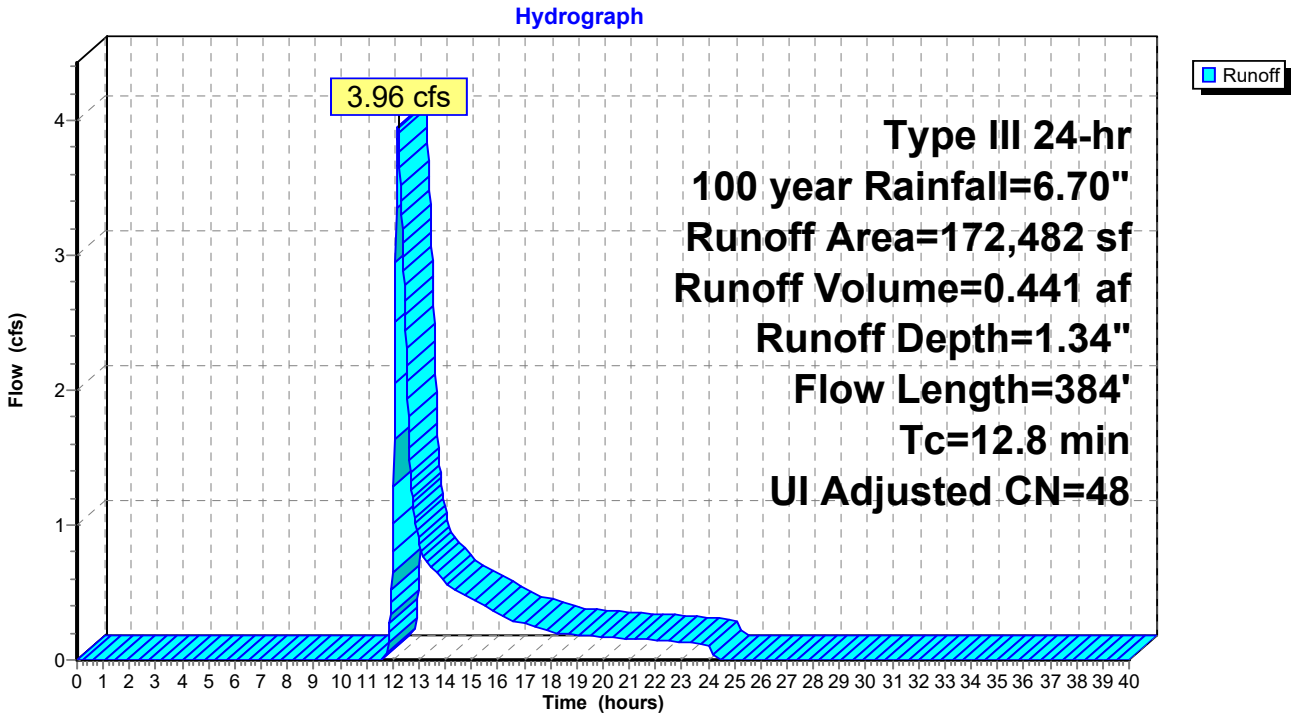
Runoff = 3.96 cfs @ 12.21 hrs, Volume= 0.441 af, Depth= 1.34"
Routed to Reach R2 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Adj	Description
143,999	43		Woods/grass comb., Fair, HSG A
28,483	98		Unconnected pavement, HSG A
172,482	52	48	Weighted Average, UI Adjusted
143,999			83.49% Pervious Area
28,483			16.51% Impervious Area
28,483			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0300	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.5	284	0.0230	1.06		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
12.8	384	Total			

Subcatchment A2: Area #2



Summary for Subcatchment A3: Area #3

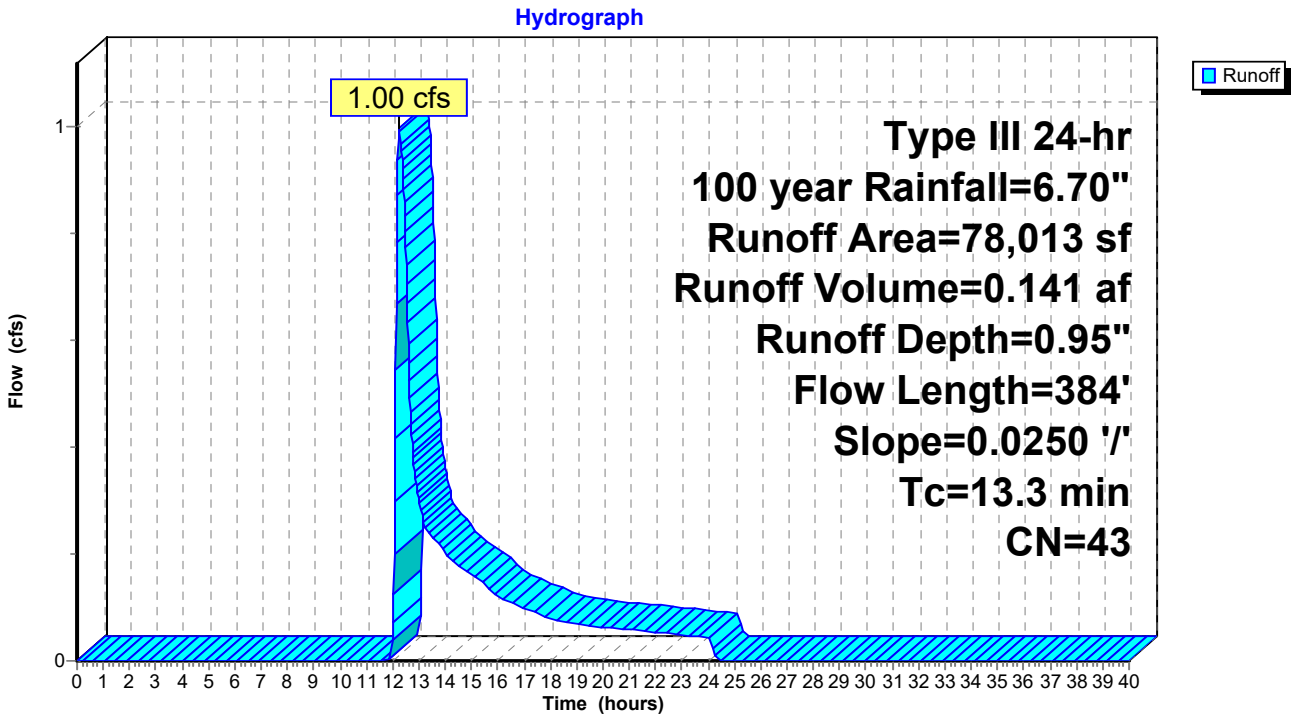
Runoff = 1.00 cfs @ 12.26 hrs, Volume= 0.141 af, Depth= 0.95"
Routed to Reach R3 : 12" RCP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Description
78,013	43	Woods/grass comb., Fair, HSG A
78,013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
4.3	284	0.0250	1.11		**Shallow Concentrated Flow, Weed and Marsh** Short Grass Pasture Kv= 7.0 fps
13.3	384	Total			

Subcatchment A3: Area #3



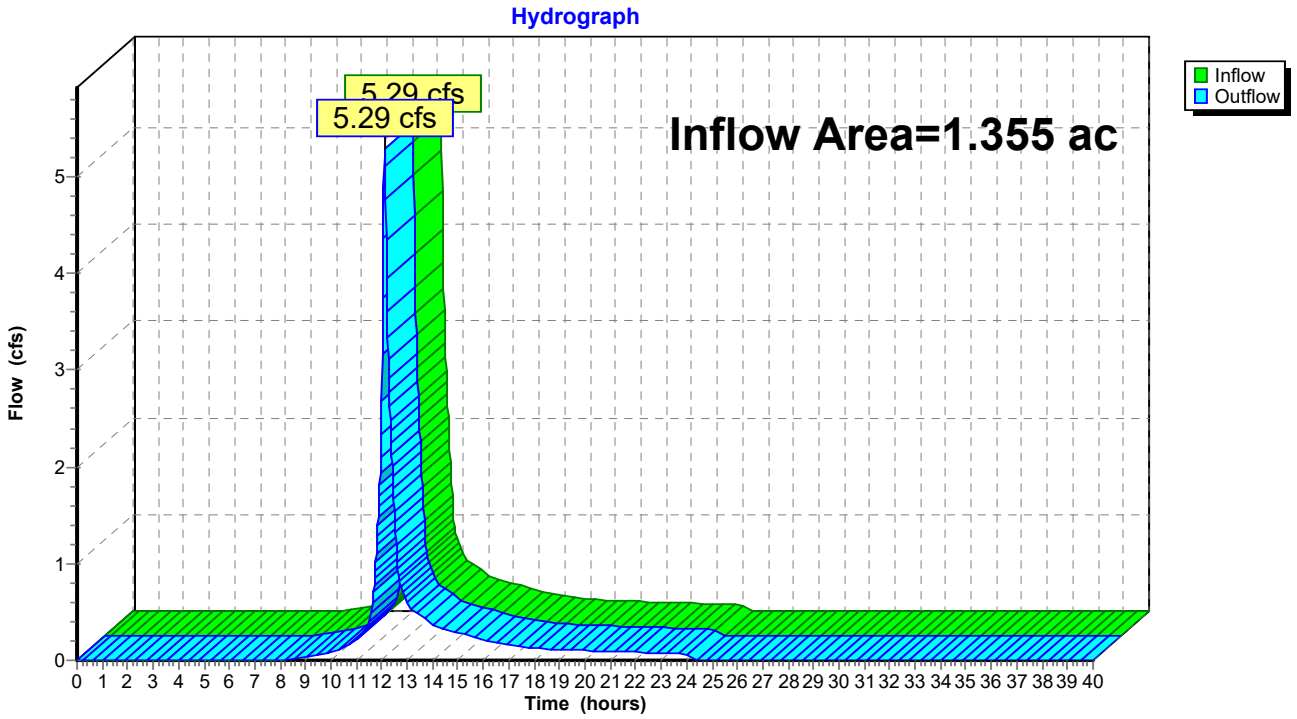
Summary for Reach R1: Fencourt Ave

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, 61.00% Impervious, Inflow Depth = 3.57" for 100 year event
Inflow = 5.29 cfs @ 12.12 hrs, Volume= 0.404 af
Outflow = 5.29 cfs @ 12.12 hrs, Volume= 0.404 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R1: Fencourt Ave



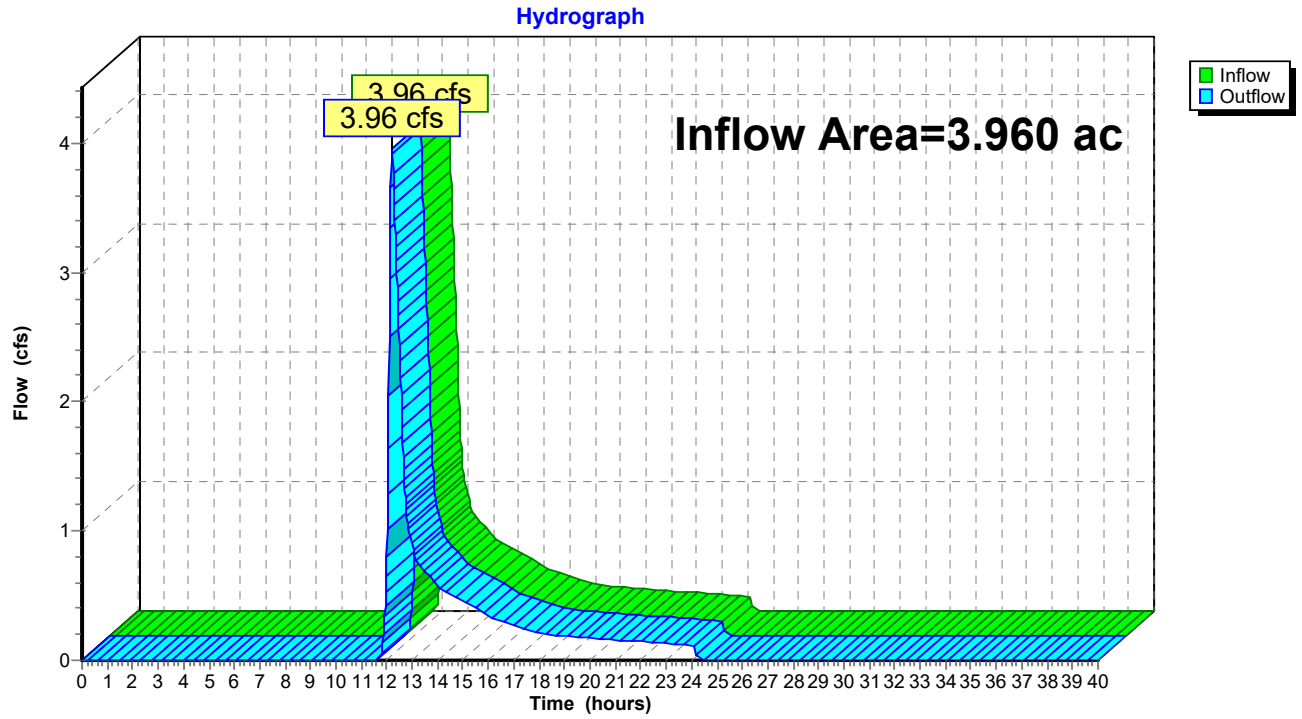
Summary for Reach R2: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.960 ac, 16.51% Impervious, Inflow Depth = 1.34" for 100 year event
Inflow = 3.96 cfs @ 12.21 hrs, Volume= 0.441 af
Outflow = 3.96 cfs @ 12.21 hrs, Volume= 0.441 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R2: Wetland



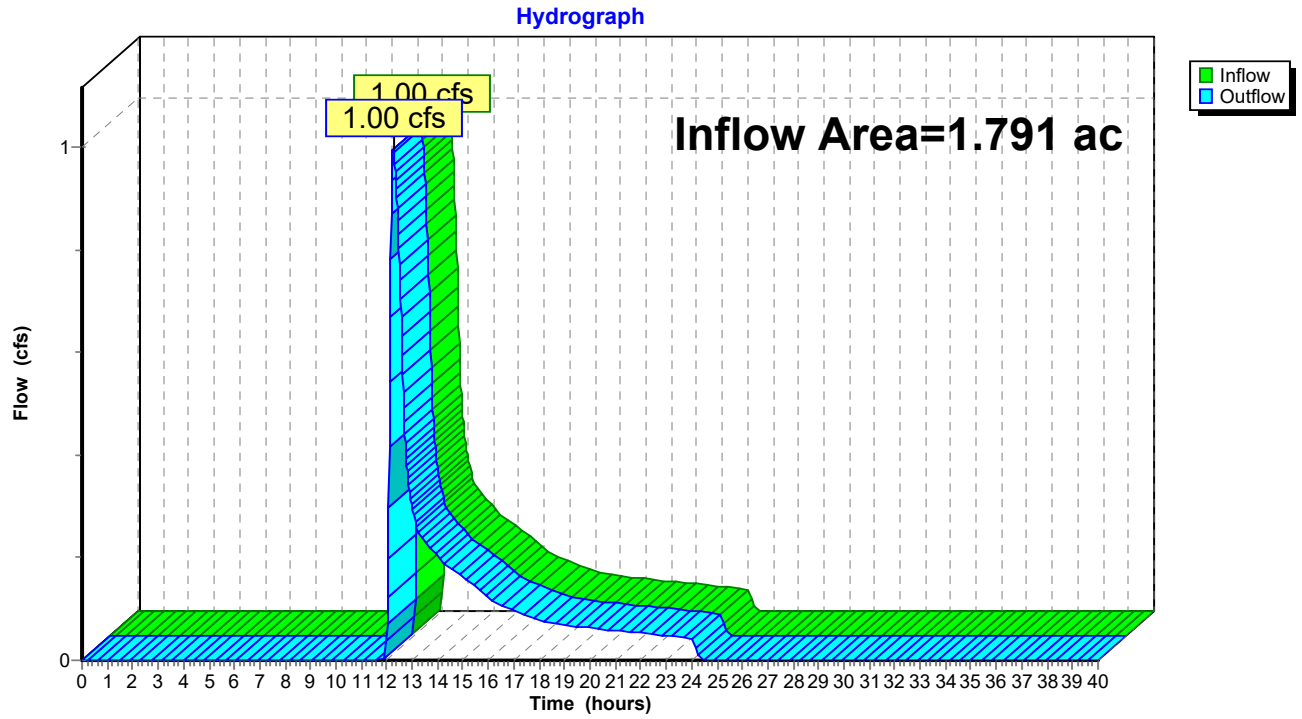
Summary for Reach R3: 12" RCP

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.791 ac, 0.00% Impervious, Inflow Depth = 0.95" for 100 year event
Inflow = 1.00 cfs @ 12.26 hrs, Volume= 0.141 af
Outflow = 1.00 cfs @ 12.26 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node T

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach R3: 12" RCP



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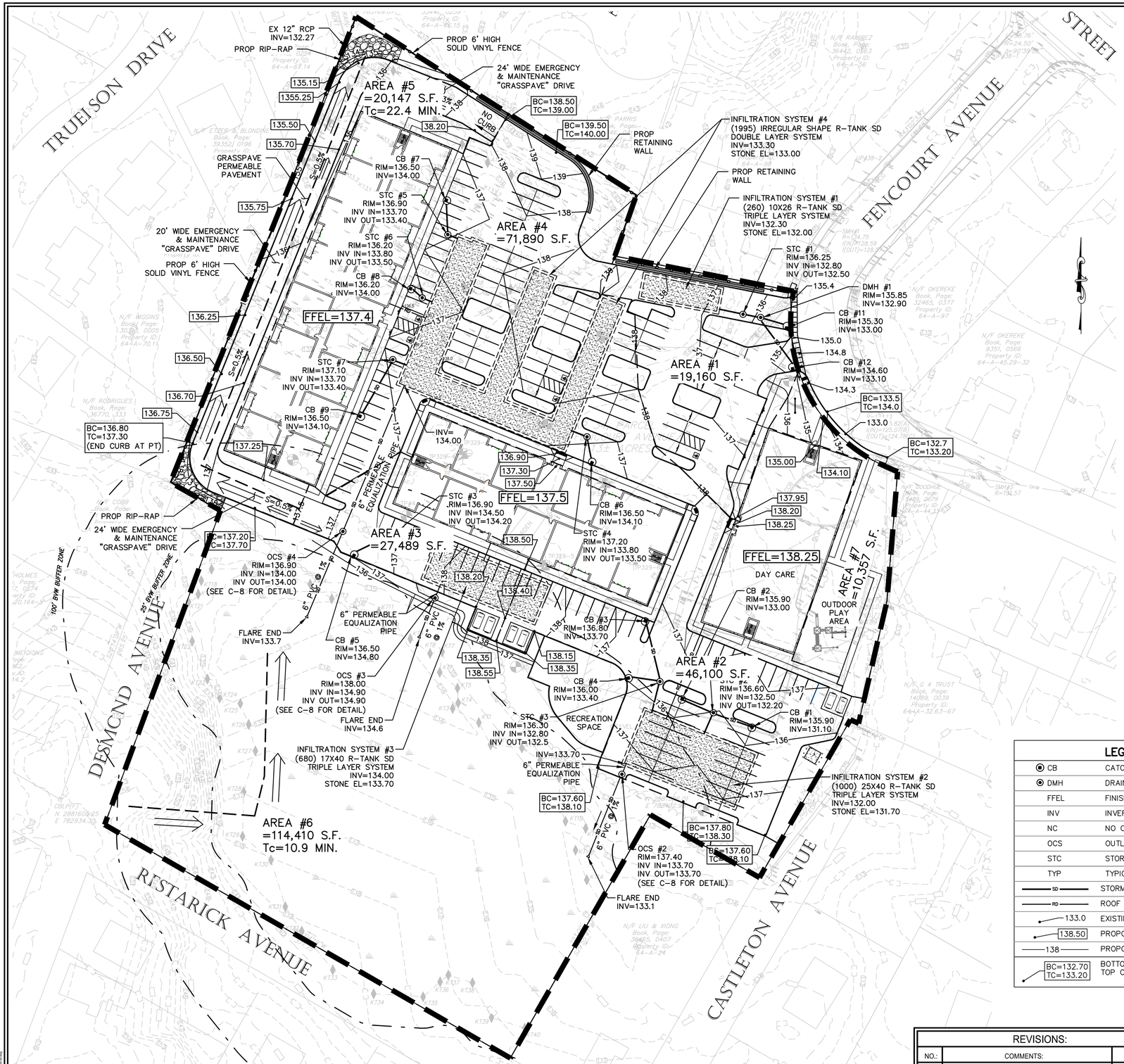
Post-Development Calculations

2, 10, 25, and 100-Year Storms



POST-DEVELOPMENT WATERSHEDS

	AREA (S.F.)
AREA #1	19,160
AREA #2	46,100
AREA #3	27,489
AREA #4	71,865
AREA #5	20,147
AREA #6	114,406
AREA #7	10357
TOTAL LOT AREA	309,524 S.F.

LEGEND

CB	CATCH BASIN
DMH	DRAIN MANHOLE
FFEL	FINISHED FLOOR ELEVATION
INV	INVERT
NC	NO CURB
OCS	OUTLET CONTROL STRUCTURE
STC	STORMCEPTOR
TYP	TYPICAL
SD	STORM DRAIN PIPE
RD	ROOF DRAIN PIPE
133.0	EXISTING SPOT ELEVATION
138.50	PROPOSED SPOT ELEVATION
138	PROPOSED CONTOUR
BC=132.70 TC=133.20	BOTTOM OF CURB TOP OF CURB

STORMWATER SYSTEM ELEVATIONS

	SYSTEM #1	SYSTEM #2	SYSTEM #3	SYSTEM #4	
MIN. GROUND ELEVATION	137.0	136.0	137.5	136.7	
TOP OF STONE	135.0	134.7	136.0	135.3	
TOP OF CHAMBER	134.5	134.2	135.5	134.8	
BOTTOM OF CHAMBER	132.3	132.0	134.0	133.3	
BOTTOM OF STONE	132.0	131.7	133.7	133.0	
OVERFLOW OUTLET	134.2	133.7	134.9	134.0	
EST. GWT	N/A	N/A	131.7	131.0	

REVISIONS:		
NO.:	COMMENTS:	DATE:

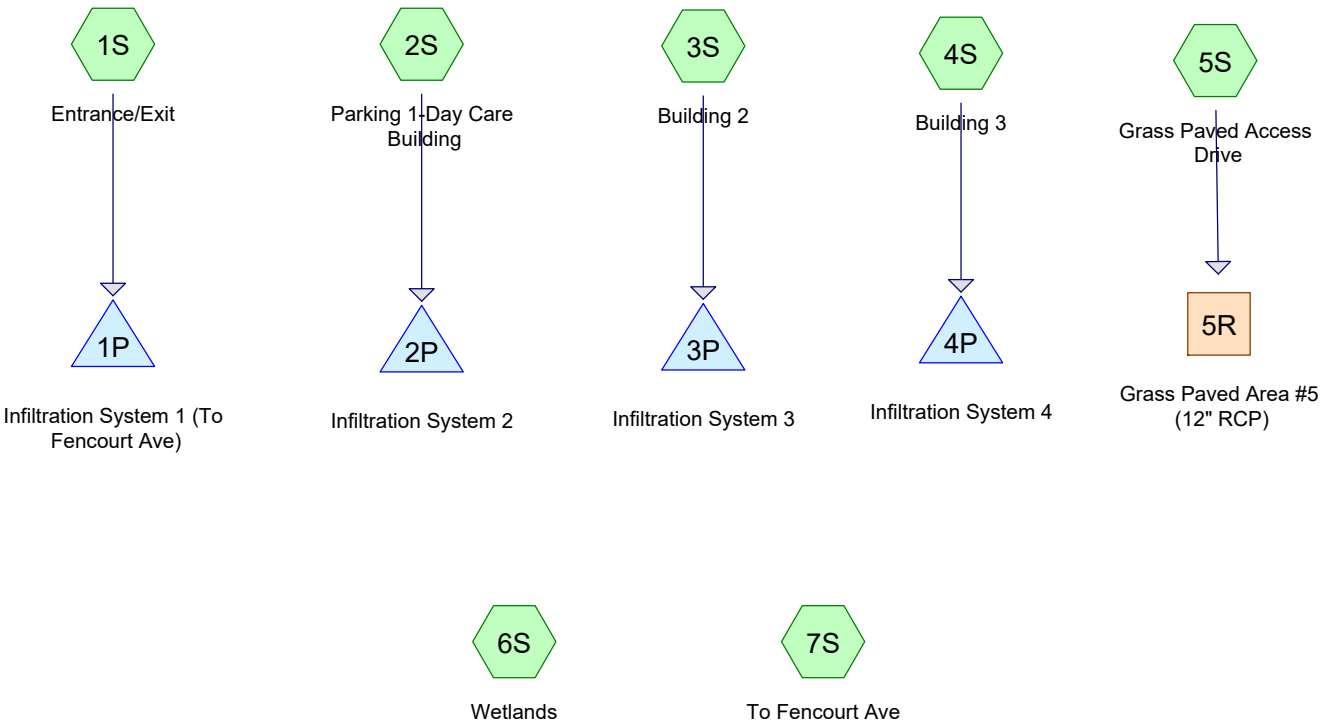
PROPOSED WATERSHED MAP
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

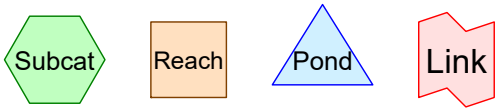
DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-09-2022
LATEST REVISION:
SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
PW-1





Routing Diagram for 16 Fencourt Avenue-Proposed 2yr storm-2022-09-09
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 1S: Entrance/Exit Runoff Area=19,160 sf 78.76% Impervious Runoff Depth=1.76"
Tc=6.0 min CN=85 Runoff=0.91 cfs 0.064 af

Subcatchment 2S: Parking 1-Day Care Runoff Area=46,100 sf 89.88% Impervious Runoff Depth=2.35"
Tc=6.0 min CN=92 Runoff=2.84 cfs 0.207 af

Subcatchment 3S: Building 2 Runoff Area=27,489 sf 96.52% Impervious Runoff Depth=2.75"
Tc=6.0 min CN=96 Runoff=1.89 cfs 0.145 af

Subcatchment 4S: Building 3 Runoff Area=71,865 sf 88.33% Impervious Runoff Depth=2.26"
Tc=6.0 min CN=91 Runoff=4.29 cfs 0.310 af

Subcatchment 5S: Grass Paved Access Runoff Area=20,147 sf 2.56% Impervious Runoff Depth=0.01"
Flow Length=435' Slope=0.0050 '/' Tc=22.4 min CN=41 Runoff=0.00 cfs 0.000 af

Subcatchment 6S: Wetlands Runoff Area=114,406 sf 0.00% Impervious Runoff Depth=0.02"
Flow Length=230' Tc=10.9 min CN=43 Runoff=0.01 cfs 0.005 af

Subcatchment 7S: To Fencourt Ave Runoff Area=10,357 sf 11.49% Impervious Runoff Depth=0.17"
Tc=6.0 min UI Adjusted CN=52 Runoff=0.01 cfs 0.003 af

Reach 5R: Grass Paved Area #5 (12" RCP) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Infiltration System 1 (To Fencourt Peak Elev=133.21' Storage=0.025 af Inflow=0.91 cfs 0.064 af
Discarded=0.08 cfs 0.064 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.064 af

Pond 2P: Infiltration System 2 Peak Elev=132.75' Storage=0.077 af Inflow=2.84 cfs 0.207 af
Discarded=0.27 cfs 0.207 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.207 af

Pond 3P: Infiltration System 3 Peak Elev=134.69' Storage=0.050 af Inflow=1.89 cfs 0.145 af
Discarded=0.19 cfs 0.145 af Primary=0.00 cfs 0.000 af Outflow=0.19 cfs 0.145 af

Pond 4P: Infiltration System 4 Peak Elev=133.76' Storage=0.104 af Inflow=4.29 cfs 0.310 af
Discarded=0.51 cfs 0.310 af Primary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.310 af

Total Runoff Area = 7.106 ac Runoff Volume = 0.735 af Average Runoff Depth = 1.24"
52.11% Pervious = 3.703 ac 47.89% Impervious = 3.403 ac

Summary for Subcatchment 1S: Entrance/Exit

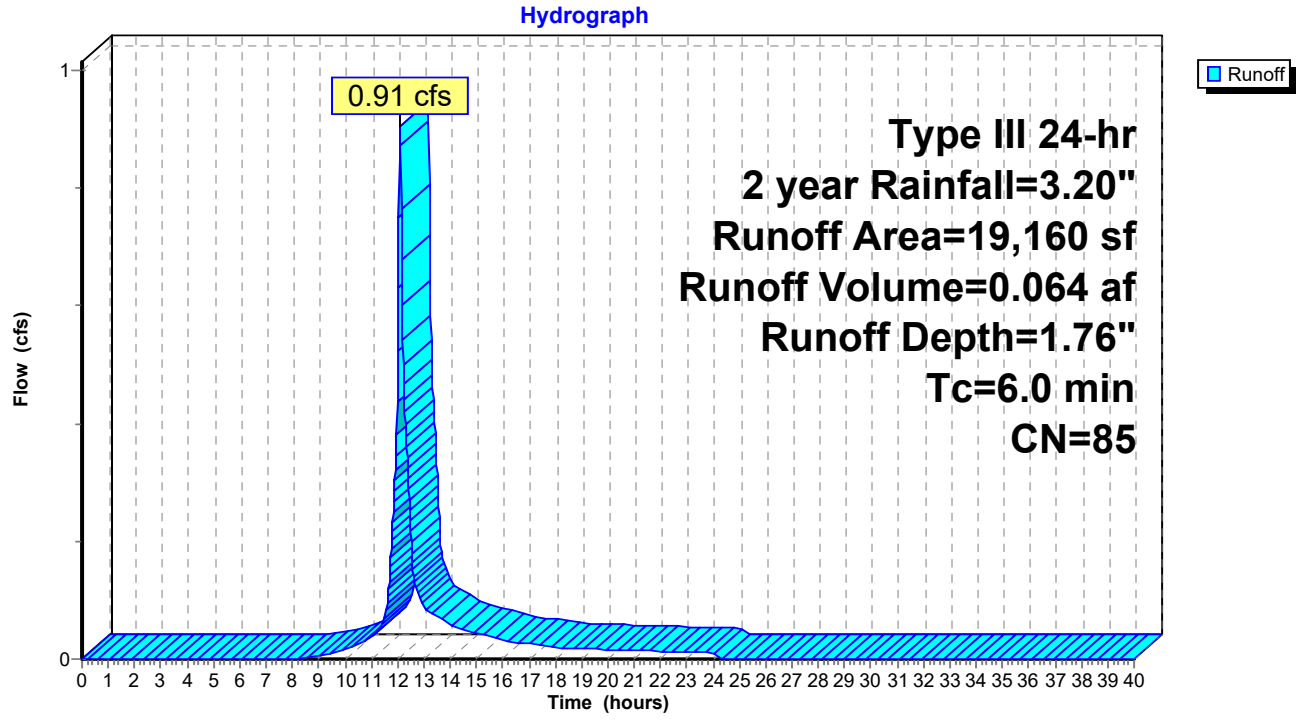
Runoff = 0.91 cfs @ 12.09 hrs, Volume= 0.064 af, Depth= 1.76"
Routed to Pond 1P : Infiltration System 1 (To Fencourt Ave)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Description
15,090	98	Paved parking, HSG A
4,070	39	>75% Grass cover, Good, HSG A
19,160	85	Weighted Average
4,070		21.24% Pervious Area
15,090		78.76% Impervious Area

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

Subcatchment 1S: Entrance/Exit



Summary for Subcatchment 2S: Parking 1-Day Care Building

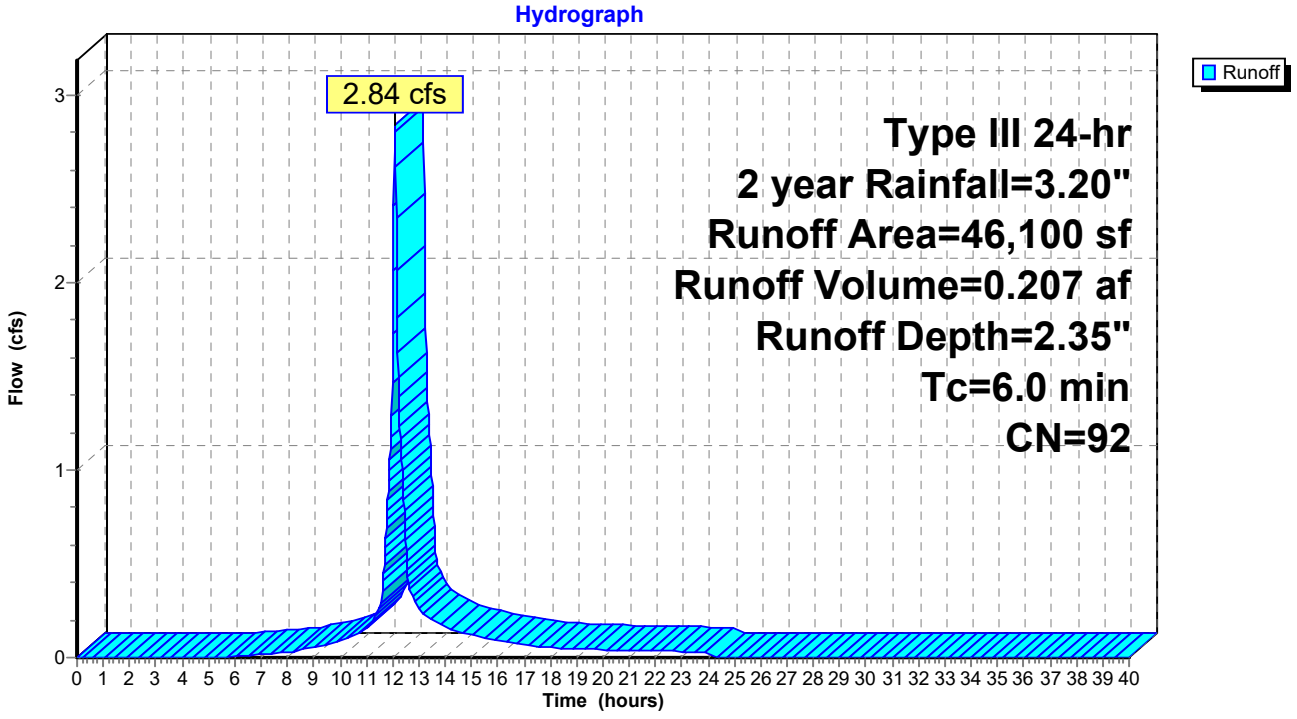
Runoff = 2.84 cfs @ 12.09 hrs, Volume= 0.207 af, Depth= 2.35"
Routed to Pond 2P : Infiltration System 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

	Area (sf)	CN	Description
	28,601	98	Paved parking, HSG A
	4,664	39	>75% Grass cover, Good, HSG A
*	12,835	98	Daycare Building, HSG A
	46,100	92	Weighted Average
	4,664		10.12% Pervious Area
	41,436		89.88% Impervious Area

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

Subcatchment 2S: Parking 1-Day Care Building



Summary for Subcatchment 3S: Building 2

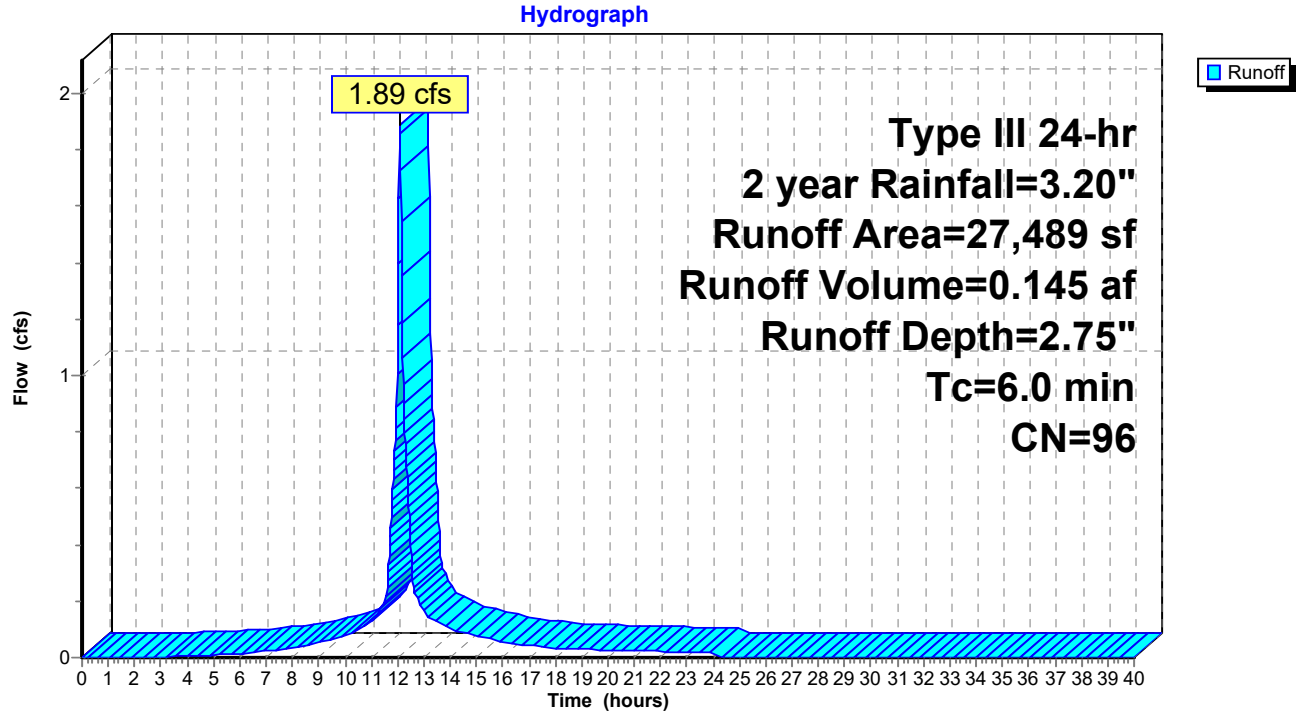
Runoff = 1.89 cfs @ 12.08 hrs, Volume= 0.145 af, Depth= 2.75"
Routed to Pond 3P : Infiltration System 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

	Area (sf)	CN	Description
	9,395	98	Paved parking, HSG A
*	17,137	98	Building #2, HSG A
	957	39	>75% Grass cover, Good, HSG A
	27,489	96	Weighted Average
	957		3.48% Pervious Area
	26,532		96.52% Impervious Area

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

Subcatchment 3S: Building 2



Summary for Subcatchment 4S: Building 3

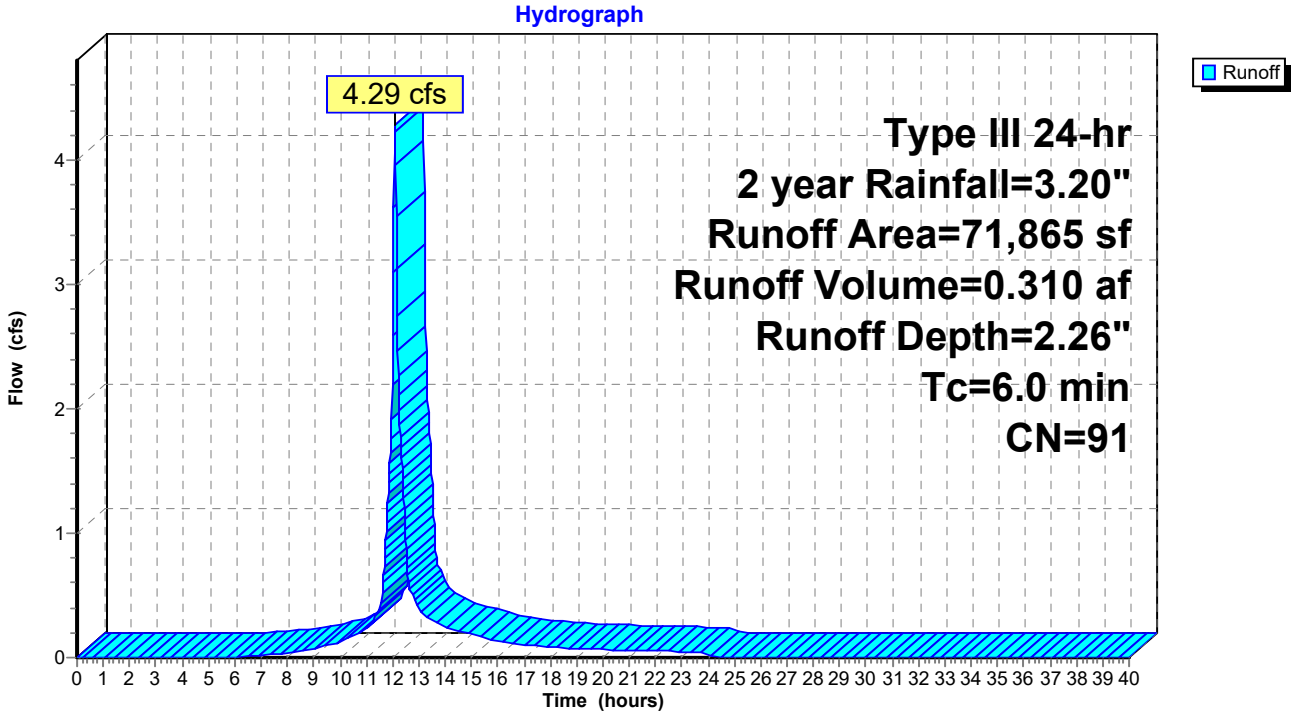
Runoff = 4.29 cfs @ 12.09 hrs, Volume= 0.310 af, Depth= 2.26"
Routed to Pond 4P : Infiltration System 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

	Area (sf)	CN	Description
	40,672	98	Paved parking, HSG A
*	22,804	98	Building 3, HSG A
	8,389	39	>75% Grass cover, Good, HSG A
	71,865	91	Weighted Average
	8,389		11.67% Pervious Area
	63,476		88.33% Impervious Area

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

Subcatchment 4S: Building 3



Summary for Subcatchment 5S: Grass Paved Access Drive

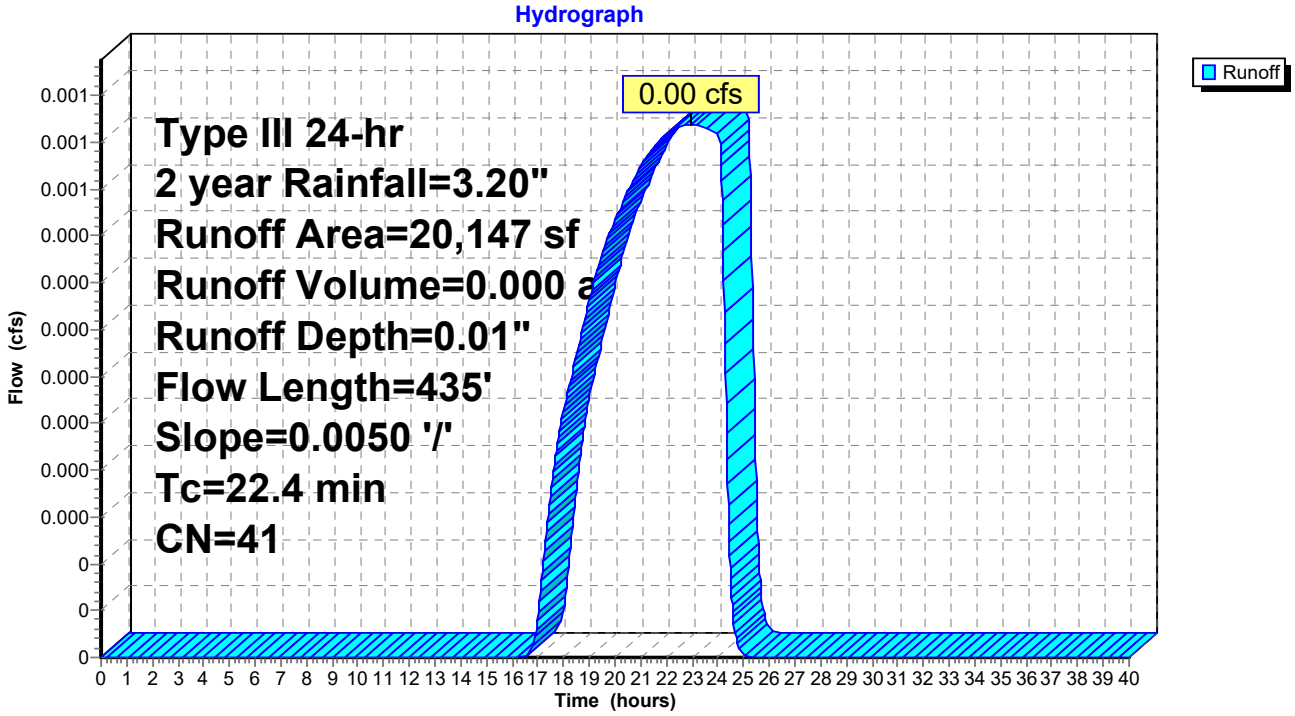
Runoff = 0.00 cfs @ 22.92 hrs, Volume= 0.000 af, Depth= 0.01"
Routed to Reach 5R : Grass Paved Area #5 (12" RCP)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

	Area (sf)	CN	Description
	19,632	39	>75% Grass cover, Good, HSG A
*	515	98	Walkway, HSG A
	20,147	41	Weighted Average
	19,632		97.44% Pervious Area
	515		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0050	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
5.3	335	0.0050	1.06		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
22.4	435	Total			

Subcatchment 5S: Grass Paved Access Drive



Summary for Subcatchment 6S: Wetlands

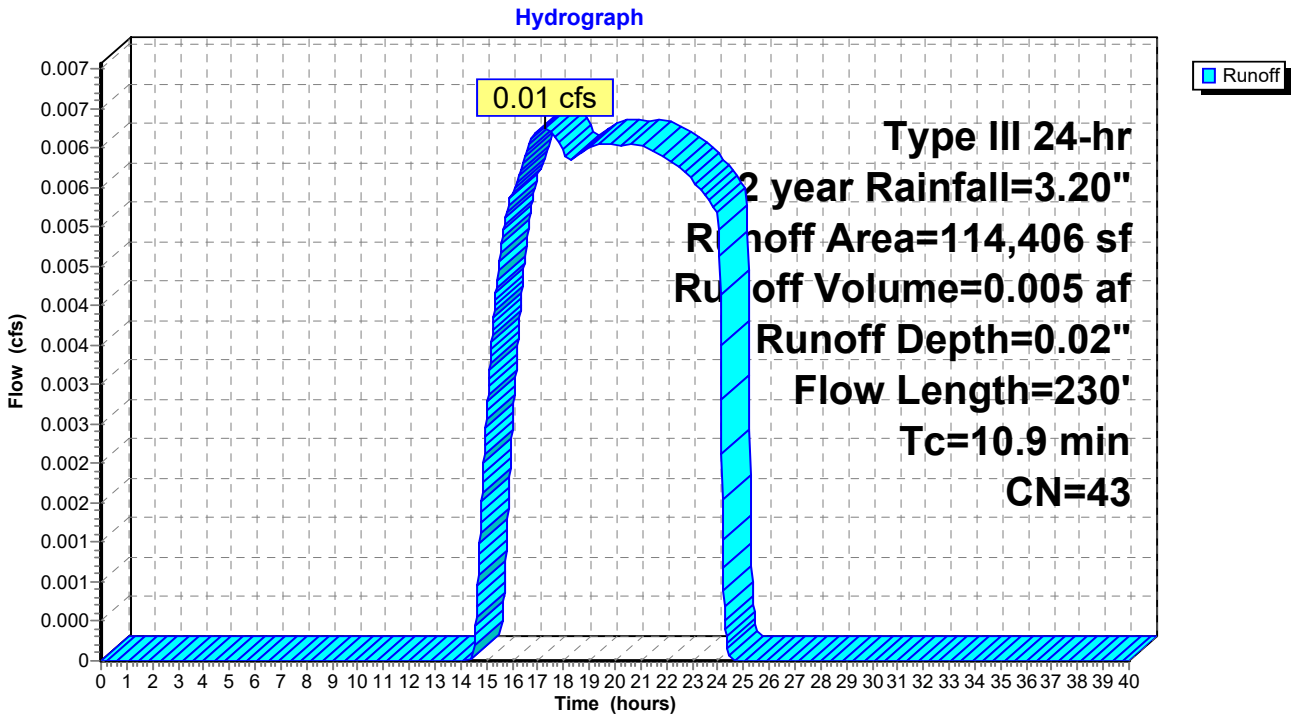
Runoff = 0.01 cfs @ 17.26 hrs, Volume= 0.005 af, Depth= 0.02"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

Area (sf)	CN	Description
114,406	43	Woods/grass comb., Fair, HSG A
114,406		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1650	0.18		**Sheet Flow, Wood/Grass** Woods: Light underbrush n= 0.400 P2= 3.20"
1.7	130	0.0346	1.30		**Shallow Concentrated Flow, Wetland** Short Grass Pasture Kv= 7.0 fps
10.9	230	Total			

Subcatchment 6S: Wetlands



Summary for Subcatchment 7S: To Fencourt Ave

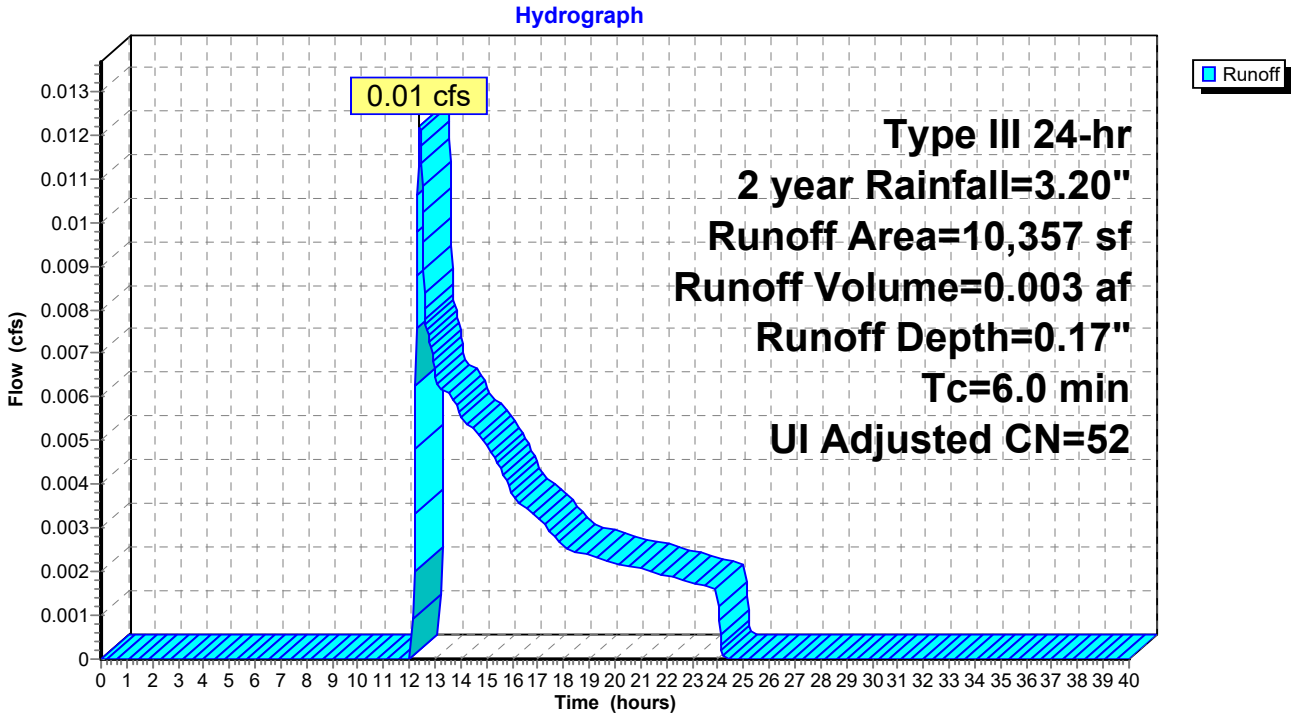
Runoff = 0.01 cfs @ 12.41 hrs, Volume= 0.003 af, Depth= 0.17"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 year Rainfall=3.20"

	Area (sf)	CN	Adj	Description
	1,190	98		Unconnected pavement, HSG A
	5,872	49		50-75% Grass cover, Fair, HSG A
*	3,295	49		Playground area
	10,357	55	52	Weighted Average, UI Adjusted
	9,167			88.51% Pervious Area
	1,190			11.49% Impervious Area
	1,190			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Walkway/Grass**

Subcatchment 7S: To Fencourt Ave



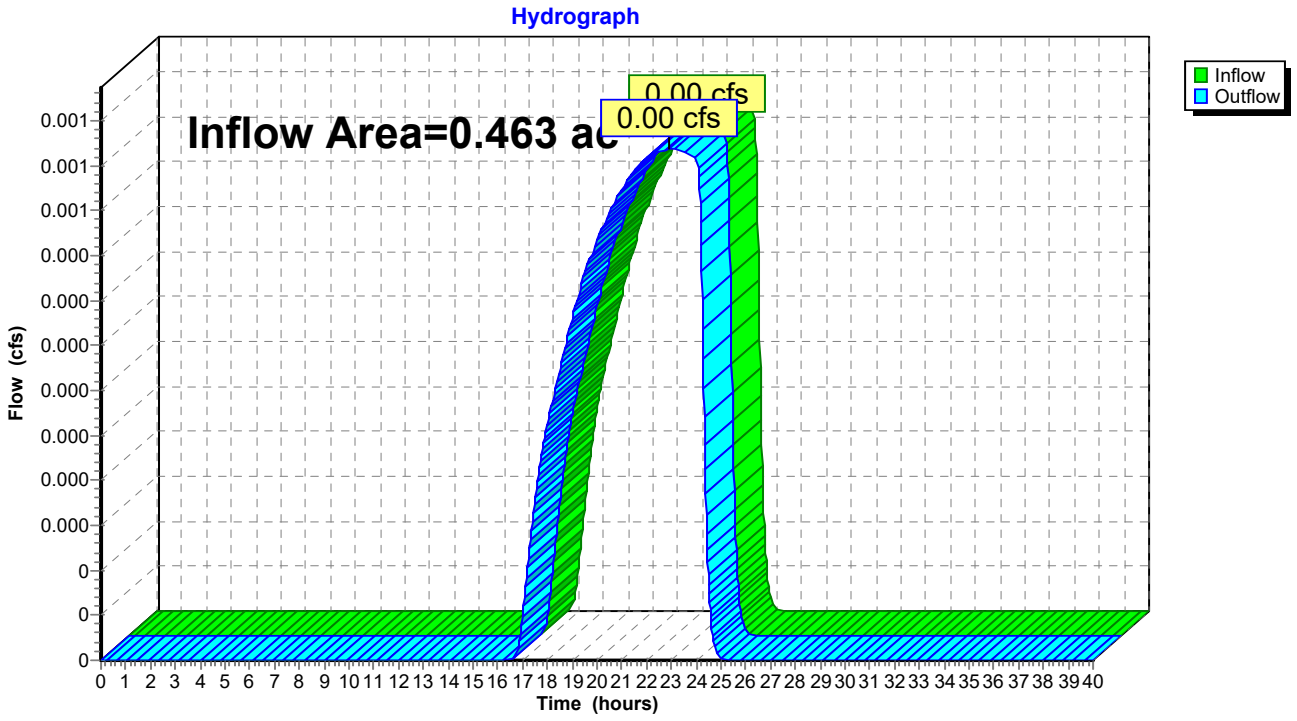
Summary for Reach 5R: Grass Paved Area #5 (12" RCP)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.463 ac, 2.56% Impervious, Inflow Depth = 0.01" for 2 year event
Inflow = 0.00 cfs @ 22.92 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 22.92 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node ALL

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach 5R: Grass Paved Area #5 (12" RCP)



Summary for Pond 1P: Infiltration System 1 (To Fencourt Ave)

Inflow Area = 0.440 ac, 78.76% Impervious, Inflow Depth = 1.76" for 2 year event
Inflow = 0.91 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.08 cfs @ 11.62 hrs, Volume= 0.064 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.62 hrs, Volume= 0.064 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 133.21' @ 13.22 hrs Surf.Area= 0.032 ac Storage= 0.025 af

Plug-Flow detention time= 123.3 min calculated for 0.064 af (100% of inflow)
Center-of-Mass det. time= 123.3 min (949.3 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.00'	0.022 af	**21.62'W x 64.99'L x 2.98'H Field A** 0.096 af Overall - 0.041 af Embedded = 0.055 af x 40.0% Voids
#2A	132.25'	0.039 af	**ACF R-Tank SD 3** x 260 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 260 Chambers in 10 Rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 11.62 hrs HW=132.03' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=132.00' (Free Discharge)
↑┌**2=Orifice/Grate** (Controls 0.00 cfs)
├**3=Orifice/Grate** (Controls 0.00 cfs)
├**4=Orifice/Grate** (Controls 0.00 cfs)
├**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Infiltration System 1 (To Fencourt Ave) - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

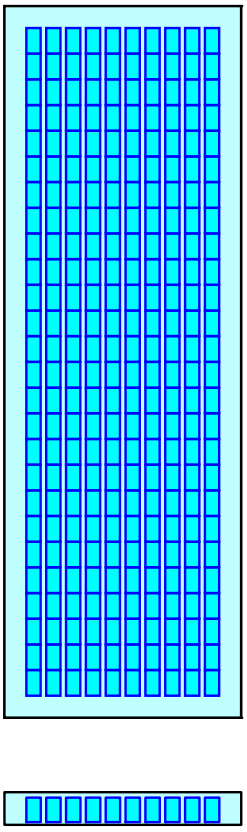
26 Chambers/Row x 2.35' Long = 60.99' Row Length +24.0" End Stone x 2 = 64.99' Base Length
10 Rows x 15.7" Wide + 6.0" Spacing x 9 + 24.0" Side Stone x 2 = 21.62' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

260 Chambers x 6.5 cf = 1,696.4 cf Chamber Storage
260 Chambers x 6.9 cf = 1,785.7 cf Displacement

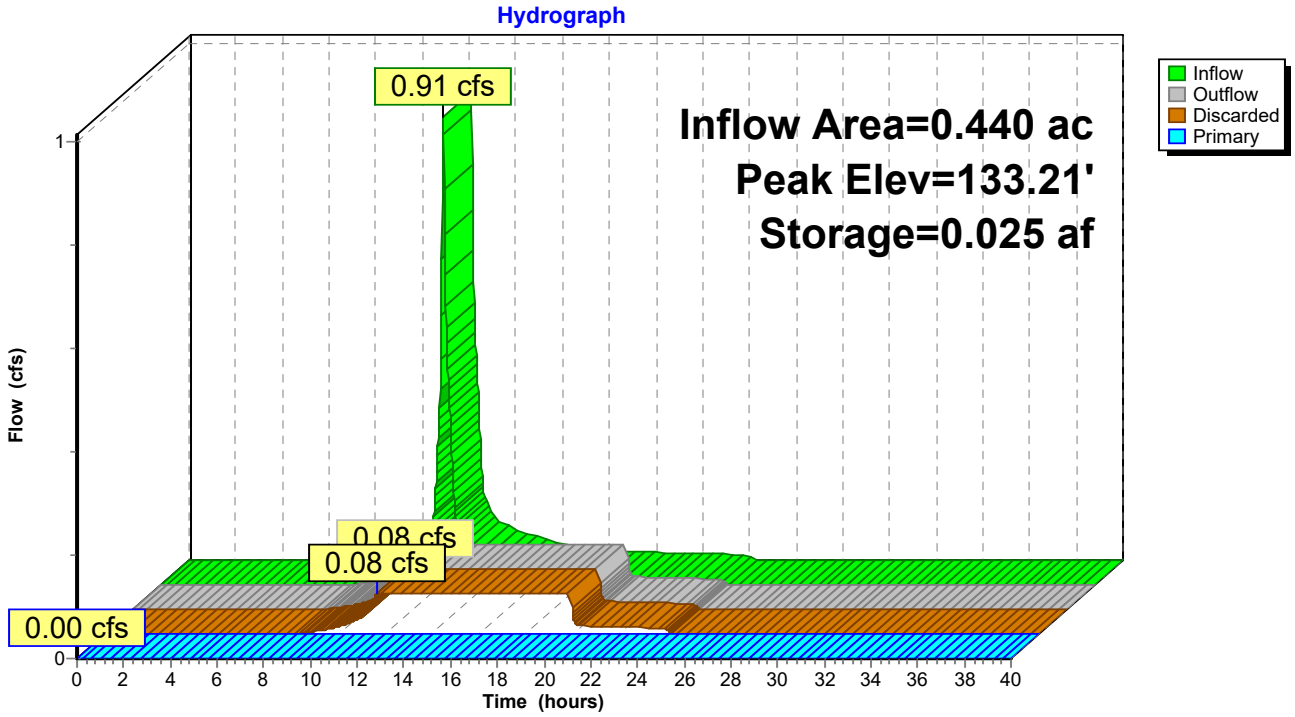
4,189.2 cf Field - 1,785.7 cf Chambers = 2,403.5 cf Stone x 40.0% Voids = 961.4 cf Stone Storage

Chamber Storage + Stone Storage = 2,657.8 cf = 0.061 af
Overall Storage Efficiency = 63.4%
Overall System Size = 64.99' x 21.62' x 2.98'

260 Chambers
155.2 cy Field
89.0 cy Stone



Pond 1P: Infiltration System 1 (To Fencourt Ave)



Summary for Pond 2P: Infiltration System 2

Inflow Area = 1.058 ac, 89.88% Impervious, Inflow Depth = 2.35" for 2 year event
Inflow = 2.84 cfs @ 12.09 hrs, Volume= 0.207 af
Outflow = 0.27 cfs @ 11.56 hrs, Volume= 0.207 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.27 cfs @ 11.56 hrs, Volume= 0.207 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 132.75' @ 12.96 hrs Surf.Area= 0.110 ac Storage= 0.077 af

Plug-Flow detention time= 98.2 min calculated for 0.207 af (100% of inflow)
Center-of-Mass det. time= 98.2 min (895.9 - 797.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	131.70'	0.068 af	**48.81'W x 97.83'L x 2.98'H Field A** 0.327 af Overall - 0.158 af Embedded = 0.169 af x 40.0% Voids
#2A	131.95'	0.150 af	**ACF R-Tank SD 3** x 1000 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 1000 Chambers in 25 Rows
		0.217 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 11.56 hrs HW=131.73' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=131.70' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Infiltration System 2 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

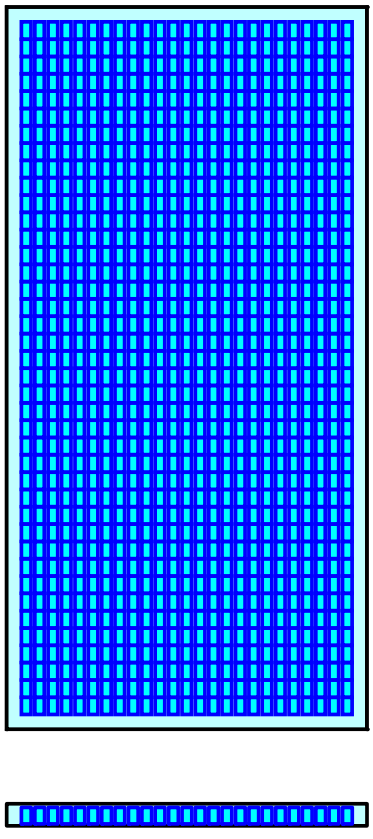
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
25 Rows x 15.7" Wide + 6.0" Spacing x 24 + 24.0" Side Stone x 2 = 48.81' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

1,000 Chambers x 6.5 cf = 6,524.6 cf Chamber Storage
1,000 Chambers x 6.9 cf = 6,868.0 cf Displacement

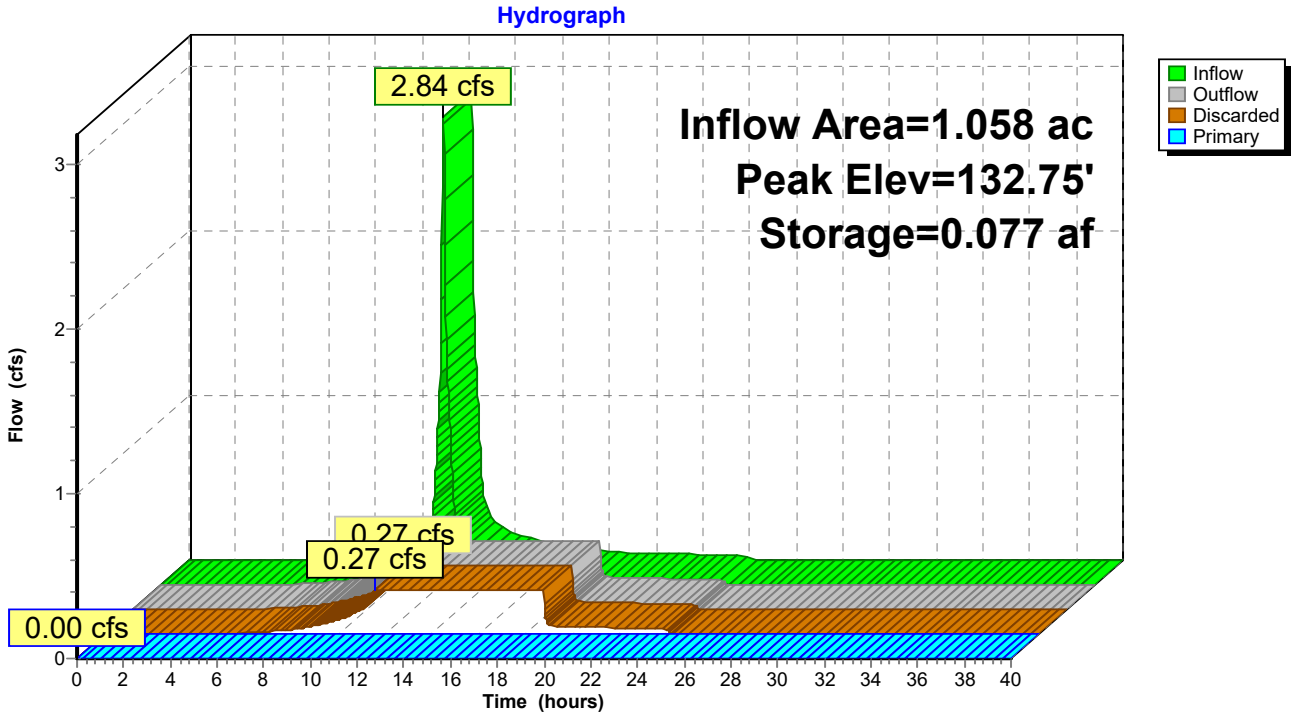
14,234.2 cf Field - 6,868.0 cf Chambers = 7,366.2 cf Stone x 40.0% Voids = 2,946.5 cf Stone Storage

Chamber Storage + Stone Storage = 9,471.1 cf = 0.217 af
Overall Storage Efficiency = 66.5%
Overall System Size = 97.83' x 48.81' x 2.98'

1,000 Chambers
527.2 cy Field
272.8 cy Stone



Pond 2P: Infiltration System 2



Summary for Pond 3P: Infiltration System 3

Inflow Area = 0.631 ac, 96.52% Impervious, Inflow Depth = 2.75" for 2 year event
Inflow = 1.89 cfs @ 12.08 hrs, Volume= 0.145 af
Outflow = 0.19 cfs @ 11.48 hrs, Volume= 0.145 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.19 cfs @ 11.48 hrs, Volume= 0.145 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.69' @ 12.86 hrs Surf.Area= 0.077 ac Storage= 0.050 af

Plug-Flow detention time= 83.0 min calculated for 0.145 af (100% of inflow)
Center-of-Mass det. time= 83.0 min (857.0 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.70'	0.041 af	**34.31'W x 97.83'L x 2.26'H Field A** 0.174 af Overall - 0.073 af Embedded = 0.102 af x 40.0% Voids
#2A	133.95'	0.069 af	**ACF R-Tank SD 2** x 680 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 680 Chambers in 17 Rows
		0.110 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.90'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	135.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.19 cfs @ 11.48 hrs HW=133.72' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=133.70' (Free Discharge)
↑├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Infiltration System 3 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

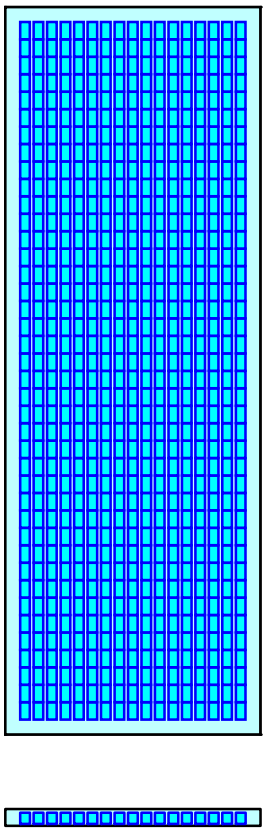
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
17 Rows x 15.7" Wide + 6.0" Spacing x 16 + 24.0" Side Stone x 2 = 34.31' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

680 Chambers x 4.4 cf = 3,001.3 cf Chamber Storage
680 Chambers x 4.6 cf = 3,159.3 cf Displacement

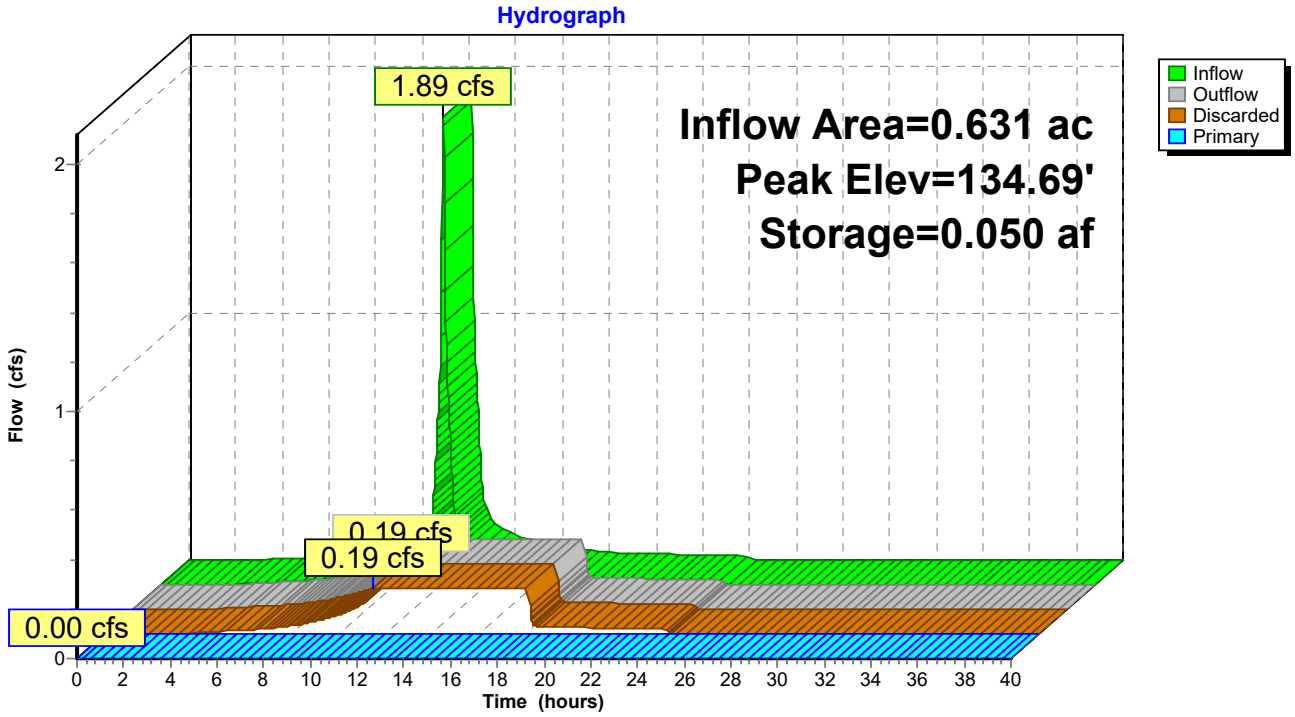
7,583.2 cf Field - 3,159.3 cf Chambers = 4,423.9 cf Stone x 40.0% Voids = 1,769.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,770.9 cf = 0.110 af
Overall Storage Efficiency = 62.9%
Overall System Size = 97.83' x 34.31' x 2.26'

680 Chambers
280.9 cy Field
163.8 cy Stone



Pond 3P: Infiltration System 3



Summary for Pond 4P: Infiltration System 4

Inflow Area = 1.650 ac, 88.33% Impervious, Inflow Depth = 2.26" for 2 year event
Inflow = 4.29 cfs @ 12.09 hrs, Volume= 0.310 af
Outflow = 0.51 cfs @ 11.66 hrs, Volume= 0.310 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.51 cfs @ 11.66 hrs, Volume= 0.310 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 133.76' @ 12.72 hrs Surf.Area= 0.212 ac Storage= 0.104 af

Plug-Flow detention time= 63.6 min calculated for 0.310 af (100% of inflow)
Center-of-Mass det. time= 63.5 min (866.0 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.106 af	**66.93'W x 137.71'L x 2.26'H Field A** 0.478 af Overall - 0.213 af Embedded = 0.265 af x 40.0% Voids
#2A	133.25'	0.202 af	**ACF R-Tank SD 2** x 1995 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 1995 Chambers in 35 Rows
		0.308 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.30'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 11.66 hrs HW=133.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.51 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=133.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
├**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Infiltration System 4 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

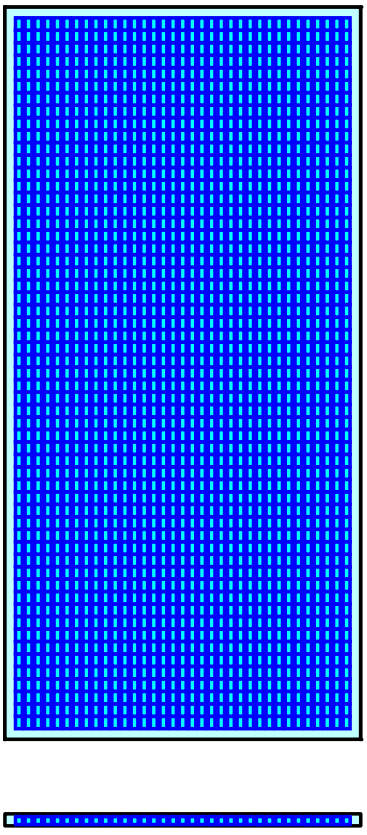
57 Chambers/Row x 2.35' Long = 133.71' Row Length +24.0" End Stone x 2 = 137.71' Base Length
35 Rows x 15.7" Wide + 6.0" Spacing x 34 + 24.0" Side Stone x 2 = 66.93' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

1,995 Chambers x 4.4 cf = 8,805.3 cf Chamber Storage
1,995 Chambers x 4.6 cf = 9,268.8 cf Displacement

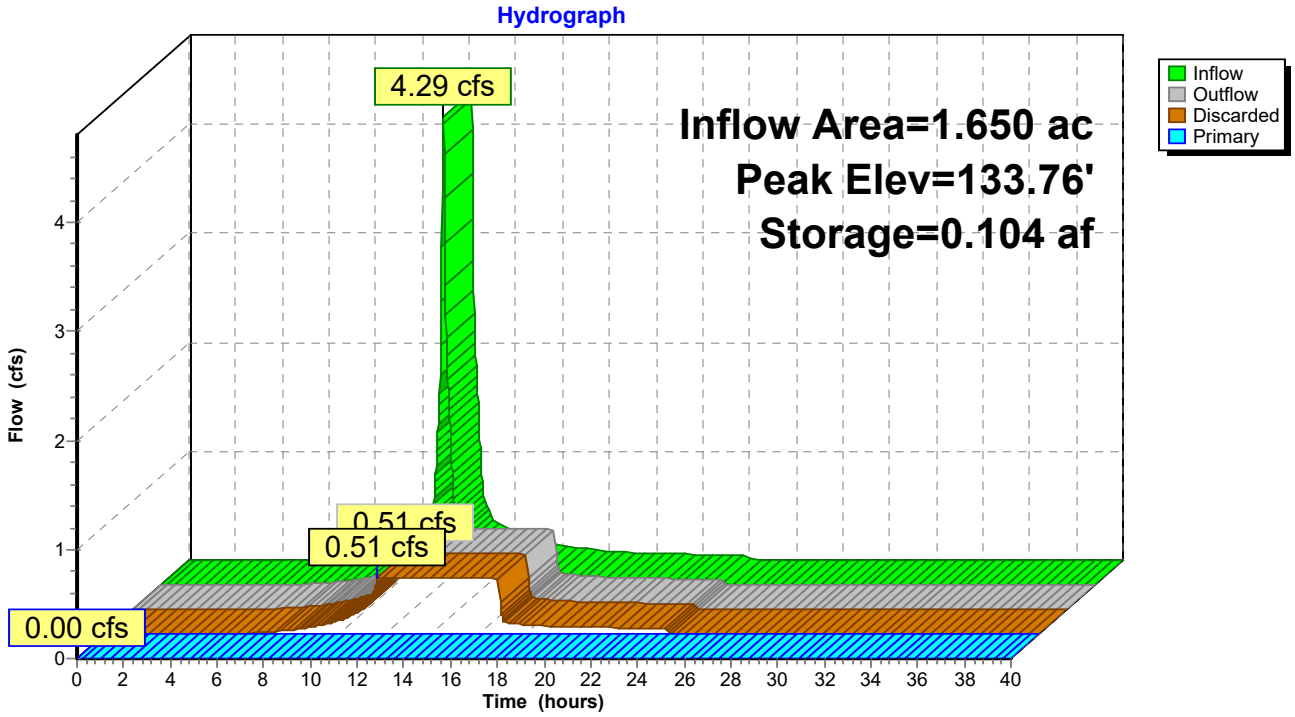
20,823.4 cf Field - 9,268.8 cf Chambers = 11,554.6 cf Stone x 40.0% Voids = 4,621.9 cf Stone Storage

Chamber Storage + Stone Storage = 13,427.2 cf = 0.308 af
Overall Storage Efficiency = 64.5%
Overall System Size = 137.71' x 66.93' x 2.26'

1,995 Chambers
771.2 cy Field
427.9 cy Stone



Pond 4P: Infiltration System 4



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8 Subcat 7S: To Fencourt Ave
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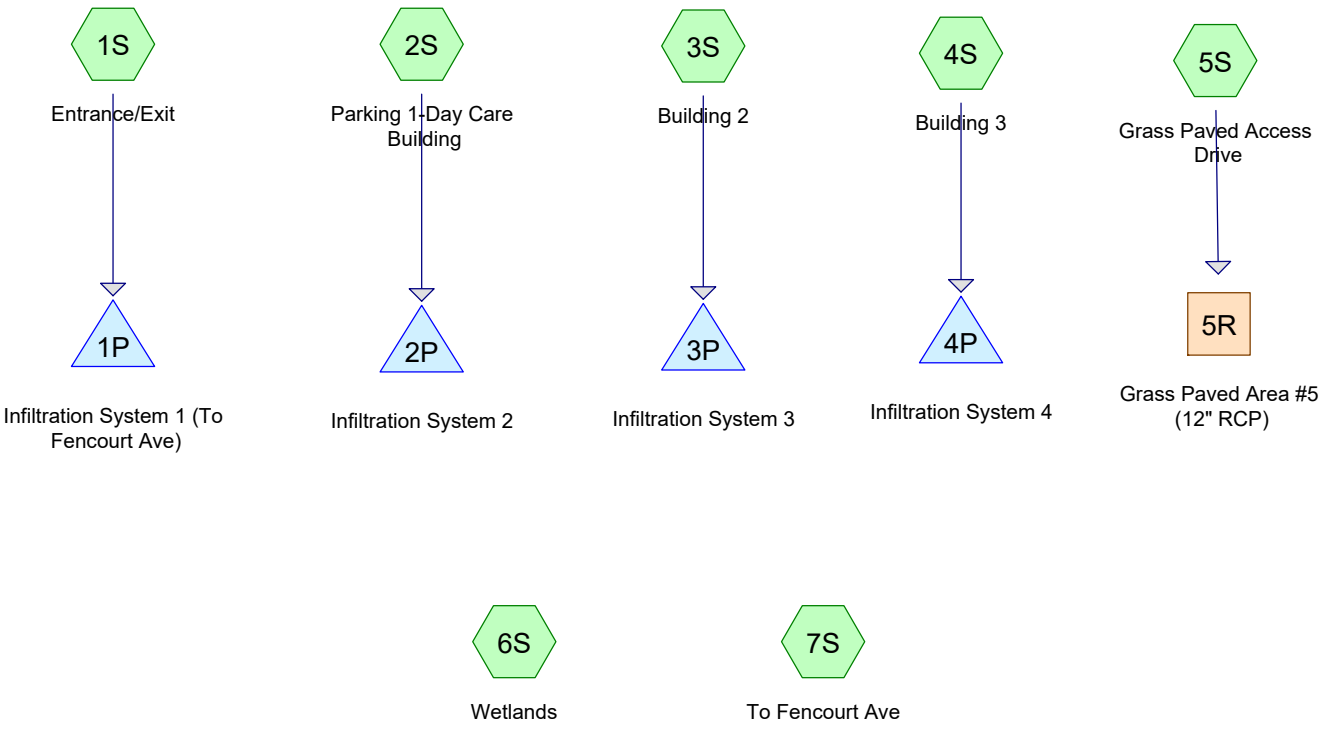
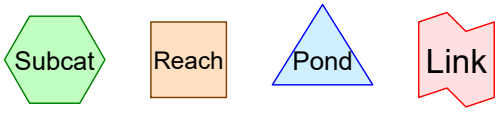
10 Pond 1P: Infiltration System 1 (To Fencourt Ave)
13 Pond 2P: Infiltration System 2
16 Pond 3P: Infiltration System 3
19 Pond 4P: Infiltration System 4





Routing Diagram for 16 Fencourt Avenue-Proposed 10yr storm-2022-09-09
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 1S: Entrance/Exit Runoff Area=19,160 sf 78.76% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=85 Runoff=1.58 cfs 0.113 af

Subcatchment 2S: Parking 1-Day Care Runoff Area=46,100 sf 89.88% Impervious Runoff Depth=3.80"
Tc=6.0 min CN=92 Runoff=4.48 cfs 0.335 af

Subcatchment 3S: Building 2 Runoff Area=27,489 sf 96.52% Impervious Runoff Depth=4.23"
Tc=6.0 min CN=96 Runoff=2.84 cfs 0.223 af

Subcatchment 4S: Building 3 Runoff Area=71,865 sf 88.33% Impervious Runoff Depth=3.69"
Tc=6.0 min CN=91 Runoff=6.85 cfs 0.507 af

Subcatchment 5S: Grass Paved Access Runoff Area=20,147 sf 2.56% Impervious Runoff Depth=0.20"
Flow Length=435' Slope=0.0050 '/' Tc=22.4 min CN=41 Runoff=0.02 cfs 0.008 af

Subcatchment 6S: Wetlands Runoff Area=114,406 sf 0.00% Impervious Runoff Depth=0.27"
Flow Length=230' Tc=10.9 min CN=43 Runoff=0.22 cfs 0.060 af

Subcatchment 7S: To Fencourt Ave Runoff Area=10,357 sf 11.49% Impervious Runoff Depth=0.67"
Tc=6.0 min UI Adjusted CN=52 Runoff=0.12 cfs 0.013 af

Reach 5R: Grass Paved Area #5 (12" RCP) Inflow=0.02 cfs 0.008 af
Outflow=0.02 cfs 0.008 af

Pond 1P: Infiltration System 1 (To Fencourt Peak Elev=134.17' Storage=0.047 af Inflow=1.58 cfs 0.113 af
Discarded=0.08 cfs 0.102 af Primary=0.13 cfs 0.011 af Outflow=0.21 cfs 0.113 af

Pond 2P: Infiltration System 2 Peak Elev=133.60' Storage=0.147 af Inflow=4.48 cfs 0.335 af
Discarded=0.27 cfs 0.335 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.335 af

Pond 3P: Infiltration System 3 Peak Elev=135.22' Storage=0.080 af Inflow=2.84 cfs 0.223 af
Discarded=0.19 cfs 0.201 af Primary=0.26 cfs 0.022 af Outflow=0.44 cfs 0.223 af

Pond 4P: Infiltration System 4 Peak Elev=134.31' Storage=0.193 af Inflow=6.85 cfs 0.507 af
Discarded=0.51 cfs 0.477 af Primary=0.20 cfs 0.030 af Outflow=0.72 cfs 0.507 af

Total Runoff Area = 7.106 ac Runoff Volume = 1.260 af Average Runoff Depth = 2.13"
52.11% Pervious = 3.703 ac 47.89% Impervious = 3.403 ac

Summary for Subcatchment 1S: Entrance/Exit

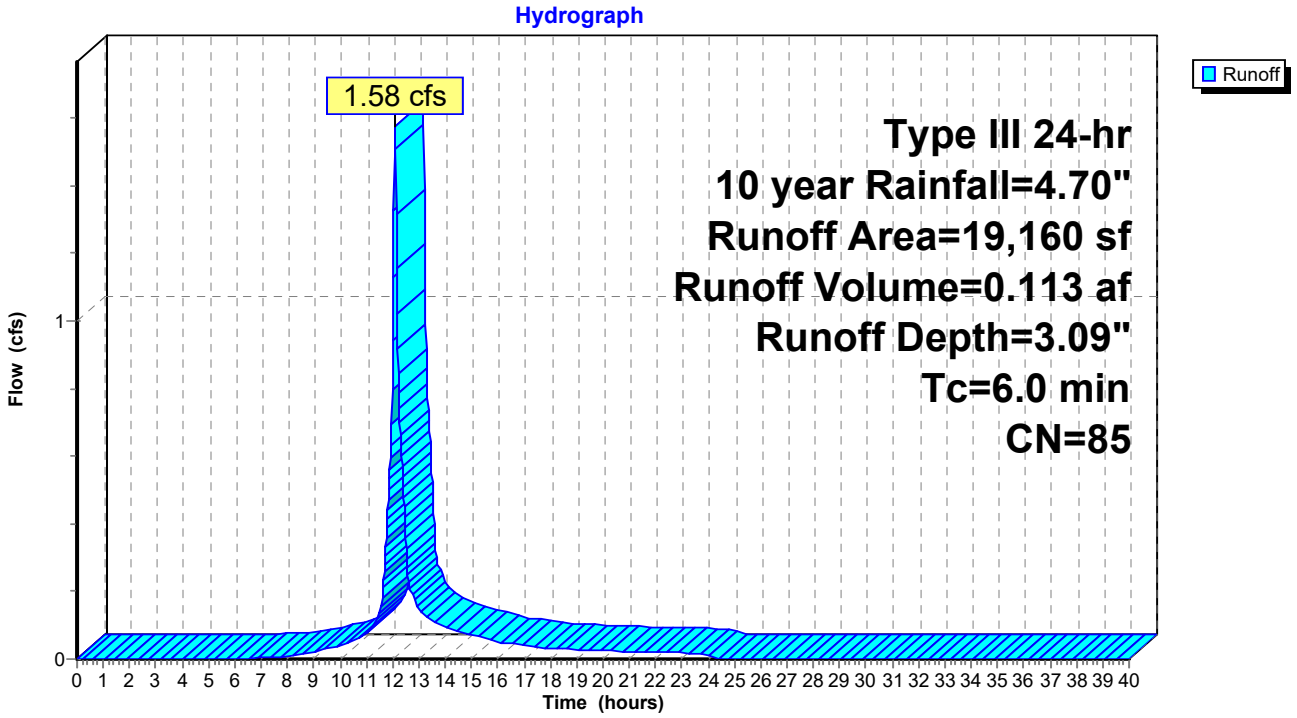
Runoff = 1.58 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 3.09"
Routed to Pond 1P : Infiltration System 1 (To Fencourt Ave)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
15,090	98	Paved parking, HSG A
4,070	39	>75% Grass cover, Good, HSG A
19,160	85	Weighted Average
4,070		21.24% Pervious Area
15,090		78.76% Impervious Area

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

Subcatchment 1S: Entrance/Exit



Summary for Subcatchment 2S: Parking 1-Day Care Building

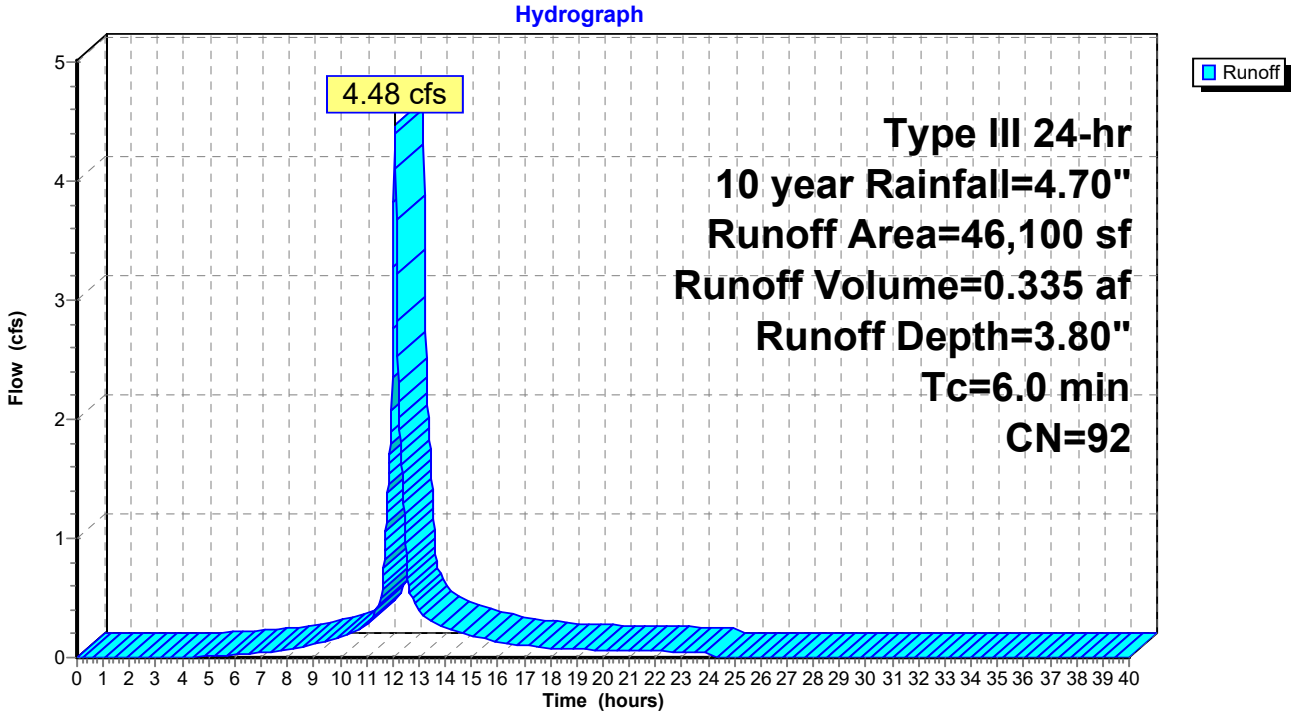
Runoff = 4.48 cfs @ 12.08 hrs, Volume= 0.335 af, Depth= 3.80"
Routed to Pond 2P : Infiltration System 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
	28,601	98	Paved parking, HSG A
	4,664	39	>75% Grass cover, Good, HSG A
*	12,835	98	Daycare Building, HSG A
	46,100	92	Weighted Average
	4,664		10.12% Pervious Area
	41,436		89.88% Impervious Area

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

Subcatchment 2S: Parking 1-Day Care Building



Summary for Subcatchment 3S: Building 2

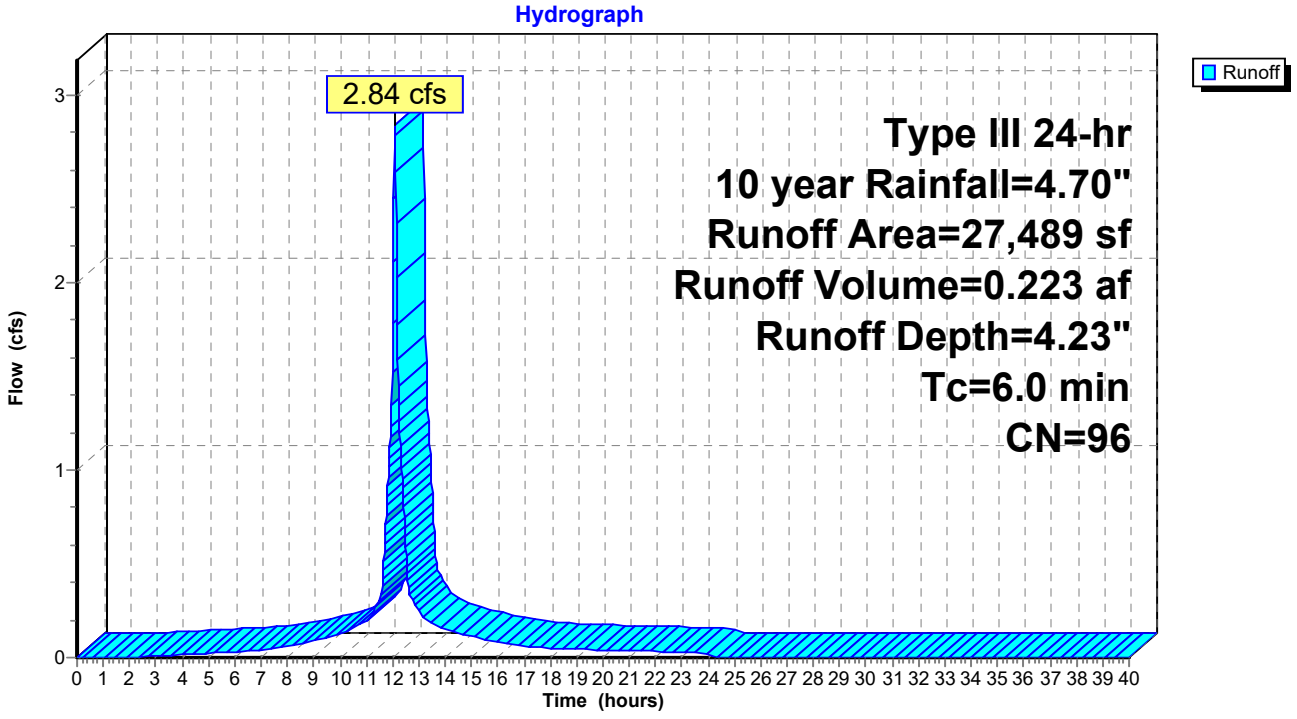
Runoff = 2.84 cfs @ 12.08 hrs, Volume= 0.223 af, Depth= 4.23"
Routed to Pond 3P : Infiltration System 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
	9,395	98	Paved parking, HSG A
*	17,137	98	Building #2, HSG A
	957	39	>75% Grass cover, Good, HSG A
	27,489	96	Weighted Average
	957		3.48% Pervious Area
	26,532		96.52% Impervious Area

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

Subcatchment 3S: Building 2



Summary for Subcatchment 4S: Building 3

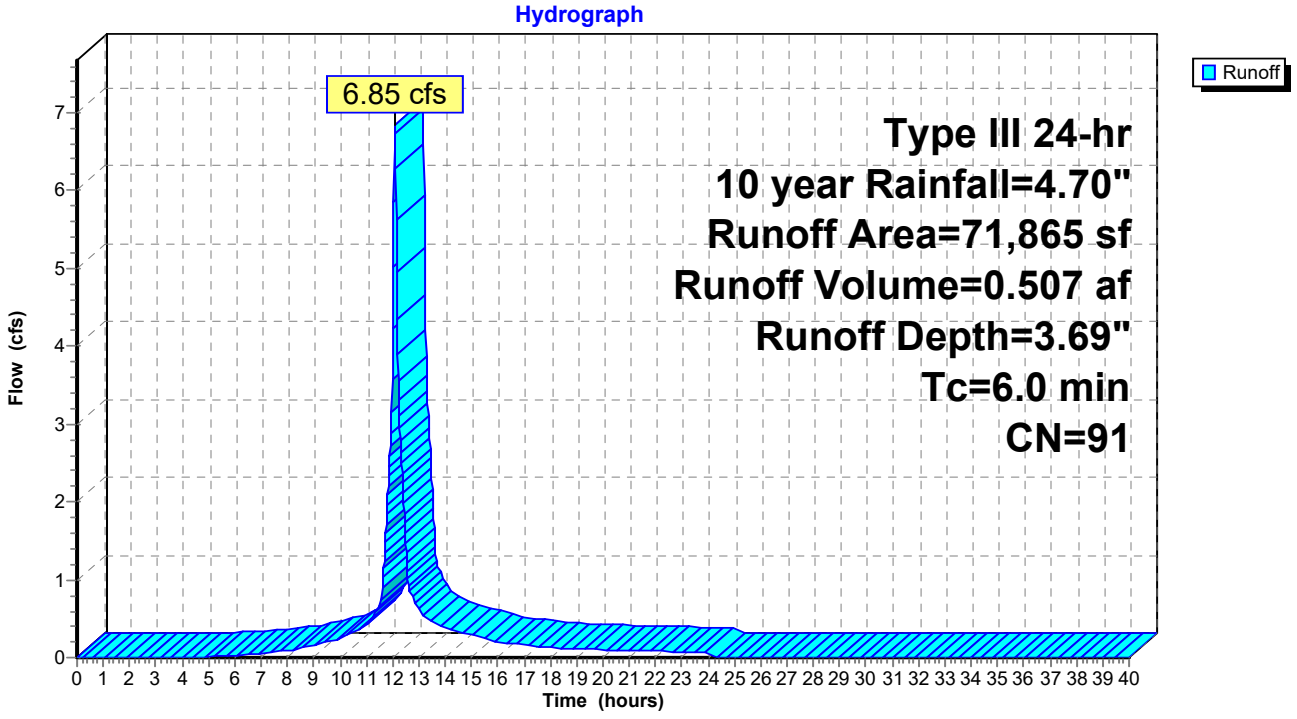
Runoff = 6.85 cfs @ 12.08 hrs, Volume= 0.507 af, Depth= 3.69"
Routed to Pond 4P : Infiltration System 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
	40,672	98	Paved parking, HSG A
*	22,804	98	Building 3, HSG A
	8,389	39	>75% Grass cover, Good, HSG A
	71,865	91	Weighted Average
	8,389		11.67% Pervious Area
	63,476		88.33% Impervious Area

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

Subcatchment 4S: Building 3



Summary for Subcatchment 5S: Grass Paved Access Drive

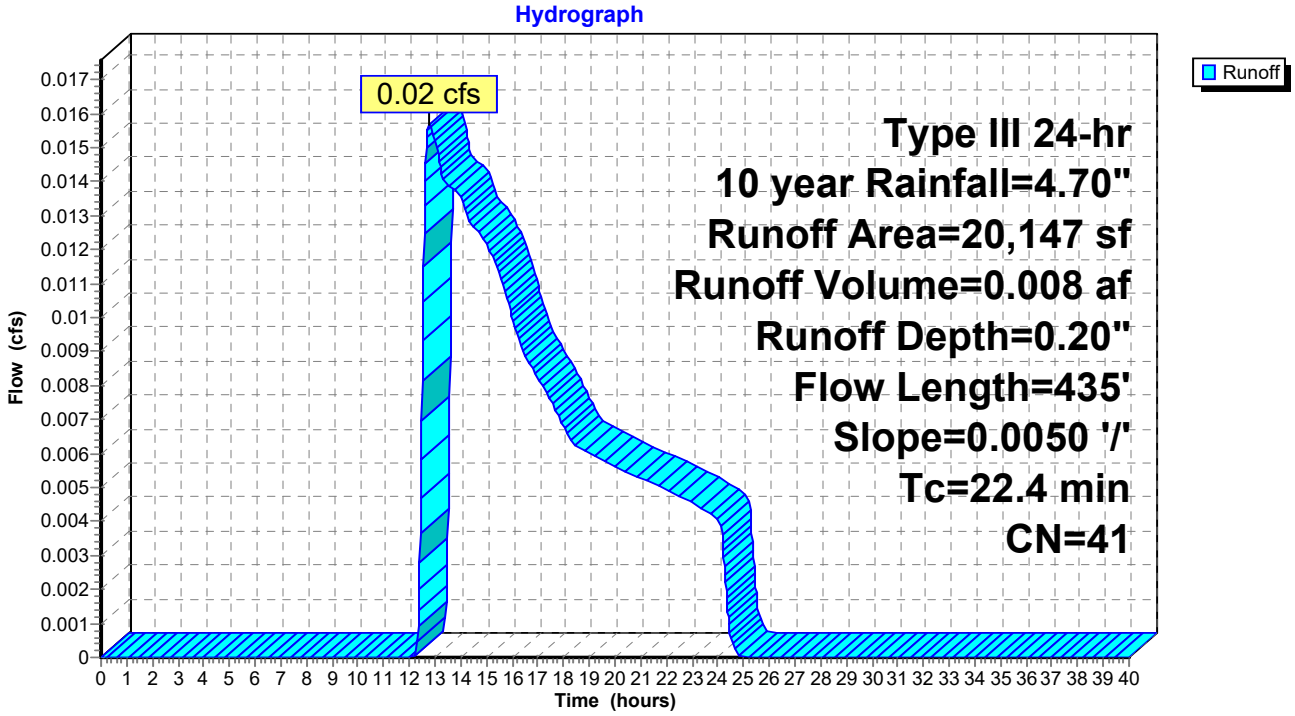
Runoff = 0.02 cfs @ 12.76 hrs, Volume= 0.008 af, Depth= 0.20"
Routed to Reach 5R : Grass Paved Area #5 (12" RCP)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
	19,632	39	>75% Grass cover, Good, HSG A
*	515	98	Walkway, HSG A
	20,147	41	Weighted Average
	19,632		97.44% Pervious Area
	515		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0050	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
5.3	335	0.0050	1.06		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
22.4	435	Total			

Subcatchment 5S: Grass Paved Access Drive



Summary for Subcatchment 6S: Wetlands

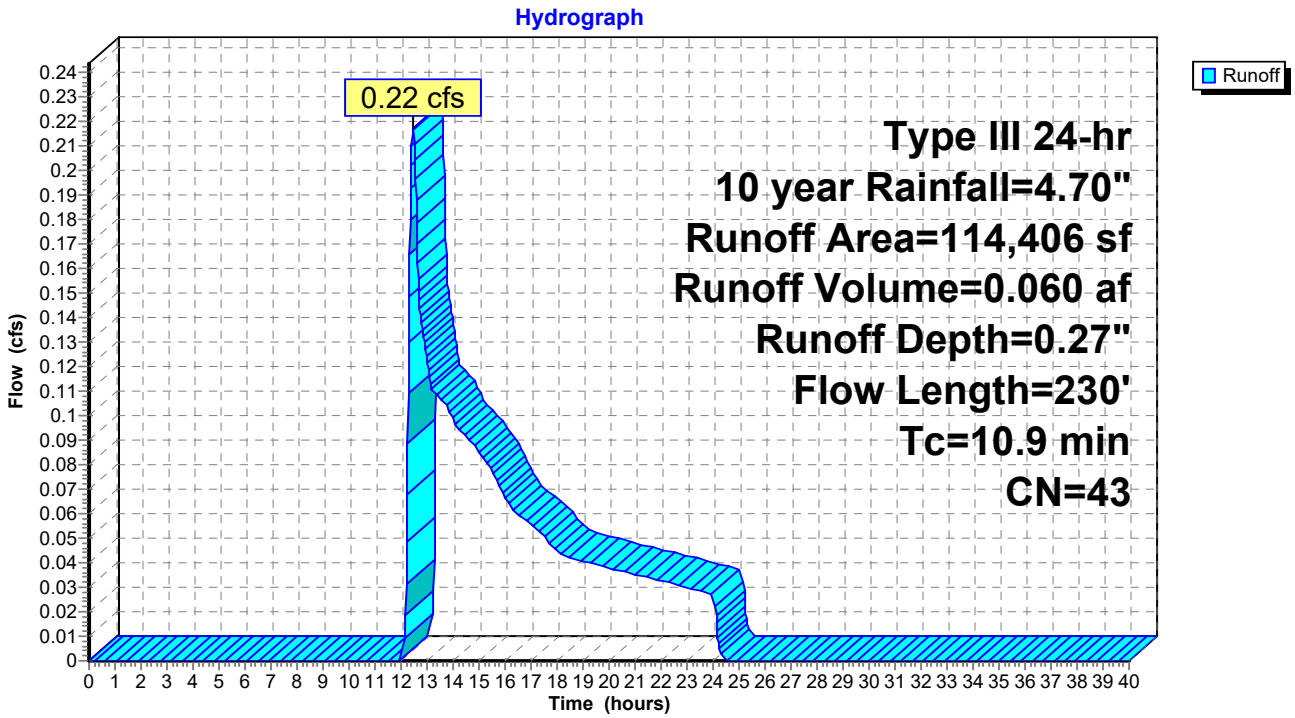
Runoff = 0.22 cfs @ 12.47 hrs, Volume= 0.060 af, Depth= 0.27"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
114,406	43	Woods/grass comb., Fair, HSG A
114,406		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1650	0.18		**Sheet Flow, Wood/Grass** Woods: Light underbrush n= 0.400 P2= 3.20"
1.7	130	0.0346	1.30		**Shallow Concentrated Flow, Wetland** Short Grass Pasture Kv= 7.0 fps
10.9	230	Total			

Subcatchment 6S: Wetlands



Summary for Subcatchment 7S: To Fencourt Ave

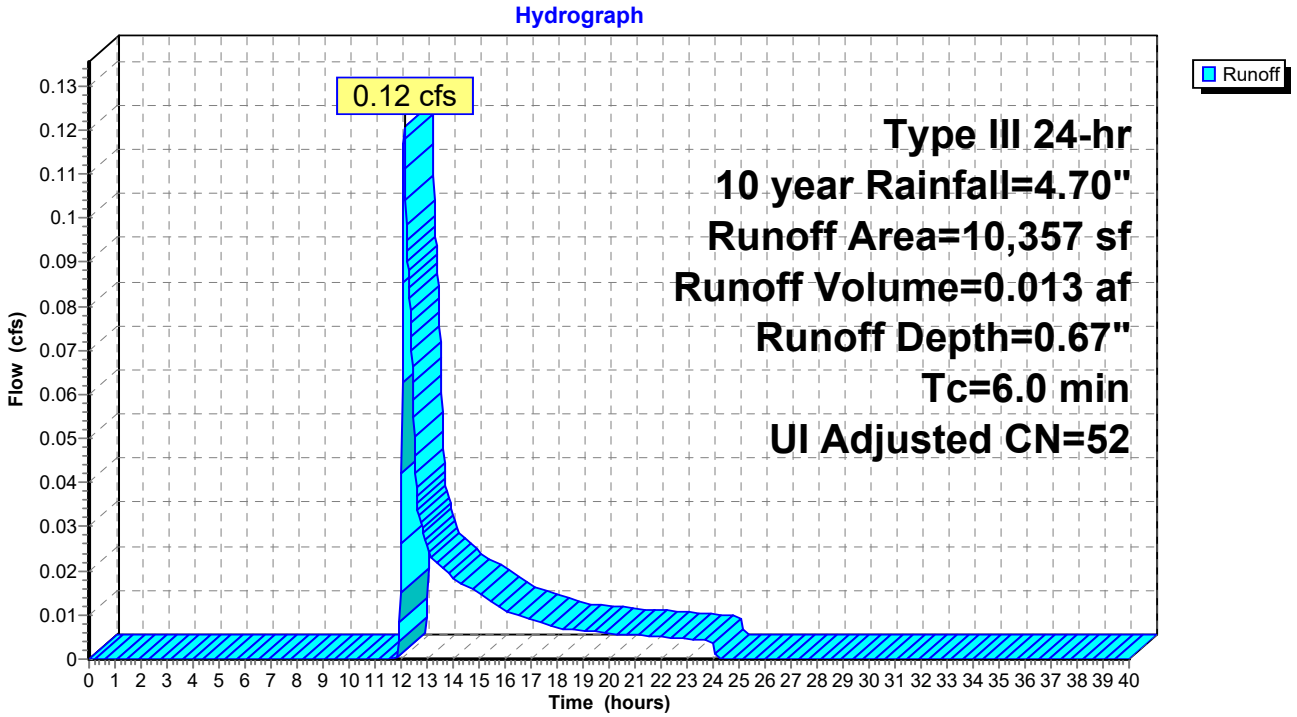
Runoff = 0.12 cfs @ 12.12 hrs, Volume= 0.013 af, Depth= 0.67"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Adj	Description
	1,190	98		Unconnected pavement, HSG A
	5,872	49		50-75% Grass cover, Fair, HSG A
*	3,295	49		Playground area
	10,357	55	52	Weighted Average, UI Adjusted
	9,167			88.51% Pervious Area
	1,190			11.49% Impervious Area
	1,190			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Walkway/Grass**

Subcatchment 7S: To Fencourt Ave



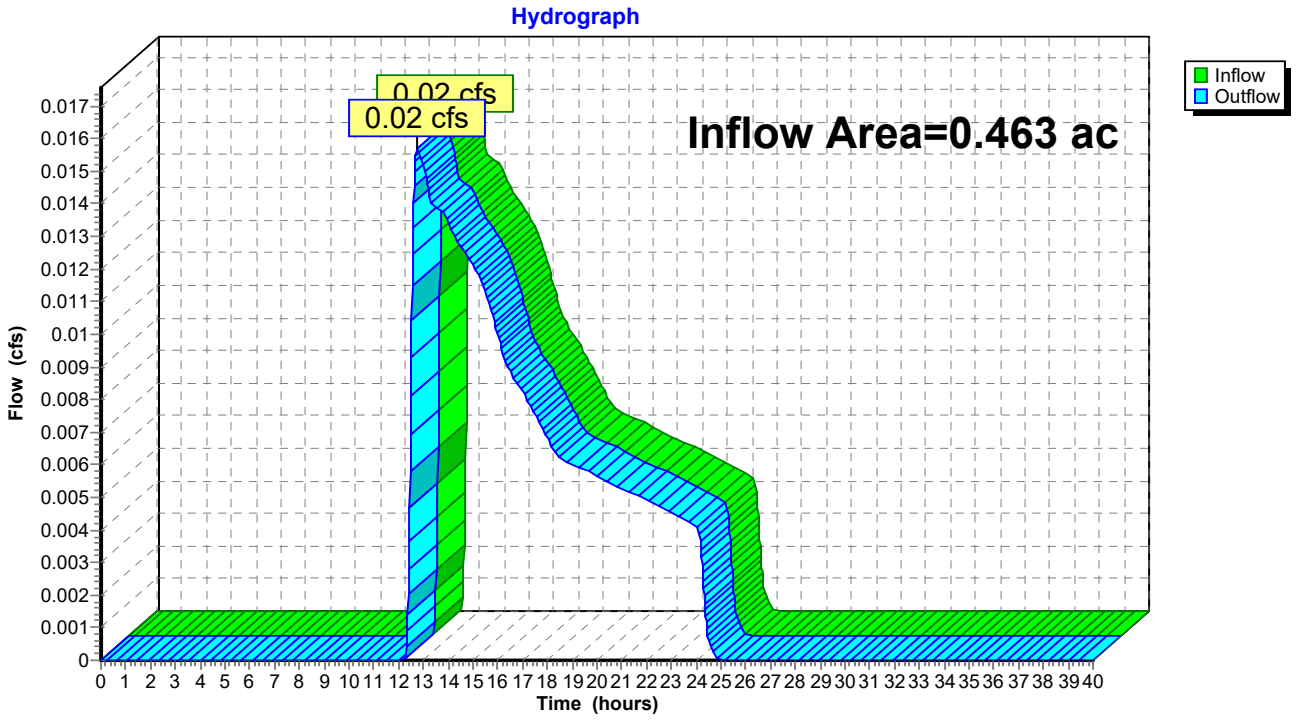
Summary for Reach 5R: Grass Paved Area #5 (12" RCP)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.463 ac, 2.56% Impervious, Inflow Depth = 0.20" for 10 year event
Inflow = 0.02 cfs @ 12.76 hrs, Volume= 0.008 af
Outflow = 0.02 cfs @ 12.76 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node ALL

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach 5R: Grass Paved Area #5 (12" RCP)



Summary for Pond 1P: Infiltration System 1 (To Fencourt Ave)

Inflow Area = 0.440 ac, 78.76% Impervious, Inflow Depth = 3.09" for 10 year event
Inflow = 1.58 cfs @ 12.09 hrs, Volume= 0.113 af
Outflow = 0.21 cfs @ 12.66 hrs, Volume= 0.113 af, Atten= 87%, Lag= 34.4 min
Discarded = 0.08 cfs @ 11.10 hrs, Volume= 0.102 af
Primary = 0.13 cfs @ 12.66 hrs, Volume= 0.011 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.17' @ 12.66 hrs Surf.Area= 0.032 ac Storage= 0.047 af

Plug-Flow detention time= 214.2 min calculated for 0.113 af (100% of inflow)
Center-of-Mass det. time= 214.2 min (1,024.1 - 810.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.00'	0.022 af	**21.62'W x 64.99'L x 2.98'H Field A** 0.096 af Overall - 0.041 af Embedded = 0.055 af x 40.0% Voids
#2A	132.25'	0.039 af	**ACF R-Tank SD 3** x 260 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 260 Chambers in 10 Rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 11.10 hrs HW=132.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.13 cfs @ 12.66 hrs HW=134.17' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
├**3=Orifice/Grate** (Controls 0.00 cfs)
├**4=Orifice/Grate** (Controls 0.00 cfs)
├**5=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.41 fps)
└**6=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.41 fps)

Pond 1P: Infiltration System 1 (To Fencourt Ave) - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

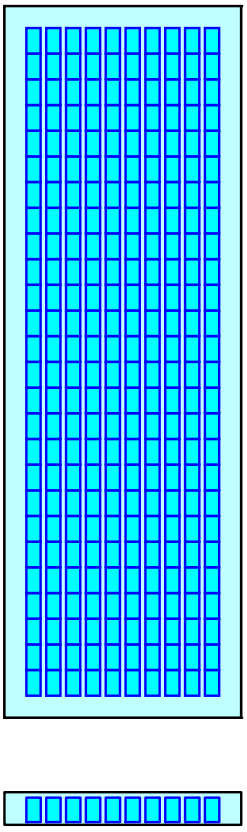
26 Chambers/Row x 2.35' Long = 60.99' Row Length +24.0" End Stone x 2 = 64.99' Base Length
10 Rows x 15.7" Wide + 6.0" Spacing x 9 + 24.0" Side Stone x 2 = 21.62' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

260 Chambers x 6.5 cf = 1,696.4 cf Chamber Storage
260 Chambers x 6.9 cf = 1,785.7 cf Displacement

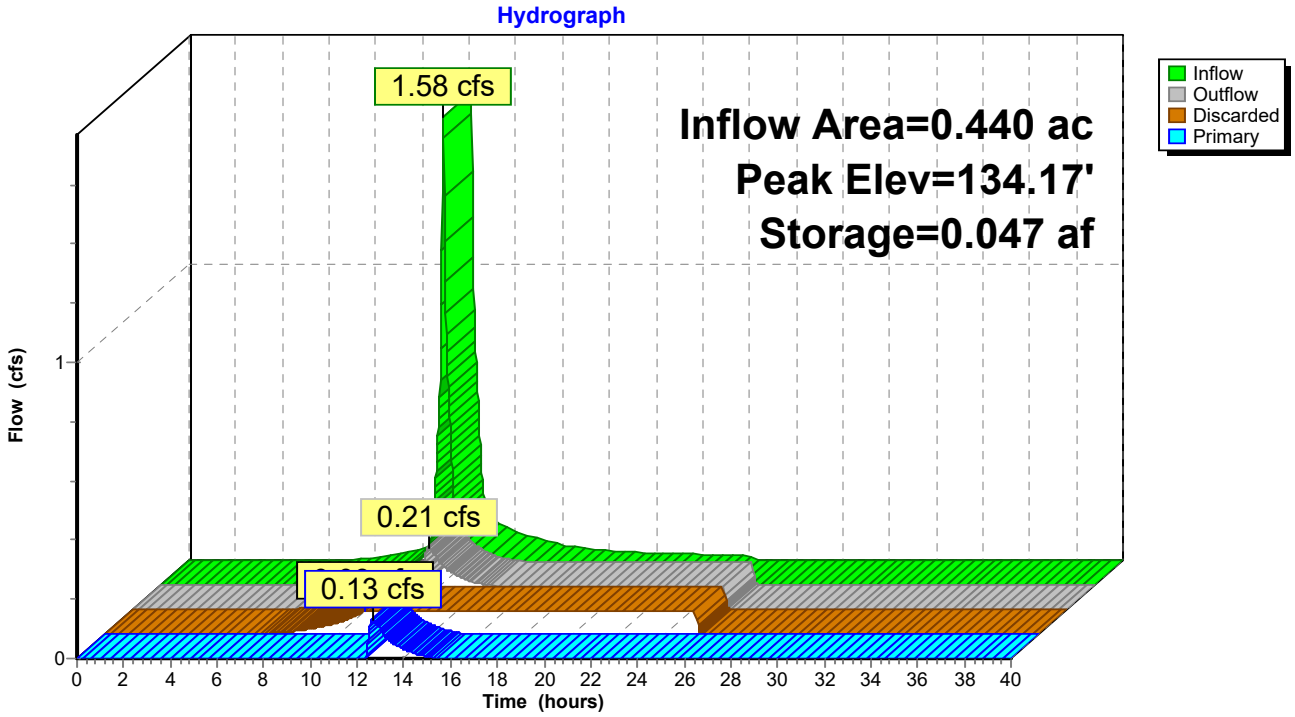
4,189.2 cf Field - 1,785.7 cf Chambers = 2,403.5 cf Stone x 40.0% Voids = 961.4 cf Stone Storage

Chamber Storage + Stone Storage = 2,657.8 cf = 0.061 af
Overall Storage Efficiency = 63.4%
Overall System Size = 64.99' x 21.62' x 2.98'

260 Chambers
155.2 cy Field
89.0 cy Stone



Pond 1P: Infiltration System 1 (To Fencourt Ave)



Summary for Pond 2P: Infiltration System 2

Inflow Area = 1.058 ac, 89.88% Impervious, Inflow Depth = 3.80" for 10 year event
Inflow = 4.48 cfs @ 12.08 hrs, Volume= 0.335 af
Outflow = 0.27 cfs @ 11.00 hrs, Volume= 0.335 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.27 cfs @ 11.00 hrs, Volume= 0.335 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 133.60' @ 13.83 hrs Surf.Area= 0.110 ac Storage= 0.147 af

Plug-Flow detention time= 206.2 min calculated for 0.335 af (100% of inflow)
Center-of-Mass det. time= 206.2 min (990.9 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	131.70'	0.068 af	**48.81'W x 97.83'L x 2.98'H Field A** 0.327 af Overall - 0.158 af Embedded = 0.169 af x 40.0% Voids
#2A	131.95'	0.150 af	**ACF R-Tank SD 3** x 1000 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 1000 Chambers in 25 Rows
		0.217 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 11.00 hrs HW=131.73' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=131.70' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Infiltration System 2 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

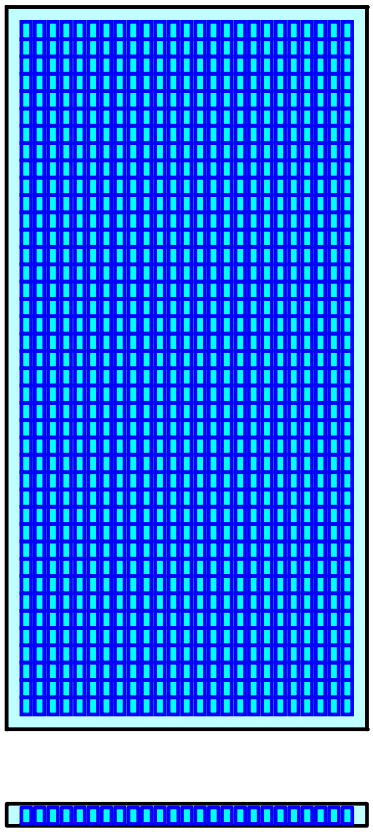
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
25 Rows x 15.7" Wide + 6.0" Spacing x 24 + 24.0" Side Stone x 2 = 48.81' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

1,000 Chambers x 6.5 cf = 6,524.6 cf Chamber Storage
1,000 Chambers x 6.9 cf = 6,868.0 cf Displacement

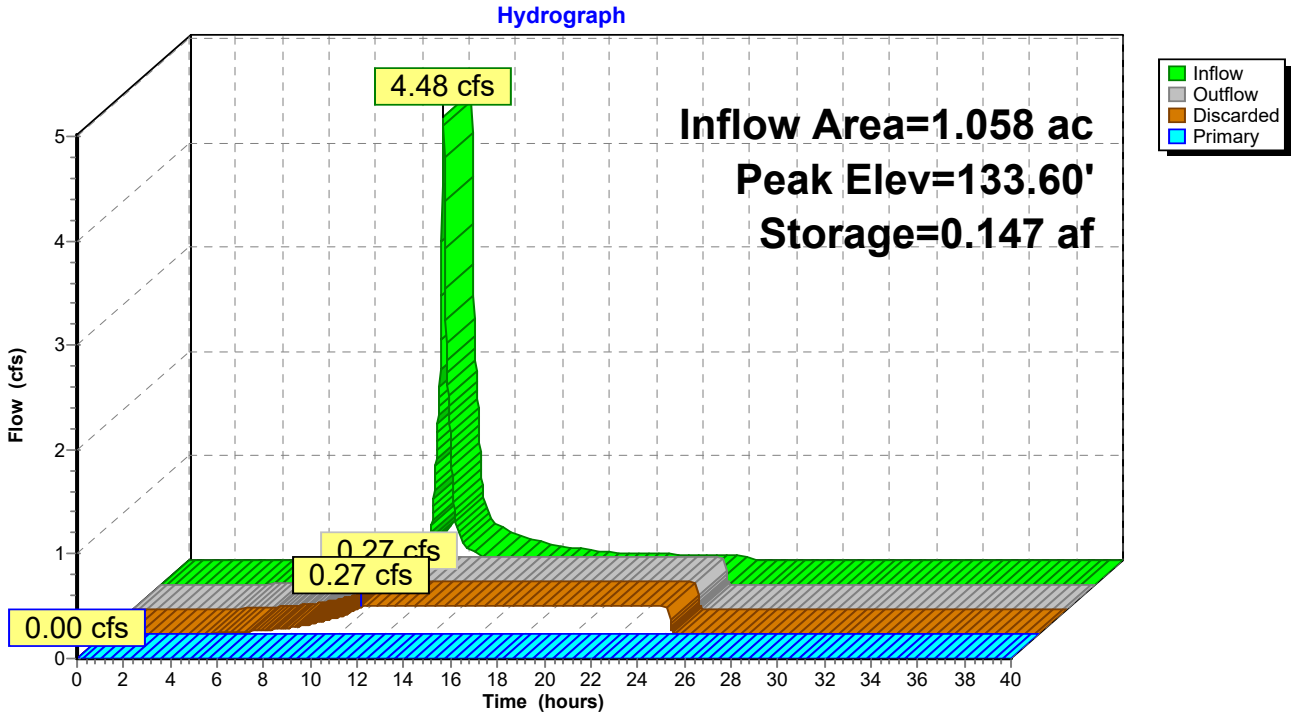
14,234.2 cf Field - 6,868.0 cf Chambers = 7,366.2 cf Stone x 40.0% Voids = 2,946.5 cf Stone Storage

Chamber Storage + Stone Storage = 9,471.1 cf = 0.217 af
Overall Storage Efficiency = 66.5%
Overall System Size = 97.83' x 48.81' x 2.98'

1,000 Chambers
527.2 cy Field
272.8 cy Stone



Pond 2P: Infiltration System 2



Summary for Pond 3P: Infiltration System 3

Inflow Area = 0.631 ac, 96.52% Impervious, Inflow Depth = 4.23" for 10 year event
Inflow = 2.84 cfs @ 12.08 hrs, Volume= 0.223 af
Outflow = 0.44 cfs @ 12.56 hrs, Volume= 0.223 af, Atten= 84%, Lag= 28.7 min
Discarded = 0.19 cfs @ 10.96 hrs, Volume= 0.201 af
Primary = 0.26 cfs @ 12.56 hrs, Volume= 0.022 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 135.22' @ 12.56 hrs Surf.Area= 0.077 ac Storage= 0.080 af

Plug-Flow detention time= 113.3 min calculated for 0.223 af (100% of inflow)
Center-of-Mass det. time= 113.3 min (877.2 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.70'	0.041 af	**34.31'W x 97.83'L x 2.26'H Field A** 0.174 af Overall - 0.073 af Embedded = 0.102 af x 40.0% Voids
#2A	133.95'	0.069 af	**ACF R-Tank SD 2** x 680 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 680 Chambers in 17 Rows
		0.110 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.90'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	135.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.19 cfs @ 10.96 hrs HW=133.72' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.26 cfs @ 12.56 hrs HW=135.22' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 1.93 fps)
└**3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.48 fps)

Pond 3P: Infiltration System 3 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

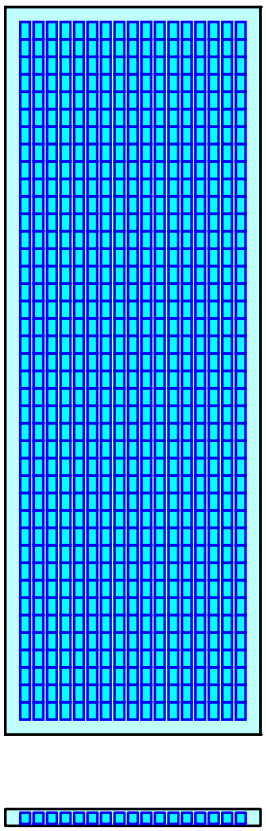
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
17 Rows x 15.7" Wide + 6.0" Spacing x 16 + 24.0" Side Stone x 2 = 34.31' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

680 Chambers x 4.4 cf = 3,001.3 cf Chamber Storage
680 Chambers x 4.6 cf = 3,159.3 cf Displacement

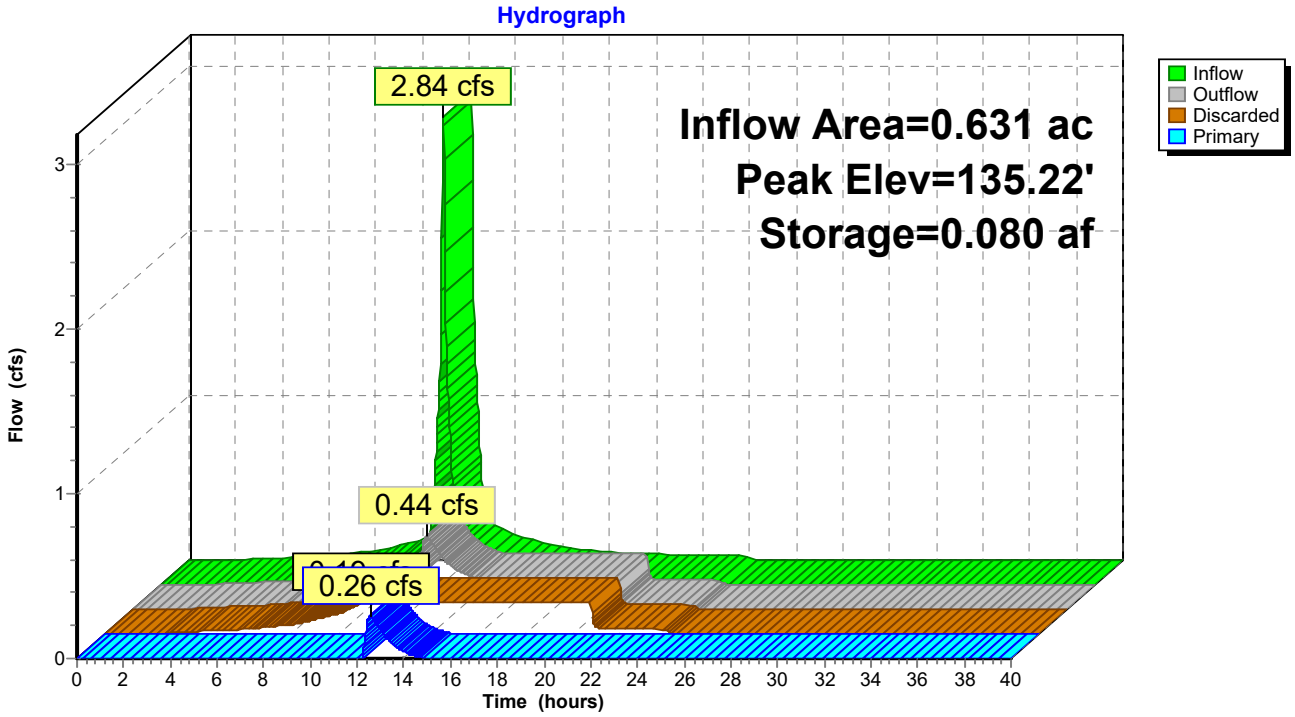
7,583.2 cf Field - 3,159.3 cf Chambers = 4,423.9 cf Stone x 40.0% Voids = 1,769.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,770.9 cf = 0.110 af
Overall Storage Efficiency = 62.9%
Overall System Size = 97.83' x 34.31' x 2.26'

680 Chambers
280.9 cy Field
163.8 cy Stone



Pond 3P: Infiltration System 3



Summary for Pond 4P: Infiltration System 4

Inflow Area = 1.650 ac, 88.33% Impervious, Inflow Depth = 3.69" for 10 year event
Inflow = 6.85 cfs @ 12.08 hrs, Volume= 0.507 af
Outflow = 0.72 cfs @ 12.83 hrs, Volume= 0.507 af, Atten= 90%, Lag= 44.8 min
Discarded = 0.51 cfs @ 11.30 hrs, Volume= 0.477 af
Primary = 0.20 cfs @ 12.83 hrs, Volume= 0.030 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.31' @ 12.83 hrs Surf.Area= 0.212 ac Storage= 0.193 af

Plug-Flow detention time= 113.6 min calculated for 0.507 af (100% of inflow)
Center-of-Mass det. time= 113.6 min (902.4 - 788.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.106 af	**66.93'W x 137.71'L x 2.26'H Field A** 0.478 af Overall - 0.213 af Embedded = 0.265 af x 40.0% Voids
#2A	133.25'	0.202 af	**ACF R-Tank SD 2** x 1995 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 1995 Chambers in 35 Rows
		0.308 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.30'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 11.30 hrs HW=133.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.51 cfs)

Primary OutFlow Max=0.20 cfs @ 12.83 hrs HW=134.31' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.32 fps)
├**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 2.06 fps)
└**4=Orifice/Grate** (Orifice Controls 0.10 cfs @ 2.06 fps)

Pond 4P: Infiltration System 4 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

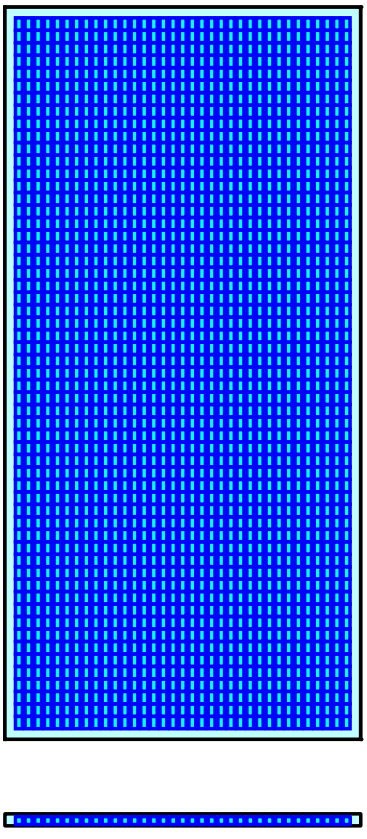
57 Chambers/Row x 2.35' Long = 133.71' Row Length +24.0" End Stone x 2 = 137.71' Base Length
35 Rows x 15.7" Wide + 6.0" Spacing x 34 + 24.0" Side Stone x 2 = 66.93' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

1,995 Chambers x 4.4 cf = 8,805.3 cf Chamber Storage
1,995 Chambers x 4.6 cf = 9,268.8 cf Displacement

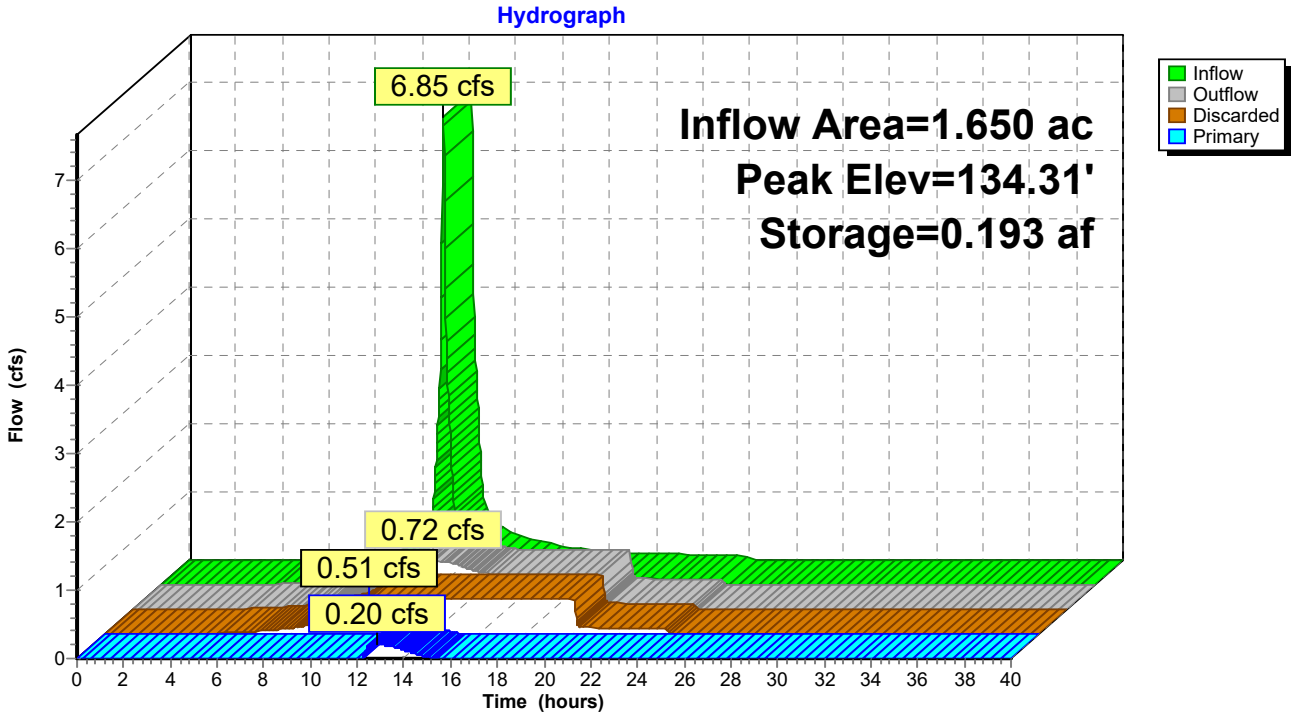
20,823.4 cf Field - 9,268.8 cf Chambers = 11,554.6 cf Stone x 40.0% Voids = 4,621.9 cf Stone Storage

Chamber Storage + Stone Storage = 13,427.2 cf = 0.308 af
Overall Storage Efficiency = 64.5%
Overall System Size = 137.71' x 66.93' x 2.26'

1,995 Chambers
771.2 cy Field
427.9 cy Stone



Pond 4P: Infiltration System 4



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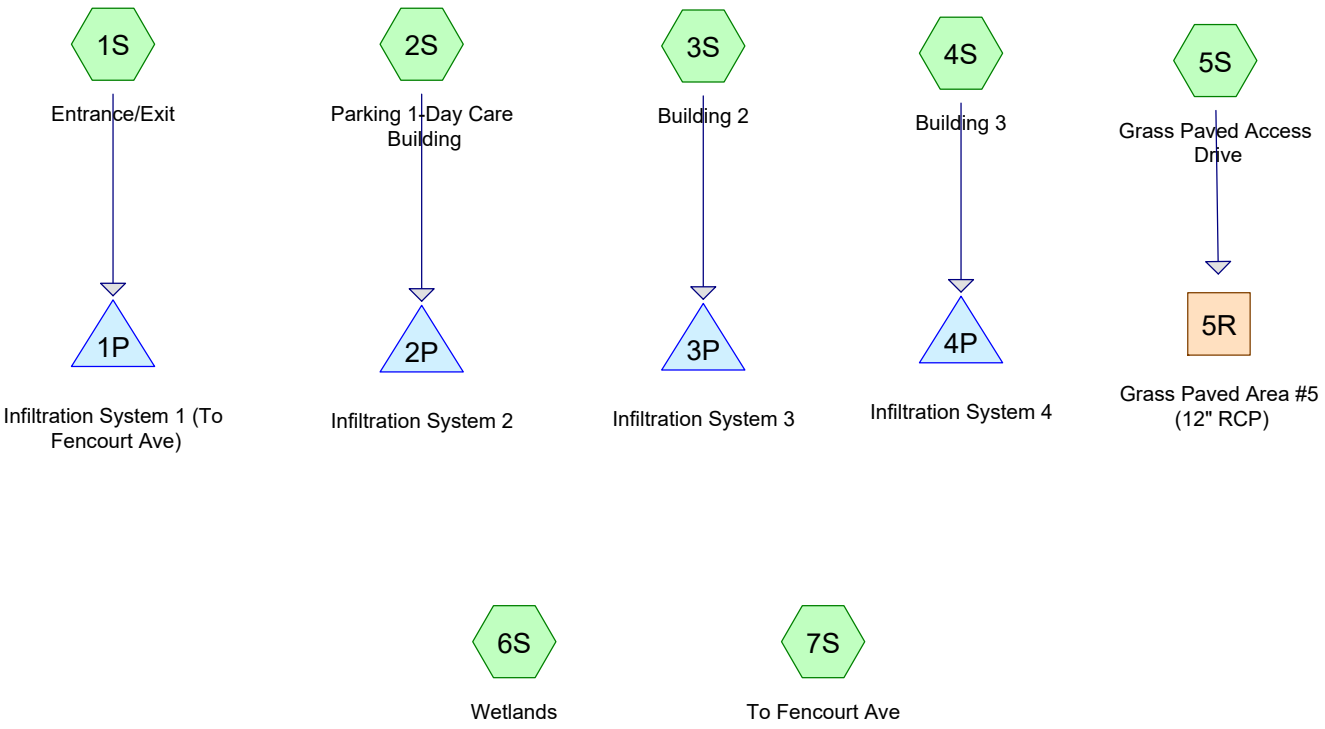
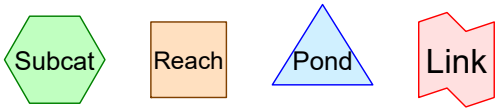




Routing Diagram for 16 Fencourt Avenue-Proposed 25yr storm-2022-09-09
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 1S: Entrance/Exit Runoff Area=19,160 sf 78.76% Impervious Runoff Depth=3.83"
Tc=6.0 min CN=85 Runoff=1.95 cfs 0.140 af

Subcatchment 2S: Parking 1-Day Care Runoff Area=46,100 sf 89.88% Impervious Runoff Depth=4.58"
Tc=6.0 min CN=92 Runoff=5.35 cfs 0.404 af

Subcatchment 3S: Building 2 Runoff Area=27,489 sf 96.52% Impervious Runoff Depth=5.03"
Tc=6.0 min CN=96 Runoff=3.35 cfs 0.265 af

Subcatchment 4S: Building 3 Runoff Area=71,865 sf 88.33% Impervious Runoff Depth=4.47"
Tc=6.0 min CN=91 Runoff=8.21 cfs 0.614 af

Subcatchment 5S: Grass Paved Access Runoff Area=20,147 sf 2.56% Impervious Runoff Depth=0.40"
Flow Length=435' Slope=0.0050 '/' Tc=22.4 min CN=41 Runoff=0.06 cfs 0.016 af

Subcatchment 6S: Wetlands Runoff Area=114,406 sf 0.00% Impervious Runoff Depth=0.50"
Flow Length=230' Tc=10.9 min CN=43 Runoff=0.58 cfs 0.110 af

Subcatchment 7S: To Fencourt Ave Runoff Area=10,357 sf 11.49% Impervious Runoff Depth=1.04"
Tc=6.0 min UI Adjusted CN=52 Runoff=0.23 cfs 0.021 af

Reach 5R: Grass Paved Area #5 (12" RCP) Inflow=0.06 cfs 0.016 af
Outflow=0.06 cfs 0.016 af

Pond 1P: Infiltration System 1 (To Fencourt Peak Elev=134.36' Storage=0.052 af Inflow=1.95 cfs 0.140 af
Discarded=0.08 cfs 0.110 af Primary=0.51 cfs 0.030 af Outflow=0.59 cfs 0.140 af

Pond 2P: Infiltration System 2 Peak Elev=133.93' Storage=0.175 af Inflow=5.35 cfs 0.404 af
Discarded=0.27 cfs 0.376 af Primary=0.21 cfs 0.028 af Outflow=0.48 cfs 0.404 af

Pond 3P: Infiltration System 3 Peak Elev=135.41' Storage=0.091 af Inflow=3.35 cfs 0.265 af
Discarded=0.19 cfs 0.218 af Primary=0.56 cfs 0.046 af Outflow=0.74 cfs 0.265 af

Pond 4P: Infiltration System 4 Peak Elev=134.58' Storage=0.237 af Inflow=8.21 cfs 0.614 af
Discarded=0.51 cfs 0.536 af Primary=0.41 cfs 0.079 af Outflow=0.93 cfs 0.614 af

Total Runoff Area = 7.106 ac Runoff Volume = 1.570 af Average Runoff Depth = 2.65"
52.11% Pervious = 3.703 ac 47.89% Impervious = 3.403 ac

Summary for Subcatchment 1S: Entrance/Exit

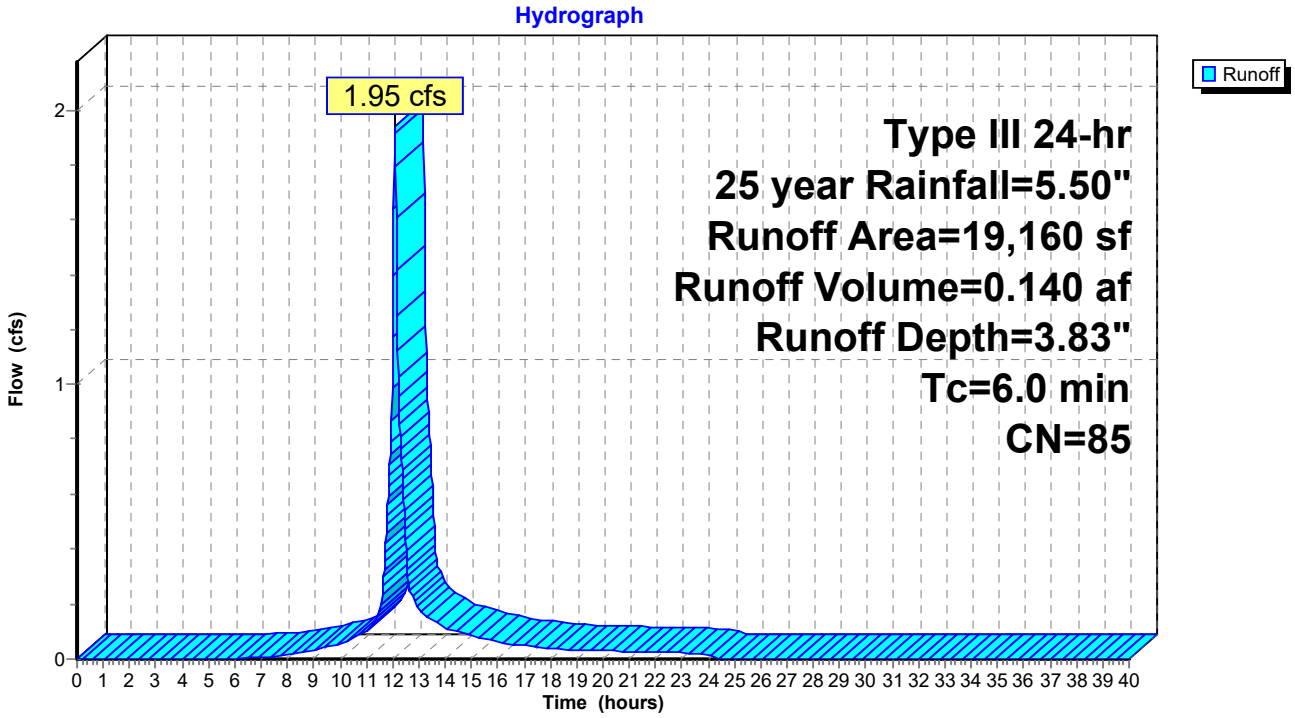
Runoff = 1.95 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 3.83"
Routed to Pond 1P : Infiltration System 1 (To Fencourt Ave)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

Area (sf)	CN	Description
15,090	98	Paved parking, HSG A
4,070	39	>75% Grass cover, Good, HSG A
19,160	85	Weighted Average
4,070		21.24% Pervious Area
15,090		78.76% Impervious Area

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

Subcatchment 1S: Entrance/Exit



Summary for Subcatchment 2S: Parking 1-Day Care Building

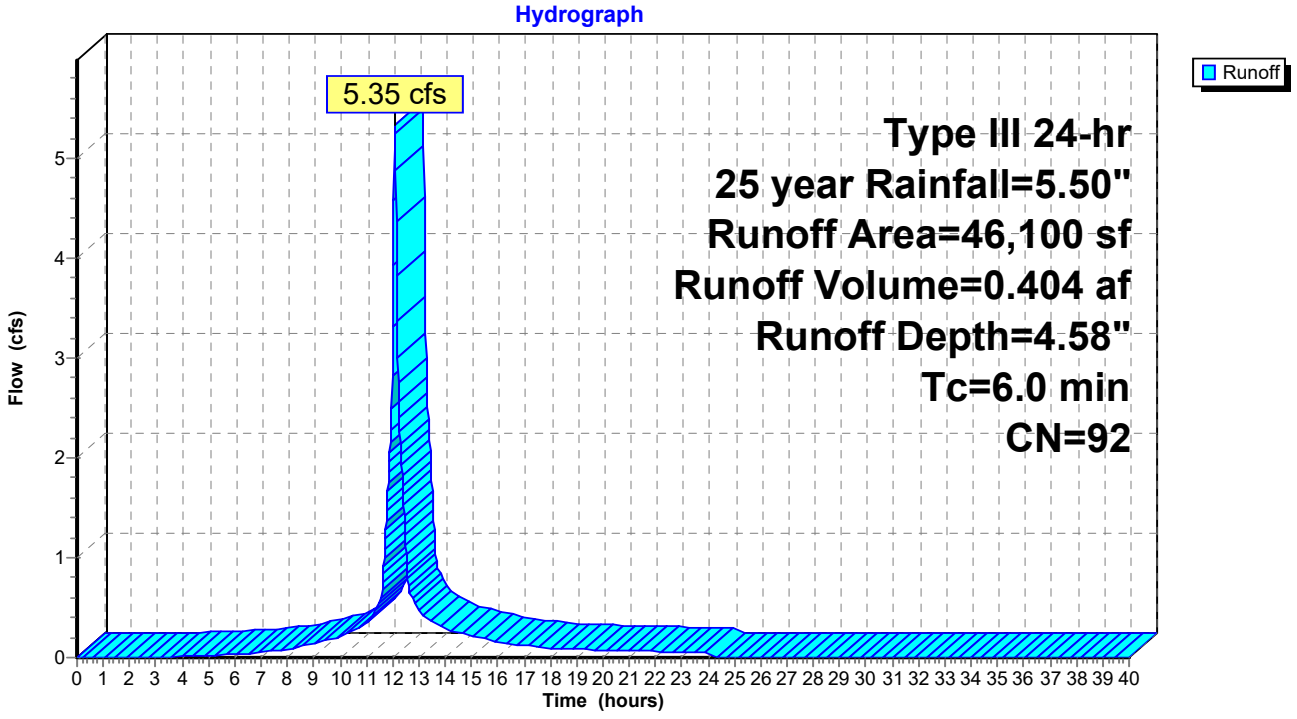
Runoff = 5.35 cfs @ 12.08 hrs, Volume= 0.404 af, Depth= 4.58"
Routed to Pond 2P : Infiltration System 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

	Area (sf)	CN	Description
	28,601	98	Paved parking, HSG A
	4,664	39	>75% Grass cover, Good, HSG A
*	12,835	98	Daycare Building, HSG A
	46,100	92	Weighted Average
	4,664		10.12% Pervious Area
	41,436		89.88% Impervious Area

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

Subcatchment 2S: Parking 1-Day Care Building



Summary for Subcatchment 3S: Building 2

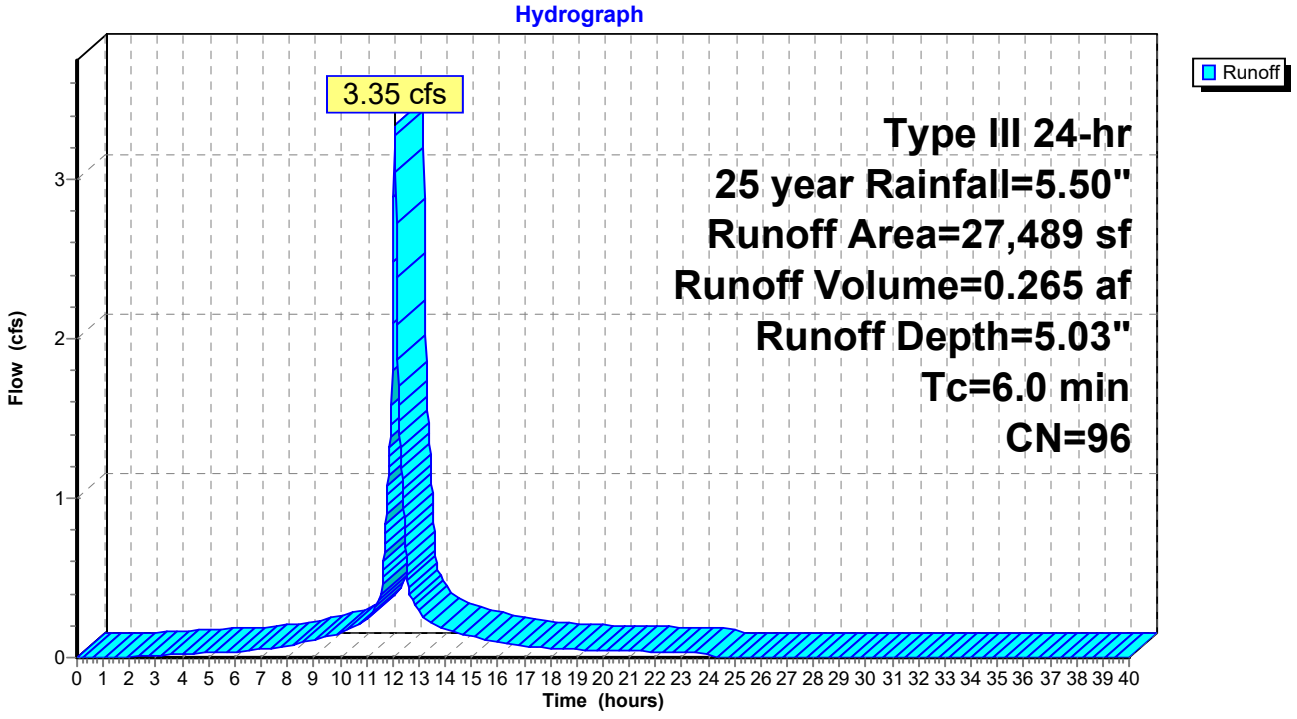
Runoff = 3.35 cfs @ 12.08 hrs, Volume= 0.265 af, Depth= 5.03"
Routed to Pond 3P : Infiltration System 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

	Area (sf)	CN	Description
	9,395	98	Paved parking, HSG A
*	17,137	98	Building #2, HSG A
	957	39	>75% Grass cover, Good, HSG A
	27,489	96	Weighted Average
	957		3.48% Pervious Area
	26,532		96.52% Impervious Area

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

Subcatchment 3S: Building 2



Summary for Subcatchment 4S: Building 3

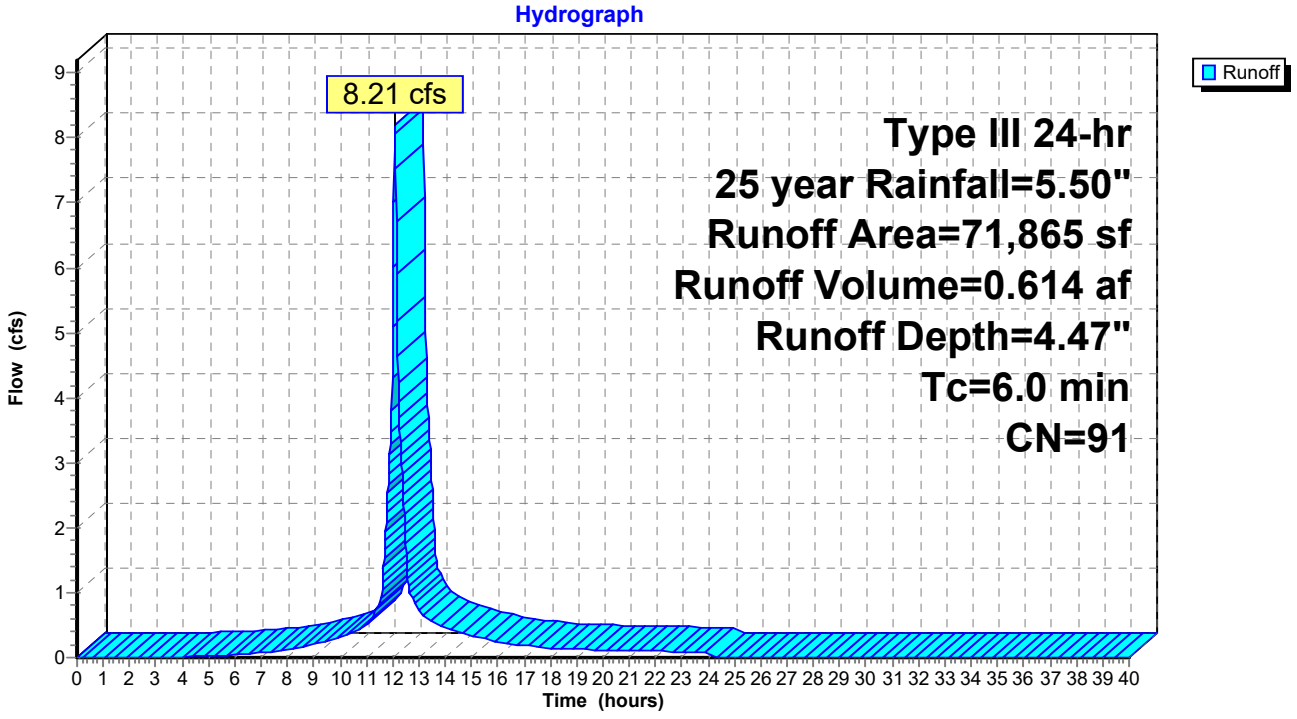
Runoff = 8.21 cfs @ 12.08 hrs, Volume= 0.614 af, Depth= 4.47"
Routed to Pond 4P : Infiltration System 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

	Area (sf)	CN	Description
	40,672	98	Paved parking, HSG A
*	22,804	98	Building 3, HSG A
	8,389	39	>75% Grass cover, Good, HSG A
	71,865	91	Weighted Average
	8,389		11.67% Pervious Area
	63,476		88.33% Impervious Area

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

Subcatchment 4S: Building 3



Summary for Subcatchment 5S: Grass Paved Access Drive

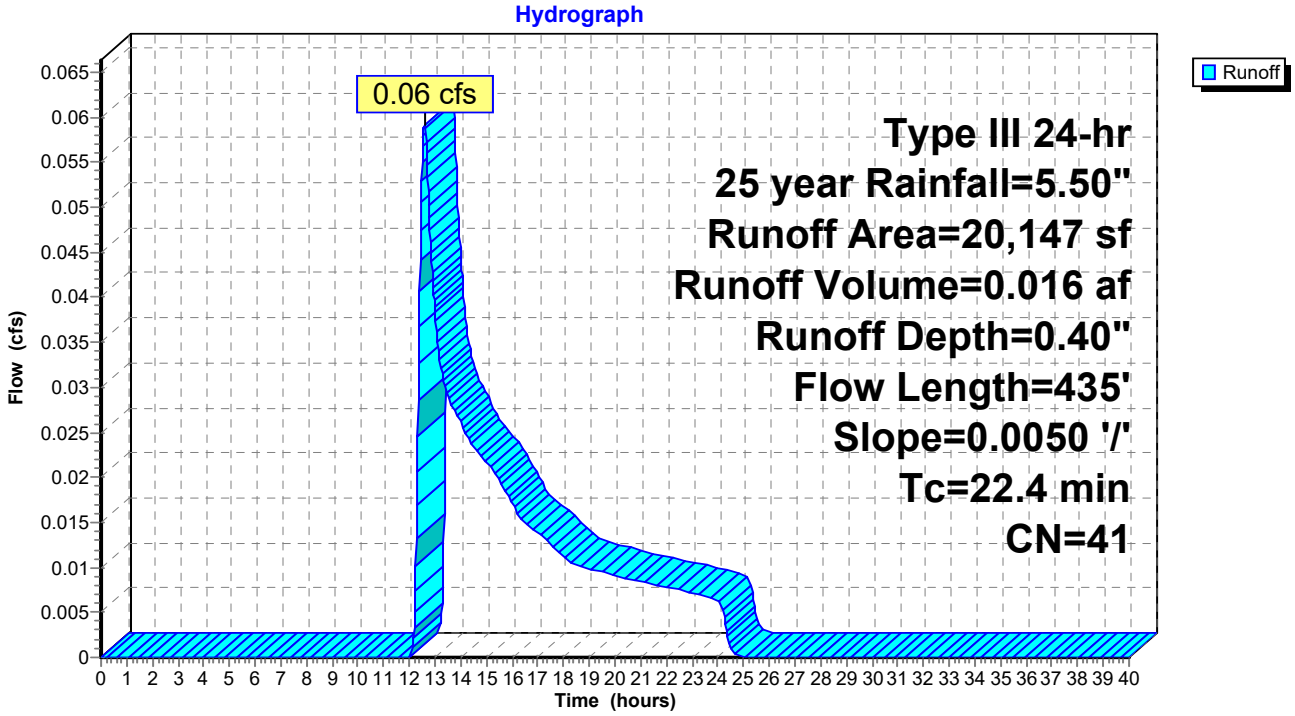
Runoff = 0.06 cfs @ 12.59 hrs, Volume= 0.016 af, Depth= 0.40"
Routed to Reach 5R : Grass Paved Area #5 (12" RCP)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

	Area (sf)	CN	Description
	19,632	39	>75% Grass cover, Good, HSG A
*	515	98	Walkway, HSG A
	20,147	41	Weighted Average
	19,632		97.44% Pervious Area
	515		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0050	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
5.3	335	0.0050	1.06		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
22.4	435	Total			

Subcatchment 5S: Grass Paved Access Drive



Summary for Subcatchment 6S: Wetlands

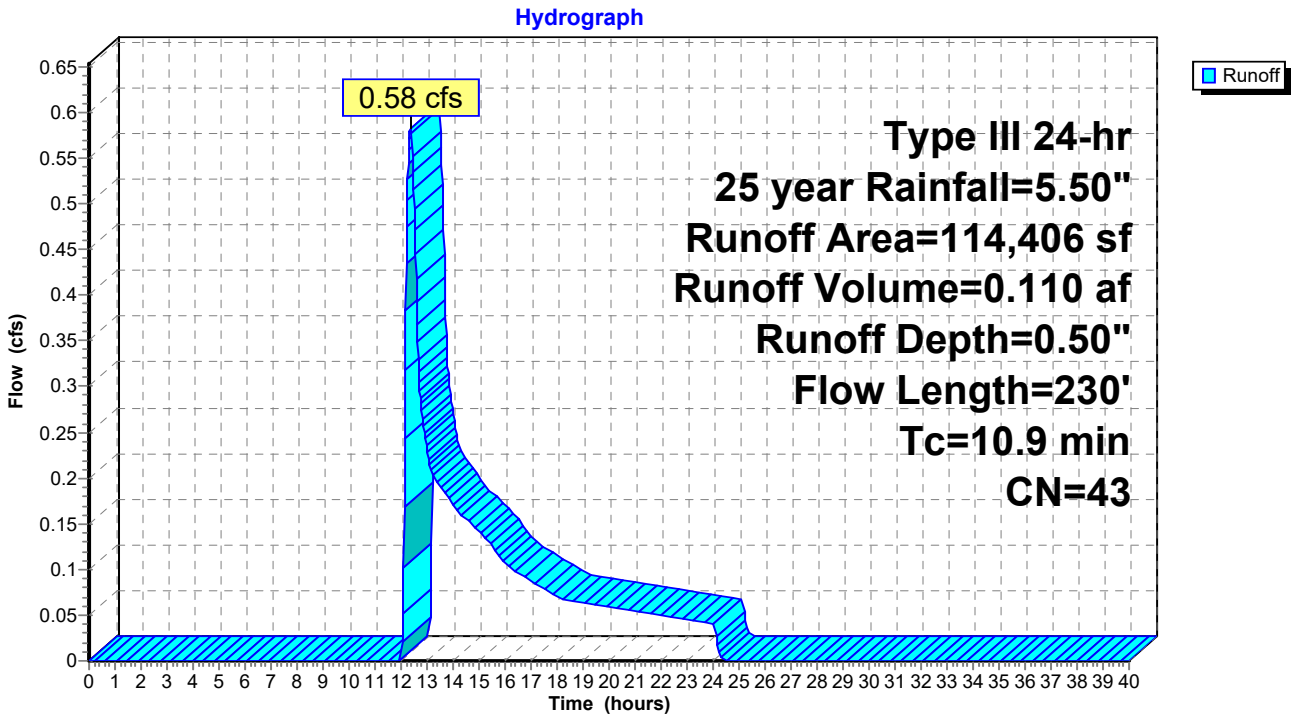
Runoff = 0.58 cfs @ 12.37 hrs, Volume= 0.110 af, Depth= 0.50"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

Area (sf)	CN	Description
114,406	43	Woods/grass comb., Fair, HSG A
114,406		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1650	0.18		**Sheet Flow, Wood/Grass** Woods: Light underbrush n= 0.400 P2= 3.20"
1.7	130	0.0346	1.30		**Shallow Concentrated Flow, Wetland** Short Grass Pasture Kv= 7.0 fps
10.9	230	Total			

Subcatchment 6S: Wetlands



Summary for Subcatchment 7S: To Fencourt Ave

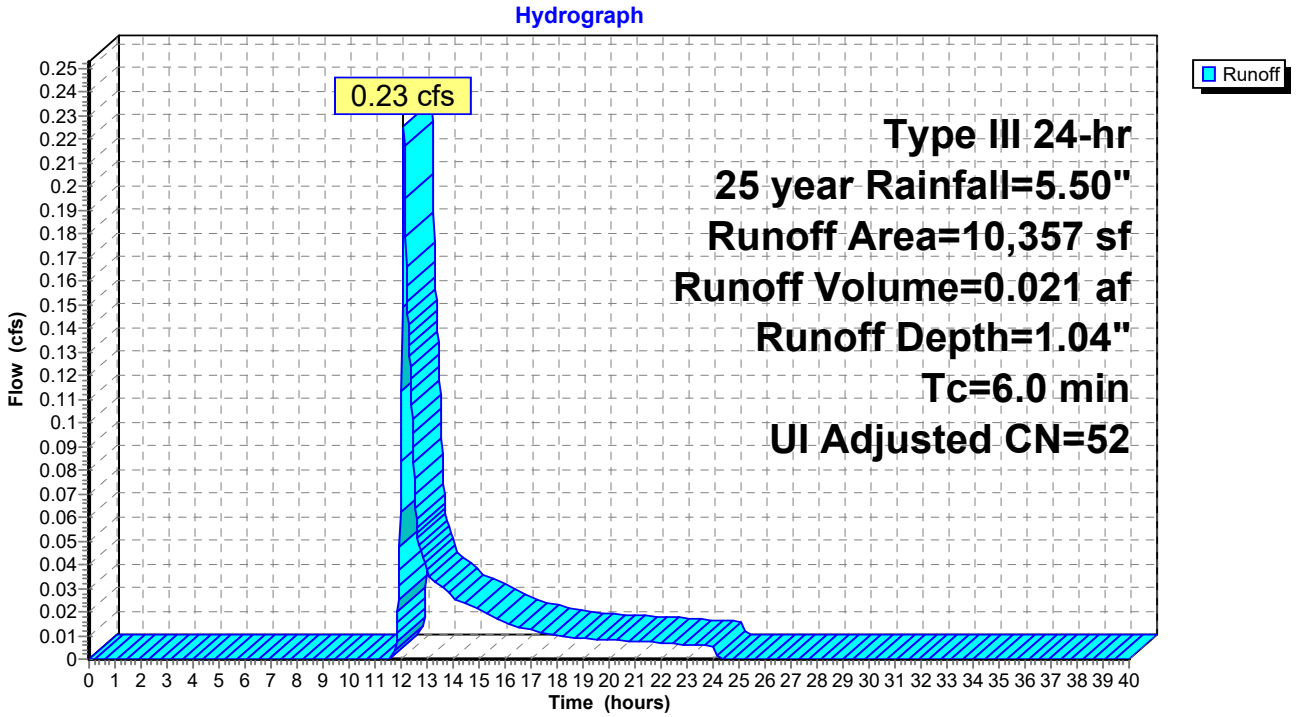
Runoff = 0.23 cfs @ 12.11 hrs, Volume= 0.021 af, Depth= 1.04"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 year Rainfall=5.50"

	Area (sf)	CN	Adj	Description
	1,190	98		Unconnected pavement, HSG A
	5,872	49		50-75% Grass cover, Fair, HSG A
*	3,295	49		Playground area
	10,357	55	52	Weighted Average, UI Adjusted
	9,167			88.51% Pervious Area
	1,190			11.49% Impervious Area
	1,190			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Walkway/Grass**

Subcatchment 7S: To Fencourt Ave



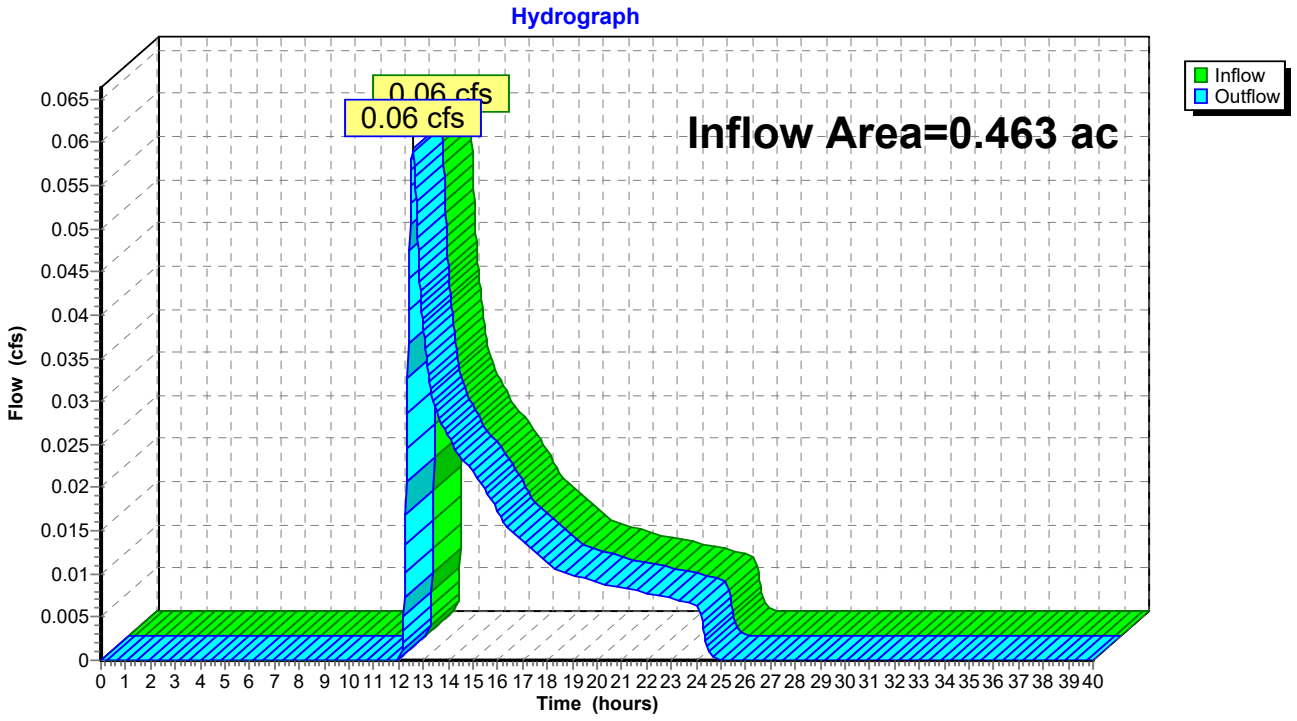
Summary for Reach 5R: Grass Paved Area #5 (12" RCP)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.463 ac, 2.56% Impervious, Inflow Depth = 0.40" for 25 year event
Inflow = 0.06 cfs @ 12.59 hrs, Volume= 0.016 af
Outflow = 0.06 cfs @ 12.59 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node ALL

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach 5R: Grass Paved Area #5 (12" RCP)



Summary for Pond 1P: Infiltration System 1 (To Fencourt Ave)

Inflow Area = 0.440 ac, 78.76% Impervious, Inflow Depth = 3.83" for 25 year event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 0.140 af
Outflow = 0.59 cfs @ 12.42 hrs, Volume= 0.140 af, Atten= 70%, Lag= 19.8 min
Discarded = 0.08 cfs @ 10.62 hrs, Volume= 0.110 af
Primary = 0.51 cfs @ 12.42 hrs, Volume= 0.030 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.36' @ 12.42 hrs Surf.Area= 0.032 ac Storage= 0.052 af

Plug-Flow detention time= 191.0 min calculated for 0.140 af (100% of inflow)
Center-of-Mass det. time= 190.9 min (994.8 - 803.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.00'	0.022 af	**21.62'W x 64.99'L x 2.98'H Field A** 0.096 af Overall - 0.041 af Embedded = 0.055 af x 40.0% Voids
#2A	132.25'	0.039 af	**ACF R-Tank SD 3** x 260 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 260 Chambers in 10 Rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 10.62 hrs HW=132.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.51 cfs @ 12.42 hrs HW=134.36' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.37 fps)
├**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.37 fps)
├**4=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.37 fps)
├**5=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.13 fps)
└**6=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.13 fps)

Pond 1P: Infiltration System 1 (To Fencourt Ave) - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

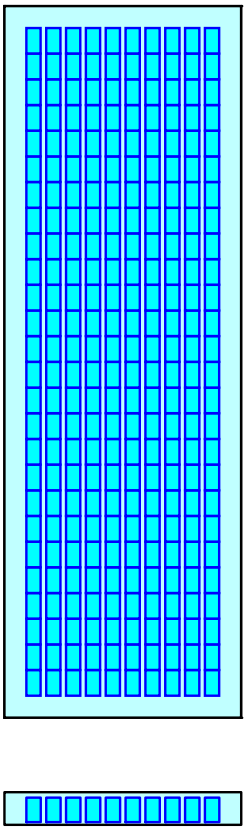
26 Chambers/Row x 2.35' Long = 60.99' Row Length +24.0" End Stone x 2 = 64.99' Base Length
10 Rows x 15.7" Wide + 6.0" Spacing x 9 + 24.0" Side Stone x 2 = 21.62' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

260 Chambers x 6.5 cf = 1,696.4 cf Chamber Storage
260 Chambers x 6.9 cf = 1,785.7 cf Displacement

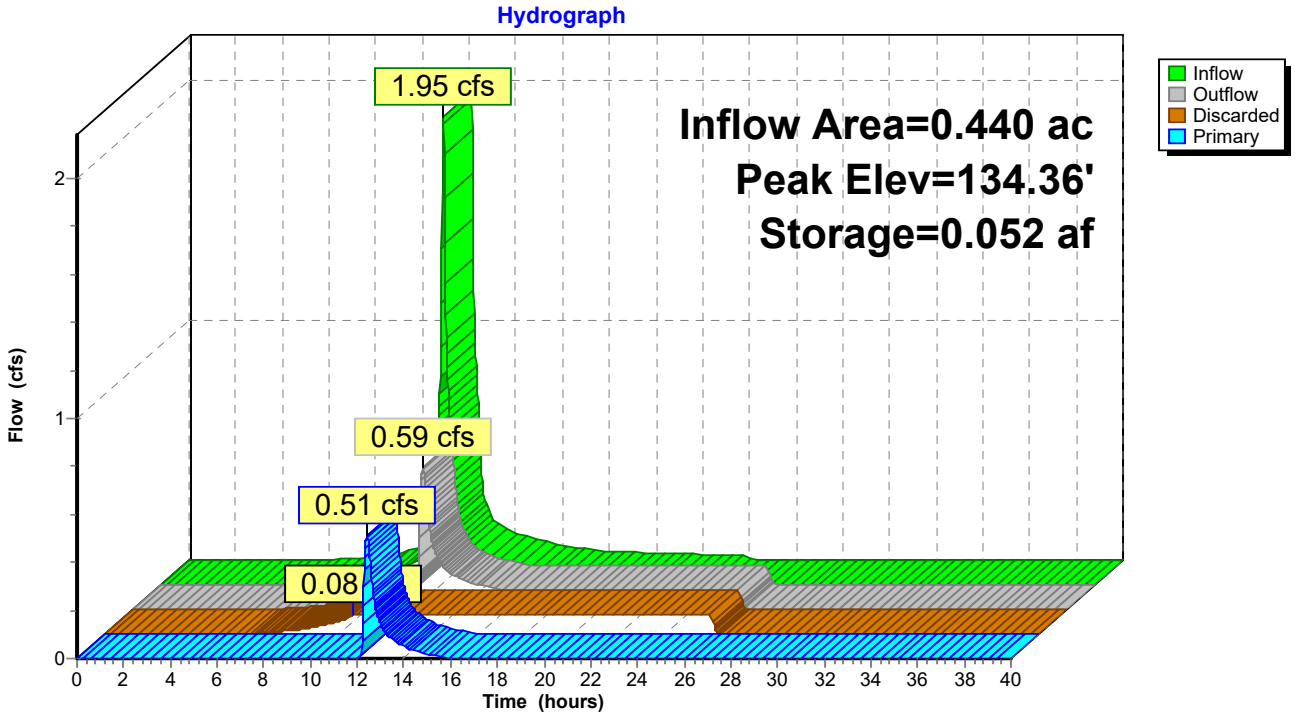
4,189.2 cf Field - 1,785.7 cf Chambers = 2,403.5 cf Stone x 40.0% Voids = 961.4 cf Stone Storage

Chamber Storage + Stone Storage = 2,657.8 cf = 0.061 af
Overall Storage Efficiency = 63.4%
Overall System Size = 64.99' x 21.62' x 2.98'

260 Chambers
155.2 cy Field
89.0 cy Stone



Pond 1P: Infiltration System 1 (To Fencourt Ave)



Summary for Pond 2P: Infiltration System 2

Inflow Area = 1.058 ac, 89.88% Impervious, Inflow Depth = 4.58" for 25 year event
Inflow = 5.35 cfs @ 12.08 hrs, Volume= 0.404 af
Outflow = 0.48 cfs @ 12.98 hrs, Volume= 0.404 af, Atten= 91%, Lag= 53.5 min
Discarded = 0.27 cfs @ 10.54 hrs, Volume= 0.376 af
Primary = 0.21 cfs @ 12.98 hrs, Volume= 0.028 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 133.93' @ 12.98 hrs Surf.Area= 0.110 ac Storage= 0.175 af

Plug-Flow detention time= 220.6 min calculated for 0.404 af (100% of inflow)
Center-of-Mass det. time= 220.6 min (1,000.3 - 779.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	131.70'	0.068 af	**48.81'W x 97.83'L x 2.98'H Field A** 0.327 af Overall - 0.158 af Embedded = 0.169 af x 40.0% Voids
#2A	131.95'	0.150 af	**ACF R-Tank SD 3** x 1000 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 1000 Chambers in 25 Rows
		0.217 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 10.54 hrs HW=131.73' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.21 cfs @ 12.98 hrs HW=133.93' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.63 fps)
└**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.63 fps)

Pond 2P: Infiltration System 2 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

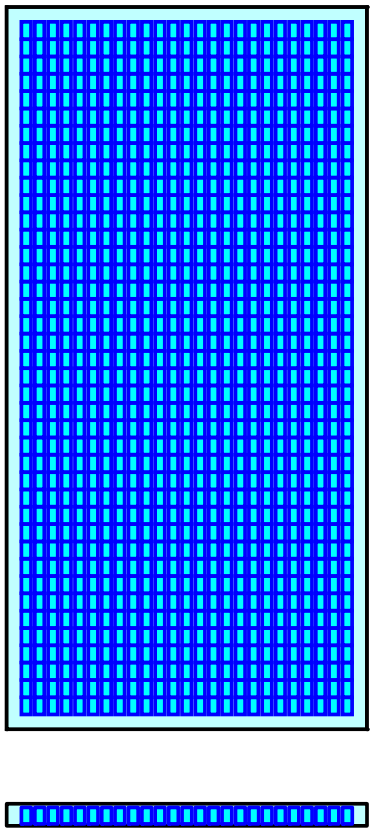
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
25 Rows x 15.7" Wide + 6.0" Spacing x 24 + 24.0" Side Stone x 2 = 48.81' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

1,000 Chambers x 6.5 cf = 6,524.6 cf Chamber Storage
1,000 Chambers x 6.9 cf = 6,868.0 cf Displacement

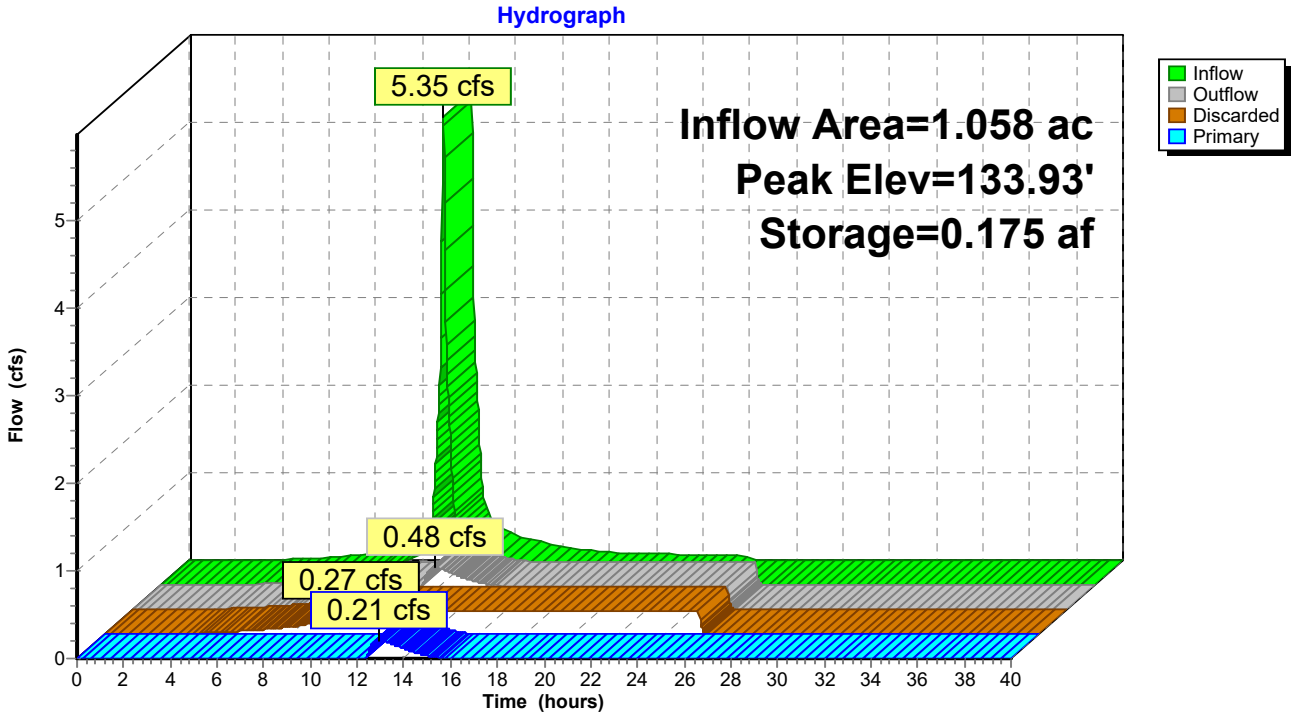
14,234.2 cf Field - 6,868.0 cf Chambers = 7,366.2 cf Stone x 40.0% Voids = 2,946.5 cf Stone Storage

Chamber Storage + Stone Storage = 9,471.1 cf = 0.217 af
Overall Storage Efficiency = 66.5%
Overall System Size = 97.83' x 48.81' x 2.98'

1,000 Chambers
527.2 cy Field
272.8 cy Stone



Pond 2P: Infiltration System 2



Summary for Pond 3P: Infiltration System 3

Inflow Area = 0.631 ac, 96.52% Impervious, Inflow Depth = 5.03" for 25 year event
Inflow = 3.35 cfs @ 12.08 hrs, Volume= 0.265 af
Outflow = 0.74 cfs @ 12.48 hrs, Volume= 0.265 af, Atten= 78%, Lag= 24.0 min
Discarded = 0.19 cfs @ 10.52 hrs, Volume= 0.218 af
Primary = 0.56 cfs @ 12.48 hrs, Volume= 0.046 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 135.41' @ 12.48 hrs Surf.Area= 0.077 ac Storage= 0.091 af

Plug-Flow detention time= 107.7 min calculated for 0.265 af (100% of inflow)
Center-of-Mass det. time= 107.7 min (867.9 - 760.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.70'	0.041 af	**34.31'W x 97.83'L x 2.26'H Field A** 0.174 af Overall - 0.073 af Embedded = 0.102 af x 40.0% Voids
#2A	133.95'	0.069 af	**ACF R-Tank SD 2** x 680 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 680 Chambers in 17 Rows
		0.110 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.90'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	135.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.19 cfs @ 10.52 hrs HW=133.72' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.56 cfs @ 12.48 hrs HW=135.41' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.49 cfs @ 2.47 fps)
└**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.57 fps)

Pond 3P: Infiltration System 3 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

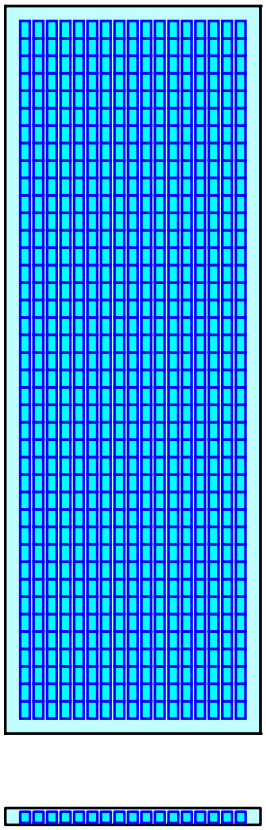
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
17 Rows x 15.7" Wide + 6.0" Spacing x 16 + 24.0" Side Stone x 2 = 34.31' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

680 Chambers x 4.4 cf = 3,001.3 cf Chamber Storage
680 Chambers x 4.6 cf = 3,159.3 cf Displacement

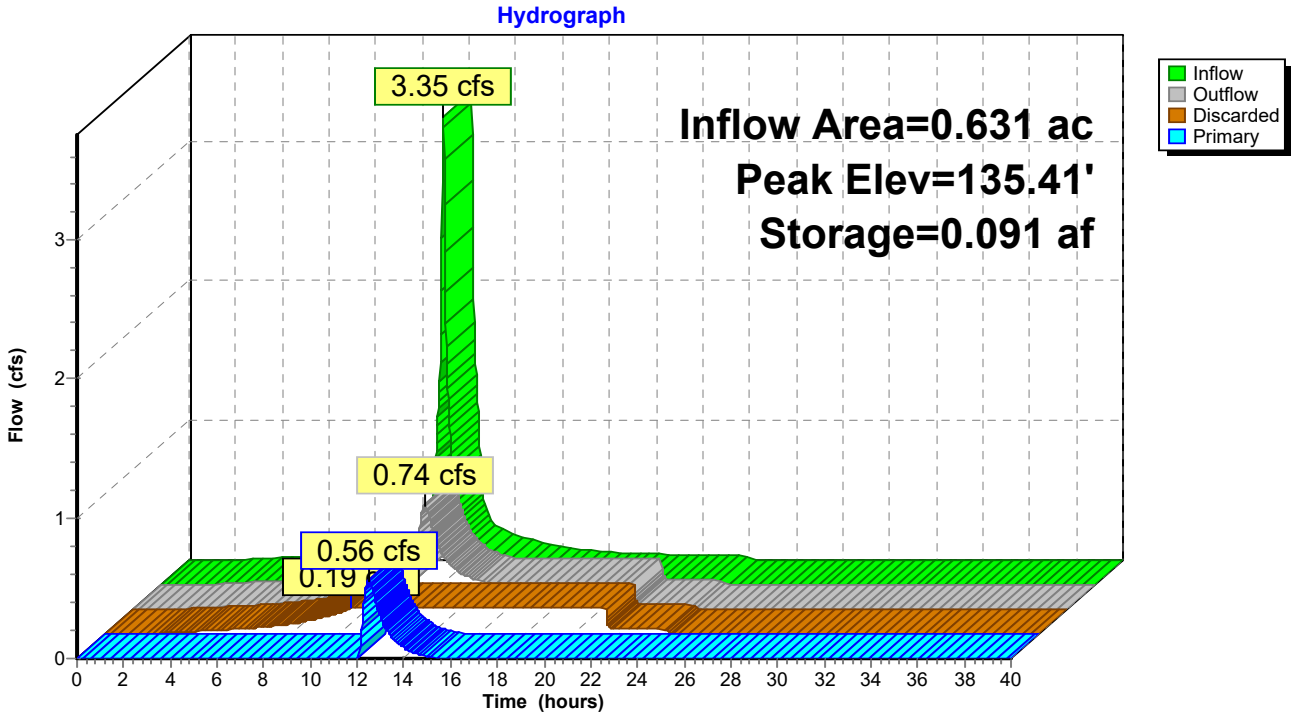
7,583.2 cf Field - 3,159.3 cf Chambers = 4,423.9 cf Stone x 40.0% Voids = 1,769.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,770.9 cf = 0.110 af
Overall Storage Efficiency = 62.9%
Overall System Size = 97.83' x 34.31' x 2.26'

680 Chambers
280.9 cy Field
163.8 cy Stone



Pond 3P: Infiltration System 3



Summary for Pond 4P: Infiltration System 4

Inflow Area = 1.650 ac, 88.33% Impervious, Inflow Depth = 4.47" for 25 year event
Inflow = 8.21 cfs @ 12.08 hrs, Volume= 0.614 af
Outflow = 0.93 cfs @ 12.74 hrs, Volume= 0.614 af, Atten= 89%, Lag= 39.3 min
Discarded = 0.51 cfs @ 11.08 hrs, Volume= 0.536 af
Primary = 0.41 cfs @ 12.74 hrs, Volume= 0.079 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.58' @ 12.74 hrs Surf.Area= 0.212 ac Storage= 0.237 af

Plug-Flow detention time= 121.0 min calculated for 0.614 af (100% of inflow)
Center-of-Mass det. time= 120.9 min (904.7 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.106 af	**66.93'W x 137.71'L x 2.26'H Field A** 0.478 af Overall - 0.213 af Embedded = 0.265 af x 40.0% Voids
#2A	133.25'	0.202 af	**ACF R-Tank SD 2** x 1995 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 1995 Chambers in 35 Rows
		0.308 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.30'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 11.08 hrs HW=133.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.51 cfs)

Primary OutFlow Max=0.41 cfs @ 12.74 hrs HW=134.58' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.89 fps)
├**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 3.25 fps)
└**4=Orifice/Grate** (Orifice Controls 0.16 cfs @ 3.25 fps)

Pond 4P: Infiltration System 4 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

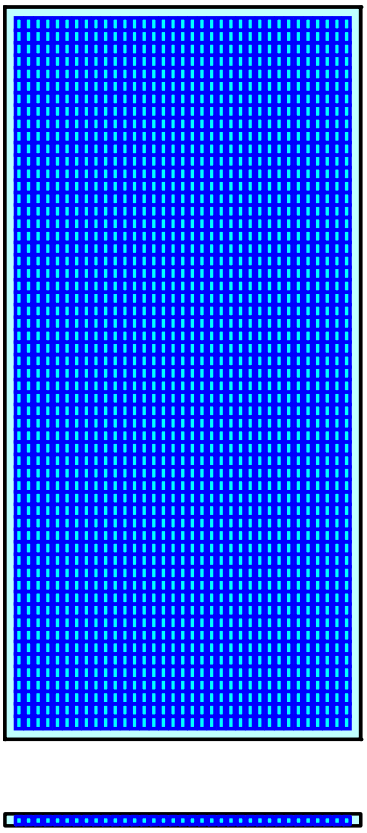
57 Chambers/Row x 2.35' Long = 133.71' Row Length +24.0" End Stone x 2 = 137.71' Base Length
35 Rows x 15.7" Wide + 6.0" Spacing x 34 + 24.0" Side Stone x 2 = 66.93' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

1,995 Chambers x 4.4 cf = 8,805.3 cf Chamber Storage
1,995 Chambers x 4.6 cf = 9,268.8 cf Displacement

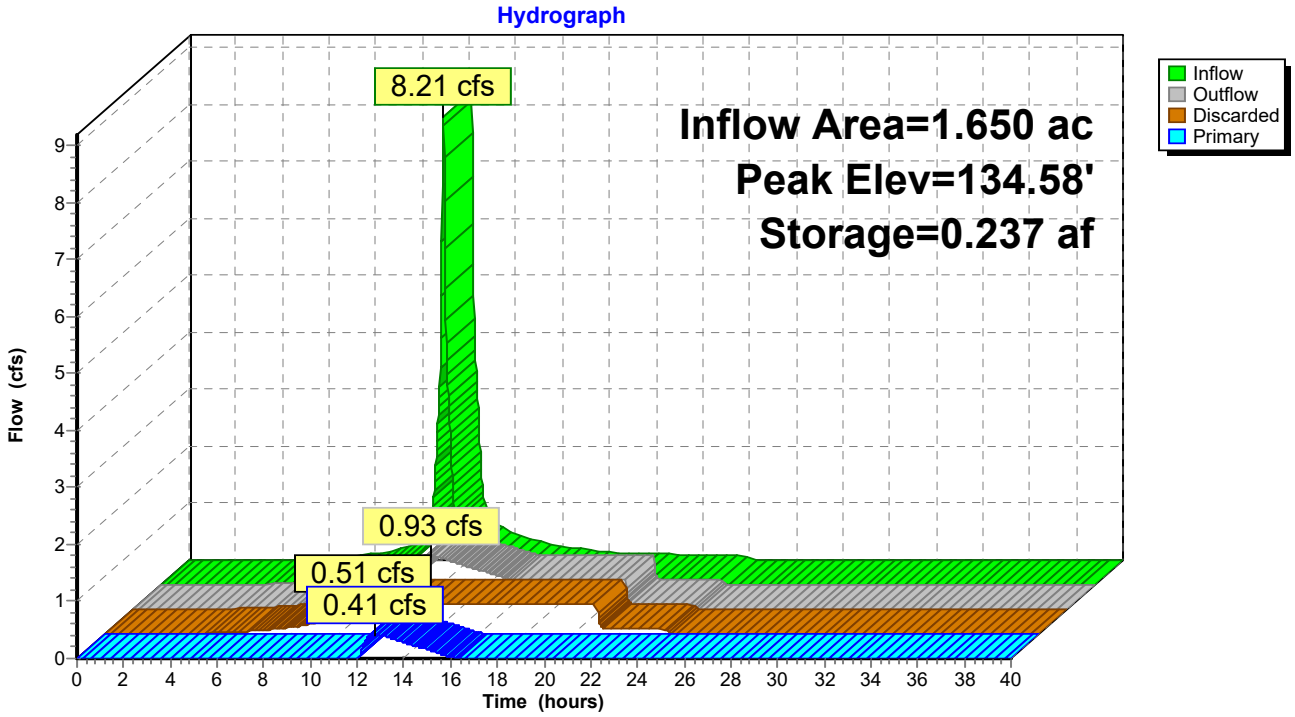
20,823.4 cf Field - 9,268.8 cf Chambers = 11,554.6 cf Stone x 40.0% Voids = 4,621.9 cf Stone Storage

Chamber Storage + Stone Storage = 13,427.2 cf = 0.308 af
Overall Storage Efficiency = 64.5%
Overall System Size = 137.71' x 66.93' x 2.26'

1,995 Chambers
771.2 cy Field
427.9 cy Stone



Pond 4P: Infiltration System 4



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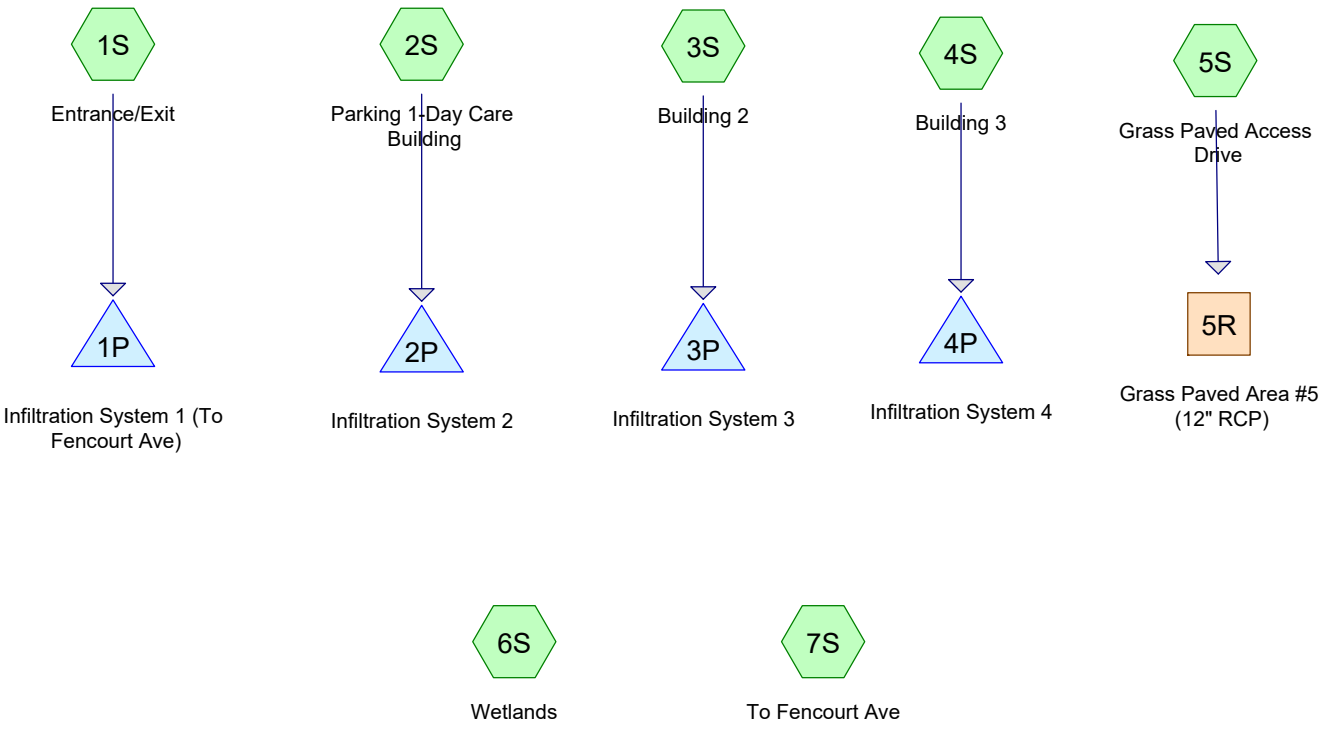
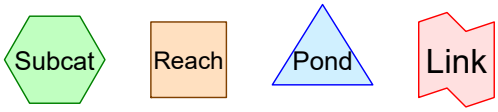




Routing Diagram for 16 Fencourt Avenue-Proposed 100yr storm-2022-09-09
Prepared by {enter your company name here}, Printed 9/9/2022
HydroCAD® 10.10-7b s/n 06054 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 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 1S: Entrance/Exit Runoff Area=19,160 sf 78.76% Impervious Runoff Depth=4.97"
Tc=6.0 min CN=85 Runoff=2.49 cfs 0.182 af

Subcatchment 2S: Parking 1-Day Care Runoff Area=46,100 sf 89.88% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=92 Runoff=6.64 cfs 0.508 af

Subcatchment 3S: Building 2 Runoff Area=27,489 sf 96.52% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=96 Runoff=4.10 cfs 0.327 af

Subcatchment 4S: Building 3 Runoff Area=71,865 sf 88.33% Impervious Runoff Depth=5.64"
Tc=6.0 min CN=91 Runoff=10.23 cfs 0.776 af

Subcatchment 5S: Grass Paved Access Runoff Area=20,147 sf 2.56% Impervious Runoff Depth=0.80"
Flow Length=435' Slope=0.0050 '/' Tc=22.4 min CN=41 Runoff=0.17 cfs 0.031 af

Subcatchment 6S: Wetlands Runoff Area=114,406 sf 0.00% Impervious Runoff Depth=0.95"
Flow Length=230' Tc=10.9 min CN=43 Runoff=1.55 cfs 0.207 af

Subcatchment 7S: To Fencourt Ave Runoff Area=10,357 sf 11.49% Impervious Runoff Depth=1.67"
Tc=6.0 min UI Adjusted CN=52 Runoff=0.41 cfs 0.033 af

Reach 5R: Grass Paved Area #5 (12" RCP) Inflow=0.17 cfs 0.031 af
Outflow=0.17 cfs 0.031 af

Pond 1P: Infiltration System 1 (To Fencourt Peak Elev=134.72' Storage=0.058 af Inflow=2.49 cfs 0.182 af
Discarded=0.08 cfs 0.121 af Primary=1.07 cfs 0.061 af Outflow=1.15 cfs 0.182 af

Pond 2P: Infiltration System 2 Peak Elev=134.52' Storage=0.211 af Inflow=6.64 cfs 0.508 af
Discarded=0.27 cfs 0.411 af Primary=0.68 cfs 0.097 af Outflow=0.95 cfs 0.508 af

Pond 3P: Infiltration System 3 Peak Elev=135.90' Storage=0.108 af Inflow=4.10 cfs 0.327 af
Discarded=0.19 cfs 0.241 af Primary=1.00 cfs 0.087 af Outflow=1.19 cfs 0.327 af

Pond 4P: Infiltration System 4 Peak Elev=135.24' Storage=0.306 af Inflow=10.23 cfs 0.776 af
Discarded=0.51 cfs 0.609 af Primary=0.71 cfs 0.167 af Outflow=1.23 cfs 0.776 af

Total Runoff Area = 7.106 ac Runoff Volume = 2.065 af Average Runoff Depth = 3.49"
52.11% Pervious = 3.703 ac 47.89% Impervious = 3.403 ac

Summary for Subcatchment 1S: Entrance/Exit

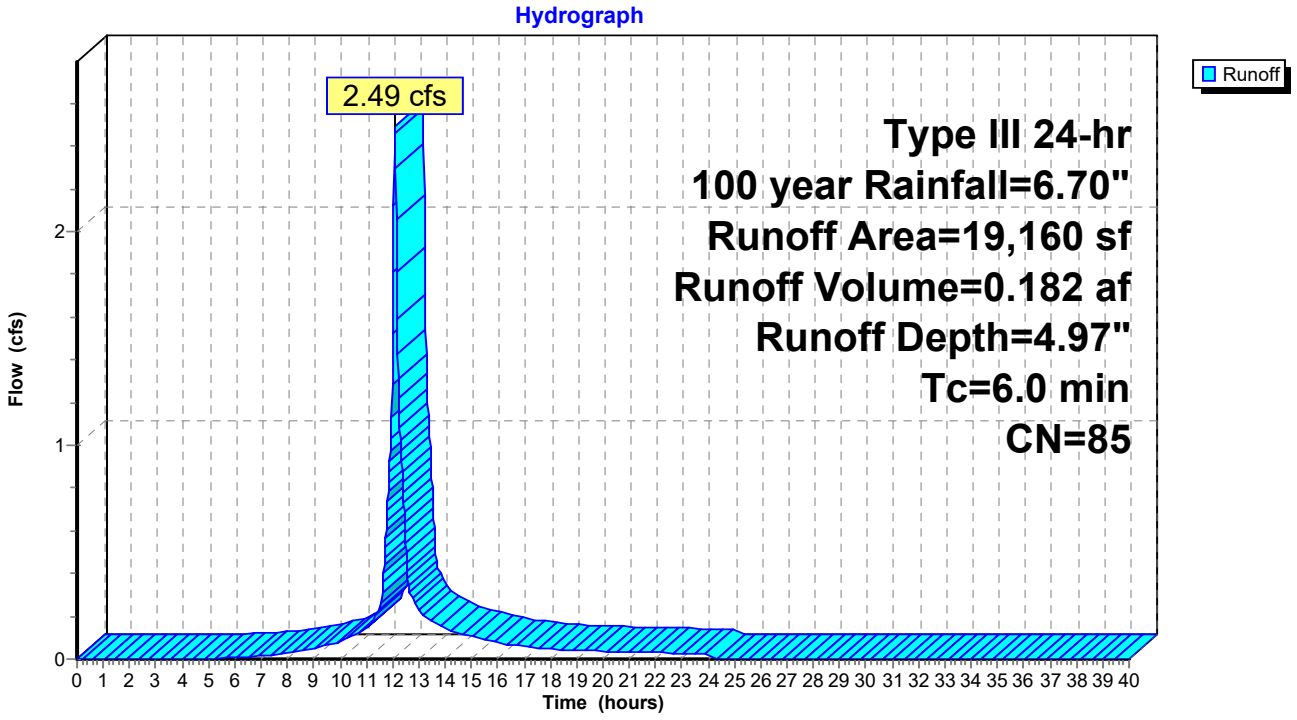
Runoff = 2.49 cfs @ 12.09 hrs, Volume= 0.182 af, Depth= 4.97"
Routed to Pond 1P : Infiltration System 1 (To Fencourt Ave)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Description
15,090	98	Paved parking, HSG A
4,070	39	>75% Grass cover, Good, HSG A
19,160	85	Weighted Average
4,070		21.24% Pervious Area
15,090		78.76% Impervious Area

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

Subcatchment 1S: Entrance/Exit



Summary for Subcatchment 2S: Parking 1-Day Care Building

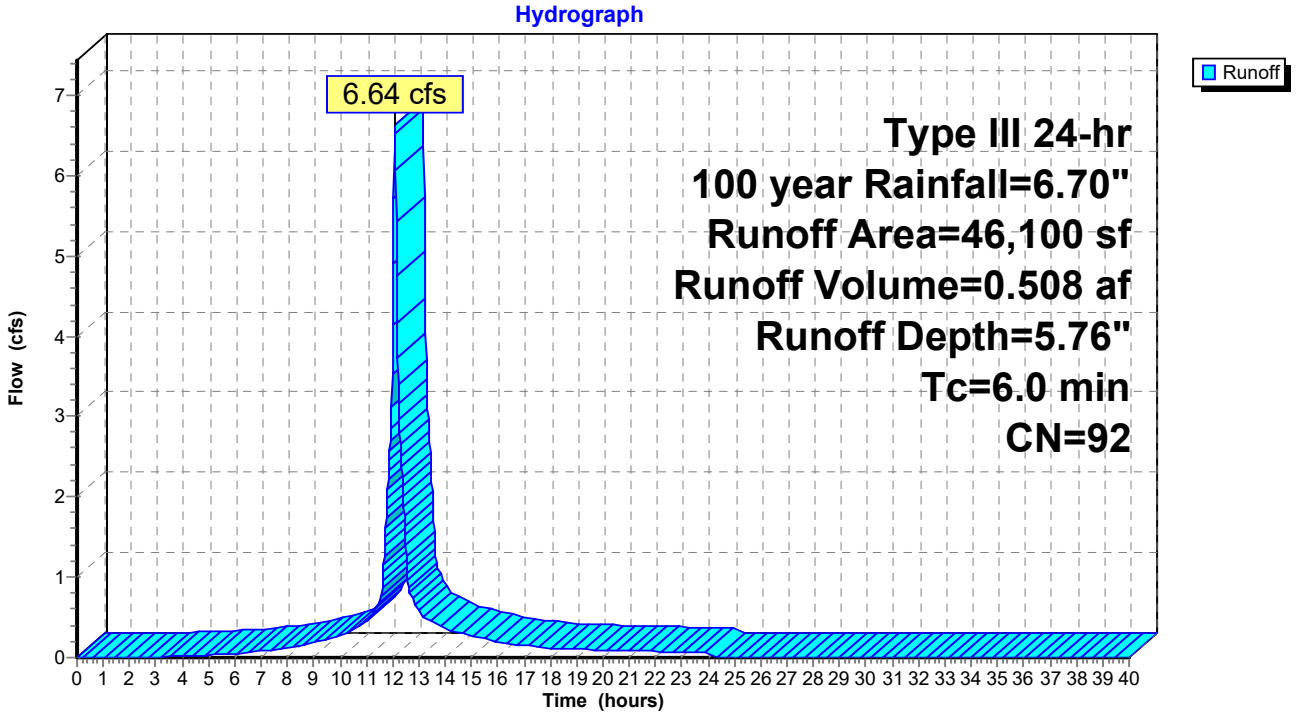
Runoff = 6.64 cfs @ 12.08 hrs, Volume= 0.508 af, Depth= 5.76"
Routed to Pond 2P : Infiltration System 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

	Area (sf)	CN	Description
	28,601	98	Paved parking, HSG A
	4,664	39	>75% Grass cover, Good, HSG A
*	12,835	98	Daycare Building, HSG A
	46,100	92	Weighted Average
	4,664		10.12% Pervious Area
	41,436		89.88% Impervious Area

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

Subcatchment 2S: Parking 1-Day Care Building



Summary for Subcatchment 3S: Building 2

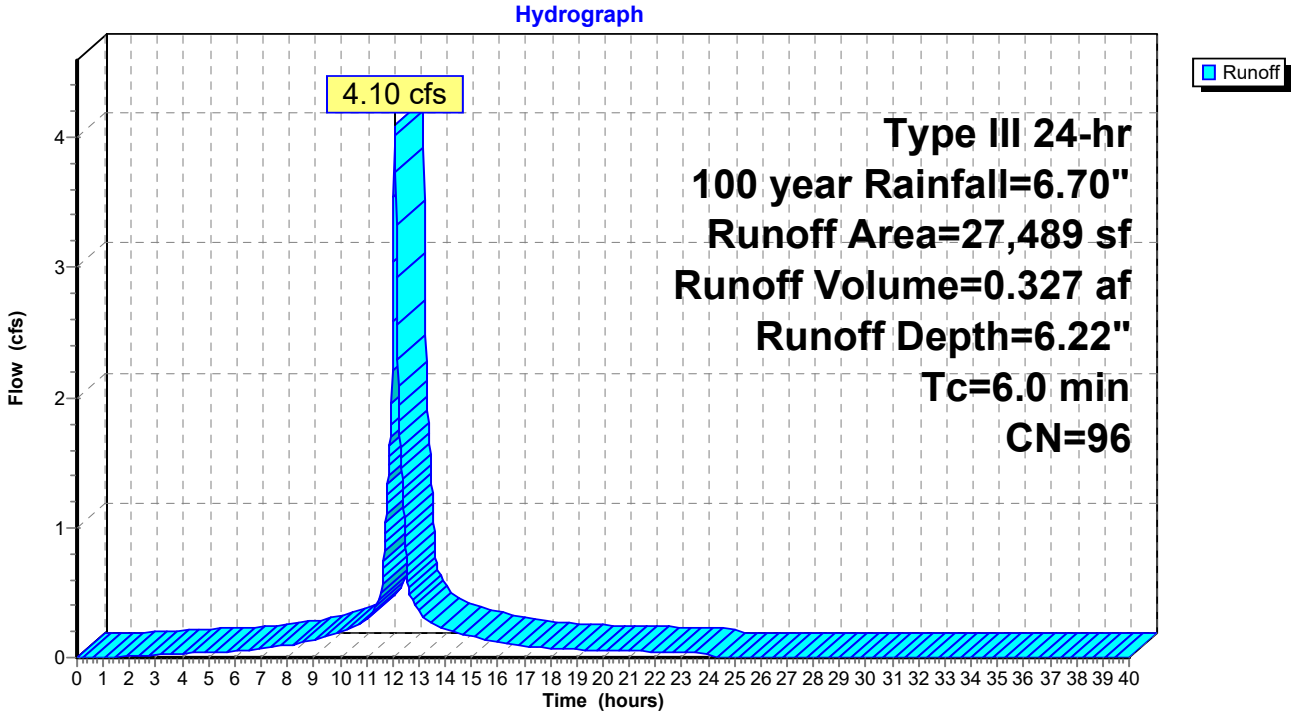
Runoff = 4.10 cfs @ 12.08 hrs, Volume= 0.327 af, Depth= 6.22"
Routed to Pond 3P : Infiltration System 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

	Area (sf)	CN	Description
	9,395	98	Paved parking, HSG A
*	17,137	98	Building #2, HSG A
	957	39	>75% Grass cover, Good, HSG A
	27,489	96	Weighted Average
	957		3.48% Pervious Area
	26,532		96.52% Impervious Area

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

Subcatchment 3S: Building 2



Summary for Subcatchment 4S: Building 3

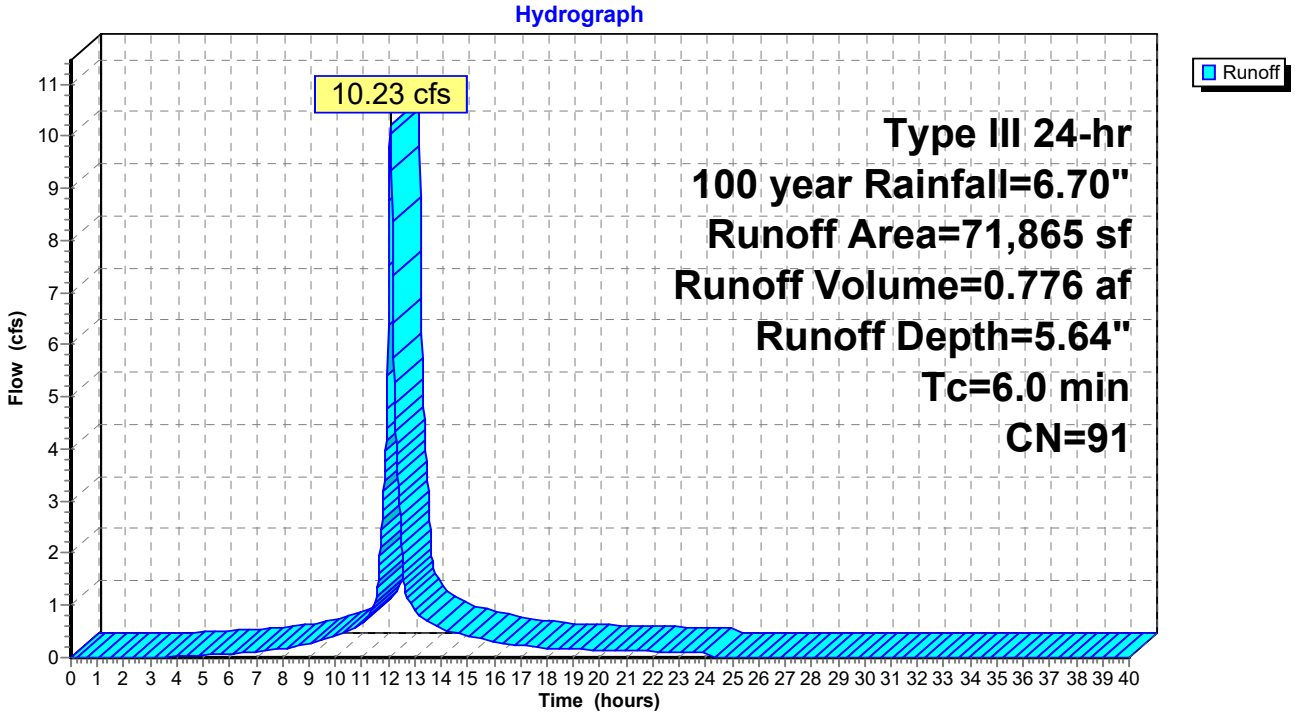
Runoff = 10.23 cfs @ 12.08 hrs, Volume= 0.776 af, Depth= 5.64"
Routed to Pond 4P : Infiltration System 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

	Area (sf)	CN	Description
	40,672	98	Paved parking, HSG A
*	22,804	98	Building 3, HSG A
	8,389	39	>75% Grass cover, Good, HSG A
	71,865	91	Weighted Average
	8,389		11.67% Pervious Area
	63,476		88.33% Impervious Area

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

Subcatchment 4S: Building 3



Summary for Subcatchment 5S: Grass Paved Access Drive

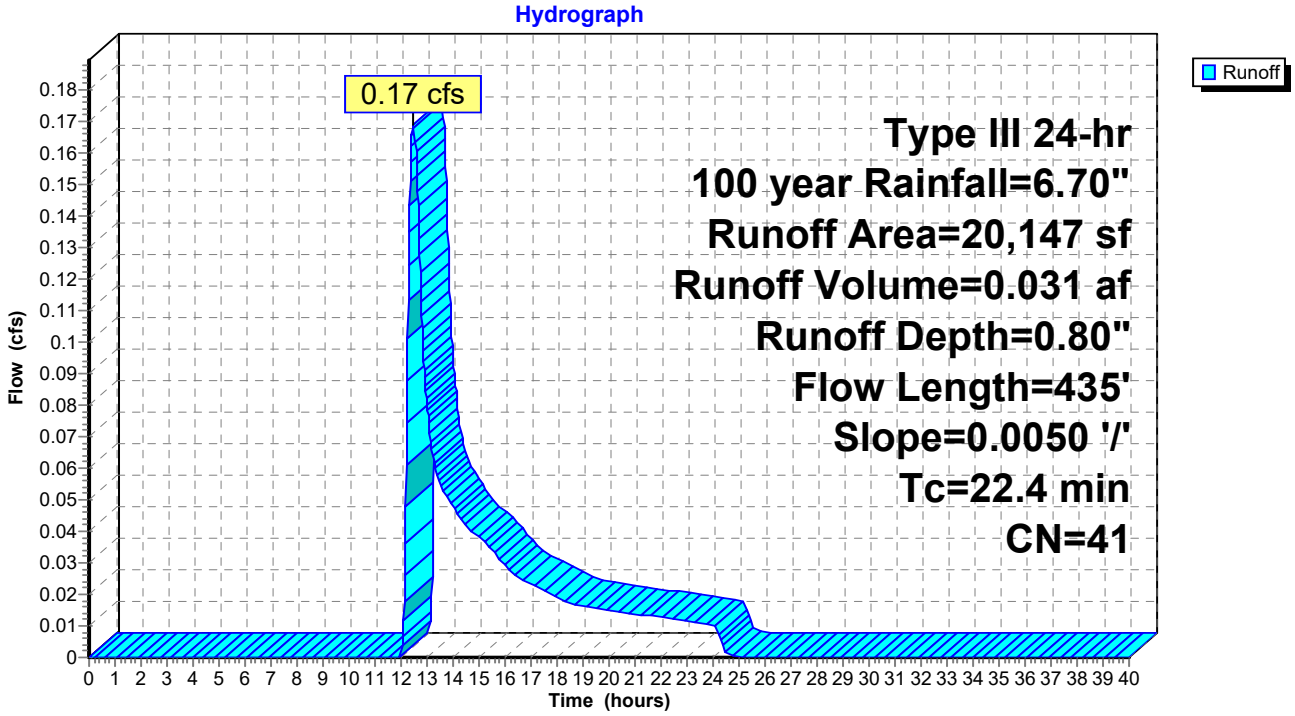
Runoff = 0.17 cfs @ 12.48 hrs, Volume= 0.031 af, Depth= 0.80"
Routed to Reach 5R : Grass Paved Area #5 (12" RCP)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

	Area (sf)	CN	Description
	19,632	39	>75% Grass cover, Good, HSG A
*	515	98	Walkway, HSG A
	20,147	41	Weighted Average
	19,632		97.44% Pervious Area
	515		2.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0050	0.10		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.20"
5.3	335	0.0050	1.06		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
22.4	435	Total			

Subcatchment 5S: Grass Paved Access Drive



Summary for Subcatchment 6S: Wetlands

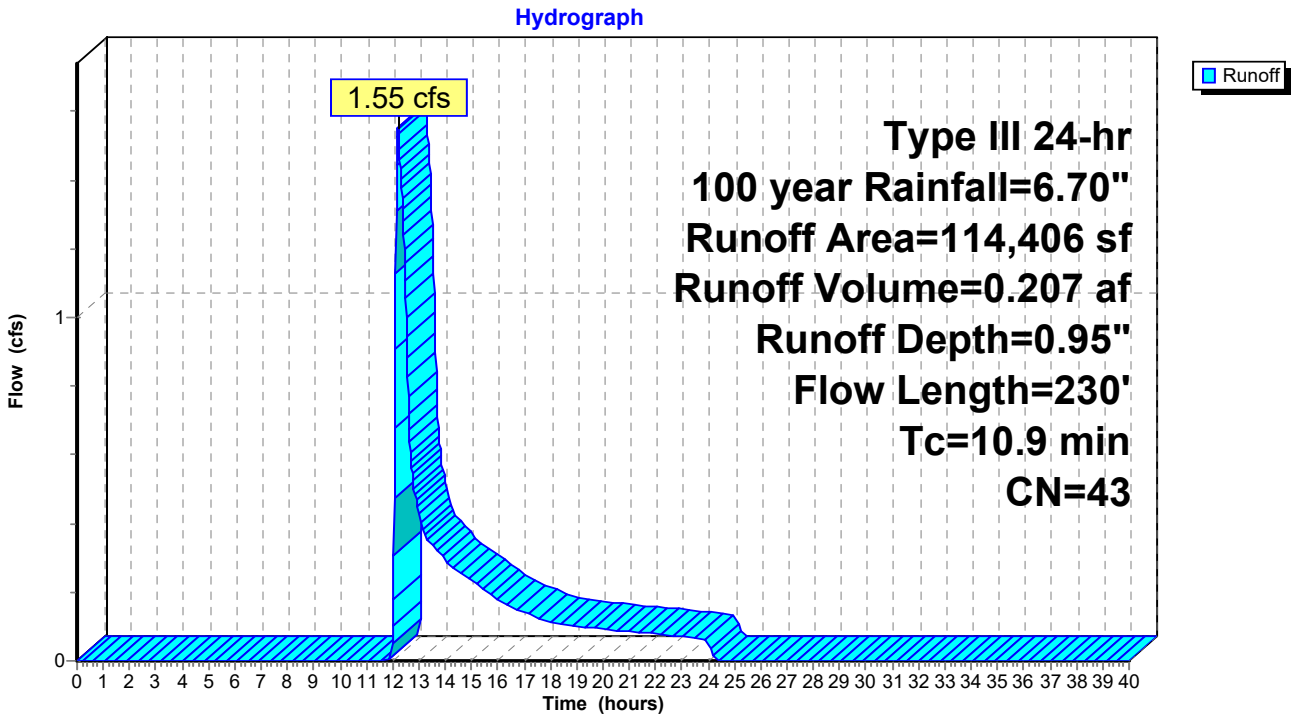
Runoff = 1.55 cfs @ 12.21 hrs, Volume= 0.207 af, Depth= 0.95"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

Area (sf)	CN	Description
114,406	43	Woods/grass comb., Fair, HSG A
114,406		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1650	0.18		**Sheet Flow, Wood/Grass** Woods: Light underbrush n= 0.400 P2= 3.20"
1.7	130	0.0346	1.30		**Shallow Concentrated Flow, Wetland** Short Grass Pasture Kv= 7.0 fps
10.9	230	Total			

Subcatchment 6S: Wetlands



Summary for Subcatchment 7S: To Fencourt Ave

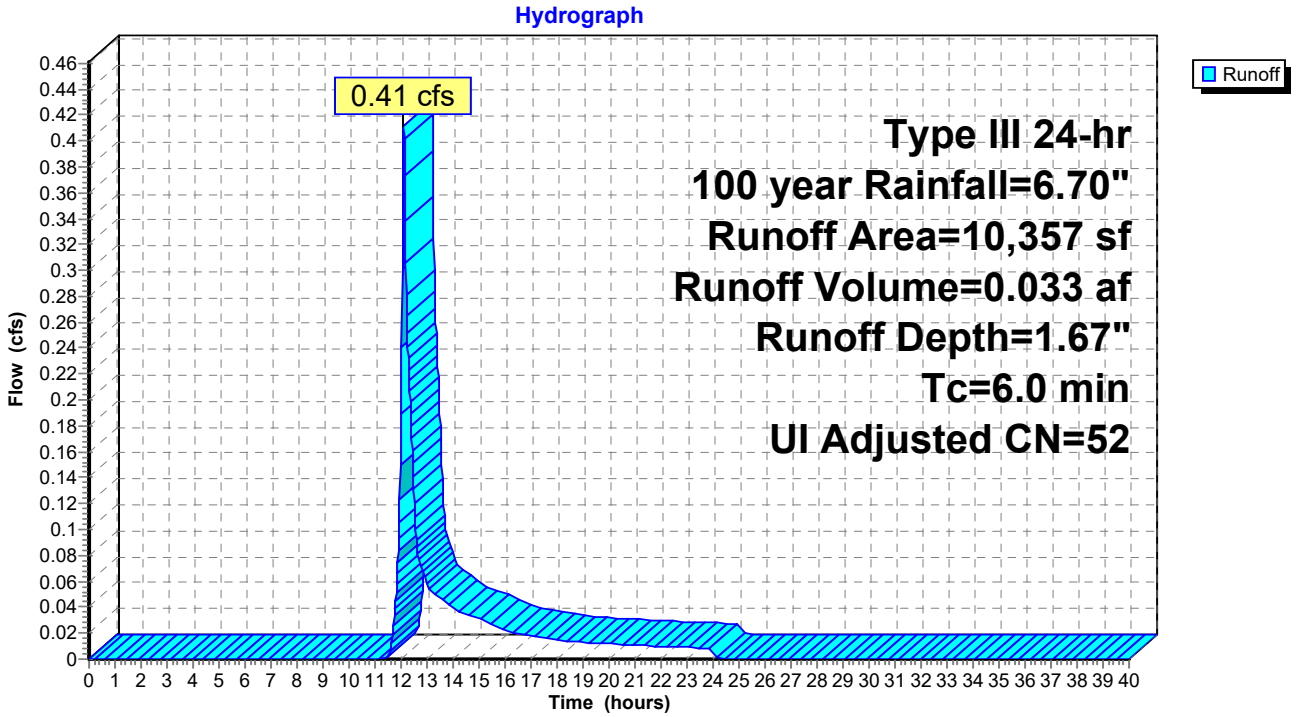
Runoff = 0.41 cfs @ 12.10 hrs, Volume= 0.033 af, Depth= 1.67"
Routed to nonexistent node ALL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 year Rainfall=6.70"

	Area (sf)	CN	Adj	Description
	1,190	98		Unconnected pavement, HSG A
	5,872	49		50-75% Grass cover, Fair, HSG A
*	3,295	49		Playground area
	10,357	55	52	Weighted Average, UI Adjusted
	9,167			88.51% Pervious Area
	1,190			11.49% Impervious Area
	1,190			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Walkway/Grass**

Subcatchment 7S: To Fencourt Ave



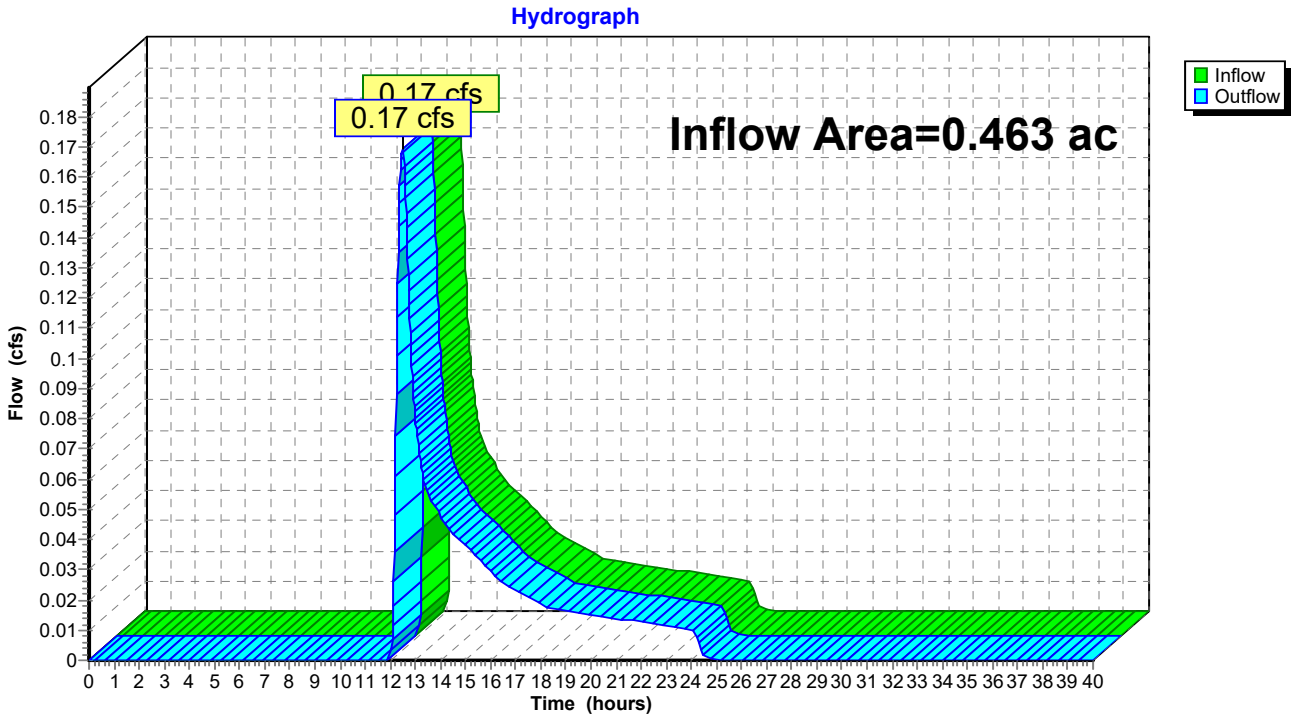
Summary for Reach 5R: Grass Paved Area #5 (12" RCP)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.463 ac, 2.56% Impervious, Inflow Depth = 0.80" for 100 year event
Inflow = 0.17 cfs @ 12.48 hrs, Volume= 0.031 af
Outflow = 0.17 cfs @ 12.48 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node ALL

Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Reach 5R: Grass Paved Area #5 (12" RCP)



Summary for Pond 1P: Infiltration System 1 (To Fencourt Ave)

Inflow Area = 0.440 ac, 78.76% Impervious, Inflow Depth = 4.97" for 100 year event
Inflow = 2.49 cfs @ 12.09 hrs, Volume= 0.182 af
Outflow = 1.15 cfs @ 12.26 hrs, Volume= 0.182 af, Atten= 54%, Lag= 10.5 min
Discarded = 0.08 cfs @ 10.04 hrs, Volume= 0.121 af
Primary = 1.07 cfs @ 12.26 hrs, Volume= 0.061 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.72' @ 12.26 hrs Surf.Area= 0.032 ac Storage= 0.058 af

Plug-Flow detention time= 166.1 min calculated for 0.182 af (100% of inflow)
Center-of-Mass det. time= 166.0 min (962.7 - 796.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.00'	0.022 af	**21.62'W x 64.99'L x 2.98'H Field A** 0.096 af Overall - 0.041 af Embedded = 0.055 af x 40.0% Voids
#2A	132.25'	0.039 af	**ACF R-Tank SD 3** x 260 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 260 Chambers in 10 Rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	134.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 10.04 hrs HW=132.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=1.07 cfs @ 12.26 hrs HW=134.72' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 3.02 fps)
├**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 3.02 fps)
├**4=Orifice/Grate** (Orifice Controls 0.15 cfs @ 3.02 fps)
├**5=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.58 fps)
└**6=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.58 fps)

Pond 1P: Infiltration System 1 (To Fencourt Ave) - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

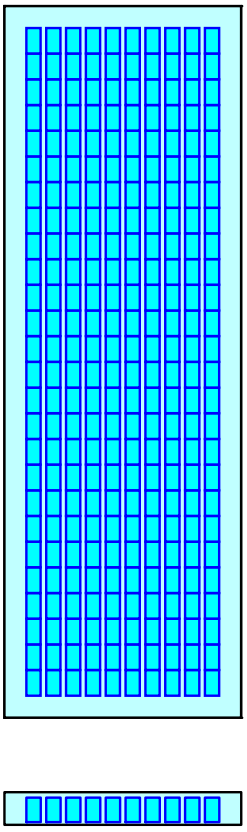
26 Chambers/Row x 2.35' Long = 60.99' Row Length +24.0" End Stone x 2 = 64.99' Base Length
10 Rows x 15.7" Wide + 6.0" Spacing x 9 + 24.0" Side Stone x 2 = 21.62' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

260 Chambers x 6.5 cf = 1,696.4 cf Chamber Storage
260 Chambers x 6.9 cf = 1,785.7 cf Displacement

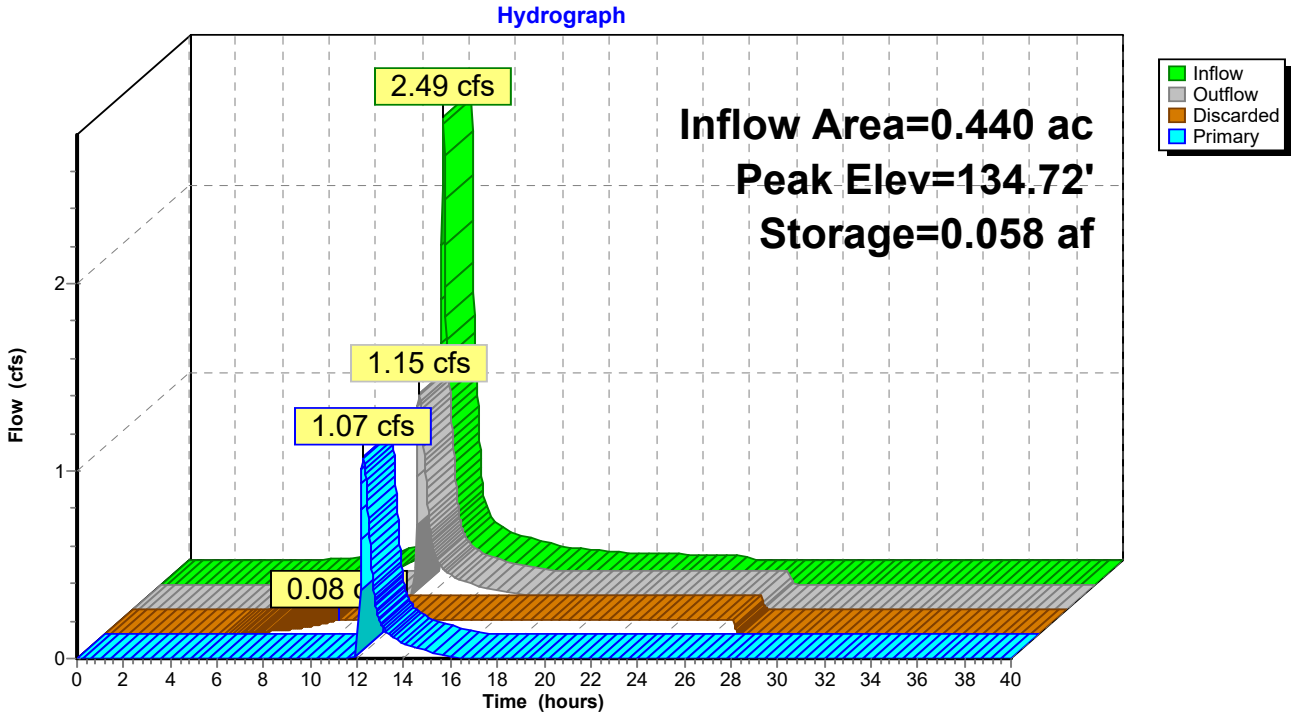
4,189.2 cf Field - 1,785.7 cf Chambers = 2,403.5 cf Stone x 40.0% Voids = 961.4 cf Stone Storage

Chamber Storage + Stone Storage = 2,657.8 cf = 0.061 af
Overall Storage Efficiency = 63.4%
Overall System Size = 64.99' x 21.62' x 2.98'

260 Chambers
155.2 cy Field
89.0 cy Stone



Pond 1P: Infiltration System 1 (To Fencourt Ave)



Summary for Pond 2P: Infiltration System 2

Inflow Area = 1.058 ac, 89.88% Impervious, Inflow Depth = 5.76" for 100 year event
Inflow = 6.64 cfs @ 12.08 hrs, Volume= 0.508 af
Outflow = 0.95 cfs @ 12.59 hrs, Volume= 0.508 af, Atten= 86%, Lag= 30.1 min
Discarded = 0.27 cfs @ 10.00 hrs, Volume= 0.411 af
Primary = 0.68 cfs @ 12.59 hrs, Volume= 0.097 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 134.52' @ 12.59 hrs Surf.Area= 0.110 ac Storage= 0.211 af

Plug-Flow detention time= 202.1 min calculated for 0.508 af (100% of inflow)
Center-of-Mass det. time= 202.1 min (976.0 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	131.70'	0.068 af	**48.81'W x 97.83'L x 2.98'H Field A** 0.327 af Overall - 0.158 af Embedded = 0.169 af x 40.0% Voids
#2A	131.95'	0.150 af	**ACF R-Tank SD 3** x 1000 Inside #1 Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf 1000 Chambers in 25 Rows
		0.217 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	133.70'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 10.00 hrs HW=131.73' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.68 cfs @ 12.59 hrs HW=134.52' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 3.90 fps)
└**3=Orifice/Grate** (Orifice Controls 0.34 cfs @ 3.90 fps)

Pond 2P: Infiltration System 2 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 3 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 26.8"H => 2.78 sf x 2.35'L = 6.5 cf
Outside= 15.7"W x 26.8"H => 2.93 sf x 2.35'L = 6.9 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

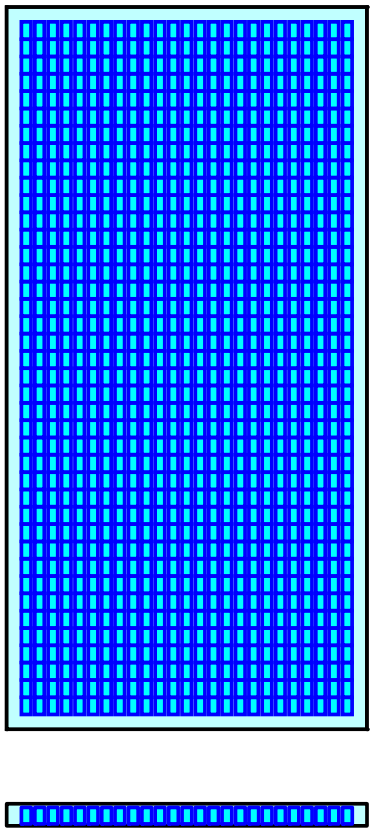
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
25 Rows x 15.7" Wide + 6.0" Spacing x 24 + 24.0" Side Stone x 2 = 48.81' Base Width
3.0" Stone Base + 26.8" Chamber Height + 6.0" Stone Cover = 2.98' Field Height

1,000 Chambers x 6.5 cf = 6,524.6 cf Chamber Storage
1,000 Chambers x 6.9 cf = 6,868.0 cf Displacement

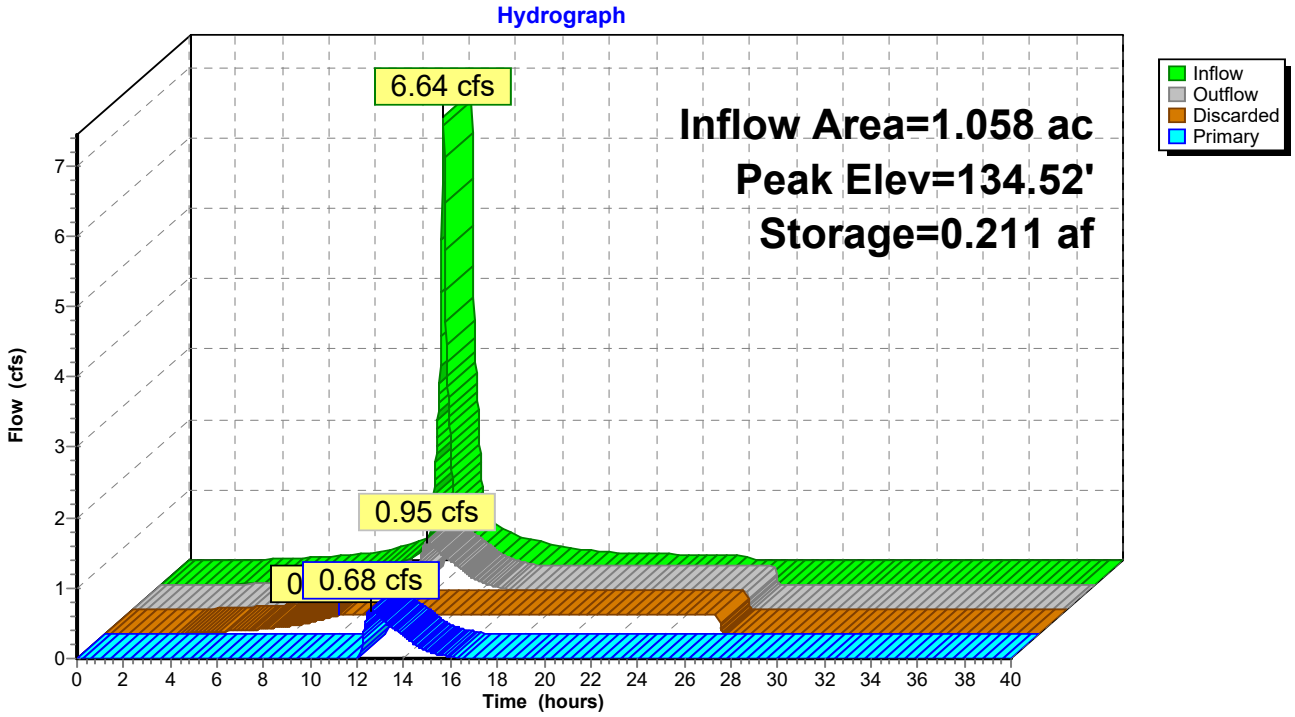
14,234.2 cf Field - 6,868.0 cf Chambers = 7,366.2 cf Stone x 40.0% Voids = 2,946.5 cf Stone Storage

Chamber Storage + Stone Storage = 9,471.1 cf = 0.217 af
Overall Storage Efficiency = 66.5%
Overall System Size = 97.83' x 48.81' x 2.98'

1,000 Chambers
527.2 cy Field
272.8 cy Stone



Pond 2P: Infiltration System 2



Summary for Pond 3P: Infiltration System 3

Inflow Area = 0.631 ac, 96.52% Impervious, Inflow Depth = 6.22" for 100 year event
Inflow = 4.10 cfs @ 12.08 hrs, Volume= 0.327 af
Outflow = 1.19 cfs @ 12.41 hrs, Volume= 0.327 af, Atten= 71%, Lag= 19.6 min
Discarded = 0.19 cfs @ 10.00 hrs, Volume= 0.241 af
Primary = 1.00 cfs @ 12.41 hrs, Volume= 0.087 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 135.90' @ 12.41 hrs Surf.Area= 0.077 ac Storage= 0.108 af

Plug-Flow detention time= 101.1 min calculated for 0.327 af (100% of inflow)
Center-of-Mass det. time= 101.0 min (856.9 - 755.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.70'	0.041 af	**34.31'W x 97.83'L x 2.26'H Field A** 0.174 af Overall - 0.073 af Embedded = 0.102 af x 40.0% Voids
#2A	133.95'	0.069 af	**ACF R-Tank SD 2** x 680 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 680 Chambers in 17 Rows
		0.110 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.70'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.90'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	135.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.19 cfs @ 10.00 hrs HW=133.72' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=1.00 cfs @ 12.41 hrs HW=135.90' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.82 cfs @ 4.17 fps)
└**3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 3.65 fps)

Pond 3P: Infiltration System 3 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

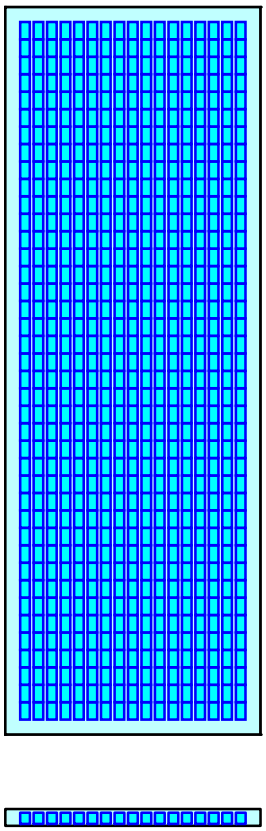
40 Chambers/Row x 2.35' Long = 93.83' Row Length +24.0" End Stone x 2 = 97.83' Base Length
17 Rows x 15.7" Wide + 6.0" Spacing x 16 + 24.0" Side Stone x 2 = 34.31' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

680 Chambers x 4.4 cf = 3,001.3 cf Chamber Storage
680 Chambers x 4.6 cf = 3,159.3 cf Displacement

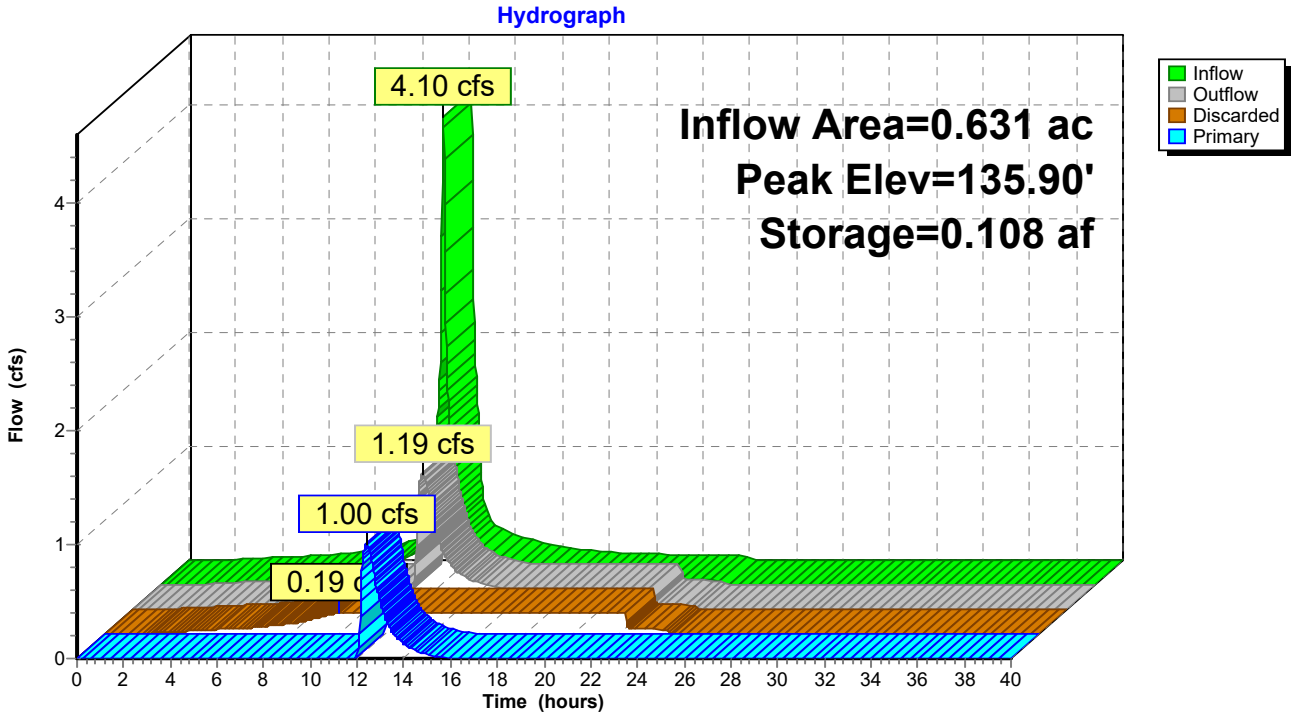
7,583.2 cf Field - 3,159.3 cf Chambers = 4,423.9 cf Stone x 40.0% Voids = 1,769.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,770.9 cf = 0.110 af
Overall Storage Efficiency = 62.9%
Overall System Size = 97.83' x 34.31' x 2.26'

680 Chambers
280.9 cy Field
163.8 cy Stone



Pond 3P: Infiltration System 3



Summary for Pond 4P: Infiltration System 4

Inflow Area = 1.650 ac, 88.33% Impervious, Inflow Depth = 5.64" for 100 year event
Inflow = 10.23 cfs @ 12.08 hrs, Volume= 0.776 af
Outflow = 1.23 cfs @ 12.67 hrs, Volume= 0.776 af, Atten= 88%, Lag= 35.3 min
Discarded = 0.51 cfs @ 10.52 hrs, Volume= 0.609 af
Primary = 0.71 cfs @ 12.67 hrs, Volume= 0.167 af
Routed to nonexistent node ALL

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 135.24' @ 12.67 hrs Surf.Area= 0.212 ac Storage= 0.306 af

Plug-Flow detention time= 128.9 min calculated for 0.776 af (100% of inflow)
Center-of-Mass det. time= 128.9 min (906.6 - 777.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.106 af	**66.93'W x 137.71'L x 2.26'H Field A** 0.478 af Overall - 0.213 af Embedded = 0.265 af x 40.0% Voids
#2A	133.25'	0.202 af	**ACF R-Tank SD 2** x 1995 Inside #1 Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf 1995 Chambers in 35 Rows
		0.308 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	134.30'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	134.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 10.52 hrs HW=133.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.51 cfs)

Primary OutFlow Max=0.71 cfs @ 12.67 hrs HW=135.24' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 4.34 fps)
├**3=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.08 fps)
└**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.08 fps)

Pond 4P: Infiltration System 4 - Chamber Wizard Field A

Chamber Model = ACF R-Tank SD 2 (ACF Environmental R-Tank SD)
Inside= 15.7"W x 18.1"H => 1.88 sf x 2.35'L = 4.4 cf
Outside= 15.7"W x 18.1"H => 1.98 sf x 2.35'L = 4.6 cf

15.7" Wide + 6.0" Spacing = 21.7" C-C Row Spacing

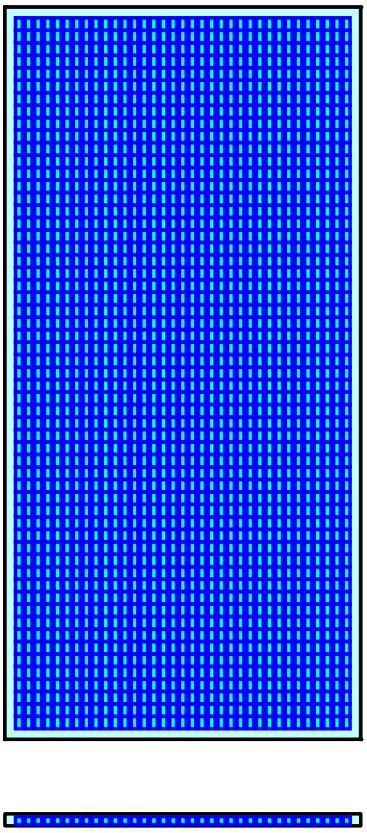
57 Chambers/Row x 2.35' Long = 133.71' Row Length +24.0" End Stone x 2 = 137.71' Base Length
35 Rows x 15.7" Wide + 6.0" Spacing x 34 + 24.0" Side Stone x 2 = 66.93' Base Width
3.0" Stone Base + 18.1" Chamber Height + 6.0" Stone Cover = 2.26' Field Height

1,995 Chambers x 4.4 cf = 8,805.3 cf Chamber Storage
1,995 Chambers x 4.6 cf = 9,268.8 cf Displacement

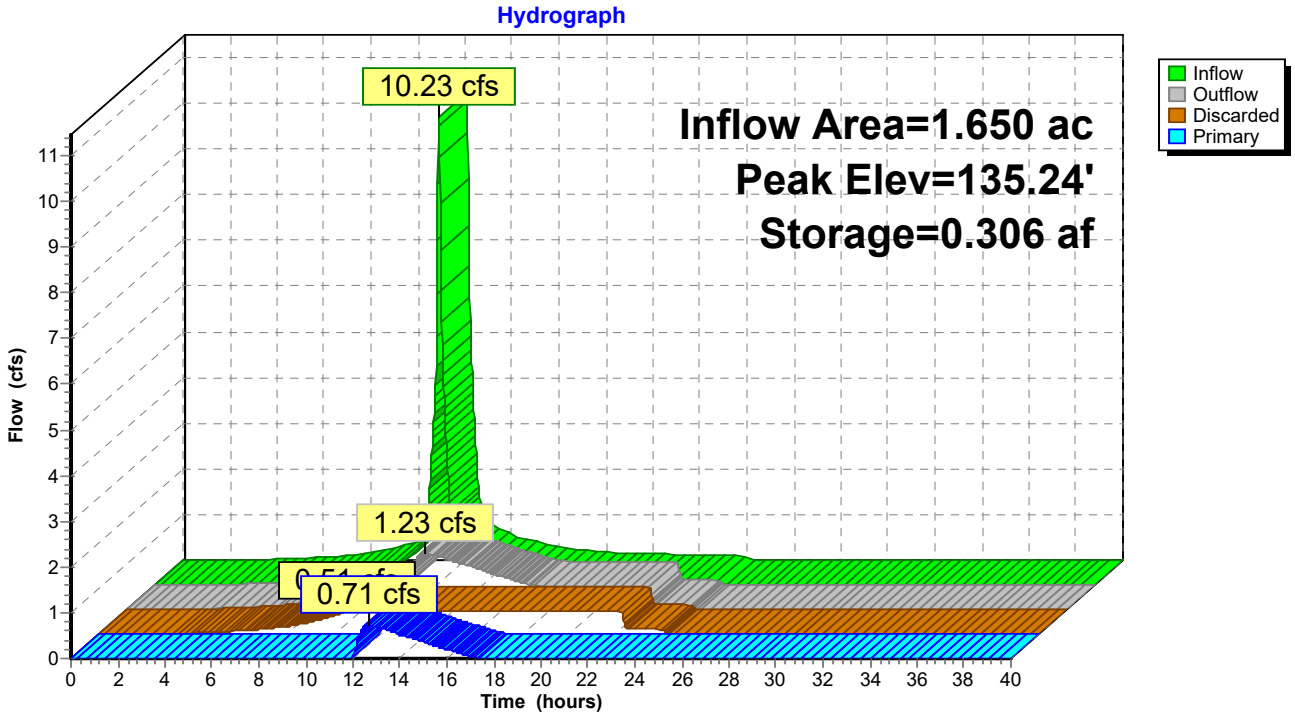
20,823.4 cf Field - 9,268.8 cf Chambers = 11,554.6 cf Stone x 40.0% Voids = 4,621.9 cf Stone Storage

Chamber Storage + Stone Storage = 13,427.2 cf = 0.308 af
Overall Storage Efficiency = 64.5%
Overall System Size = 137.71' x 66.93' x 2.26'

1,995 Chambers
771.2 cy Field
427.9 cy Stone



Pond 4P: Infiltration System 4



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Infiltration Structure Sizing Calculations

Volume of Infiltration System

The volume of the infiltration system is shown in the table below. The numbers were calculated by the following formulas:

Chamber Storage = Number of Chambers x 6.5 cf for triple layer, 4.4 cf for double layer

Chamber Displacement = Number of Chambers x 6.9 cf for triple layer, 4.6 cf for double layer

Field Area = System Length x System Width

Field Volume = Field Area x Field Hight

Stone Storage = (Field Volume – Chamber Displacement) x 40% Stone Voids

System Storage = Chamber Storage + Stone Storage

System #1, #2 are triple layer systems

System #3, #4 are double layer systems

INFILTRATION SYSTEM VOLUME CALCULATIONS					
	System 1	**System 2**	**System 3**	**System 4**	**Total**
No. Chambers	260x3	1000x3	680x2	1995x2	9,130
Field Dimension (ft x ft x ft)	64.99 x 21.62x2.98	97.83 x 48.81x2.98	97.83x 34.31x2.26	- - -	- - -
Field Area (sf)	1,405.1	4,775.1	3,356.5	10,459.5	19,996.2
Field Volume (cf)	4,189.2	14,234.2	7,583.2	23,638.5	49,645.1
Chamber Storage (cf)	1,696.4	6,524.6	3,001.3	8,805.3	20,027.6
Chamber Displacement (cf)	1,785.7	6,868.0	3,159.3	9,268.8	21,081.8
Stone Storage (cf)	961.4	2,946.5	1,769.6	4,621.9	11,455.8
System Storage (cf)	2,657.8	9,471.1	4,770.9	13,427.2	30,327

Massachusetts Stormwater Standards - Required Recharge Volume

Rv = F x Impervious Area

Where:

Rv = Required Recharged Volume

F = Target Depth Factor, for Type A Soils = 0.6”

Total Impervious Area on-site = 148,239 sf

Wv = 0.6” x 1 ft/12 inches x 148,239 sf = 7,412 cf

Infiltration Volume of Each Infiltration System During 1-yr Storm (Reference to HydroCAD Analysis):

System #1: 0.052 af = 2,265.1 cf

System #2: 0.174 af = 7,579.4 cf

System #3: 0.124 af = 5,401.4 cf

System #4: 0.259 af = 11,282.0 cf

Total Volume: 2,265.1 cf + 7,579.4 cf + 5,401.4 cf + 11,282.0 cf

= 26,527.9 cf > 7,412 cf

Massachusetts Stormwater Standards – Water Quality Volume I

Wv = f x Impervious Area

Where:

Wv = Required Recharged Volume

f = 1 Inch of Runoff

Total Impervious Area on-site = 148,239 sf

Wv = 1" x 1 ft/12 inches x 148,239 sf = 12,353.3 cf < 26,527.9 cf

Time to Infiltrate – Static Method

Time to Infiltrate = Rv / (K x Bottom of Stone Area x n)

Where

Rv=Required Recharged Volume

K=Rawls Rate (per Table 2.3.3 in the Mass Stormwater Handbook) = 2.41 in/hr for Loamy Sand

n=stone voids = 0.40

Retention System #1

Bottom of Stone Area Infiltration Area 1= 1,405 sf

Time to Infiltrate= 2,685 cf / (2.41 in/hr x 1 ft/12 inches x 1,405 sf x 0.40) = 23.8 hours

23.8 hours < 72 hours: Meets Standard

Retention System #2

Bottom of Stone Area Infiltration Area 2= 4,775 sf

Time to Infiltrate= 9,471 cf / (2.41 in/hr x 1 ft/12 inches x 4,775 sf x 0.40) = 24.7 hours

24.7 hours < 72 hours: Meets Standard

Retention System #3

Bottom of Stone Area Infiltration Area 3= 3,357 sf

Time to Infiltrate= 4,771cf / (2.41 in/hr x 1 ft/12 inches x 3,357 sf x 0.40) = 17.7 hours

17.7 hours < 72 hours: Meets Standard

Retention System #4

Bottom of Stone Area Infiltration Area 4= 10,460 sf

Time to Infiltrate= 13,427 cf / (2.41 in/hr x 1 ft/12 inches x 10,460 sf x 0.40) = 16 hours

16 hours < 72 hours: Meets Standard

Stormwater Operation and Maintenance Plan

16 Fencourt Avenue
Randolph, MA
July 8, 2022

Stormwater Management System Owner:

TAJ ESTATES OF RANDOLPH II LLC

The following Operation and Maintenance Plan is intended as a guide for maintaining the structural and non-structural BMP's post-construction. In order to document maintenance activities, the attached maintenance log should be kept on site. A minimum of two years' worth of records should be up to date and available for review and inspection, if requested by Town officials. The transfer of ownership (e.g. from developer to condo association) also includes the transfer of the maintenance obligation to the new owners. In order to ensure the proposed stormwater management system continues to function as designed and to prevent any adverse impacts down-gradient, proper maintenance is required.

Operation and Maintenance Plan During Construction

All erosion and sediment control measures must be in place prior to any disturbance.

Inlet Protection: Catch basins shall be protected from siltation during construction through the use of siltation fabric. The siltation fabric must be installed under the catch basin grates and the grates must be secured to prevent untreated seepage. The fabric should be inspected daily and immediately after a rainstorm. Sediment deposits must be removed promptly, and fabric must be repaired as necessary.

Perimeter Silt Protection: A "Silt Sock" (or approved equal) perimeter fence must be installed around the perimeter of work limits and material stockpiles. Installation shall be in accordance with manufacturer specifications and attached details. Silt fence shall be inspected daily. Trapped sediments shall be removed and repairs shall be made promptly.

Stabilized Construction Entrance: A stabilized construction entrance must be installed at the entrance to the construction site. Entrance shall be made of 1 ½" crushed stone for a depth of four inches. Construction entrance shall be inspected daily and repairs shall be made promptly.

Stormwater Operation and Maintenance Plan

16 Fencourt Avenue
Randolph, MA
July 8, 2022

Stormwater Management System Owner:

TAJ ESTATES OF RANDOLPH II LLC

The following Operation and Maintenance Plan is intended as a guide for maintaining the structural and non-structural BMP's post-construction. In order to document maintenance activities, the attached maintenance log should be kept on site. A minimum of two years' worth of records should be up to date and available for review and inspection, if requested by Town officials. The transfer of ownership (e.g. from developer to condo association) also includes the transfer of the maintenance obligation to the new owners. In order to ensure the proposed stormwater management system continues to function as designed and to prevent any adverse impacts down-gradient, proper maintenance is required.

Operation and Maintenance Activities Post-Construction

General Housekeeping: Paved areas should be kept clear of debris or leaf buildup to prevent clogging of the catch basins. All chemical and hazardous materials shall be store in secured designated locations with spill protection.

Catch Basins and Deep Sump Drain Manhole Inspection and Cleaning: Catch basins and deep sump drain manhole shall be inspected at least four (4) times per year and cleaned a minimum of two (2) times per year. Inspections should include the frame and grate, outlet pipe, hood and overall structure. Cleaning of all structures shall be conducted in the early spring (after winter sanding and before spring rains), if there are 18-inches of accumulated sediments or if a noticeable hydrocarbon sheen is present. The sumps shall be cleaned utilizing a vacuum or clamshell type device.

R-Tank System Inspection and Cleaning: The subsurface infiltration basin does not require regular maintenance if pretreatment devices (catch basins, trench drains, and deep sump drain manholes) are properly maintained. The system has inspection ports that should be inspected when the other on-site stormwater devices are inspected. If sediment build-up within the retention system is found during inspection, the sediment shall be removed by vacuumed method through the inspection ports. Maintenance introduction sheet has been provided in the package.

Stormceptor Inspection and Cleaning: Inspect 2 times a year. Inspection and pump out as necessary per manufacturer's recommendation.

Drainage Outfall Inspection and Cleaning: Inspect 2 times a year. Trash debris removed & restore rip rap as necessary.

Snow and Ice: During winter snow season, snow shall be mechanically removed. Snow shall be stockpile at the landscape areas on-site where it can naturally melt. Snow melt runoff can then be slowly infiltrated into the ground or treated by the stormwater management system. If excessive snow encountered, the excessive snow shall be removed by a private contractor for off-site disposal. At no time snow shall be pushed off site to the public right of way of abutting lands.

O & M Budget: The annual overall O & M budget to maintain the BMP's to protect our water resources is set at $5,000 which include the maintenance and clean-out of the above BMP's. This budget is to be annually review and update to ensure the long-term performance of the system.

Long Term Operation and Maintenance Log
16 Fencourt Avenue, Randolph, MA

Driveway/Parking Lot/Street Sweeping	December-February ☐ By: _____	March-May ☐ By: _____	June-August ☐ By: _____	September-November ☐ By: _____	Comments: _____
Trench/Catch Basin Cleaning	January-February ☐ By: _____	March-April ☐ By: _____	June-July ☐ By: _____	November-December ☐ By: _____	Comments: _____
Deep Sump Manhole Inspection/Pump Out	March/April ☐ By: _____ Pump Out: Yes No		Nov ☐ By: _____ Pump Out: Yes No		Comments: _____
Infiltration System Inspection/Flushing	March/April ☐ By: _____ Flush Out: Yes No		Nov ☐ By: _____ Flush Out: Yes No		Comments: _____
Stormceptor System Inspection/Flushing	March/April ☐ By: _____ Flush Out: Yes No		Nov ☐ By: _____ Flush Out: Yes No		Comments: _____

Note: O & M Log and maintenance record to be kept in management office and retain for miniumum 2 years and shall be made available for Town inspection when necessay.

TSS Removal Calculation Worksheet

Proj. No.:
Date: 9/14/2022

Location: 16 Fencourt Avenue, Randolph, MA
System # System #1, #2, #3, #4

Computed by: SL

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
Catch Basin	25	1.00	0.25	0.75
Stormceptor 450I	80	0.75	0.60	0.15

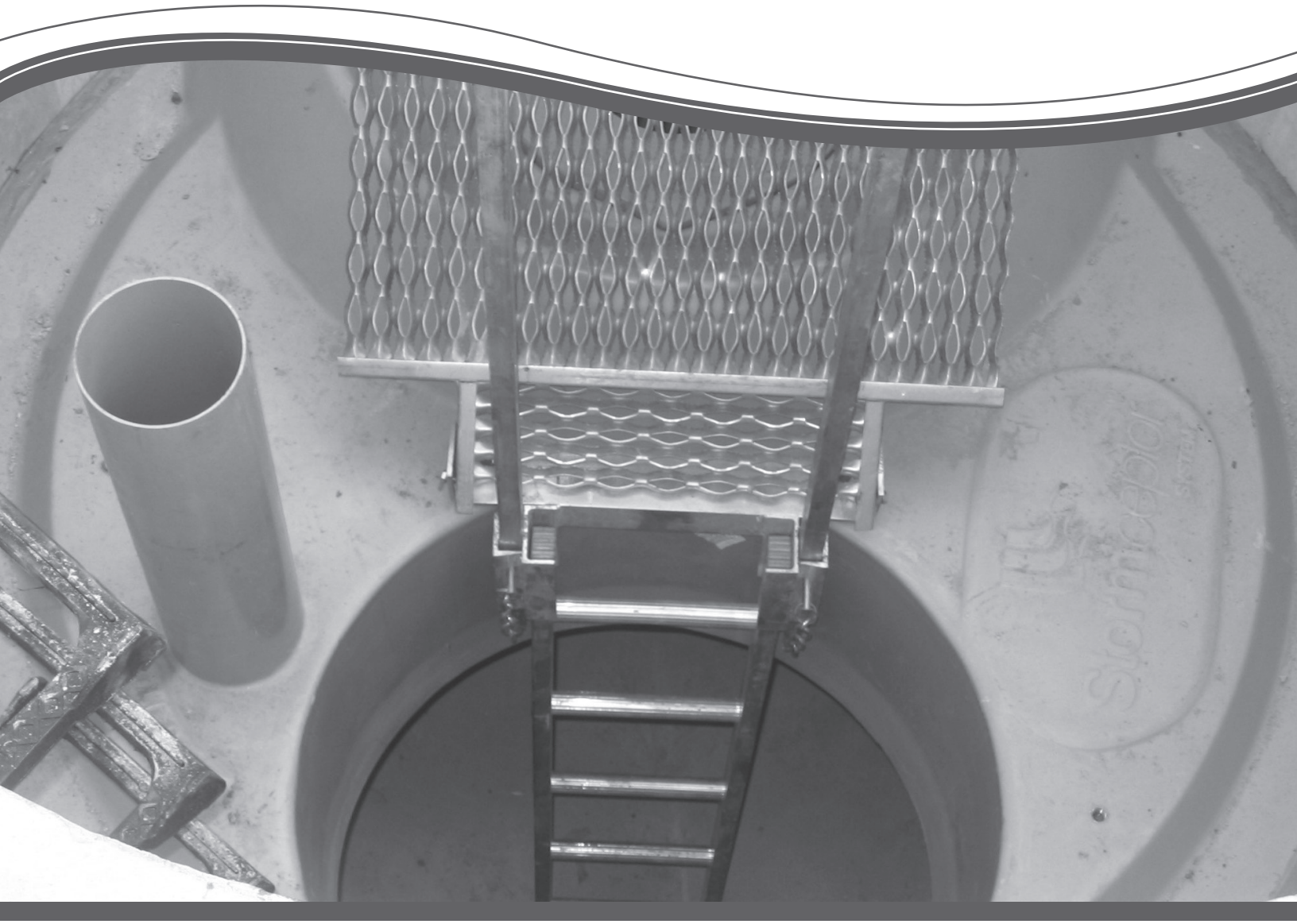
Total TSS Removal= **85%**

Notes:

*Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

CONTECH®
ENGINEERED SOLUTIONS

Stormceptor® STC
Operation and Maintenance Guide



Stormceptor Design Notes

- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.

Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences			
Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in. (75 mm)	1 in. (25 mm)	3 in. (75 mm)
Multiple inlet pipes	3 in. (75 mm)	3 in. (75 mm)	Only one inlet pipe.

Maximum inlet and outlet pipe diameters:

Inlet/Outlet Configuration	Inlet Unit STC 450i	In-Line Unit STC 900 to STC 7200	Series* STC 11000 to STC 16000
Straight Through	24 inch (600 mm)	42 inch (1050 mm)	60 inch (1500 mm)
Bend (90 degrees)	18 inch (450 mm)	33 inch (825 mm)	33 inch (825 mm)

- The inlet and in-line Stormceptor units can accommodate turns to a maximum of 90 degrees.
- Minimum distance from top of grade to crown is 2 feet (0.6 m)
- Submerged conditions. A unit is submerged when the standing water elevation at the proposed location of the Stormceptor unit is greater than the outlet invert elevation during zero flow conditions. In these cases, please contact your local Stormceptor representative and provide the following information:
- Top of grade elevation
- Stormceptor inlet and outlet pipe diameters and invert elevations
- Standing water elevation
- Stormceptor head loss, K = 1.3 (for submerged condition, K = 4)

Stormceptor® STC

OPERATION AND MAINTENANCE GUIDE
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1. About Stormceptor

The Stormceptor® STC (Standard Treatment Cell) was developed by Imbrium™ Systems to address the growing need to remove and isolate pollution from the storm drain system before it enters the environment. The Stormceptor STC targets hydrocarbons and total suspended solids (TSS) in stormwater runoff. It improves water quality by removing contaminants through the gravitational settling of fine sediments and floatation of hydrocarbons while preventing the re-suspension or scour of previously captured pollutants.

The development of the Stormceptor STC revolutionized stormwater treatment, and created an entirely new category of environmental technology. Protecting thousands of waterways around the world, the Stormceptor System has set the standard for effective stormwater treatment.

1.1. Patent Information

The Stormceptor technology is protected by the following patents:

- Australia Patent No. 693,164 • 693,164 • 707,133 • 729,096 • 779401
- Austrian Patent No. 289647
- Canadian Patent No 2,009,208 •2,137,942 • 2,175,277 • 2,180,305 • 2,180,383 • 2,206,338 • 2,327,768 (Pending)
- China Patent No 1168439
- Denmark DK 711879
- German DE 69534021
- Indonesian Patent No 16688
- Japan Patent No 9-11476 (Pending)
- Korea 10-2000-0026101 (Pending)
- Malaysia Patent No PI9701737 (Pending)
- New Zealand Patent No 314646
- United States Patent No 4,985,148 • 5,498,331 • 5,725,760 • 5,753,115 • 5,849,181 • 6,068,765 • 6,371,690
- Stormceptor OSR Patent Pending • Stormceptor LCS Patent Pending

2. Stormceptor Design Overview

2.1. Design Philosophy

The patented Stormceptor System has been designed to focus on the environmental objective of providing long-term pollution control. The unique and innovative Stormceptor design allows for continuous positive treatment of runoff during all rainfall events, while ensuring that all captured pollutants are retained within the system, even during intense storm events.

An integral part of the Stormceptor design is PCSWMM for Stormceptor - sizing software developed in conjunction with Computational Hydraulics Inc. (CHI) and internationally acclaimed expert, Dr. Bill James. Using local historical rainfall data and continuous simulation modeling, this software allows a Stormceptor unit to be designed for each individual site and the corresponding water quality objectives.

By using PCSWMM for Stormceptor, the Stormceptor System can be designed to remove a wide range of particles (typically from 20 to 2,000 microns), and can also be customized to remove a specific particle size distribution (PSD). The specified PSD should accurately reflect what is in the stormwater runoff to ensure the device is achieving the desired water quality objective. Since stormwater runoff contains small particles (less than 75 microns), it is important to design a treatment system to remove smaller particles in addition to coarse particles.

2.2. Benefits

The Stormceptor System removes free oil and suspended solids from stormwater, preventing spills and non-point source pollution from entering downstream lakes and rivers. The key benefits, capabilities and applications of the Stormceptor System are as follows:

- Provides continuous positive treatment during all rainfall events
- Can be designed to remove over 80% of the annual sediment load
- Removes a wide range of particles
- Can be designed to remove a specific particle size distribution (PSD)
- Captures free oil from stormwater
- Prevents scouring or re-suspension of trapped pollutants
- Pre-treatment to reduce maintenance costs for downstream treatment measures (ponds, swales, detention basins, filters)
- Groundwater recharge protection
- Spills capture and mitigation
- Simple to design and specify
- Designed to your local watershed conditions
- Small footprint to allow for easy retrofit installations
- Easy to maintain (vacuum truck)
- Multiple inlets can connect to a single unit
- Suitable as a bend structure
- Pre-engineered for traffic loading (minimum AASHTO HS-20)
- Minimal elevation drop between inlet and outlet pipes
- Small head loss
- Additional protection provided by an 18" (457 mm) fiberglass skirt below the top of the insert, for the containment of hydrocarbons in the event of a spill.

2.3. Environmental Benefit

Freshwater resources are vital to the health and welfare of their surrounding communities. There is increasing public awareness, government regulations and corporate commitment to reducing the pollution entering our waterways. A major source of this pollution originates from stormwater runoff from urban areas. Rainfall runoff carries oils, sediment and other contaminants from roads and parking lots discharging directly into our streams, lakes and coastal waterways.

The Stormceptor System is designed to isolate contaminants from getting into the natural environment. The Stormceptor technology provides protection for the environment from spills that occur at service stations and vehicle accident sites, while also removing contaminated sediment in runoff that washes from roads and parking lots.

3. Key Operation Features

3.1. Scour Prevention

A key feature of the Stormceptor System is its patented scour prevention technology. This innovation ensures pollutants are captured and retained during all rainfall events, even extreme storms. The Stormceptor System provides continuous positive treatment for all rainfall events, including intense storms. Stormceptor slows incoming runoff, controlling and reducing velocities in the lower chamber to create a non-turbulent environment that promotes free oils and floatable debris to rise and sediment to settle.

The patented scour prevention technology, the fiberglass insert, regulates flows into the lower chamber through a combination of a weir and orifice while diverting high energy flows away through the upper chamber to prevent scouring. Laboratory testing demonstrated no scouring when tested up to 125% of the unit's operating rate, with the unit loaded to 100% sediment capacity (NJDEP, 2005). Second, the depth of the lower chamber ensures the sediment storage zone is adequately separated from the path of flow in the lower chamber to prevent scouring.

3.2. Operational Hydraulic Loading Rate

Designers and regulators need to evaluate the treatment capacity and performance of manufactured stormwater treatment systems. A commonly used parameter is the "operational hydraulic loading rate" which originated as a design methodology for wastewater treatment devices.

Operational hydraulic loading rate may be calculated by dividing the flow rate into a device by its settling area. This represents the critical settling velocity that is the prime determinant to quantify the influent particle size and density captured by the device. PCSWMM for Stormceptor uses a similar parameter that is calculated by dividing the hydraulic detention time in the device by the fall distance of the sediment.

$$v_{SC} = \frac{H}{6_H} = \frac{Q}{A_S}$$

Where:

v_{SC} = critical settling velocity, ft/s (m/s)

H = tank depth, ft (m)

$Ø_H$ = hydraulic detention time, ft/s (m/s)

Q = volumetric flow rate, ft3/s (m3/s)

A_S = surface area, ft^2 (m^2)

(Tchobanoglous, G. and Schroeder, E.D. 1987. Water Quality. Addison Wesley.)

Unlike designing typical wastewater devices, stormwater systems are designed for highly variable flow rates including intense peak flows. PCSWMM for Stormceptor incorporates all of the flows into its calculations, ensuring that the operational hydraulic loading rate is considered not only for one flow rate, but for all flows including extreme events.

3.3. Double Wall Containment

The Stormceptor System was conceived as a pollution identifier to assist with identifying illicit discharges. The fiberglass insert has a continuous skirt that lines the concrete barrel wall for a depth of 18 inches (457 mm) that provides double wall containment for hydrocarbons storage. This protective barrier ensures that toxic floatables do not migrate through the concrete wall into the surrounding soils.

4. Stormceptor Product Line

4.1. Stormceptor Models

A summary of Stormceptor models and capacities are listed in Table 1.

Table 1. Stormceptor Models

Stormceptor Model	Total Storage Volume U.S. Gal (L)	Hydrocarbon Storage Capacity U.S. Gal (L)	Maximum Sediment Capacity ft^3 (L)
STC 450i	470 (1,780)	86 (330)	46 (1,302)
STC 900	952 (3,600)	251 (950)	89 (2,520)
STC 1200	1,234 (4,670)	251 (950)	127 (3,596)
STC 1800	1,833 (6,940)	251 (950)	207 (5,861)
STC 2400	2,462 (9,320)	840 (3,180)	205 (5,805)
STC 3600	3,715 (1,406)	840 (3,180)	373 (10,562)
STC 4800	5,059 (1,950)	909 (3,440)	543 (15,376)
STC 6000	6,136 (23,230)	909 (3,440)	687 (19,453)
STC 7200	7,420 (28,090)	1,059 (4,010)	839 (23,757)
STC 11000	11,194 (42,370)	2,797 (10, 590)	1,086 (30,752)
STC 13000	13,348 (50,530)	2,797 (10, 590)	1,374 (38,907)
STC 16000	15,918 (60,260)	3,055 (11, 560)	1,677 (47,487)

NOTE: Storage volumes may vary slightly from region to region. For detailed information, contact your local Stormceptor representative.

4.2. Inline Stormceptor

The Inline Stormceptor, Figure 1, is the standard design for most stormwater treatment applications. The patented Stormceptor design allows the Inline unit to maintain continuous positive treatment of total suspended solids (TSS) year-round, regardless of flow rate. The Inline Stormceptor is composed of a precast concrete tank with a fiberglass insert situated at the invert of the storm sewer pipe, creating an upper chamber above the insert and a lower chamber below the insert.

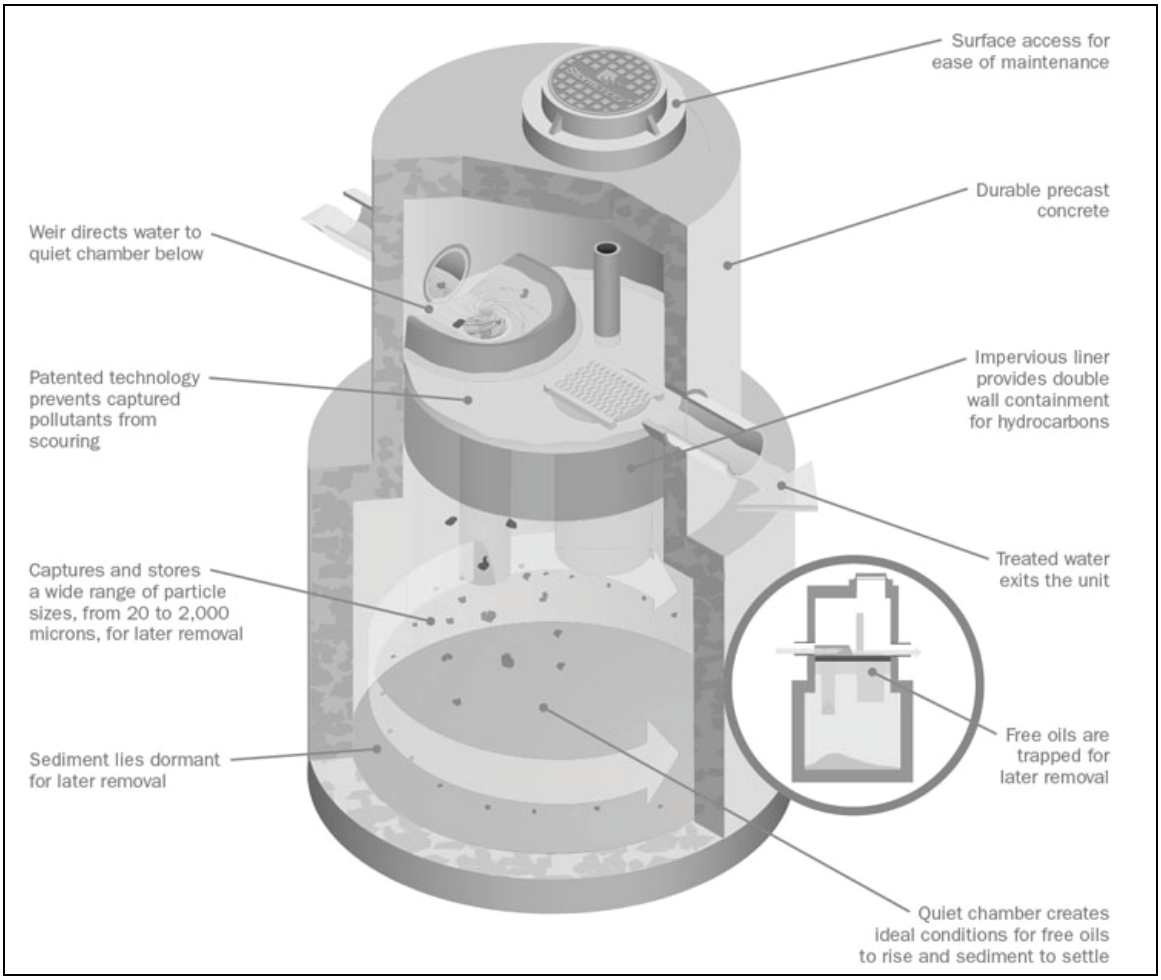

Figure 1. Inline Stormceptor

Operation

As water flows into the Stormceptor unit, it is slowed and directed to the lower chamber by a weir and drop tee. The stormwater enters the lower chamber, a non-turbulent environment, allowing free oils to rise and sediment to settle. The oil is captured underneath the fiberglass insert and shielded from exposure to the concrete walls by a fiberglass skirt. After the pollutants separate, treated water continues up a riser pipe, and exits the lower chamber on the downstream side of the weir before leaving the unit. During high flow events, the Stormceptor System's patented scour prevention technology ensures continuous pollutant removal and prevents re-suspension of previously captured pollutants.

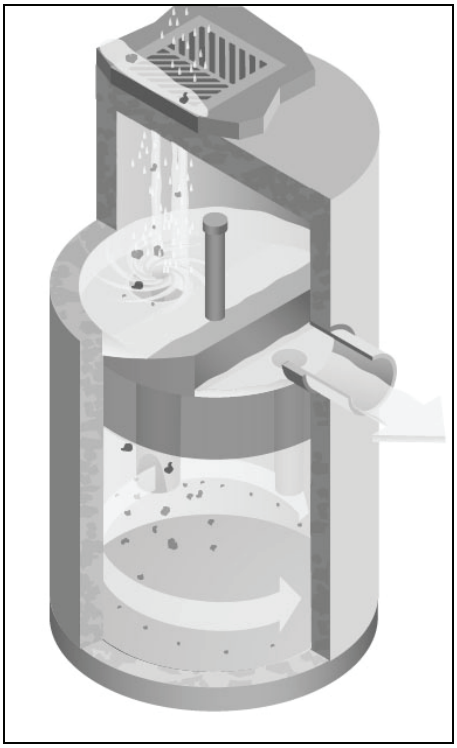

Figure 2. Inlet Stormceptor

4.3. Inlet Stormceptor

The Inlet Stormceptor System, Figure 2, was designed to provide protection for parking lots, loading bays, gas stations and other spill-prone areas. The Inlet Stormceptor is designed to remove sediment from stormwater introduced through a grated inlet, a storm sewer pipe, or both.

The Inlet Stormceptor design operates in the same manner as the Inline unit, providing continuous positive treatment, and ensuring that captured material is not re-suspended.

4.4. Series Stormceptor

Designed to treat larger drainage areas, the Series Stormceptor System, Figure 3, consists of two adjacent Stormceptor models that function in parallel. This design eliminates the need for additional structures and piping to reduce installation costs.

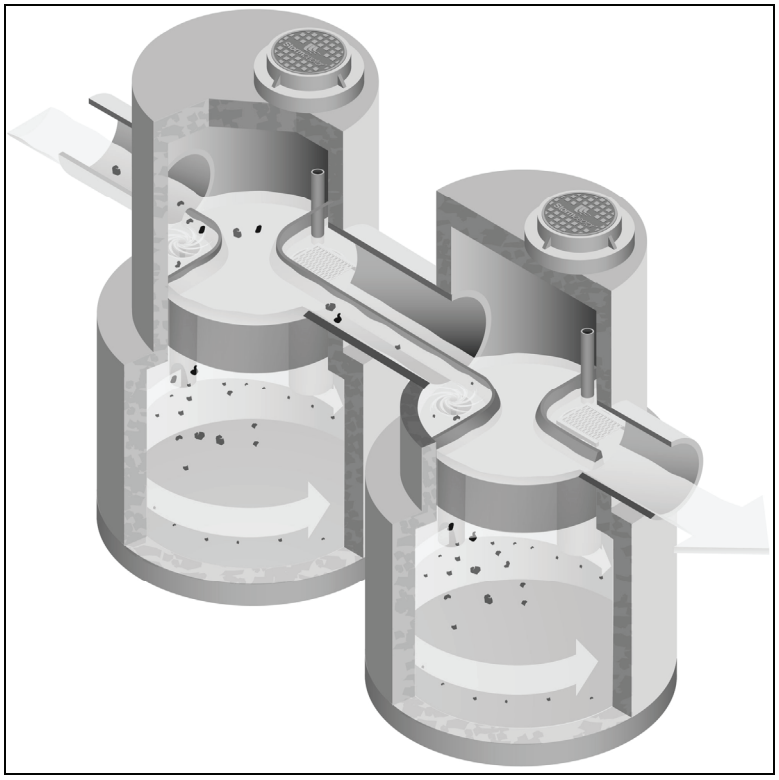

Figure 3. Series System

The Series Stormceptor design operates in the same manner as the Inline unit, providing continuous positive treatment, and ensuring that captured material is not re-suspended.

5. Sizing the Stormceptor System

The Stormceptor System is a versatile product that can be used for many different aspects of water quality improvement. While addressing these needs, there are conditions that the designer needs to be aware of in order to size the Stormceptor model to meet the demands of each individual site in an efficient and cost-effective manner.

PCSWMM for Stormceptor is the support tool used for identifying the appropriate Stormceptor model. In order to size a unit, it is recommended the user follow the seven design steps in the program. The steps are as follows:

STEP 1 – Project Details

The first step prior to sizing the Stormceptor System is to clearly identify the water quality objective for the development. It is recommended that a level of annual sediment (TSS) removal be identified and defined by a particle size distribution.

STEP 2 – Site Details

Identify the site development by the drainage area and the level of imperviousness. It is recommended that imperviousness be calculated based on the actual area of imperviousness based on paved surfaces, sidewalks and rooftops.

STEP 3 – Upstream Attenuation

The Stormceptor System is designed as a water quality device and is sometimes used in conjunction with onsite water quantity control devices such as ponds or underground detention systems. When possible, a greater benefit is typically achieved when installing a Stormceptor unit upstream of a detention facility. By placing the Stormceptor unit upstream of a detention structure, a benefit of less maintenance of the detention facility is realized.

STEP 4 – Particle Size Distribution

It is critical that the PSD be defined as part of the water quality objective. PSD is critical for the design of treatment system for a unit process of gravity settling and governs the size of a treatment system. A range of particle sizes has been provided and it is recommended that clays and silt-sized particles be considered in addition to sand and gravel-sized particles. Options and sample PSDs are provided in PCSWMM for Stormceptor. The default particle size distribution is the Fine Distribution, Table 2, option.

Table 2. Fine Distribution

Particle Size	Distribution	Specific Gravity
20	20%	1.3
60	20%	1.8
150	20%	2.2
400	20%	2.65
2000	20%	2.65

If the objective is the long-term removal of 80% of the total suspended solids on a given site, the PSD should be representative of the expected sediment on the site. For example, a system designed to remove 80% of coarse particles (greater than 75 microns) would provide relatively poor removal efficiency of finer particles that may be naturally prevalent in runoff from the site.

Since the small particle fraction contributes a disproportionately large amount of the total available particle surface area for pollutant adsorption, a system designed primarily for coarse particle capture will compromise water quality objectives.

STEP 5 – Rainfall Records

Local historical rainfall has been acquired from the U.S. National Oceanic and Atmospheric Administration, Environment Canada and regulatory agencies across North America. The rainfall data provided with PCSMM for Stormceptor provides an accurate estimation of small storm hydrology by modeling actual historical storm events including duration, intensities and peaks.

STEP 6 – Summary

At this point, the program may be executed to predict the level of TSS removal from the site. Once the simulation has completed, a table shall be generated identifying the TSS removal of each Stormceptor unit.

STEP 7 – Sizing Summary

Performance estimates of all Stormceptor units for the given site parameters will be displayed in a tabular format. The unit that meets the water quality objective, identified in Step 1, will be highlighted.

5.1. PCSWMM for Stormceptor

The Stormceptor System has been developed in conjunction with PCSWMM for Stormceptor as a technological solution to achieve water quality goals. Together, these two innovations model, simulate, predict and calculate the water quality objectives desired by a design engineer for TSS removal.

PCSWMM for Stormceptor is a proprietary sizing program which uses site specific inputs to a computer model to simulate sediment accumulation, hydrology and long-term total suspended solids removal. The model has been calibrated to field monitoring results from Stormceptor units that have been monitored in North America. The sizing methodology can be described by three processes:

1. Determination of real time hydrology
2. Buildup and wash off of TSS from impervious land areas
3. TSS transport through the Stormceptor (settling and discharge). The use of a calibrated model is the preferred method for sizing stormwater quality structures for the following reasons:
   - » The hydrology of the local area is properly and accurately incorporated in the sizing (distribution of flows, flow rate ranges and peaks, back-to-back storms, inter-event times)
   - » The distribution of TSS with the hydrology is properly and accurately considered in the sizing
   - » Particle size distribution is properly considered in the sizing
   - » The sizing can be optimized for TSS removal
   - » The cost benefit of alternate TSS removal criteria can be easily assessed
   - » The program assesses the performance of all Stormceptor models. Sizing may be selected based on a specific water quality outcome or based on the Maximum Extent Practicable

For more information regarding PCSWMM for Stormceptor, contact your local Stormceptor representative, or visit www.imbriumsystems.com to download a free copy of the program.

5.2. Sediment Loading Characteristics

The way in which sediment is transferred to stormwater can have a considerable effect on which type of system is implemented. On typical impervious surfaces (e.g. parking lots) sediment will build over time and wash off with the next rainfall. When rainfall patterns are examined, a short intense storm will have a higher concentration of sediment than a long slow drizzle. Together with rainfall data representing the site's typical rainfall patterns, sediment loading characteristics play a part in the correct sizing of a stormwater quality device.

Typical Sites

For standard site design of the Stormceptor System, PCSWMM for Stormceptor is utilized to accurately assess the unit's performance. As an integral part of the product's design, the program can be used to meet local requirements for total suspended solid removal. Typical installations of manufactured stormwater treatment devices would occur on areas such as paved parking lots or paved roads. These are considered "stable" surfaces which have non – erodible surfaces.

Unstable Sites

While standard sites consist of stable concrete or asphalt surfaces, sites such as gravel parking lots, or maintenance yards with stockpiles of sediment would be classified as "unstable". These types of sites do not exhibit first flush characteristics, are highly erodible and exhibit atypical sediment loading characteristics and must therefore be sized more carefully. Contact your local Stormceptor representative for assistance in selecting a proper unit sized for such unstable sites.

6. Spill Controls

When considering the removal of total petroleum hydrocarbons (TPH) from a storm sewer system there are two functions of the system: oil removal, and spill capture.

'Oil Removal' describes the capture of the minute volumes of free oil mobilized from impervious surfaces. In this instance relatively low concentrations, volumes and flow rates are considered. While the Stormceptor unit will still provide an appreciable oil removal function during higher flow events and/or with higher TPH concentrations, desired effluent limits may be exceeded under these conditions.

'Spill Capture' describes a manner of TPH removal more appropriate to recovery of a relatively high volume of a single phase deleterious liquid that is introduced to the storm sewer system over a relatively short duration. The two design criteria involved when considering this manner of introduction are overall volume and the specific gravity of the material. A standard Stormceptor unit will be able to capture and retain a maximum spill volume and a minimum specific gravity.

For spill characteristics that fall outside these limits, unit modifications are required. Contact your local Stormceptor Representative for more information.

One of the key features of the Stormceptor technology is its ability to capture and retain spills. While the standard Stormceptor System provides excellent protection for spill control, there are additional options to enhance spill protection if desired.

6.1. Oil Level Alarm

The oil level alarm is an electronic monitoring system designed to trigger a visual and audible alarm when a pre-set level of oil is reached within the lower chamber. As a standard, the oil

level alarm is designed to trigger at approximately 85% of the unit's available depth level for oil capture. The feature acts as a safeguard against spills caused by exceeding the oil storage capacity of the separator and eliminates the need for manual oil level inspection.

The oil level alarm installed on the Stormceptor insert is illustrated in Figure 4.

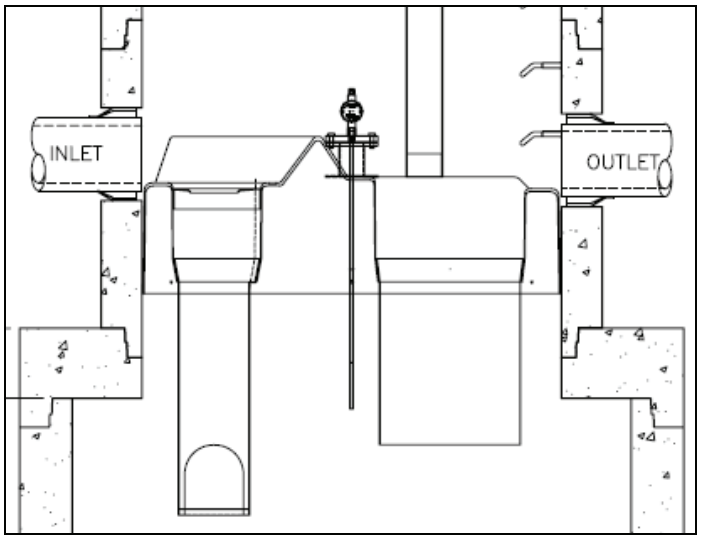

Figure 4. Oil level alarm

6.2. Increased Volume Storage Capacity

The Stormceptor unit may be modified to store a greater spill volume than is typically available. Under such a scenario, instead of installing a larger than required unit, modifications can be made to the recommended Stormceptor model to accommodate larger volumes. Contact your local Stormceptor representative for additional information and assistance for modifications.

7. Stormceptor Options

The Stormceptor System allows flexibility to incorporate to existing and new storm drainage infrastructure. The following section identifies considerations that should be reviewed when installing the system into a drainage network. For conditions that fall outside of the recommendations in this section, please contact your local Stormceptor representative for further guidance.

7.1. Installation Depth Minimum Cover

The minimum distance from the top of grade to the crown of the inlet pipe is 24 inches (600 mm). For situations that have a lower minimum distance, contact your local Stormceptor representative.

7.2. Maximum Inlet and Outlet Pipe Diameters

Maximum inlet and outlet pipe diameters are illustrated in Figure 5. Contact your local Stormceptor representative for larger pipe diameters

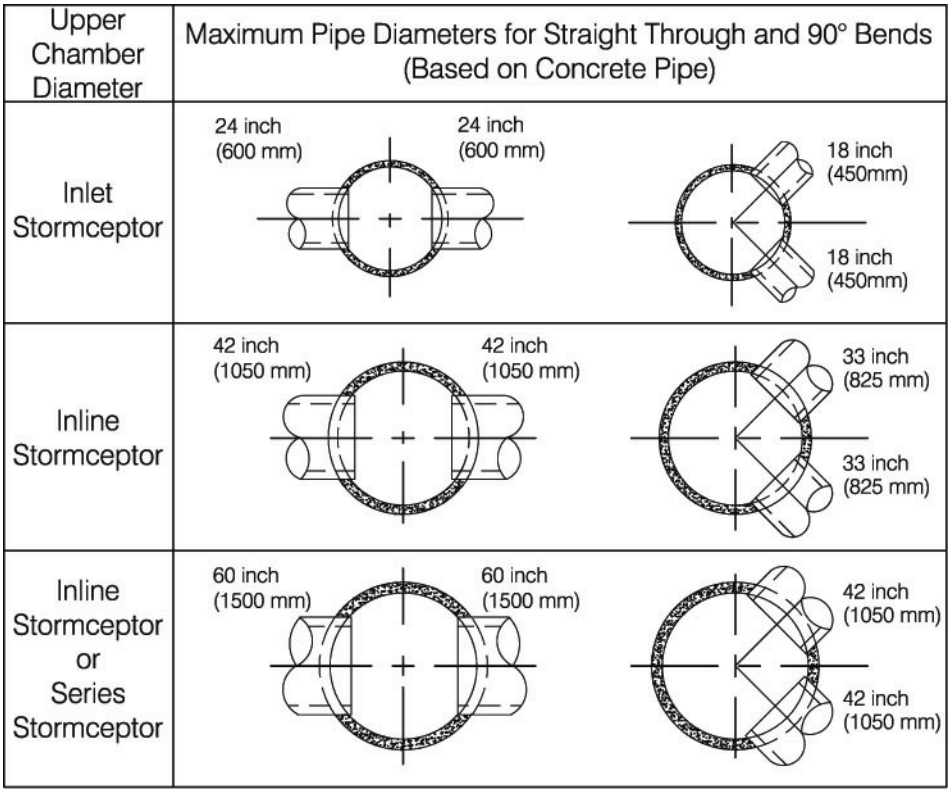

Figure 5. Maximum pipe diameters for straight through and bend applications

*The bend should only be incorporated into the second structure (downstream structure) of the Series Stormceptor System

7.3. Bends

The Stormceptor System can be used to change horizontal alignment in the storm drain network up to a maximum of 90 degrees. Figure 6 illustrates the typical bend situations of the Stormceptor System. Bends should only be applied to the second structure (downstream structure) of the Series Stormceptor System.

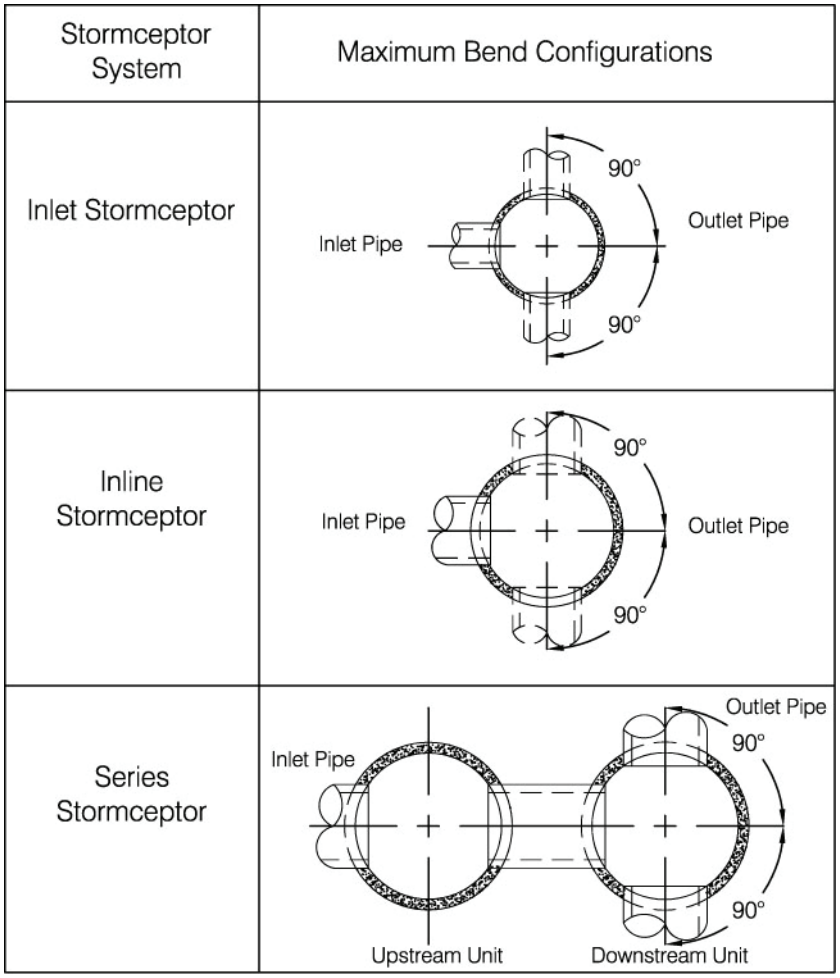

Figure 6. Maximum bend angles

7.4. Multiple Inlet Pipes

The Inlet and Inline Stormceptor System can accommodate two or more inlet pipes. The maximum number of inlet pipes that can be accommodated into a Stormceptor unit is a function of the number, alignment and diameter of the pipes and its effects on the structural integrity of the precast concrete. When multiple inlet pipes are used for new developments, each inlet pipe shall have an invert elevation 3 inches (75 mm) higher than the outlet pipe invert elevation.

7.5. Inlet/Outlet Pipe Invert Elevations

Recommended inlet and outlet pipe invert differences are listed in Table 3.

Table 3. Recommended Drops Between Inlet and Outlet Pipe Inverts

Number of Inlet Pipes	Inlet System	In-Line System	Series System
1	3 inches (75 mm)	1 inch (25 mm)	3 inches (75 mm)
>1	3 inches (75 mm)	3 inches (75 mm)	Not Applicable

7.6. Shallow Stormceptor

In cases where there may be restrictions to the depth of burial of storm sewer systems. In this situation, for selected Stormceptor models, the lower chamber components may be increased in diameter to reduce the overall depth of excavation required.

7.7. Customized Live Load

The Stormceptor system is typically designed for local highway truck loading (AASHTO HS- 20). When the project requires live loads greater than HS-20, the Stormceptor System may be customized structurally for a pre-specified live load. Contact your local Stormceptor representative for customized loading conditions.

7.8. Pre-treatment

The Stormceptor System may be sized to remove sediment and for spills control in conjunction with other stormwater BMPs to meet the water quality objective. For pretreatment applications, the Stormceptor System should be the first unit in a treatment train. The benefits of pre-treatment include the extension of the operational life (extension of maintenance frequency) of large stormwater management facilities, prevention of spills and lower total life- cycle maintenance cost.

7.9. Head loss

The head loss through the Stormceptor System is similar to a 60 degree bend at a manhole. The K value for calculating minor losses is approximately 1.3 (minor loss = k*1.3v2/2g).

However, when a Submerged modification is applied to a Stormceptor unit, the corresponding K value is 4.

7.10. Submerged

The Submerged modification, Figure 7, allows the Stormceptor System to operate in submerged or partially submerged storm sewers. This configuration can be installed on all models of the Stormceptor System by modifying the fiberglass insert. A customized weir height and a secondary drop tee are added.

Submerged instances are defined as standing water in the storm drain system during zero flow conditions. In these instances, the following information is necessary for the proper design and application of submerged modifications:

- Stormceptor top of grade elevation
- Stormceptor outlet pipe invert elevation
- Standing water elevation

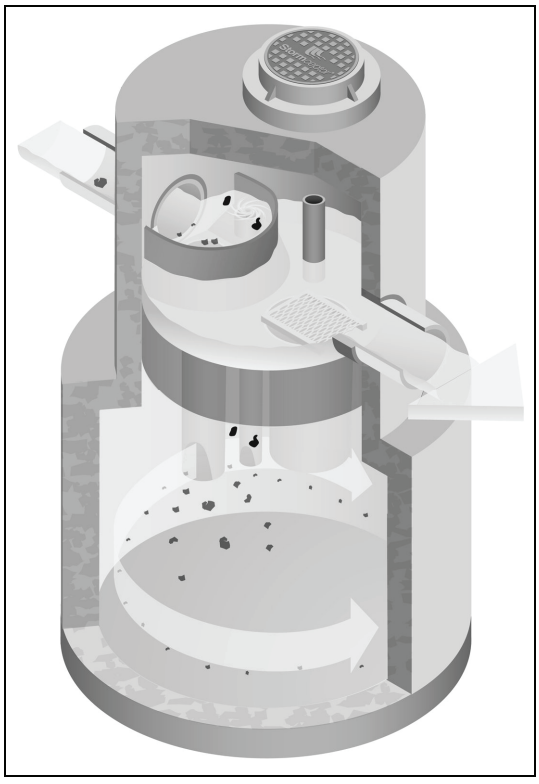

Figure 7. Submerged Stormceptor

8. Comparing Technologies

Designers have many choices available to achieve water quality goals in the treatment of stormwater runoff. Since many alternatives are available for use in stormwater quality treatment it is important to consider how to make an appropriate comparison between "approved alternatives". The following is a guide to assist with the accurate comparison of differing technologies and performance claims.

8.1. Particle Size Distribution (PSD)

The most sensitive parameter to the design of a stormwater quality device is the selection of the design particle size. While it is recommended that the actual particle size distribution (PSD) for sites be measured prior to sizing, alternative values for particle size should be selected to represent what is likely to occur naturally on the site. A reasonable estimate of a particle size distribution likely to be found on parking lots or other impervious surfaces should consist of a wide range of particles such as 20 microns to 2,000 microns (Ontario MOE, 1994).

There is no absolute right particle size distribution or specific gravity and the user is cautioned to review the site location, characteristics, material handling practices and regulatory requirements when selecting a particle size distribution. When comparing technologies, designs using different PSDs will result in incomparable TSS removal efficiencies. The PSD of the TSS removed needs to be standard between two products to allow for an accurate comparison.

8.2. Scour Prevention

In order to accurately predict the performance of a manufactured treatment device, there must be confidence that it will perform under all conditions. Since rainfall patterns cannot be predicted, stormwater quality devices placed in storm sewer systems must be able to withstand extreme events, and ensure that all pollutants previously captured are retained in the system.

In order to have confidence in a system's performance under extreme conditions, independent validation of scour prevention is essential when examining different technologies. Lack of independent verification of scour prevention should make a designer wary of accepting any product's performance claims.

8.3. Hydraulics

Full scale laboratory testing has been used to confirm the hydraulics of the Stormceptor System. Results of lab testing have been used to physically design the Stormceptor System and the sewer pipes entering and leaving the unit. Key benefits of Stormceptor are:

- Low head loss (typical k value of 1.3)
- Minimal inlet/outlet invert elevation drop across the structure
- Use as a bend structure
- Accommodates multiple inlets

The adaptability of the treatment device to the storm sewer design infrastructure can affect the overall performance and cost of the site.

8.4. Hydrology

Stormwater quality treatment technologies need to perform under varying climatic conditions. These can vary from long low intensity rainfall to short duration, high intensity storms. Since a treatment device is expected to perform under all these conditions, it makes sense that any system's design should accommodate those conditions as well.

Long-term continuous simulation evaluates the performance of a technology under the varying conditions expected in the climate of the subject site. Single, peak event design does not provide this information and is not equivalent to long-term simulation. Designers should request long-term simulation performance to ensure the technology can meet the long-term water quality objective.

9. Testing

The Stormceptor System has been the most widely monitored stormwater treatment technology in the world. Performance verification and monitoring programs are completed to the strictest standards and integrity. Since its introduction in 1990, numerous independent field tests and studies detailing the effectiveness of the Stormceptor System have been completed.

- Coventry University, UK – 97% removal of oil, 83% removal of sand and 73% removal of peat
- National Water Research Institute, Canada, - scaled testing for the development of the Stormceptor System identifying both TSS removal and scour prevention.
- New Jersey TARP Program – full scale testing of an STC 900 demonstrating 75% TSS removal of particles from 1 to 1000 microns. Scour testing completed demonstrated that the system does not scour. The New Jersey Department of Environmental Protection was followed.
- City of Indianapolis – full scale testing of an STC 900 demonstrating over 80% TSS removal of particles from 50 microns to 300 microns at 130% of the unit's operating rate. Scour testing completed demonstrated that the system does not scour.
- Westwood Massachusetts (1997), demonstrated >80% TSS removal
- Como Park (1997), demonstrated 76% TSS removal
- Ontario MOE SWAMP Program – 57% removal of 1 to 25 micron particles
- Laval Quebec – 50% removal of 1 to 25 micron particles

10. Installation

The installation of the concrete Stormceptor should conform in general to state highway, or local specifications for the installation of manholes. Selected sections of a general specification that are applicable are summarized in the following sections.

10.1. Excavation

Excavation for the installation of the Stormceptor should conform to state highway, or local specifications. Topsoil removed during the excavation for the Stormceptor should be stockpiled in designated areas and should not be mixed with subsoil or other materials.

Topsoil stockpiles and the general site preparation for the installation of the Stormceptor should conform to state highway or local specifications.

The Stormceptor should not be installed on frozen ground. Excavation should extend a minimum of 12 inches (300 mm) from the precast concrete surfaces plus an allowance for shoring and bracing where required. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

In areas with a high water table, continuous dewatering may be required to ensure that the excavation is stable and free of water.

10.2. Backfilling

Backfill material should conform to state highway or local specifications. Backfill material should be placed in uniform layers not exceeding 12 inches (300mm) in depth and compacted to state highway or local specifications.

11. Stormceptor Construction Sequence

The concrete Stormceptor is installed in sections in the following sequence:

1. Aggregate base
2. Base slab
3. Lower chamber sections
4. Upper chamber section with fiberglass insert
5. Connect inlet and outlet pipes
6. Assembly of fiberglass insert components (drop tee, riser pipe, oil cleanout port and orifice plate
7. Remainder of upper chamber
8. Frame and access cover

The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

Adjustment of the Stormceptor can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary. Once the Stormceptor has been constructed, any lift holes must be plugged with mortar.

12. Maintenance

12.1. Health and Safety

The Stormceptor System has been designed considering safety first. It is recommended that confined space entry protocols be followed if entry to the unit is required. In addition, the fiberglass insert has the following health and safety features:

- Designed to withstand the weight of personnel
- A safety grate is located over the 24 inch (600 mm) riser pipe opening
- Ladder rungs can be provided for entry into the unit, if required

12.2. Maintenance Procedures

Maintenance of the Stormceptor system is performed using vacuum trucks. No entry into the unit is required for maintenance (in most cases). The vacuum service industry is a well- established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean a Stormceptor will vary based on the size of unit and transportation distances.

The need for maintenance can be determined easily by inspecting the unit from the surface. The depth of oil in the unit can be determined by inserting a dipstick in the oil inspection/cleanout port.

Similarly, the depth of sediment can be measured from the surface without entry into the Stormceptor via a dipstick tube equipped with a ball valve. This tube would be inserted through the riser pipe. Maintenance should be performed once the sediment depth exceeds the guideline values provided in the Table 4.

Table 4. Sediment Depths Indicating Required Servicing*

Particle Size	Specific Gravity
Model	Sediment Depth inches (mm)
450i	8 (200)
900	8 (200)
1200	10 (250)
1800	15 (381)
2400	12 (300)
3600	17 (430)
4800	15 (380)
6000	18 (460)
7200	15 (381)
11000	17 (380)
13000	20 (500)
16000	17 (380)
* based on 15% of the Stormceptor unit's total storage	

Although annual servicing is recommended, the frequency of maintenance may need to be increased or reduced based on local conditions (i.e. if the unit is filling up with sediment more quickly than projected, maintenance may be required semi-annually; conversely once the site has stabilized maintenance may only be required every two or three years).

Oil is removed through the oil inspection/cleanout port and sediment is removed through the riser pipe. Alternatively oil could be removed from the 24 inches (600 mm) opening if water is removed from the lower chamber to lower the oil level below the drop pipes.

The following procedures should be taken when cleaning out Stormceptor:

1. Check for oil through the oil cleanout port
2. Remove any oil separately using a small portable pump
3. Decant the water from the unit to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank
4. Remove the sludge from the bottom of the unit using the vacuum truck
5. Re-fill Stormceptor with water where required by the local jurisdiction

12.3. Submerged Stormceptor

Careful attention should be paid to maintenance of the Submerged Stormceptor System. In cases where the storm drain system is submerged, there is a requirement to plug both the inlet and outlet pipes to economically clean out the unit.

12.4. Hydrocarbon Spills

The Stormceptor is often installed in areas where the potential for spills is great. The Stormceptor System should be cleaned immediately after a spill occurs by a licensed liquid waste hauler.

12.5. Disposal

Requirements for the disposal of material from the Stormceptor System are similar to that of any other stormwater Best Management Practice (BMP) where permitted. Disposal options for the sediment may range from disposal in a sanitary trunk sewer upstream of a sewage treatment plant, to disposal in a sanitary landfill site. Petroleum waste products collected in the Stormceptor (free oil/chemical/fuel spills) should be removed by a licensed waste management company.

12.6. Oil Sheens

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a rainbow or sheen can be seen at very small oil concentrations (<10 mg/L). Stormceptor will remove over 98% of all free oil spills from storm sewer systems for dry weather or frequently occurring runoff events.

The appearance of a sheen at the outlet with high influent oil concentrations does not mean the unit is not working to this level of removal. In addition, if the influent oil is emulsified the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified conditions.

SUPPORT

Drawings and specifications are available at www.ContechES.com.

Site-specific design support is available from our engineers.

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R TANK®

STORMWATER DETENTION SYSTEM

LD HD SD UD XD

LET'S GET IT DONE®

ACF ENVIRONMENTAL

STORMWATER MANAGEMENT

IS YOUR STORMWATER SYSTEM TAKING UP TOO MUCH SPACE?

Reduce the size with the R-Tank System, an efficient and versatile underground stormwater storage system. This system will reduce your underground stormwater storage system footprint to resolve a utility conflict or free up space for a future expansion.

It will also provide additional options for vehicular loading and cover depths, and deliver greater installation versatility.

DOES YOUR PROJECT REQUIRE A UNIQUE SOLUTION DUE TO DEPTH OR TRAFFIC LOADS?

With five different module configurations, R-Tank provides system height options from 2" to over 7' deep. It also delivers support for HS-20 and HS-25 traffic, with cover depths from 6" to over 16'.

With an unlimited array of system footprints and configurations, R-Tank solves tough stormwater problems by adapting to the needs of your site - whether your're designing a project at the beach with minimal depth over a water table or a deep system in the hills.

R TANK®

R-TANK®

BENEFITS

HIGH CAPACITY
- 95% void internal area

STRENGTH
- Easily supports traffic loading from parking lots and roads
- Module options for HS-20 and HS-25 rating with cover depths from 6 inches to 16 feet

DESIGN & CONSTRUCTION VERSATILITY
- Modules can be combined into various shapes efficiently and effectively use space
- Varied height from 2 inches to 7 feet

INCREASED INFILTRATION AND EXILFILTRATION
- Outer shell is 90% open
- Increases groundwater recharge, reducing post-construction discharge volumes

EASY TO TRANSPORT
- Can be supplied unassembled for reduced delivery costs

LIGHTWEIGHT AND QUICK TO INSTALL
- Installed by hand; no cranes required
- Reduces site access delays

RECYCLED CONTENT
- Manufactured with recycled polypropylene

R-TANK LD

- Light Duty module (30 psi)
- Ideal for applications in green space
- Not rated for vehicular traffic
- 12” Minimum cover, 36” maximum cover
- Four internal plates

R-TANK HD

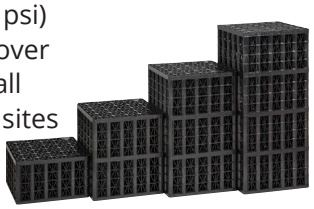
- Heavy Duty module (33.4 psi)
- Standard module for HS-20 traffic applications
- 20” Minimum cover,
- 84” Maximum cover
- Five internal plates

R-TANK SD

- Super Duty module (42.9 psi)
- Higher safety factors for shallow traffic applications and deeper cover
- 18” Minimum cover,
- 120” Maximum cover
- Five internal plates

R-TANK UD

- Ultra Duty module (134.2 psi)
- Traffic loads with 12” of cover
- Available from 14” – 66” tall
- Ideal for high water table sites



R-TANK XD

- Extreme Duty module (240.2 psi)
- Traffic loads with 6” cover
- 16.5’ maximum cover
- Available from 2” - 10’ tall
- 90% void

DESIGN CONSIDERATIONS

Many factors will influence the design of the R-Tank® system. While this list is not intended to be all-inclusive, the following design considerations are worth highlighting:

1. PRE-TREATMENT

Removing pollutants from runoff before they enter an underground detention system is the smart way to design & build a system. Trash Guard Plus® (see page 6) is a great tool for this. Be sure the system you select will remove, heavy sediments, gross pollutants (trash) and biodegradable debris.

2. BACKFILL MATERIALS

Backfill materials should be stone (<1.5" in diameter) or soil (GW, GP SW or SP per the Unified Soil Classification System). Material must be free from lumps, debris and sharp objects that could cut the geotextile. See the R-Tank® narrative specification section 2.03 for additional information.

3. RUNOFF REDUCTION

Most designs incorporate an outlet to drain the system at a controlled rate and/or an overflow to prevent flooding in extreme events. Any infiltration that can be achieved on the site should also be taken advantage of. Consider raising the invert of your outlet or creating a sump to capture and infiltrate the water quality volume whenever possible.

4. WATER TABLE

While installing R-Tank® below the water table is manageable, a stable base must be created to account for the system's ability to drain water out or limit its ability to enter the system. If a liner is used to prevent ground water from entering, measures must be taken to prevent the system from floating.

5. CONSTRUCTION LOADS

Construction loads are often the heaviest loads the system will experience. Care must be taken during backfilling and compaction (see specification section 3.05), and post-installation construction traffic should be routed around the system (Install Guide step 12).

6. LATERAL LOADS

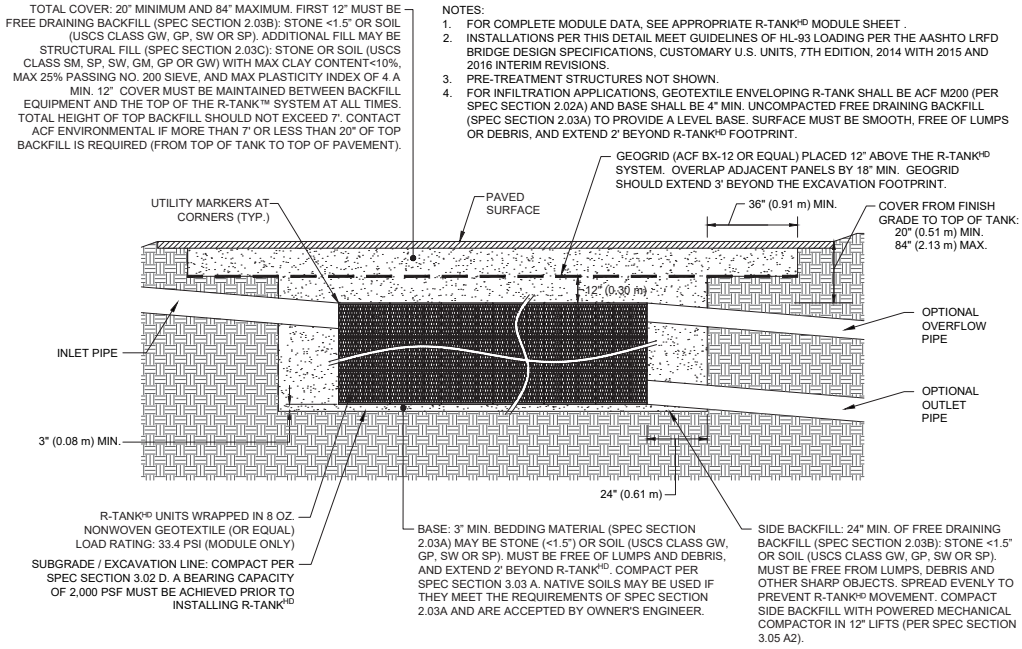
As systems get deeper, the loads acting on the sides of the tank increase. While vertical loads often control the design, lateral loads should also be considered.

7. R-TANK MODULES

Selecting the right module for your application is critical. See page 3 and the specs on the back of this brochure, for details. Our team is also here to help!

8. LOAD MODELING

A safety factor of >1.75 is required when designing an R-Tank System using the AASHTO LRFD Bridge Design Specifications. It is also necessary to run your own loading model with specific site requirements. Example models can be found in our Tech Note on loading capabilities, and minimum cover requirements can be found in the specs on the back of this brochure.



LOW IMPACT DESIGN & GREEN INFRASTRUCTURE

As much of the nation's Gray Infrastructure continues to decay, new concepts for rebuilding it are emerging through Green Infrastructure (GI) and Low Impact Development (LID). This type of reconstruction moves beyond traditional systems that do one thing well, to systems that accomplish multiple objectives simultaneously.

ACF Environmental has several technologies that dovetail with the goals of LID and GI and can play a significant role in the redevelopment process.

R-TANK®

Pipe and stone are used in traditional systems to move and store runoff. R-Tank accomplishes the same purpose with several additional benefits.

- Stores and moves runoff
- Moves water slowly, increasing time of concentration
- Open system encourages infiltration
- Fully accessible for maintenance
- Stores 138% more water than stone
- Maximizes storage potential of GI practices
- Easily handles traffic loads
- Ships flat to reduce site disturbance

PERMEABLE PAVEMENTS

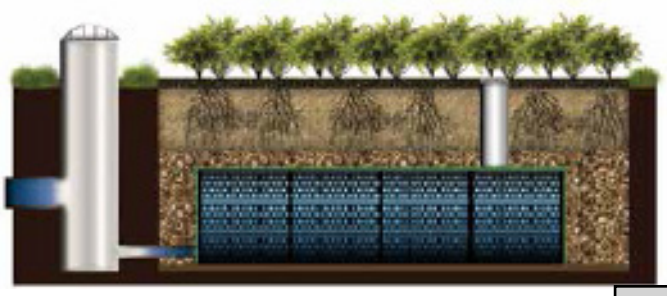
Traditional pavements move vehicles efficiently, but are easily damaged by stormwater. ACF Environmental specializes in permeable pavements that handle traffic loads, while providing surface infiltration rates 10x higher than traditional pervious pavements, helping reduce the expense of long-term maintenance.

- Handles all vehicular loads
- Drains ten times faster than competing pervious pavements
- Reduces long-term maintenance costs
- Encourages infiltration
- Pair with R-Tank® to maximize water storage and transport

FOCALPOINT

Traditional landscaping adds aesthetic value to projects, but has more potential. Many developers turn to bioretention, but are forced to surrender massive land areas and dedicate significant future funds to maintenance. FocalPoint reduces the space requirements and maintenance costs of bioretention by up to 90% while providing similar pollutant removal.

- Adds aesthetic value to properties
- Cleans runoff to improve water quality
- Reduces space requirements and maintenance costs of traditional bioretention systems
- Encourages infiltration to reduce volume of water discharged
- Pairs with R-Tank® to maximize water storage and transport



R-Tank maximizes the storage capabilities of bioretention and permeable pavement systems.

MAINTENANCE

DESIGNING AN R-TANK SYSTEM WITH LONGEVITY & MAINTENANCE IN MIND IS A THREE-STEP PROCESS:

1. PREVENT

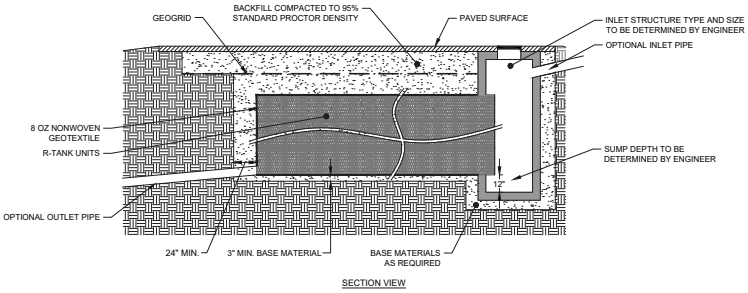
Keep debris and sediment out of the system by pre-treating runoff with the Trash Guard Plus® unit (see below). For a more centralized approach, you could consider having the R-Tank units penetrate the connecting structure, which allows the use of the R-Tank® as its own trash screen. This works best with a structure that includes a sump (see Inlet Connection drawing below).

2. ISOLATE

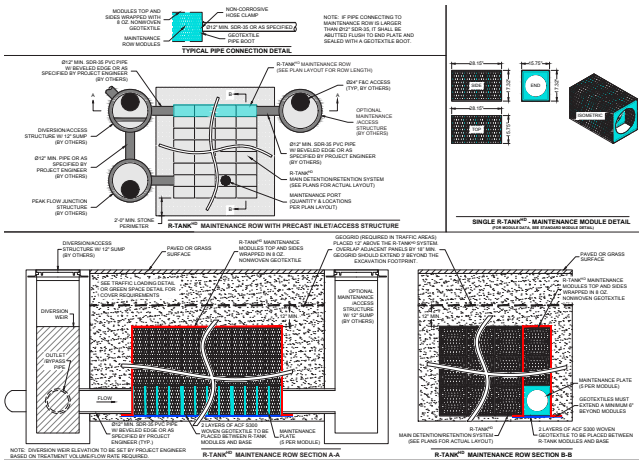
Trap solid pollutants inside the maintenance row (see Maintenance Row drawing below) where they can be easily removed, using the Maintenance Modules (available in LD, HD, and UD only). These modules are wrapped in geotextile to retain solids and are fully accessible by conventional jet-vac systems to remove captured pollutants.

3. PROTECT

Ensure a long system life by including maintenance ports to remove any pollutants that evade the pre-treatment system and maintenance row. Maintenance ports should be specified within 10’ of inlet and outlet connections, and roughly 50’ on center (see detail on page 7).



INLET CONNECTION



MAINTENANCE ROW

MAINTENANCE PREVENTION

TRASH GUARD PLUS ®

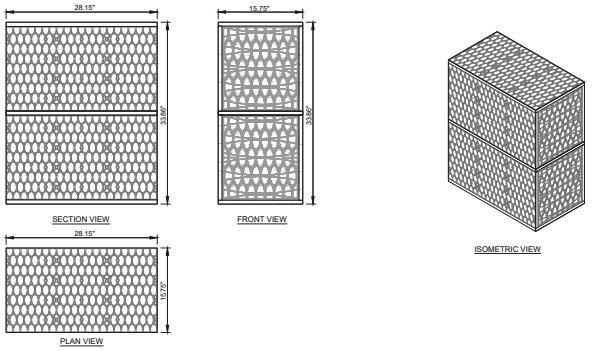
Trash Guard Plus® is a patented stormwater pretreatment device that captures debris, sediment and floatables. Easy to install and maintain, it is a fraction of the cost of other pretreatment devices.

BENEFITS

- Simple retrofit to existing catch basins
- Installs without heavy equipment
- Quick and easy assembly
- Adjusts to irregular catch basin bottoms and/or walls
- Eliminates stormwater trash at public parks, beaches, and waterways
- Removes harmful nutrients and regulated metals

TYPICAL DESIGN

MODULE DRAWING - DOUBLE

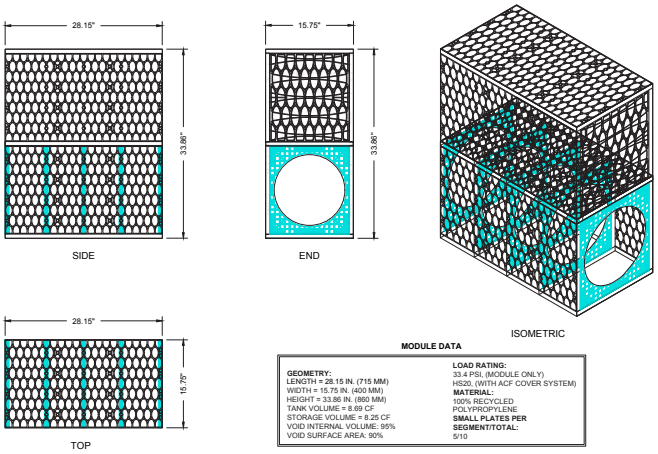


MODULE DATA

GEOMETRY: LENGTH = 28.15 IN. (715 MM)
WIDTH = 15.75 IN. (400 MM)
HEIGHT = 33.86 IN. (860 MM)
TANK VOLUME = 8.69 CF
STORAGE VOLUME = 8.25 CF
VOID INTERNAL VOLUME: 95%
VOID SURFACE AREA: 90%

LOAD RATING: 33.4 PSI, (MODULE ONLY)
HS25, (WITH ACF COVER SYSTEM)
MATERIAL: 100% RECYCLED POLYPROPYLENE
SMALL PLATES PER SEGMENT/TOTAL: 5/10

MAINTENANCE MODULE - DOUBLE



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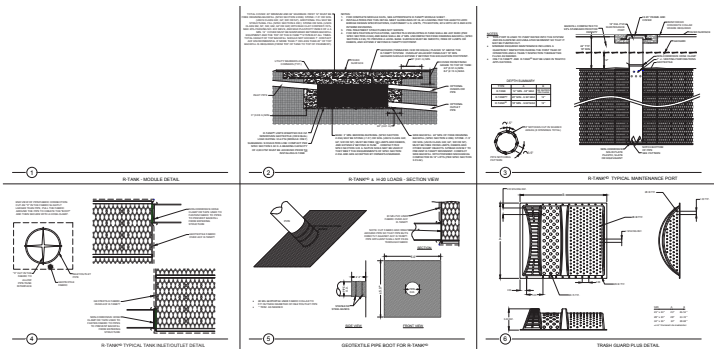
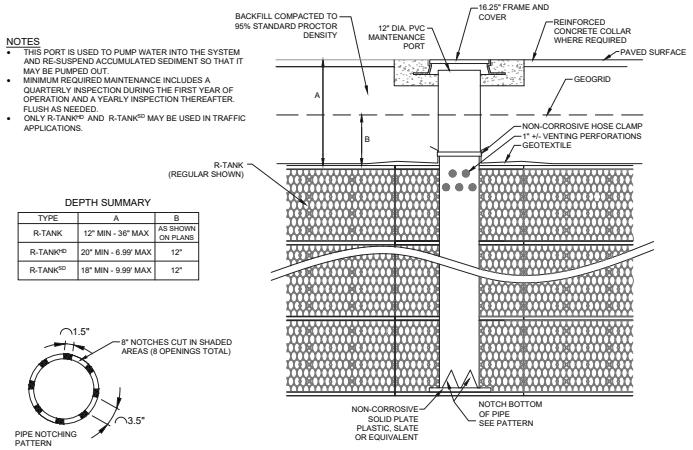
COMPOSITE DETAILS



MAINTENANCE PORT



SELECTING THE RIGHT R-TANK MODULE

Cover Depth (inches)*	LD	HD	SD	UD	XD
Min. 6"	Green Space - No Traffic	Green Space - No Traffic	Green Space - No Traffic	Green Space - No Traffic	HS-20
12"	Green Space - No Traffic	Green Space - No Traffic	Green Space - No Traffic	HS-20**	HS-20
14"	Green Space - No Traffic	Green Space - No Traffic	Green Space - No Traffic	HS-20	HS-20
18"	Green Space - No Traffic	Green Space - No Traffic	HS-20	HS-20	HS-20
20"	Green Space - No Traffic	HS-20	HS-20	HS-20	HS-20
24"	Green Space - No Traffic	HS-20	HS-20	HS-20	HS-20
36"	Green Space - No Traffic	HS-20	HS-20	HS-20	HS-20
48"		HS-20	HS-20	HS-20	HS-20
60"		HS-20	HS-20	HS-20	HS-20
72"		HS-20	HS-20		HS-20
84"			HS-20		HS-20
120"			HS-20		HS-20
160"					HS-20
Max. 200"					HS-20

HS-20 designation based on AASHTO LRFD Bridge Design Spec for single lane traffic. HS-25 loading is available. Call ACF for details.
*Cover depth is measured from top of module to finished grade or top of pavement
**The UD module requires STONE backfill (not soil) on sides at this depth

R-TANK SPECIFICATIONS

LD HD

DIMENSIONS & CAPACITY

Module (Segments)	Width (inch)	Length (inch)	Height (in/ft)	Volume (cf)	Capacity (cf)	Weight* (lbs)
Mini	15.75	28.15	9.45”/0.79’	2.42	2.30	10.1/10.9
Single(1)	15.75	28.15	17.32”/1.44’	4.44	4.22	15.7/17.3
Single + Mini(1.5)	15.75	28.15	25.98”/2.17’	6.67	6.33	23.6/25.9
Double (2)	15.75	28.15	33.86”/2.82’	8.69	8.25	29.1/32.3
Double + Mini(2.5)	15.75	28.15	42.52”/3.54’	10.91	10.36	37.0/41.0
Triple (3)	15.75	28.15	50.39”/4.20’	12.93	12.28	42.5/47.4
Triple + Mini(3.5)	15.75	28.15	59.06”/4.92’	15.15	14.39	50.4/56.0
Quad(4)	15.75	28.15	66.93”/5.58’	17.17	16.31	55.9/62.4
Quad + Mini(4.5)	15.75	28.15	75.59”/6.30’	19.39	18.42	63.8/71.0
Pent(5)	15.75	28.15	83.46”/6.96’	21.41	20.34	69.3/77.4

*Weights shown are for LD/HD modules.

SD

DIMENSIONS & CAPACITY

Module (Segments)	Width (inch)	Length (inch)	Height (in/ft)	Volume (cf)	Capacity (cf)	Weight (lbs)
Single (1)	15.75	28.15	9.45”/0.79’	2.42	2.30	10.95
Double (2)	15.75	28.15	18.12”/1.51’	4.64	4.41	19.58
Triple (3)	15.75	28.15	26.79”/2.23’	6.86	6.52	28.21
Quad (4)	15.75	28.15	35.46”/2.96’	9.08	8.63	36.84
Pent (5)	15.75	28.15	44.13”/3.68’	11.30	10.74	45.47
Hex (6)	15.75	28.15	52.80”/4.40’	13.52	12.84	54.10
Septa (7)	15.75	28.15	61.47”/5.12’	15.74	14.95	62.73
Octo (8)	15.75	28.15	70.14”/5.85’	17.96	17.06	71.36
Nono (9)	15.75	28.15	78.81”/6.57’	20.18	19.17	79.99
Decka (10)	15.75	28.15	87.48”/7.29’	22.40	21.28	88.62

UD

DIMENSIONS & CAPACITY

Module (Segments)	Width (inch)	Length (inch)	Height (in/ft)	Volume (cf)	Capacity (cf)	Weight (lbs)
Single (1)	23.62	23.62	14.17”/1.18’	4.57	4.35	21.2
Double (2)	23.62	23.62	27.17”/2.26’	8.77	8.33	39.0
Triple (3)	23.62	23.62	40.16”/3.35’	12.97	12.32	56.8
Quad (4)	23.62	23.62	53.15”/4.43’	17.16	16.30	74.6
Pent (5)	23.62	23.62	66.14”/5.5’	21.35	20.29	92.4

XD

DIMENSIONS & CAPACITY

Module (Segments)	Width (inch)	Length (inch)	Height (inch)	Volume (cf)	Capacity (cf)	Weight (lbs)
Single (1)	19.68	23.62	1.97	0.53	0.48	4
Double (2)	19.68	23.62	3.94	1.06	0.95	8
Triple (3)	19.68	23.62	5.91	1.59	1.43	12
Quad (4)	19.68	23.62	7.87	2.12	1.91	16
Pent (5)	19.68	23.62	9.84	2.65	2.38	20

Note: XD modules may be stacked up to 10’ tall (60 layers).

SPECIFICATIONS

Item	Description	LD	HD	SD	UD	XD
Void Area	Volume available for water storage	95%	95%	95%	95%	90%
Surface Area Void	% of exterior available for infiltration	90%	90%	90%	90%	90%
Compressive Strength	ASTM D 2412/ ASTM F 2318	30.0 psi	33.4 psi	42.9 psi	134.2 psi	240.2 psi
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs/cf	3.62 lbs/cf	3.96 lbs/cf	4.33 lbs/cf	7.55 lbs/cf
Rib Thickness	Thickness of load-bearing members	0.18”	0.18”	0.18”	-	-
Service Temperature	Safe temperature range for use	-14 - 167º F	-14 - 167º F	-14 - 167º F	-14 - 167º F	-14 - 167º F
Recycled Content	Use of recycled polypropylene	100%	100%	100%	100%	100%
Minimum Cover	Cover required for HS-20 loading	Not traffic rated	20”	18”	12” - 14”	6”
	Cover required for HS-25 loading	Not traffic rated	24”	18”	15” - 17”	6”
Maximum Cover	Maximum allowable cover depth	36”	6.99’	9.99’	5.0’	16.7’

STORMWATER DESIGN (English Units)

Project Name: 16 Fencourt Avenue, Randolph
System #1

Design Storm Event = 24hrs -10yr storm, 4.70 in/hr

Pavement thickness (ft) = 1

Pipe Thickness (inches) = 1

Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum CA (acre)	T_c Across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	Pipe Capacity Check (Column 13 vs. Column 17)	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*8a*	*9*	*10*	*11*	*12*	*13*	*14*	*14a*	*15*	*16*	*17*	*17a*	*17b*	*18*	*19*	*20*	*21*
N	CB #11	SC #1	Parking	0.20	0.90	0.18	0.18	6.0	6.0	4.70	0.76	0.00	0.76	12	0.012	0.0054	3.60	2.83	VELOCITY OK	ADEQUATE PIPE CAPACITY	37.23	0.20	133.00	132.80
N	CB #12	SC #1	Parking	0.20	0.90	0.18	0.18	6.0	6.0	4.70	0.76	0.00	0.76	12	0.012	0.0040	3.11	2.44	VELOCITY OK	ADEQUATE PIPE CAPACITY	49.92	0.20	133.00	132.80
N	SC #1	System#1	Parking	0.40	0.90	0.36	0.36	6.0	6.3	4.70	1.52	0.00	1.52	12	0.012	0.0069	4.08	3.20	VELOCITY OK	ADEQUATE PIPE CAPACITY	29.06	0.20	132.50	132.30

STORMWATER DESIGN (English Units)

Project Name: 16 Fencourt Avenue, Randolph
System #2

Design Storm Event = 24hrs -10yr storm, 4.70 in/hr

Pavement thickness (ft) = 1

Pipe Thickness (inches) = 1

Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum CA (acre)	T_c Across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	Pipe Capacity Check (Column 13 vs. Column 17)	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*8a*	*9*	*10*	*11*	*12*	*13*	*14*	*14a*	*15*	*16*	*17*	*17a*	*17b*	*18*	*19*	*20*	*21*
SE	CB #1	SC #2	Parking	0.26	0.90	0.23	0.23	6.0	6.0	4.70	0.99	0.00	0.99	12	0.012	0.0191	6.80	5.33	VELOCITY OK	ADEQUATE PIPE CAPACITY	31.35	0.60	133.10	132.50
SE	CB #2	SC #2	Parking	0.26	0.90	0.23	0.23	6.0	6.0	4.70	0.99	0.00	0.99	12	0.012	0.0217	7.23	5.68	VELOCITY OK	ADEQUATE PIPE CAPACITY	23.07	0.50	133.00	132.50
SE	SC #2	System#2	Parking	0.52	0.90	0.47	0.47	6.0	6.1	4.70	1.98	0.00	1.98	12	0.012	0.0185	6.67	5.24	VELOCITY OK	ADEQUATE PIPE CAPACITY	10.84	0.20	132.20	132.00
SE	CB #3	SC #3	Parking	0.26	0.90	0.23	0.23	6.0	6.0	4.70	0.99	0.00	0.99	12	0.012	0.0194	6.84	5.37	VELOCITY OK	ADEQUATE PIPE CAPACITY	46.43	0.90	133.70	132.80
SE	CB #4	SC #2	Parking	0.26	0.90	0.23	0.23	6.0	6.0	4.70	0.99	0.00	0.99	12	0.012	0.0206	7.05	5.53	VELOCITY OK	ADEQUATE PIPE CAPACITY	29.14	0.60	133.40	132.80
SE	SC #3	System#2	Parking	0.52	0.90	0.47	0.47	6.0	6.1	4.70	1.98	0.00	1.98	12	0.012	0.0212	7.15	5.61	VELOCITY OK	ADEQUATE PIPE CAPACITY	23.61	0.50	133.50	133.00

STORMWATER DESIGN (English Units)

Project Name: 16 Fencourt Avenue, Randolph
System #3

Design Storm Event = 24hrs -10yr storm, 4.70 in/hr

Pavement thickness (ft) = 1

Pipe Thickness (inches) = 1

Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum CA (acre)	T_c Across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	]	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*8a*	*9*	*10*	*11*	*12*	*13*	*14*	*14a*	*15*	*16*	*17*	*17a*	*17b*	*18*	*19*	*20*	*21*
S	CB #5	SC #3	Parking	0.63	0.90	0.57	0.57	6.0	6.0	4.70	2.40	0.00	2.40	12	0.012	0.0077	4.30	3.37	VELOCITY OK	ADEQUATE PIPE CAPACITY	39.18	0.30	134.80	134.50
SE	SC #3	System#3	Parking	0.63	0.90	0.57	0.57	6.0	6.0	4.70	2.40	0.00	2.40	12	0.012	0.0061	3.82	3.00	VELOCITY OK	ADEQUATE PIPE CAPACITY	33.05	0.20	134.20	134.00

STORMWATER DESIGN (English Units)

Project Name: 16 Fencourt Avenue, Randolph
System #4

Design Storm Event = 24hrs -10yr storm, 4.70 in/hr

Pavement thickness (ft) = 1

Pipe Thickness (inches) = 1

Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum CA (acre)	T_c Across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	]	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*8a*	*9*	*10*	*11*	*12*	*13*	*14*	*14a*	*15*	*16*	*17*	*17a*	*17b*	*18*	*19*	*20*	*21*
MIDDLE	CB #6	SC #4	Parking	0.21	0.90	0.19	0.19	6.0	6.0	4.70	0.80	0.00	0.80	12	0.012	0.0176	6.52	5.11	VELOCITY OK	ADEQUATE PIPE CAPACITY	17.06	0.30	134.10	133.80
MIDDLE	SC #4	System#4	Parking	0.21	0.90	0.19	0.19	6.0	6.0	4.70	0.80	0.00	0.80	12	0.012	0.0180	6.59	5.18	VELOCITY OK	ADEQUATE PIPE CAPACITY	11.10	0.20	133.50	133.30
MIDDLE	CB #7	SC #5	Parking	0.28	0.90	0.25	0.25	6.0	6.0	4.70	1.07	0.00	1.07	12	0.012	0.0124	5.47	4.29	VELOCITY OK	ADEQUATE PIPE CAPACITY	24.19	0.30	134.00	133.70
MIDDLE	SC #5	System#4	Parking	0.28	0.90	0.25	0.25	6.0	6.0	4.70	1.07	0.00	1.07	12	0.012	0.0153	6.07	4.76	VELOCITY OK	ADEQUATE PIPE CAPACITY	6.55	0.10	133.40	133.30
MIDDLE	CB #8	SC #6	Parking	0.22	0.90	0.20	0.20	6.0	6.0	4.70	0.84	0.00	0.84	12	0.012	0.0247	7.72	6.05	VELOCITY OK	ADEQUATE PIPE CAPACITY	8.11	0.20	134.00	133.80
MIDDLE	SC #6	System#4	Parking	0.22	0.90	0.20	0.20	6.0	6.0	4.70	0.84	0.00	0.84	12	0.012	0.0305	8.59	6.74	VELOCITY OK	ADEQUATE PIPE CAPACITY	6.55	0.20	133.50	133.30
MIDDLE	CB #9	SC #7	Parking	0.22	0.90	0.20	0.20	6.0	6.0	4.70	0.84	0.00	0.84	12	0.012	0.0103	4.99	3.92	VELOCITY OK	ADEQUATE PIPE CAPACITY	38.72	0.40	134.10	133.70
MIDDLE	SC #7	System#4	Parking	0.22	0.90	0.20	0.20	6.0	6.0	4.70	0.84	0.00	0.84	12	0.012	0.0153	6.07	4.76	VELOCITY OK	ADEQUATE PIPE CAPACITY	6.55	0.10	133.40	133.30

Massachusetts Department of Environmental Protection
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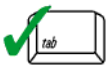
Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

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Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

09/19/2022

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

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Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

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Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Town of Randolph

TOD District Design Review Committee

Illicit Discharge Statement

I, as Owner Representative, certify that:

1) The existing buildings located 16 Fencourt Avenue, Randolph, MA Massachusetts is to be demolished under the proposed site redevelopment. During the building demolition process, any illicit discharge, if exists, will be removed as part of the demolition process.
2) The plan accompanied the Special Permit application submittal clearly identifies the following:
    - The location of all on-site systems for conveying wastewater and stormwater.
    - The location of any measures taken to prevent the entry of illicit discharges int the Town of Randolph storm drain system.
    - There is no connects between the wastewater management and the Town of Randolph storm drain system.

Property Owner:
Taj Estates of Randolph II LLC
16 Fencourt Avenue
Randolph, MA

Signature:

09/19/2022

Chi Y. Man, PE
Hardy + Man Design Group, PC

HARDY+MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING

MEMORANDUM

TO: Taj Estates II of Randolph, LLC
c/o Mr. Mirajuddin Ahmed
95 East Main Street
Westborough, MA 01581

FROM: Mr. Jeffrey S. Dirk, P.E.*, PTOE, FITE
Managing Partner *and*
Mr. Daniel LaCivita
Transportation Engineer
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
**Professional Engineer in CT, MA, ME, NH, RI and VA*

DATE: September 13, 2022

RE: 9440

SUBJECT: Transportation Impact Assessment
Proposed Mixed-Use Development – 16 Fencourt Avenue
Randolph, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a mixed-use development to be located at 16 Fencourt Avenue in Randolph, Massachusetts (hereafter referred to as the "Project"). This assessment: i) reviews the existing conditions context of the transportation infrastructure serving the Project site; and ii) qualitatively evaluates the potential impact of the Project on the transportation infrastructure.

Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] for similar land uses that will be located within the Project site, the Project is expected to generate approximately 1,334 vehicle trips on an average weekday (two-way, 24-hour volume), with approximately 188 vehicle trips expected during the weekday morning peak-hour and 200 vehicle trips expected during the weekday evening peak-hour;

2. In comparison to the former use that operated within the Project site and that will be removed to accommodate the Project (senior and veterans center), the Project is expected to generate 1,046 additional vehicle trips on an average weekday, with 169 additional vehicle trips expected during the weekday morning peak-hour and 175 additional vehicle trips expected during the weekday evening peak-hour;

3. No apparent safety deficiencies were noted with respect to the motor vehicle crash history in the vicinity of the Project site; and

[1] *Trip Generation,* 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

4. Lines of sight to and from the Project site driveway are expected to exceed the recommended minimum distance for the intersection to operate in a safe manner.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations defined herein. The following details our findings with respect to the Project.

PROJECT DESCRIPTION

The Project will entail the construction of a mixed-use development to be located at 16 Fencourt Avenue in Randolph, Massachusetts, that will include a 12,000± square foot (sf) day care facility and two (2) three-story residential buildings that will accommodate a total of 107 multifamily units. The Project site encompasses 7.13± acres of land that is bounded by residential properties and Fencourt Avenue to the north; residential properties, Castleton Avenue and Restarick Avenue to the south; Fencourt Avenue, Castleton Avenue and residential properties to the east; and Desmond Avenue and residential properties to the west. The Project site is currently occupied by a one-story building (former James M. Hurley Senior & Veterans Center) with associated parking area and appurtenances that will be removed to the accommodate the Project, and areas of open and wooded space.

Imagery ©2022 Google

Access to the Project site will be provided by way of a new driveway that will intersect the west side of Fencourt Avenue at the 90 degree bend approximately 320 feet south of Union Street (Route 139). Vehicles entering and exiting the Project site will be separated by a raised landscaped island at Fencourt Avenue. Off-street parking will be provided for 183 vehicles to support both uses. Sidewalks are provided within the Project site and around the building perimeters that link the proposed buildings to the sidewalk along Fencourt Avenue.

EXISTING CONDITIONS

In order to establish the existing conditions context of the Project with respect to the transportation infrastructure, a review of existing roadway geometrics; pedestrian and bicycle facilities; posted speed limits; and land use information was completed along Fencourt Avenue and at the intersections of Fencourt Avenue with both Union Street (Route 139) and Center Street. The following provides a description of the transportation infrastructure serving the Project site.

Roadways

Fencourt Avenue

- Two-way local access roadway under Town jurisdiction
- Traverses a circuitous alignment between Center Street and Route 139
- Provides a variable width paved traveled way that ranges from 20-feet to 40-feet, with the 40-foot wide section located between the 90 degree bend at the Project site and Route 139
- A faded double-yellow centerline is provided approaching Route 139 for a distance of approximately 130-feet, with no pavement markings provided along the remainder of the roadway
- Sidewalks are provided along both sides of the roadway between Route 139 and the existing driveway that serves the Project site
- Illumination is provided by way of street lights mounted on wood poles
- The statutory speed limit pursuant to M.G.L. c. 90 § 17C is 25 miles per hour (mph)[2]
- Land use within the study area consists of the Project site, residential properties and areas of open and wooded space

Intersections

Table 1 summarizes existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections.

[2]The statutory or "prima facie" speed is defined in M.G.L Chapter 90, Section 17, as the speed which would be deemed reasonable and proper to operate a motor vehicle. On March 27, 2017, the Town of Randolph enacted a townwide statutory speed limit of 25 mph on roadways located within a thickly settled district that are not subject to a special speed regulation (i.e., posted speed limit).

Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Rte. 139/ Fencourt Ave.	S	1 general-purpose travel lane provided on all approaches	Yes; 2 to 5-feet on Rte. 139	Yes; sidewalks provided along both sides of the intersecting roadways; crosswalk provided for crossing Fencourt Ave. and the Rte. 139 west leg approximately 50 ft west of the intersection	Yes; shared-traveled-way along Rte. 139[b]
Center St./ Fencourt Ave.	S	1 general-purpose travel lane provided on all approaches	Yes; 3 to 6-feet on Center St.	Yes; sidewalk provided along the west side of Center St. south of the intersection	Yes; shared-traveled-way along Center St.

[a]S = STOP-sign control.
[b]Combined shoulder and travel lane width equal to or exceed 14 feet.

Pedestrian and Bicycle Facilities

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in September 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of existing and planned future bicycle facilities. Sidewalks are provided along both sides of Route 139, along the west side of Center Street south of Fencourt Avenue, and on both sides of Fencourt Avenue from Union Street to the 90 degree bend in the roadway, with marked crosswalks provided for crossing the Fencourt Avenue and Route 139 west legs of the Route 139/Fencourt Avenue intersection.

Formal bicycle facilities are not provided within the study area; however, Route 139 and Center Street provide sufficient width (combined travel lane and shoulder) on a continuous basis to support bicycle travel in a shared traveled-way configuration (i.e., motor vehicles and bicyclists sharing the roadway).[3]

Public Transportation Services

Public transportation services are provided within the study area by the Massachusetts Bay Transportation Authority (MBTA). The MBTA provides fixed-route bus service along Route 139 by way of Route 238, *Holbrook/Randolph – Quincy Center Station*, and Route 240, *Avon Square - Ashmont Station* (weekday service only) The Route 238 bus provides service between Quincy Center and the MBTA Randolph/Holbrook Commuter Rail Station, where connections can be made to the Red Line subway, the Commuter Rail (Middleborough/Lakeville Line) and other MBTA bus routes. The Route 240 bus provides service between Avon Square and Ashmont Station on the MBTA Red Line subway system, with weekday peak period service provided to the Randolph/Holbrook Commuter Rail Station. The closest regular stop for the Route 238 and Route 240 buses is located at the Route 139/Fencourt Avenue intersection, approximately 0.1 miles (a 2-minute walk) to the north of the Project site. In addition, the MBTA also operates the RIDE paratransit service for eligible persons who cannot use fixed-route bus services all or

[3]A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

some of the time due to a physical, cognitive, or mental disability in compliance with the Americans with Disabilities Act (ADA).

Motor Vehicle Crash Data

A review of the MassDOT statewide high crash location database (Highway Safety Improvement Program (HSIP) listing) indicates that there are no high crash locations in the vicinity of the Project site.

PROJECT-GENERATED TRAFFIC

As proposed the Project will entail the construction of a mixed-use development that will include a 12,000± sf day care facility and two (2) three-story residential buildings that will accommodate a total of 107 multifamily units. In order to determine the traffic characteristics of the Project, trip-generation statistics and methodologies published by the Institute of Transportation Engineers (ITE)[4] for similar land uses as those proposed were used. ITE Land Use Codes (LUCs) 220, *Multifamily Housing (Low-Rise)* and 565, *Day Care Center*, were used develop the base trip-generation calculations of the Project.

Transit Use

Given the availability of public transportation services to the Project site (MBTA bus service and connections to the Commuter Rail) and the interconnected network of sidewalks and bicycle accommodations, it is expected that a portion of the residents of the Project will use public transportation services, walk, or bicycle, thereby reducing the volume of single-occupant vehicle (SOV) trips that may be associated with the Project. In order to determine the proportion of residents of the Project that may use transit, walk, or bicycle as their primary mode of transportation, travel mode data obtained from the 2015-2019 American Community Survey (ACS) for the Census Tracts that contain the Project site (Census Tracts 4203.01 and 4203.02) were reviewed. Based on the ACS data, the following commuting modes were identified for workers aged 16 or older who reside within the Town:

- Single-Occupant Vehicle: 77.0%
- Car/Vanpool/Taxi: 9.7%
- Public Transportation: 9.7%
- Walk/Bike/Other: 2.5%%
- Worked at Home: 1.1%

According to the ACS data, approximately 23 percent of workers that reside in the Census Tracts that contain the Project site reported they used an alternative mode of transportation to a SOV to travel to/from work, with approximately 10 percent participating in car or vanpool, 10 percent using public transportation (transit) and 3 percent walking/bicycling or using other methods of transportation. In addition, 1 percent of respondents reported that they worked at home.

That being said, in order to provide conservative (high) traffic volumes from which to assess the potential impact of the Project on the transportation infrastructure, a reduction of the ITE base trip-generation calculations was not applied to account for transit use or the use of alternative modes of transportation to SOVs.

Table 2 summarizes the anticipated traffic characteristics of the Project using the above methodology.

[4]Ibid 1.

Table 2
TRIP GENERATION SUMMARY

Time Period/Direction	Vehicle Trips (A) Multifamily Residential (107 units)[a]	(B) Day Care Center (12,000 sf)[b]	(A + B) Total Trips
Average Weekday Daily:			
Entering	381	286	667
Exiting	381	286	667
Total	762	572	1,334
Weekday Morning Peak Hour:			
Entering	13	70	83
Exiting	43	62	105
Total	56	132	188
Weekday Evening Peak Hour:			
Entering	42	62	104
Exiting	25	71	96
Total	67	133	200

[a]Based on ITE LUC 220, *Multifamily Housing (Low-Rise)*.
[b]Based on ITE LUC 565, *Day Care Center.*

Project-Generated Traffic Volume Summary

As can be seen in Table 3, the Project is expected to generate approximately 1,334 vehicle trips on an average weekday (two-way volume over the operational day of the Project, or 667 vehicles entering and 667 exiting), with approximately 188 vehicle trips (83 vehicles entering and 105 exiting) expected during the weekday morning peak-hour and 200 vehicle trips (104 vehicles entering and 96 exiting) expected during the weekday evening peak-hour.

With consideration of the use of public transportation and pedestrian/bicycle trips by the residents of the Project and the dispersal of trips over the respective peak hours and to Route 139, Center Street, and the surrounding roadways, the additional traffic attributable to the Project would not be expected to result in a significant impact (increase) on motorist delays or vehicle queueing over existing conditions. The potential impacts associated with the Project can be further reduced through implementation of a Transportation Demand Management (TDM) program that encourages the use of alternative modes of transportation to SOVs (discussed in the Recommendations section of this assessment).

Table 3 compares the traffic characteristics of the Project to those of the former Senior & Veterans Center that operated at the Project site.

Table 3
TRIP GENERATION SUMMARY COMPARISON

Time Period/Direction	Vehicle Trips (A) Proposed Mixed-Use Development	(B) Existing Senior and Veterans Center (10,000± sf)[a]	(A - B) Difference
Average Weekday Daily:	1,334	288	+1,046
Weekday Morning Peak Hour:	188	19	+169
Weekday Evening Peak Hour:	200	25	+175

[a]Based on ITE LUC 495, *Recreational Community Center*.

As can be seen in Table 3, in comparison to the former Senior & Veterans Center, the Project is expected to generate approximately 1,046 additional vehicle trips on an average weekday, with 169 additional vehicle trips expected during the weekday morning peak-hour and 175 additional vehicle trips expected during the weekday evening peak hour.

SIGHT DISTANCE ASSESSMENT

The Project site driveway has been situated along Fencourt Avenue so as to afford clear lines of sight to and from Route 139 and Center Street, with the sight line to/from Union Street approximately 338 feet and the sight line to/from Center Street approximately 570 feet. For context, a minimum sight distance of 200 feet is required for safe operation of the intersection assuming an approach speed of 30 mph along Fencourt Avenue, which is 5 mph above the statutory speed limit (25 mph).

SUMMARY

VAI has completed an assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a mixed-use development to be located at 16 Fencourt Avenue in Randolph, Massachusetts. This assessment has: i) reviewed the existing conditions context of the transportation infrastructure serving the Project site; and ii) qualitatively evaluated the potential impact of the Project on the transportation infrastructure. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE[5] for similar land uses that will be located within the Project site, the Project is expected to generate approximately 1,334 vehicle trips on an average weekday (two-way 24-hour volume), with approximately 188 vehicle trips expected during the weekday morning peak-hour and 200 vehicle trips expected during the weekday evening peak-hour;

[5]Ibid 1.

2. In comparison to the former use that operated within the Project site and that will be removed to accommodate the Project (senior and veterans center), the Project is expected to generate 1,046 additional vehicle trips on an average weekday, with 169 additional vehicle trips expected during the weekday morning peak-hour and 175 additional vehicle trips expected during the weekday evening peak-hour;

3. No apparent safety deficiencies were noted with respect to the motor vehicle crash history in the vicinity of the Project site; and

4. Lines of sight to and from the Project site driveway are expected to exceed the recommended minimum distance for the intersection to operate in a safe manner.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified as a part of this assessment. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site will be provided by way of a new driveway that will intersect the west side of Fencourt Avenue at the 90 degree bend approximately 320 feet south of Route 139. Vehicles entering and exiting the Project site will be separated by a raised landscaped island at Fencourt Avenue. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site driveway should accommodate a 20-foot wide entering travel lane and a 20-foot wide exiting travel lane separated by a raised island that should be a minimum of 6-feet in width unless a reduced travel lane width is approved by the Fire Chief. The driveway geometry and internal circulating drives should be designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.

- Where perpendicular parking is proposed the drive aisle behind the parking will be a minimum of 24 feet in order to facilitate parking maneuvers.

- Vehicles exiting the Project site to Fencourt Avenue will be placed under STOP-sign control and a marked STOP-line should be provided.

- All signs and pavement markings to be installed within the Project site shall conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[6]

[6] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

- Appropriate signs ("KEEP RIGHT" and "DO NOT ENTER") and pavement markings should be provided in the landscaped island at Fencourt Avenue to provide proper guidance for motorists entering and exiting the Project site.

- A sidewalk has been provided along the south side of the Project site driveway that will connect to a sidewalk that will be constructed along the frontage of the Project site along Fencourt Avenue. The proposed sidewalks will be connected to the existing sidewalk along Fencourt Avenue by way of a marked crosswalk across the Project site driveway that will include American with Disabilities Act (ADA)-compliant wheelchair ramps.

- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.

- Snow accumulations (windrows) within sight triangle areas will be promptly removed where such accumulations would impede sight lines.

- Consideration should be given to providing electric vehicle (EV) charging stations within the Project site.

Day Care Center Traffic Management

A student drop-off/pick-up management plan should be developed for the day care center. The tenants of the plan should include staggered or timed arrivals and departures in order to manage the number of parent/caregiver vehicles arriving and departing to a level that can be accommodated within the Project site without impeding access or circulation. It is recommended that vehicle circulation for student drop-off/pick-up be directed in a one-way counterclockwise pattern around the perimeter of the Project site and that students are transferred from/to vehicles queued curbside along the west side of the day care building. The drive aisle between the residential building and the day care building should operate in a one-way northbound direction during student drop-off/pick-up periods.

Transportation Demand Management

In an effort to encourage the use of alternative modes of transportation to SOVs and to promote healthy transportation options to residents of the Project, the following Transportation Demand Management (TDM) measures should be considered for implementation as a part of the Project:

- A transportation coordinator should be assigned for the Project to coordinate the TDM program;

- Information regarding public transportation services, maps, schedules and fare information should be posted in a central location and/or otherwise made available to residents;

- A "welcome packet" should be provided to residents detailing public transportation services, bicycle and walking alternatives, and other available commuting options;

- Pedestrian accommodations have been incorporated within the Project and consist of sidewalks that connect to the existing sidewalk along Fencourt Avenue;

- A central mail drop should be provided for the residential component of the Project; and

- Secure bicycle parking should be provided at an appropriate location within the Project site.

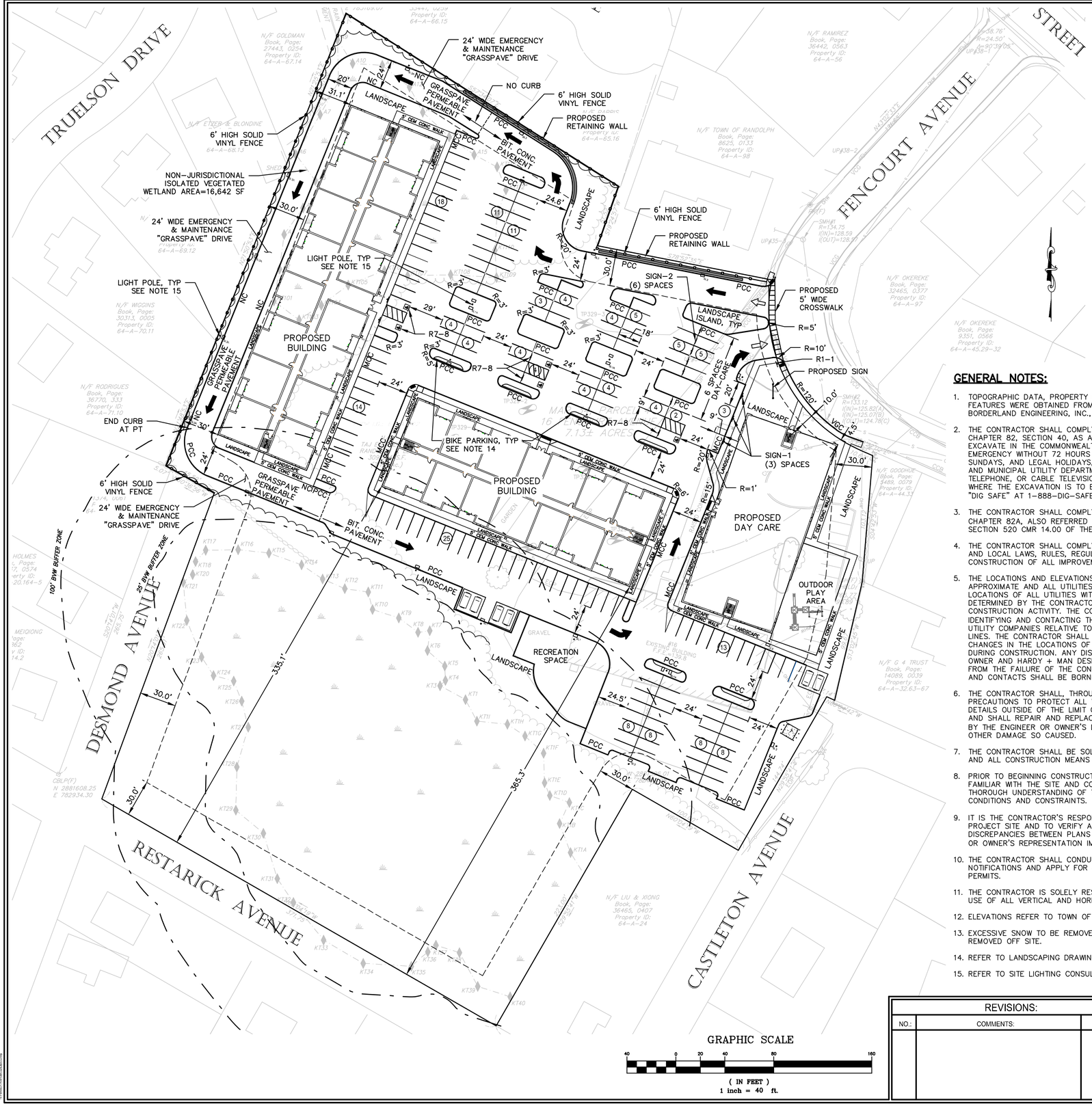
With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

cc: File

ATTACHMENTS

PROJECT SITE PLAN
PUBLIC TRANSPORTATION SCHEDULE
MASSDOT HIGH CRASH LOCATION MAPPING
TRIP-GENERATION CALCULATIONS
US CENSUS DATA

PROJECT SITE PLAN



TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW		BACK-GROUND	LEGEND	BORDER	
R7-8	12"	18"	RESERVED PARKING	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	5	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	P-5 5
R1-1	30"	30"	STOP				1				P-5 1
SIGN-1	12"	18"	DAY CARE PARKING PICKUP DROPOFF				3				P-5 3
SIGN-2	12"	18"	DAY CARE PARKING ONLY				6				P-5 6

GENERAL NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM TURNING POINT ENGINEERING, AND BORDERLAND ENGINEERING, INC., DATED AUGUST 13, 2022.
2. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 CMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
4. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
5. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND HARDY + MAN DESIGN GROUP, PC. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
7. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
8. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENT TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
10. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
11. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
12. ELEVATIONS REFER TO TOWN OF RANDOLPH DATUM.
13. EXCESSIVE SNOW TO BE REMOVED BY AN INDEPENDENT CONTRACTOR AND REMOVED OFF SITE.
14. REFER TO LANDSCAPING DRAWINGS FOR BIKE PARKING DETAILS.
15. REFER TO SITE LIGHTING CONSULTANT FOR EXACT LOCATIONS AND DETAILS.

DIMENSIONAL REQUIREMENTS

ZONING ITEM	UCTD	EXISTING	PROPOSED
MIN. LOT AREA	5 ACRES	7.13 ACRES	7.13 ACRES
MIN. LOT FRONTAGE/DEPTH	100/75 FT	142.5/599FT	142.5/599FT
MAX. YARD – FRONT	10 FT**	167.5 FT	5.4 FT
MIN. YARD – SIDE	30 FT***	69.9 FT	30 FT
MIN. YARD – REAR	30 FT***	287.3 FT	30 FT
BUILDING HEIGHT	NOTE****	1 STORY	3 STORIES
MIN. OPEN SPACE	10%	79%	45.1%

* VARIANCE REQUIRED

** IN ORDER TO DEFINE A CONSISTENT BUILDING LINE ALONG THE STREET, NEW BUILDING SHALL NOT BE SET BACK MORE THAN (10) FEET FROM THE FRONT PROPERTY LINE.

*** A UCTD PROJECT SHALL COMPLY WITH THE FOLLOWING REQUIREMENT:
1) SIDE YARD SETBACK FOR THREE (3) STORY BUILDING ABUTTING A RESIDENTIAL DISTRICT: 30 FEET FROM THE LOT LINE.
2) REAR YARD SETBACK FOR THREE (3) STORY BUILDING ABUTTING A RESIDENTIAL DISTRICT: 30 FEET FROM THE LOT LINE.

**** THE MINIMUM PERMITTED HEIGHT FOR BUILDING IN A UCTD PROJECT SHALL BE TWO (2) STORIES OR TWENTY (20) FEET, WHICHEVER IS GREATER, AND THE MAXIMUM PERMITTED HEIGHT FOR BUILDING AND STRUCTURES IN A UCTD PROJECT SHALL BE FOUR (4) STORIES OR (FORTY) 40 FEET, WHICH EVER IS LESS.
1) THE HEIGHT OF A BUILDING OR STRUCTURE IN THE UCTD SHALL BE DEFINED AS THE VERTICAL DISTANCE FROM THE AVERAGE GRADE OF THE STREET THE PROPERTY HAS FRONTAGE ON, ALONG THE FRONTAGE OF THE LOT/S OF THE UCTD PROJECT AT THE TIME OF THE SPECIAL PERMIT APPLICATION, TO THE TOP OF THE STRUCTURE (THE HIGHEST ROOF BEAMS OF A FLAT ROOF, THE DECK OF A MANSARD ROOF OR THE MEAN LEVEL OF THE HIGHEST GABLE OR SLOPE OF A HIP ROOF).

PARKING REQUIREMENTS

ZONING	REQUIRED	PROVIDED
107 UNITS/12,000 SF COMMERCIAL	201*	183

* (107x1.5) + (12000/400) + (107/10) = 160.5 + 30 + 10.7 = 201

LEGEND

MCC	MONOLITHIC CONCRETE CURB
NC	NO CURB
PCC	PRECAST CONCRETE CURB
VGC	VERTICAL GRANITE CURB
TYP	TYPICAL
	DETECTABLE WARNING PANEL
	CEMENT CONCRETE
	FIRE TRUCK ACCESS EXHIBIT
	VEHICLE TRAFFIC FLOW
	PROPOSED 6' HIGH SOLID VINYL FENCE
	PROPOSED TREE LINE
	PROPOSED SITE LIGHTING

CHI Y MAN
CIVIL
NO. 43441
REGISTERED
PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

09/06/2022

REVISIONS:		
NO.:	COMMENTS:	DATE:

LAYOUT PLAN
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-06-2022
LATEST REVISION:
SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

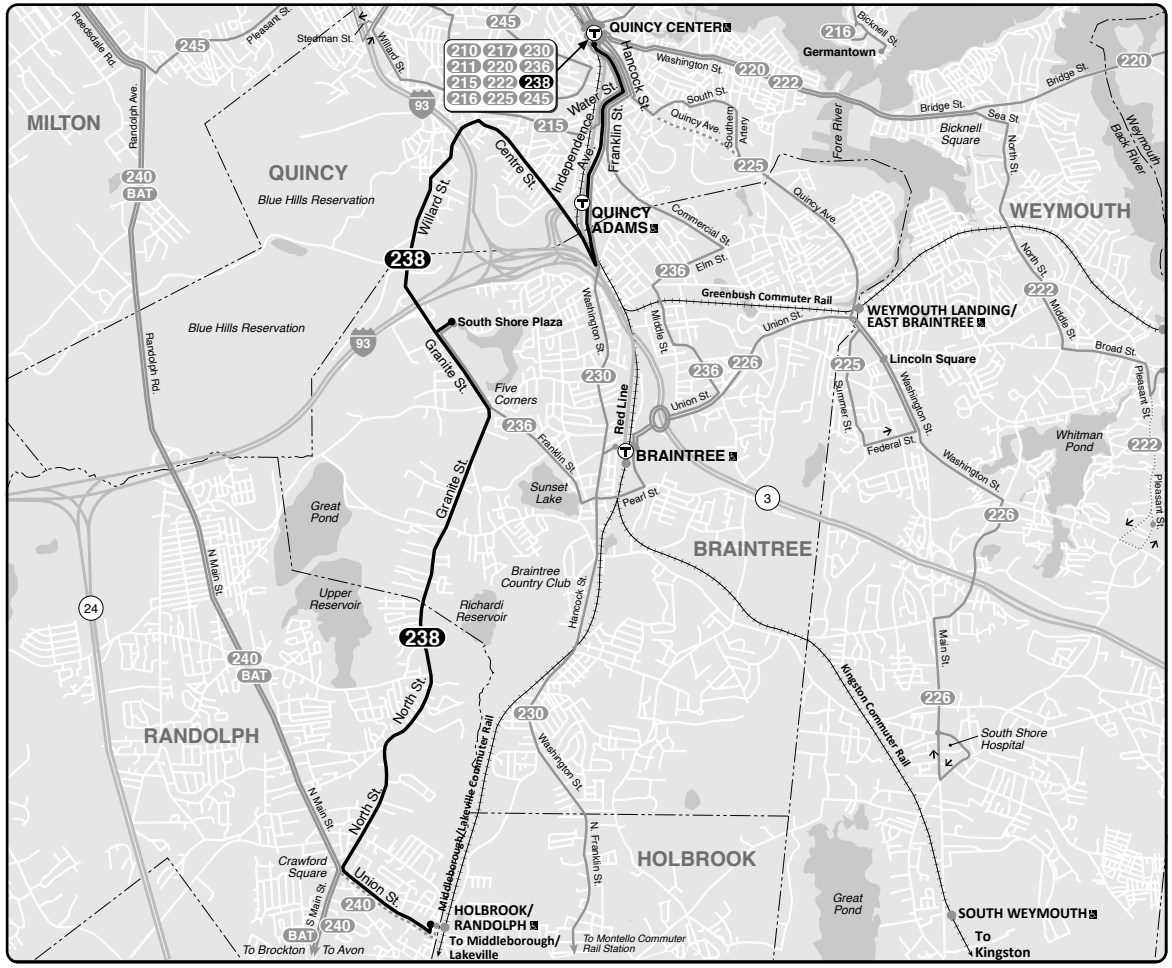
SHEET
C-2

PUBLIC TRANSPORTATION SCHEDULE

Effective **August 28, 2022** Replaces March 2022

238 Holb/Rand Sta – Quincy Center Sta

Schedule Change – Saturday, Sunday



- Transfer to bus/subway available on CharlieCard—good for 2 hours, pay fare difference.
- Children 11 & under ride free with a paying customer.

All MBTA buses are accessible to people with disabilities.

	CharlieCard	Cash on board	Reduced fare
Bus	**$1.70**	**$1.70**	**$0.85**
Bus + Subway	**$2.40**	**$4.10**	**$1.10**

Complete fare/pass rules and free/reduced fare eligibility:
mbta.com/fares or call **617-222-3200**

Connections

RED LINE

GREENBUSH LINE | KINGSTON LINE

MIDDLEBOROUGH/LAKEVILLE LINE

Information **617-222-3200**
Lost and Found **617-222-5367**
TTY **617-222-5146**

Realtime arrival information, maps, and more
mbta.com

A128-3-22.1

Weekday 238

Inbound

Holbrook/ Randolph Station	Crawford Square	South Shore Plaza	Quincy Center Station
5:05	5:09	5:20	5:41
5:30	5:34	5:45	6:06
5:50	5:54	6:07	6:32
6:10	6:14	6:28	6:53
6:35	6:39	6:53	7:18
7:00	7:04	7:18	7:43
7:25	7:29	7:43	8:09
7:55	7:59	8:13	8:40
8:25	8:29	8:43	9:10
8:55	8:59	9:13	9:40
9:25	9:29	9:43	10:10
9:55	9:59	10:13	10:40
10:35	10:39	10:53	11:20
11:35	11:39	11:53	**12:20**
12:40	**12:44**	**12:58**	**1:25**
1:45	**1:49**	**2:05**	**2:34**
2:50	**2:54**	**3:10**	**3:39**
3:55	**3:59**	**4:15**	**4:44**
5:00	**5:04**	**5:20**	**5:48**
5:50	**5:54**	**6:07**	**6:35**
6:30	**6:34**	**6:47**	**7:15**
7:05	**7:09**	**7:22**	**7:50**
-	**7:40**	**7:53**	**8:17**
8:40	**8:44**	**8:55**	**9:16**
-	**9:02**	**9:13**	**9:34**
-	**9:41**	**9:52**	**10:13**
-	**11:01**	**11:12**	**11:33**

Outbound

Quincy Center Station	South Shore Plaza	Crawford Square	Holbrook/ Randolph Station
A 5:23	5:44	5:54	-
5:50	6:11	6:24	6:27
6:15	6:36	6:49	6:52
6:37	6:58	7:12	7:15
7:05	7:30	7:44	7:47
7:35	8:00	8:14	8:17
8:00	8:25	8:39	8:42
8:25	8:50	9:04	9:07
8:55	9:20	9:34	9:37
9:25	9:50	10:04	10:07
10:30	10:55	11:09	11:12
11:40	**12:06**	**12:21**	**12:24**
12:40	**1:06**	**1:21**	**1:24**
1:45	**2:14**	**2:34**	**2:37**
2:50	**3:19**	**3:39**	**3:42**
3:55	**4:24**	**4:44**	**4:47**
4:35	**5:04**	**5:24**	**5:27**
5:15	**5:44**	**6:04**	**6:07**
5:57	**6:26**	**6:46**	**6:49**
6:41	**7:08**	**7:24**	**-**
7:45	**8:08**	**8:24**	**8:27**
9:00	**9:23**	**9:39**	**-**
10:20	**10:43**	**10:59**	**-**

Saturday 238

Inbound

Crawford Square	South Shore Plaza	Quincy Center Station
7:27	7:40	7:59
8:04	8:17	8:37
8:50	9:04	9:27
9:40	9:54	10:17
10:30	10:44	11:07
11:23	11:37	**12:00**
12:08	**12:22**	**12:45**
1:03	**1:17**	**1:40**
2:06	**2:20**	**2:43**
3:11	**3:25**	**3:48**
4:15	**4:29**	**4:52**
5:18	**5:32**	**5:55**
6:19	**6:33**	**6:56**
7:04	**7:18**	**7:40**
7:48	**8:01**	**8:22**
8:28	**8:41**	**9:02**
9:15	**9:28**	**9:49**
9:50	**10:03**	**10:24**
11:15	**11:28**	**11:49**

Outbound

Quincy Center Station	South Shore Plaza	Crawford Square
5:11	5:29	5:46
5:51	6:09	6:26
6:35	6:53	7:10
7:15	7:33	7:50
8:10	8:32	8:49
8:48	9:10	9:27
9:32	9:54	10:11
10:25	10:48	11:07
11:15	11:38	11:57
12:15	**12:38**	**12:57**
12:58	**1:21**	**1:40**
1:48	**2:11**	**2:30**
2:54	**3:17**	**3:36**
3:35	**3:58**	**4:17**
4:15	**4:38**	**4:57**
5:04	**5:27**	**5:46**
6:03	**6:26**	**6:45**
7:04	**7:27**	**7:46**
7:47	**8:08**	**8:25**
8:30	**8:49**	**9:06**
9:11	**9:30**	**9:47**
10:33	**10:52**	**11:09**

Sunday 238

Inbound

Avon Square	Crawford Square	South Shore Plaza	Quincy Center Station
-	8:00	8:14	8:34
-	9:20	9:34	9:54
-	10:35	10:49	11:09
-	11:50	**12:04**	**12:24**
-	**1:05**	**1:19**	**1:39**
-	**2:25**	**2:39**	**2:59**
3:35	**3:42**	**3:54**	**4:14**
4:55	**5:02**	**5:14**	**5:34**
6:15	**6:22**	**6:34**	**6:54**
7:30	**7:37**	**7:49**	**8:09**
8:45	**8:52**	**9:03**	**9:20**
10:00	**10:07**	**10:18**	**10:35**
11:00	**11:07**	**11:18**	**11:35**

Outbound

Quincy Center Station	South Shore Plaza	Crawford Square	Avon Square
B 6:30	-	6:57	-
7:30	7:48	8:00	8:05
8:40	8:58	9:10	9:15
9:59	10:17	10:29	10:34
11:14	11:36	11:48	11:53
12:30	**12:52**	**1:04**	**1:09**
1:45	**2:07**	**2:21**	**-**
3:05	**3:27**	**3:41**	**-**
4:20	**4:42**	**4:56**	**-**
5:40	**6:00**	**6:14**	**-**
7:00	**7:20**	**7:34**	**-**
8:20	**8:40**	**8:54**	**-**
9:30	**9:50**	**10:04**	**-**
10:39	**10:56**	**11:10**	**-**

Quincy Adams served on Sundays only.

A continues to Avon Square

B does not serve Quincy Adams Busway

PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

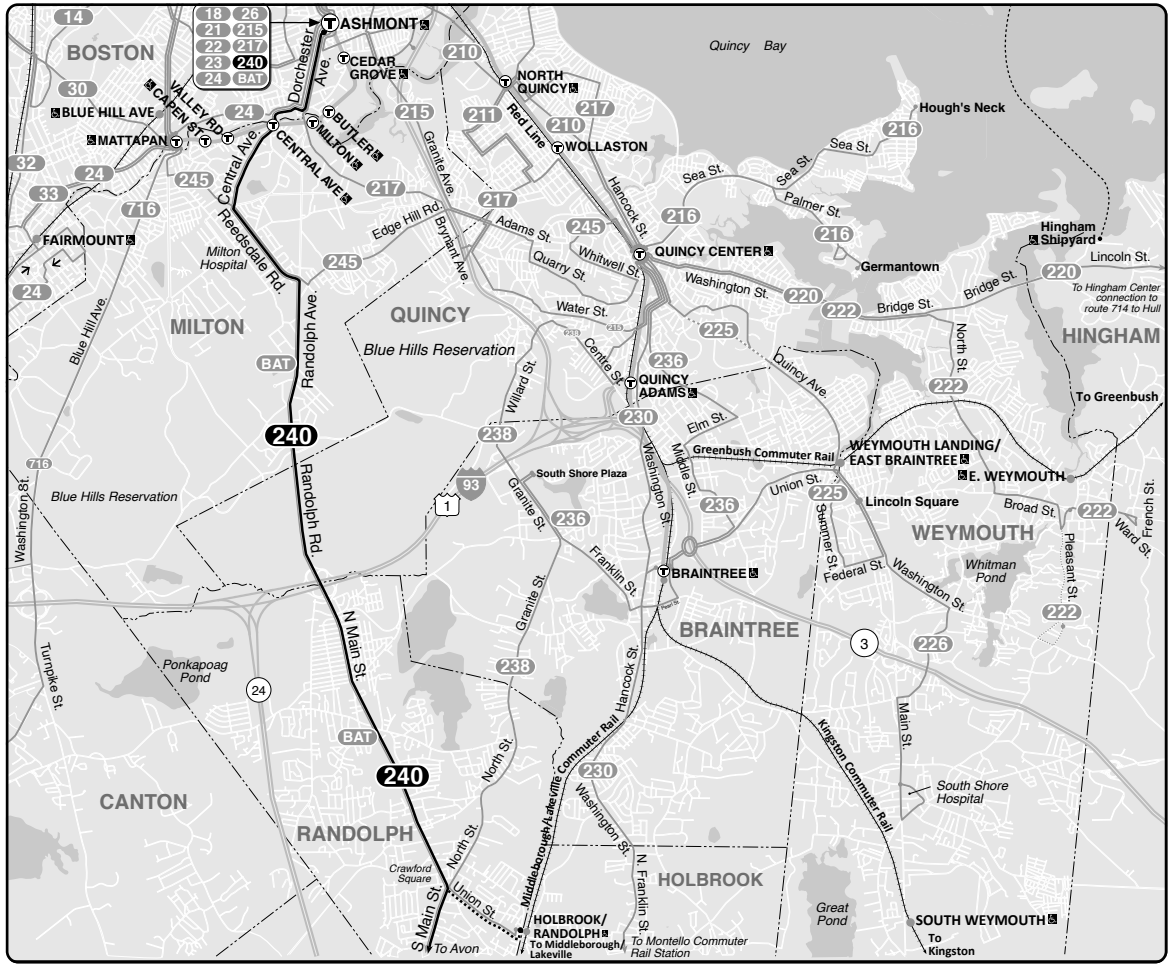
2022 Holidays

- SUN Memorial Day
- SUN Independence Day
- SUN Labor Day
- SUN Thanksgiving Day
- SUN Christmas Day
- SUN Christmas Day Observed
- SAT New Year's Eve
- SUN New Year's Day

Effective **August 28, 2022** Replaces March 2022

240 Avon Sq or Holb/Rand Sta – Ashmont Sta

Schedule Change – Sunday



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A128-3-22.1

Weekday 240

Inbound				Outbound			
Avon Square	Holbrook/ Randolph Station	Crawford Square	Ashmont Station	Ashmont Station	Crawford Square	Holbrook/ Randolph Station	Avon Square
-	-	4:45	5:26	5:41	6:05	6:08	-
-	-	4:55	5:36	5:53	6:17	-	6:22
-	-	5:05	5:46	6:05	6:29	-	-
-	-	5:15	5:56	6:18	6:46	6:49	-
5:20	-	5:25	6:06	6:30	7:01	-	7:06
-	-	5:35	6:16	6:43	7:14	7:17	-
-	-	5:50	6:31	7:08	7:39	7:42	-
6:00	-	6:05	6:46	7:36	8:07	8:10	-
-	-	6:15	6:56	7:55	8:26	-	8:31
6:26	-	6:31	7:17	8:15	8:46	-	8:51
-	-	6:40	7:28	8:45	9:16	9:19	-
6:46	-	6:51	7:46	9:15	9:46	-	9:51
-	6:59	7:02	8:02	9:45	10:16	10:19	-
7:13	-	7:18	8:18	10:15	10:46	-	10:51
-	7:25	7:28	8:28	10:46	11:17	11:20	-
-	7:50	7:53	8:53	11:15	11:46	-	11:51
8:05	-	8:10	9:06	11:45	**12:16**	**12:19**	**-**
-	8:25	8:28	9:17	**12:15**	**12:46**	**-**	**12:51**
8:40	-	8:45	9:26	**12:45**	**1:16**	**1:19**	**-**
9:00	-	9:05	9:41	**1:15**	**1:46**	**-**	**1:51**
-	9:27	9:29	10:05	**1:45**	**2:16**	**2:19**	**-**
9:57	-	10:02	10:38	**2:15**	**2:50**	**-**	**2:57**
-	10:27	10:29	11:05	**2:45**	**3:25**	**3:28**	**-**
10:59	-	11:04	11:38	**3:15**	**3:55**	**-**	**4:02**
-	11:30	11:33	**12:03**	**3:45**	**4:25**	**4:28**	**-**
12:00	**-**	**12:04**	**12:34**	**4:15**	**5:01**	**-**	**5:08**
-	**12:30**	**12:33**	**1:03**	**4:40**	**5:27**	**5:32**	**-**
1:00	**-**	**1:04**	**1:34**	**5:05**	**5:52**	**-**	**5:57**
-	**1:30**	**1:33**	**2:03**	**5:30**	**6:15**	**-**	**6:20**
2:00	**-**	**2:04**	**2:34**	**5:50**	**6:35**	**6:38**	**-**
-	**2:30**	**2:33**	**3:03**	**6:00**	**6:44**	**-**	**6:49**
3:05	**-**	**3:10**	**3:52**	**6:15**	**6:56**	**6:59**	**-**
-	**3:45**	**3:48**	**4:28**	**6:30**	**7:09**	**-**	**7:14**
4:10	**-**	**4:14**	**4:50**	**7:00**	**7:38**	**-**	**7:43**
-	**4:35**	**4:38**	**5:14**	**7:37**	**8:08**	**-**	**-**
5:16	**-**	**5:20**	**5:56**	**8:04**	**8:33**	**-**	**8:38**
-	**5:40**	**5:43**	**6:19**	**8:29**	**8:56**	**-**	**-**
6:10	**-**	**6:14**	**6:50**	**9:21**	**9:48**	**-**	**9:53**
6:34	**-**	**6:38**	**7:12**	**10:32**	**10:59**	**-**	**11:04**
[A] **-**	**6:50**	**6:53**	**-**	**11:43**	12:09	-	12:14
6:56	**-**	**7:00**	**7:29**	12:50	1:16	-	-
[A] **-**	**7:08**	**7:11**	**-**				
7:23	**-**	**7:27**	**7:56**				
7:48	**-**	**7:52**	**8:21**				
[A] **-**	**-**	**8:14**	**-**				
8:41	**-**	**8:45**	**9:14**				
9:57	**-**	**10:01**	**10:24**				
11:10	**-**	**11:13**	**11:36**				
12:17	-	12:20	12:43				

Saturday 240

Inbound			Outbound		
Avon Square	Crawford Square	Ashmont Station	Ashmont Station	Crawford Square	Avon Square
-	5:50	6:16	6:21	6:41	6:47
-	6:30	6:58	7:03	7:23	7:29
6:52	6:59	7:27	7:32	7:59	-
-	7:14	7:42	7:47	8:14	8:22
7:37	7:44	8:12	8:18	8:45	-
-	7:54	8:22	8:27	8:54	9:02
8:28	8:35	9:03	9:08	9:35	-
-	8:52	9:20	9:25	9:52	10:00
9:08	9:15	9:44	9:49	10:16	-
-	9:29	9:58	10:03	10:30	10:39
10:08	10:15	10:44	10:50	11:17	-
-	10:18	10:47	10:53	11:20	11:29
10:46	10:53	11:25	11:31	**12:02**	**-**
-	11:15	11:49	11:55	**12:26**	**12:35**
11:36	11:43	**12:17**	**12:23**	**12:54**	**-**
-	**12:05**	**12:39**	**12:50**	**1:21**	**1:30**
12:42	**12:49**	**1:23**	**1:29**	**2:00**	**-**
-	**1:05**	**1:39**	**1:55**	**2:26**	**2:35**
[A] **-**	**1:48**	**-**	**2:29**	**3:00**	**-**
1:42	**1:49**	**2:23**	**3:15**	**3:46**	**3:55**
-	**2:38**	**3:09**	**3:33**	**4:04**	**-**
2:50	**2:55**	**3:26**	**4:21**	**4:50**	**4:59**
-	**3:44**	**4:15**	**4:43**	**5:11**	**-**
4:01	**4:06**	**4:37**	**5:02**	**5:30**	**5:39**
-	**4:25**	**4:56**	**5:41**	**6:09**	**6:18**
-	**5:05**	**5:35**	**5:46**	**6:14**	**-**
5:05	**5:10**	**5:40**	**6:27**	**6:55**	**-**
5:46	**5:51**	**6:21**	**6:32**	**7:00**	**7:09**
-	**5:56**	**6:26**	**7:12**	**7:40**	**-**
6:31	**6:36**	**7:06**	**7:29**	**7:57**	**8:06**
-	**6:53**	**7:23**	**7:57**	**8:25**	**-**
7:16	**7:21**	**7:50**	**8:28**	**8:53**	**9:02**
8:13	**8:18**	**8:47**	**9:05**	**9:30**	**9:39**
9:09	**9:14**	**9:43**	**9:51**	**10:16**	**10:25**
10:01	**10:05**	**10:34**	**10:40**	**11:03**	**11:11**
10:45	**10:49**	**11:18**	**11:30**	**11:53**	12:01
11:30	**11:34**	12:00	12:20	12:43	12:51
12:15	12:19	12:45	12:53	1:16	-

Sunday 240

Inbound			Outbound		
Avon Square	Crawford Square	Ashmont Station	Ashmont Station	Crawford Square	Avon Square
-	7:00	7:27	7:30	7:57	-
8:10	8:15	8:44	8:50	9:17	-
9:25	9:30	10:02	10:05	10:32	-
10:40	10:45	11:18	11:20	11:47	-
11:55	**12:00**	**12:33**	**12:35**	**1:02**	**-**
1:10	**1:15**	**1:48**	**1:55**	**2:22**	**-**
-	**2:25**	**2:57**	**3:00**	**3:27**	**3:34**
-	**3:45**	**4:15**	**4:20**	**4:47**	**4:54**
-	**5:00**	**5:30**	**5:35**	**6:04**	**6:10**
-	**6:20**	**6:47**	**6:50**	**7:16**	**7:22**
-	**7:40**	**8:07**	**8:10**	**8:37**	**8:43**
-	**9:00**	**9:24**	**9:30**	**9:54**	**10:00**
-	**10:08**	**10:29**	**10:30**	**10:53**	**10:59**
-	**11:14**	**11:35**	**11:35**	**11:58**	12:04
-	12:13	12:35	12:40	1:00	-

[A] runs express to Quincy Center Station

PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

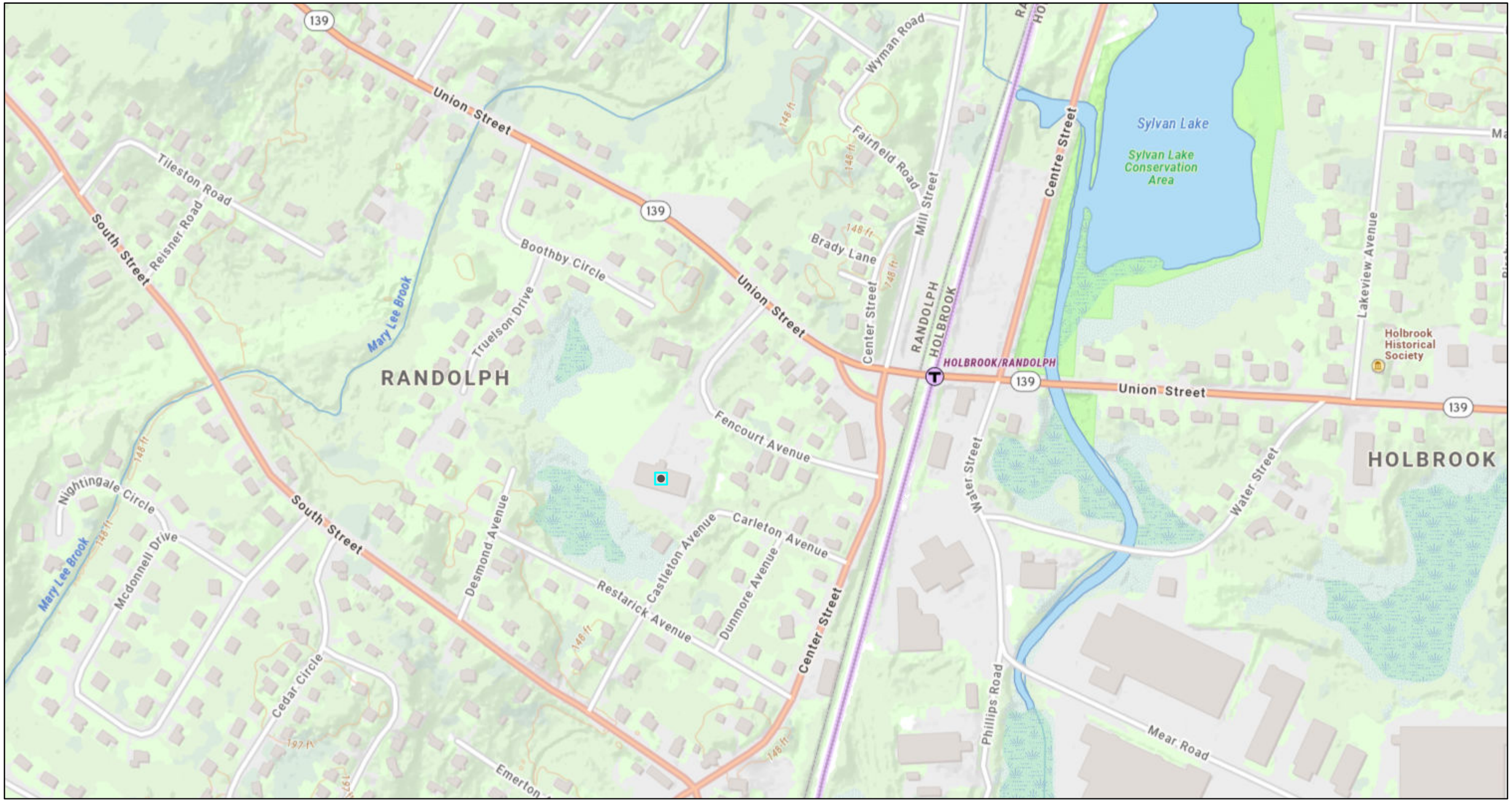
Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

2022 Holidays

- SUN Memorial Day
- SUN Independence Day
- SUN Labor Day
- SUN Thanksgiving Day
- SUN Christmas Day
- SUN Christmas Day Observed
- SAT New Year's Eve
- SUN New Year's Day

MASSDOT HIGH CRASH LOCATION MAPPING

MassDOT Top Crash Locations



9/9/2022, 11:56:53 AM

1:4,514

0 0.04 0.08 0.16 mi

0 0.05 0.1 0.2 km

MassGIS

MassDOT
MassGIS |

TRIP-GENERATION CALCULATIONS

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

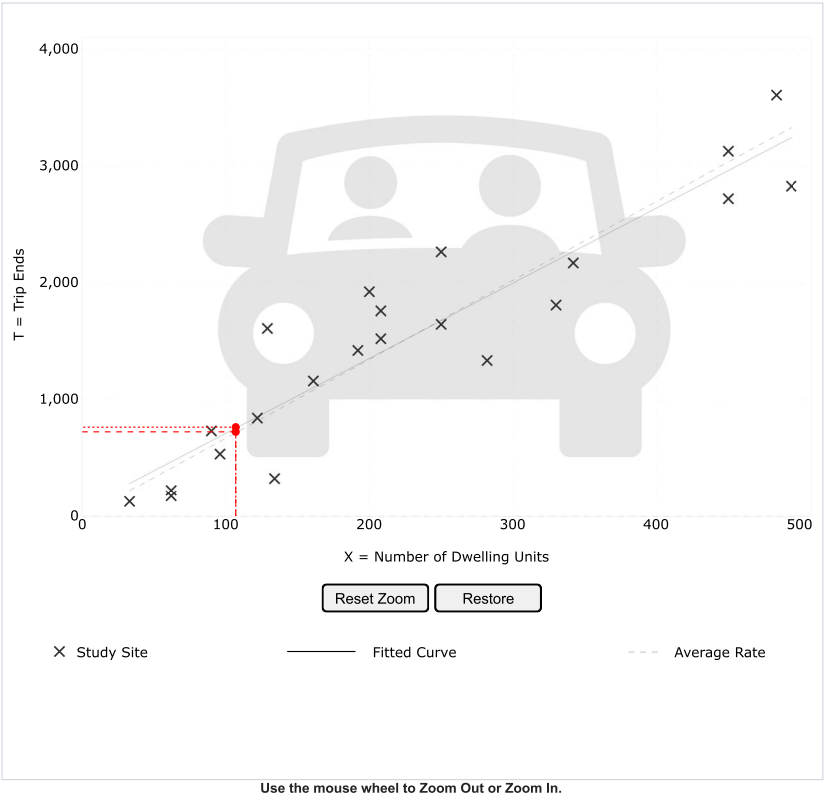
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
107 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
22

Avg. Num. of Dwelling Units:
229

Average Rate:
6.74

Range of Rates:
2.46 - 12.50

Standard Deviation:
1.79

Fitted Curve Equation:
T = 6.41(X) + 75.31

R^2:
0.86

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 721 (Total), 360 (Entry), 361 (Exit)
Fitted Curve: 761 (Total), 380 (Entry), 381 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

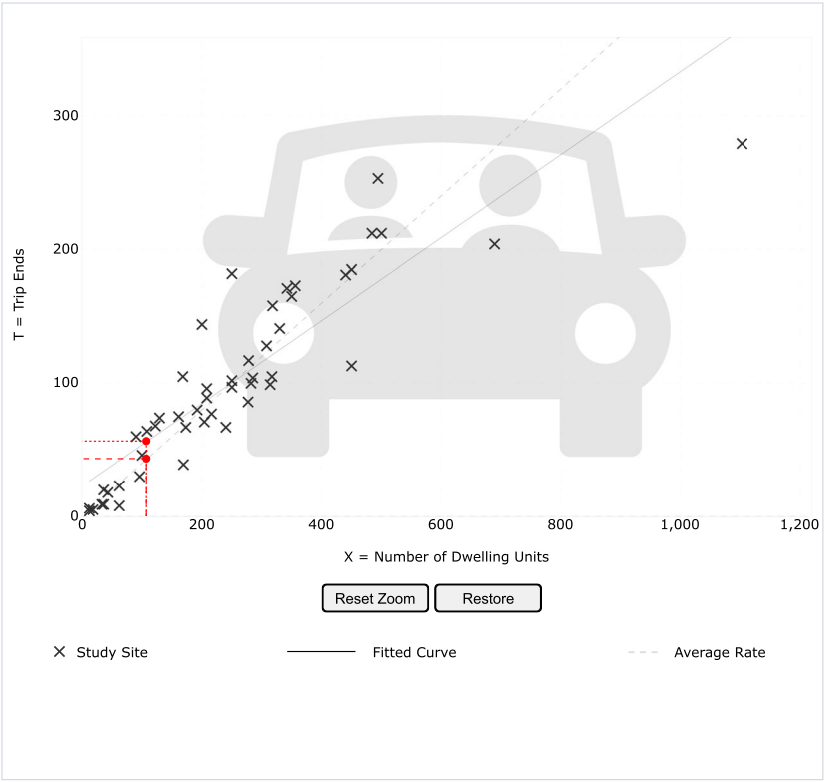
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
107 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
49

Avg. Num. of Dwelling Units:
249

Average Rate:
0.40

Range of Rates:
0.13 - 0.73

Standard Deviation:
0.12

Fitted Curve Equation:
T = 0.31(X) + 22.85

R^2:
0.79

Directional Distribution:
24% entering, 76% exiting

Calculated Trip Ends:
Average Rate: 43 (Total), 10 (Entry), 33 (Exit)
Fitted Curve: 56 (Total), 13 (Entry), 43 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

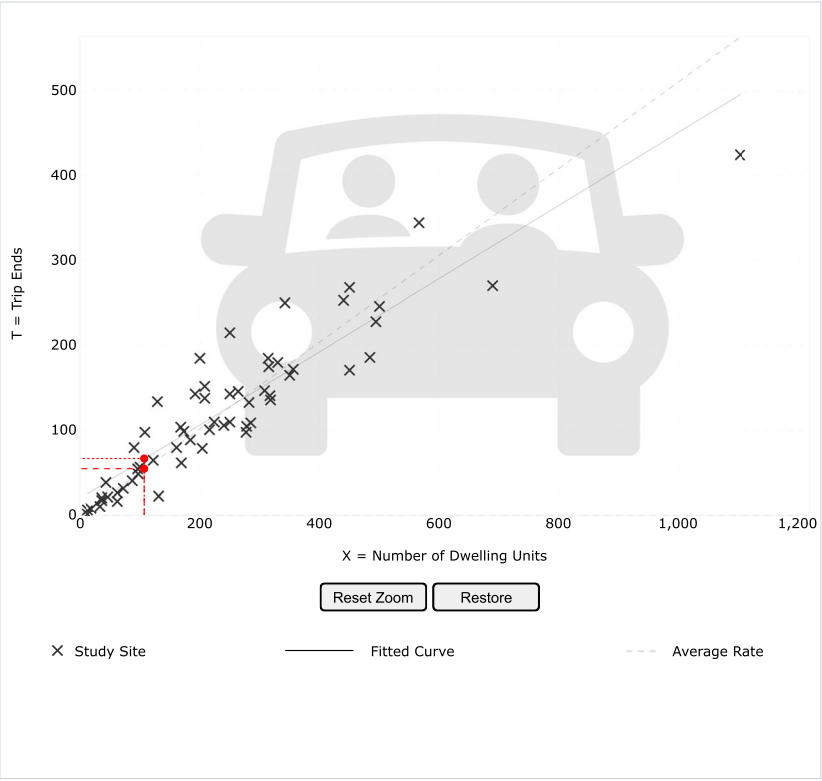
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
107 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
59

Avg. Num. of Dwelling Units:
241

Average Rate:
0.51

Range of Rates:
0.08 - 1.04

Standard Deviation:
0.15

Fitted Curve Equation:
T = 0.43(X) + 20.55

R^2:
0.84

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 55 (Total), 34 (Entry), 21 (Exit)
Fitted Curve: 67 (Total), 42 (Entry), 25 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
565

LAND USE GROUP:
(500-599) Institutional

LAND USE :
565 - Day Care Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

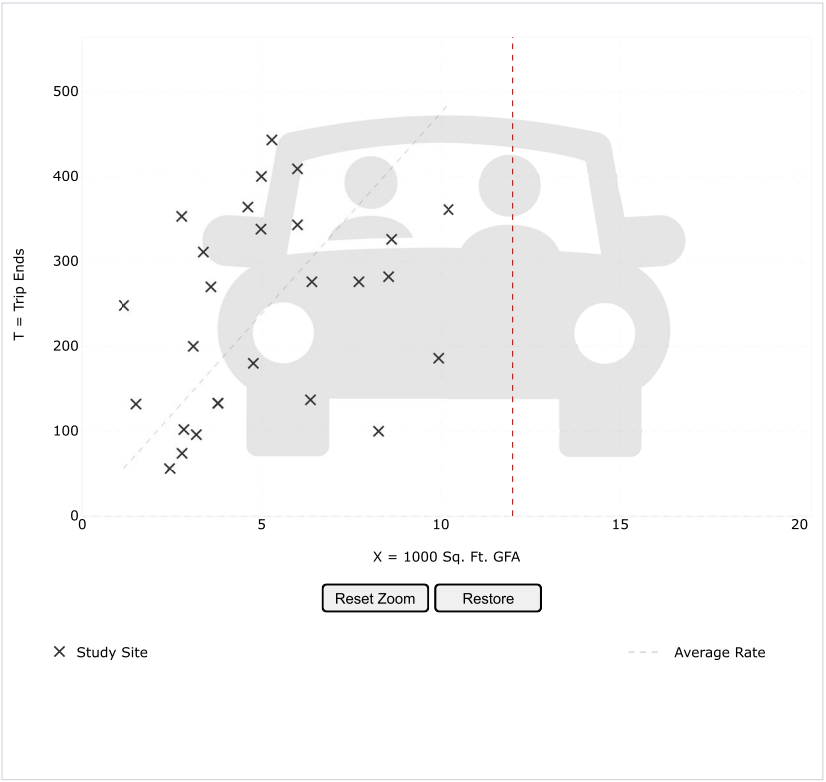
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
12 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Day Care Center (565) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
27

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
47.62

Range of Rates:
12.12 - 211.06

Standard Deviation:
29.78

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 571 (Total), 285 (Entry), 286 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
565

LAND USE GROUP:
(500-599) Institutional

LAND USE :
565 - Day Care Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

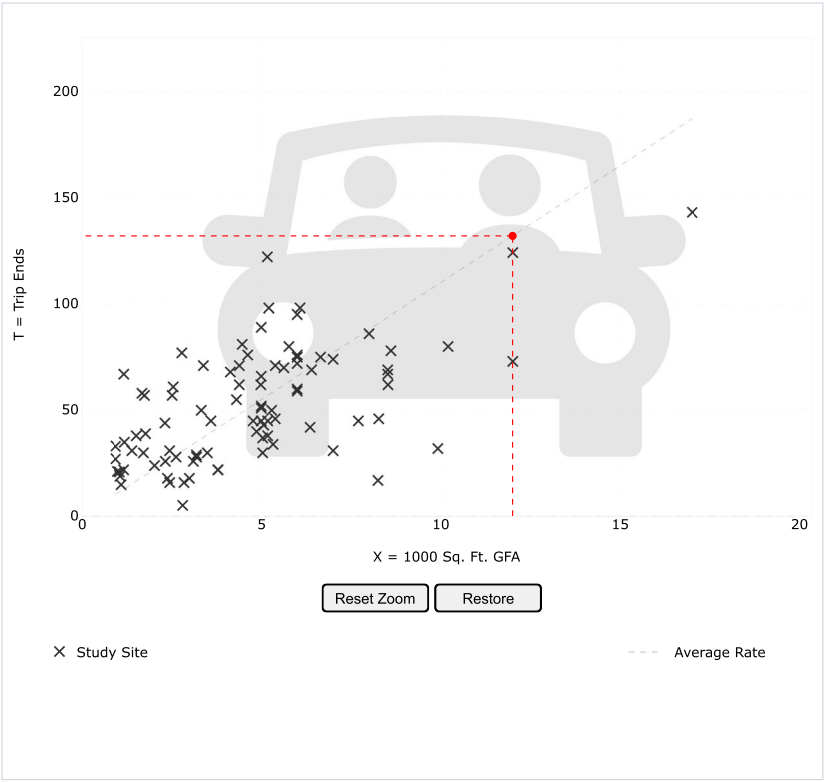
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
12
Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Day Care Center (565) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
89

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
11.00

Range of Rates:
1.79 - 57.02

Standard Deviation:
6.08

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
53% entering, 47% exiting

Calculated Trip Ends:
Average Rate: 132 (Total), 70 (Entry), 62 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
565

LAND USE GROUP:
(500-599) Institutional

LAND USE :
565 - Day Care Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

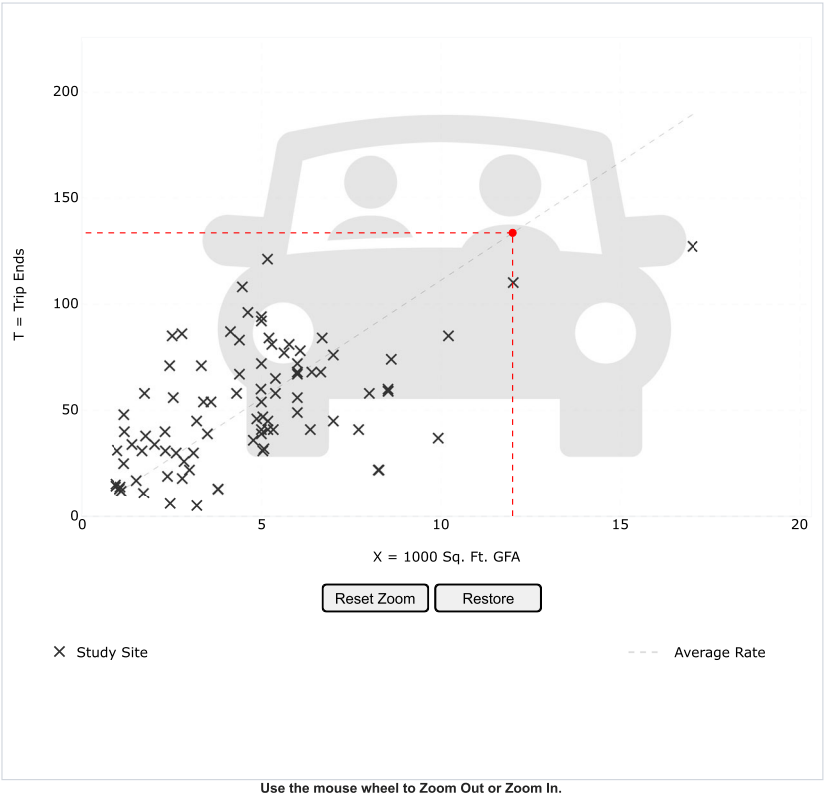
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
12
Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Day Care Center (565) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
90

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
11.12

Range of Rates:
1.56 - 40.85

Standard Deviation:
6.28

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
47% entering, 53% exiting

Calculated Trip Ends:
Average Rate: 133 (Total), 62 (Entry), 71 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 495

LAND USE GROUP: (400-499) Recreational

LAND USE : 495 - Recreational Community Center

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GFA

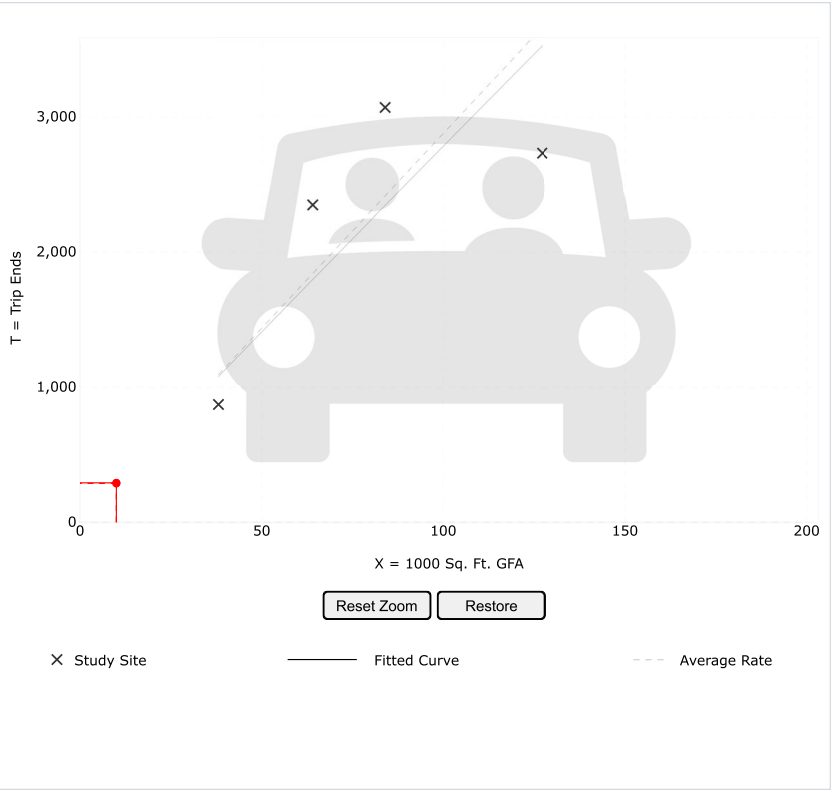
TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 10 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Recreational Community Center (495) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
4

Avg. 1000 Sq. Ft. GFA:
78

Average Rate:
28.82

Range of Rates:
21.49 - 36.71

Standard Deviation:
8.56

Fitted Curve Equation:
Ln(T) = 0.98 Ln(X) + 3.42

R^2:
0.74

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 288 (Total), 144 (Entry), 144 (Exit)
Fitted Curve: 292 (Total), 146 (Entry), 146 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
495

LAND USE GROUP:
(400-499) Recreational

LAND USE :
495 - Recreational Community Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

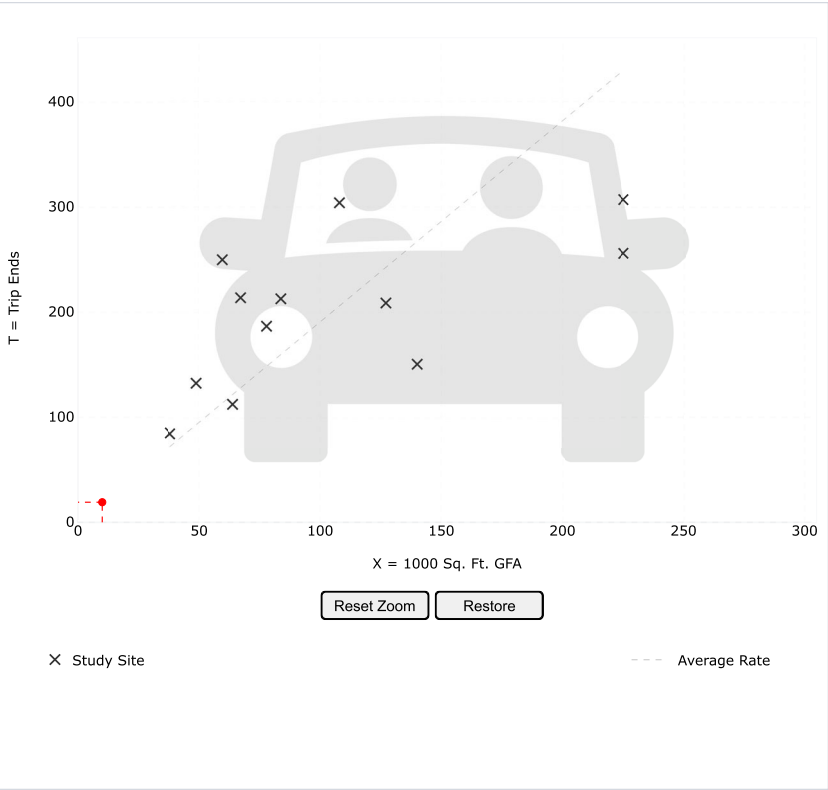
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Recreational Community Center (495) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
12

Avg. 1000 Sq. Ft. GFA:
105

Average Rate:
1.91

Range of Rates:
1.08 - 4.18

Standard Deviation:
0.88

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
66% entering, 34% exiting

Calculated Trip Ends:
Average Rate: 19 (Total), 13 (Entry), 6 (Exit)

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Graph Look Up

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 495

LAND USE GROUP: (400-499) Recreational

LAND USE : 495 - Recreational Community Center

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

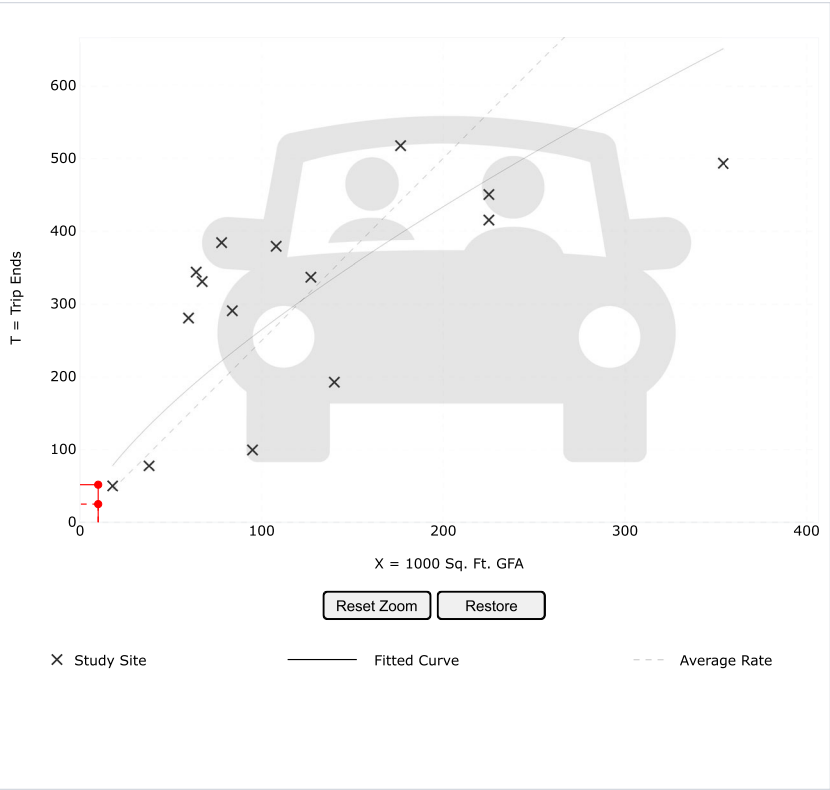
INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GFA

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 10 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Recreational Community Center (495) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
15

Avg. 1000 Sq. Ft. GFA:
124

Average Rate:
2.50

Range of Rates:
1.05 - 5.37

Standard Deviation:
1.28

Fitted Curve Equation:
Ln(T) = 0.71 Ln(X) + 2.31

R^2:
0.57

Directional Distribution:
47% entering, 53% exiting

Calculated Trip Ends:
Average Rate: 25 (Total), 12 (Entry), 13 (Exit)
Fitted Curve: 52 (Total), 24 (Entry), 28 (Exit)

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US CENSUS DATA

MEANS OF TRANSPORTATION TO WORK

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

	Census Tract 4203.01, Norfolk County, Massachusetts		Census Tract 4203.02, Norfolk County, Massachusetts	
Label	Estimate	Margin of Error	Estimate	Margin of Error
Total:	3,549	±367	4,013	±468
Car, truck, or van:	3,037	±367	3,513	±454
Drove alone	2,749	±411	3,064	±418
Carpooled:	288	±162	449	±255
In 2-person carpool	261	±160	293	±186
In 3-person carpool	27	±49	0	±17
In 4-person carpool	0	±17	154	±196
In 5- or 6-person carpool	0	±17	0	±17
In 7-or-more-person carpool	0	±17	2	±16
Public transportation (excluding taxicab):	293	±153	444	±214
Bus	90	±77	141	±118
Subway or elevated rail	173	±114	182	±133
Long-distance train or commuter rail	30	±36	121	±103
Light rail, streetcar or trolley (carro público in Puerto Rico)	0	±17	0	±17
Ferryboat	0	±17	0	±17
Taxicab	0	±17	0	±17
Motorcycle	0	±17	0	±17
Bicycle	40	±61	0	±17
Walked	93	±65	24	±39
Other means	32	±38	0	±17
Worked from home	54	±52	32	±40

Table Notes

MEANS OF TRANSPORTATION TO WORK

Survey/Program: American Community Survey
Universe: Workers 16 years and over
Year: 2019
Estimates: 5-Year
Table ID: B08301

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates

2019 ACS data products include updates to several categories of the existing means of transportation question. For more information, see: Change to Means of Transportation.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

Workers include members of the Armed Forces and civilians who were at work last week.

The 2015-2019 American Community Survey (ACS) data generally reflect the September 2018 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances, the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

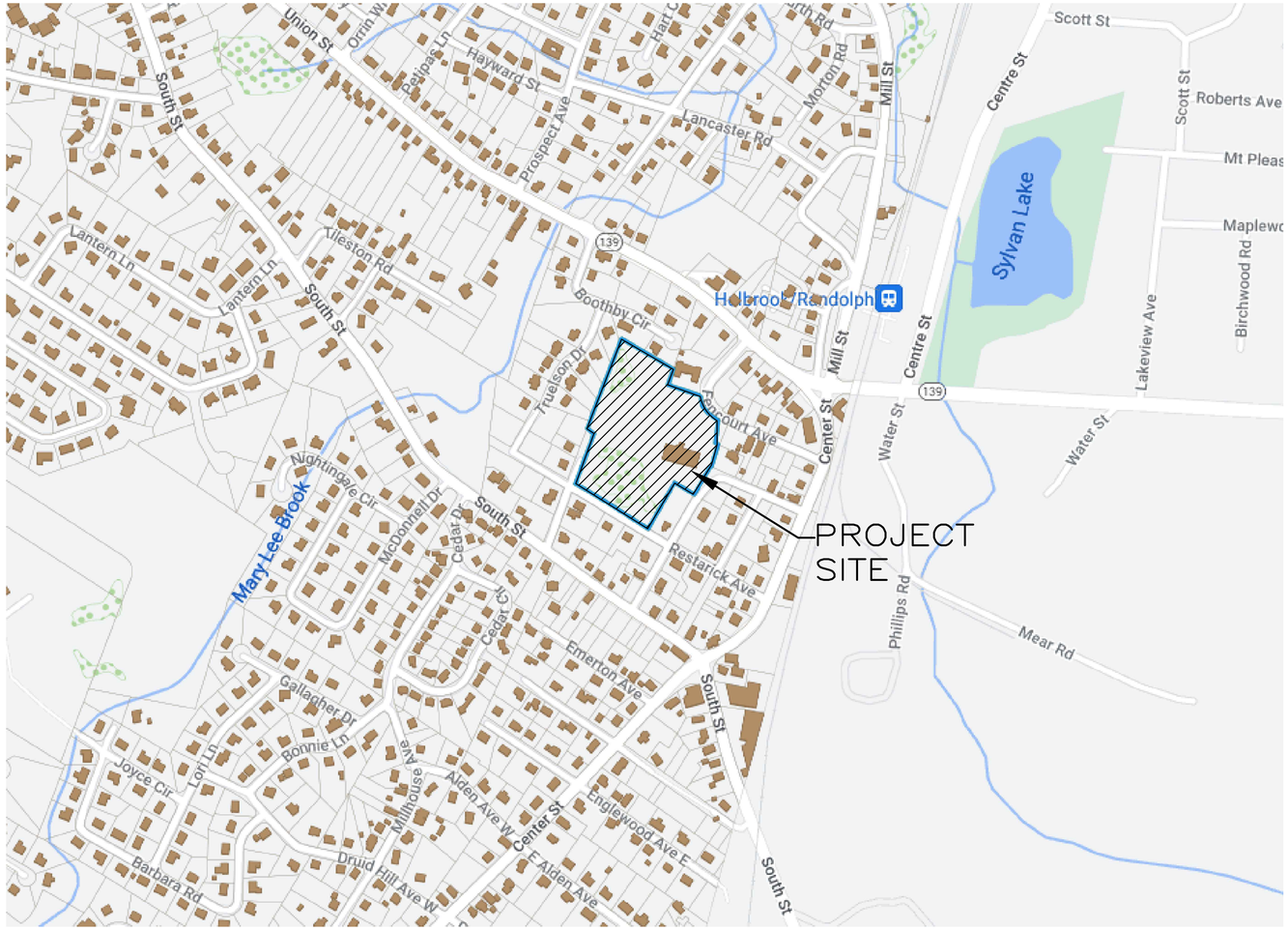
An "**" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution, or the margin of error associated with a median was larger than the median itself.
An "-" following a median estimate means the median falls in the lowest interval of an open-ended distribution.
An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution.
An "***" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
An "*****" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
An "(X)" means that the estimate is not applicable or not available.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

SITE PLAN

16 FENCOURT AVENUE, RANDOLPH, MA



LOCUS MAP
APPROX. 1" = 300'

DIMENSIONAL REQUIREMENTS			
ZONING ITEM	UCTD	EXISTING	PROPOSED
MIN. LOT AREA	5 ACRES	7.13 ACRES	7.13 ACRES
MIN. LOT FRONTAGE/DEPTH	100/75 FT	142.5/599FT	142.5/599FT
MAX. YARD – FRONT	10 FT**	167.5 FT	5.4 FT
MIN. YARD – SIDE	30 FT***	69.9 FT	30 FT
MIN. YARD – REAR	30 FT***	287.3 FT	30 FT
BUILDING HEIGHT	NOTE****	1 STORY	3 STORIES
MIN. OPEN SPACE	10%	79%	45.1%

* VARIANCE REQUIRED

** IN ORDER TO DEFINE A CONSISTENT BUILDING LINE ALONG THE STREET, NEW BUILDING SHALL NOT BE SET BACK MORE THAN (10) FEET FROM THE FRONT PROPERTY LINE.

*** A UCTD PROJECT SHALL COMPLY WITH THE FOLLOWING REQUIREMENT:
1) SIDE YARD SETBACK FOR THREE (3) STORY BUILDING ABUTTING A RESIDENTIAL DISTRICT: 30 FEET FROM THE LOT LINE.
2) REAR YARD SETBACK FOR THREE (3) STORY BUILDING ABUTTING A RESIDENTIAL DISTRICT: 30 FEET FROM THE LOT LINE.

**** THE MINIMUM PERMITTED HEIGHT FOR BUILDING IN A UCTD PROJECT SHALL BE TWO (2) STORIES OR TWENTY (20) FEET, WHICHEVER IS GREATER, AND THE MAXIMUM PERMITTED HEIGHT FOR BUILDING AND STRUCTURES IN A UCTD PROJECT SHALL BE FOUR (4) STORIES OR (FORTY) 40 FEET, WHICH EVER IS LESS.
1) THE HEIGHT OF A BUILDING OR STRUCTURE IN THE UCTD SHALL BE DEFINED AS THE VERTICAL DISTANCE FROM THE AVERAGE GRADE OF THE STREET THE PROPERTY HAS FRONTAGE ON, ALONG THE FRONTAGE OF THE LOT/S OF THE UCTD PROJECT AT THE TIME OF THE SPECIAL PERMIT APPLICATION, TO THE TOP OF THE STRUCTURE (THE HIGHEST ROOF BEAMS OF A FLAT ROOF, THE DECK OF A MANSARD ROOF OR THE MEAN LEVEL OF THE HIGHEST GABLE OR SLOPE OF A HIP ROOF).

DRAWING INDEX:

C-1 TITLE SHEET
C-2 LAYOUT PLAN
C-3 GRADING AND DRAINAGE PLAN
C-4 UTILITY PLAN
C-5 DEMOLITION & EROSION CONTROL PLAN
C-6 DETAIL SHEET 1
C-7 DETAIL SHEET 2
C-8 DETAIL SHEET 3

ZONING:
UCTD

RECORD OWNER:
TAJ ESTATES OF RANDOLPH II, LLC
BOOK 39214 PAGE 555

DATUM:
ALL ELEVATIONS ARE ON NAVD 1988 DATUM

GENERAL NOTES

1. NOTIFY DIG–SAFE AT 1–888–DIG–SAFE PRIOR TO EXCAVATION.
2. EXISTING CONDITIONS BASE MAP PROVIDED BY TURNING POINT ENGINEERING, INC. REFERENCE TO THE EXISTING CONDITIONS PLAN.

OWNER/APPLICANT:
TAJ ESTATES OF RANDOLPH II, LLC
16 FENCOURT AVENUE
RANDOLPH, MA 02368

LEGAL COUNCIL:
KEVIN M. REILLY, ESQ
19 SOUTH MAIN STREET
RANDOLPH, MA 02368
(781) 961–7343

ARCHITECT:
DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203
FOXBOROUGH, MA 02035
(508) 241–2122

CIVIL ENGINEER:
HARDY + MAN DESIGN GROUP PC
1285 WASHINGTON STREET
WEYMOUTH, MA 02189
(781) 335–1464

LAND SURVEYOR:
BORDERLAND ENGINEERING, INC.
61 PLEASANT STREET, STUDIO B
RANDOLPH, MA 02368
(781) 963–9500

TRAFFIC ENGINEER:
VANASSE & ASSOCIATES, INC.
35 NEW ENGLAND BUSINESS CENTER DRIVE
SUITE 140
ANDOVER, MA 01810
(978) 474–8800

SITE LIGHTING CONSULTANT:
BOSTON LIGHT SOURCE
64 COMMERCIAL WHARF
BOSTON, MA 02110
(617) 788–2400

09/26/2022

COMMONWEALTH OF MASSACHUSETTS — CHI Y MAN — CIVIL NO. 45441 — REGISTERED PROFESSIONAL ENGINEER

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9–26–2022

TITLE SHEET
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

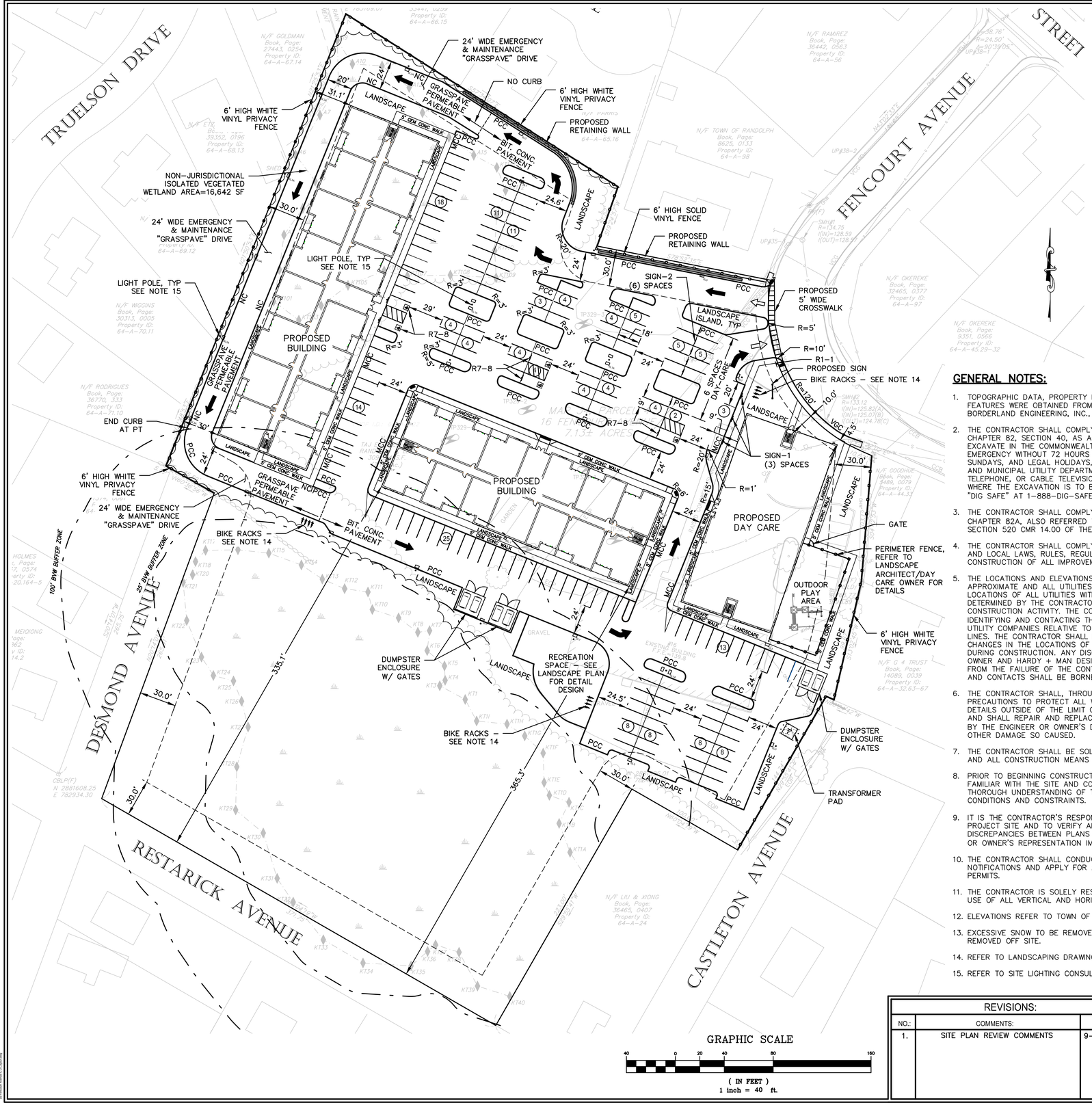
DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-06-2022
LATEST REVISION: 9-26-2022
SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335–1464

PREPARED FOR:
PERMITTING

SHEET
C-1

Electronic Version Is Official



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW		BACK-GROUND	LEGEND	BORDER	
R7-8	12"	18"	RESERVED PARKING	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	5	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	SEE 2009 MUTCD STANDARDS	P-5 5
R1-1	30"	30"	STOP				1				P-5 1
SIGN-1	12"	18"	DAY CARE PARKING PICKUP DROPOFF				3				P-5 3
SIGN-2	12"	18"	DAY CARE PARKING ONLY				6				P-5 6

GENERAL NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM TURNING POINT ENGINEERING, AND BORDERLAND ENGINEERING, INC., DATED AUGUST 13, 2022.
2. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 CMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
4. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
5. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND HARDY + MAN DESIGN GROUP, PC. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
7. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
8. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENT TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
10. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
11. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
12. ELEVATIONS REFER TO TOWN OF RANDOLPH DATUM.
13. EXCESSIVE SNOW TO BE REMOVED BY AN INDEPENDENT CONTRACTOR AND REMOVED OFF SITE.
14. REFER TO LANDSCAPING DRAWINGS FOR BIKE RACKS DETAILS.
15. REFER TO SITE LIGHTING CONSULTANT FOR EXACT LOCATIONS AND DETAILS.

DIMENSIONAL REQUIREMENTS

ZONING ITEM	UCTD	EXISTING	PROPOSED
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PARKING REQUIREMENTS

ZONING	REQUIRED	PROVIDED
107 UNITS/12,000 SF COMMERCIAL	201*	183

* (107x1.5) + (12000/400) + (107/10) = 160.5 + 30 + 10.7 = 201

LEGEND

MCC	MONOLITHIC CONCRETE CURB
NC	NO CURB
PCC	PRECAST CONCRETE CURB
VGC	VERTICAL GRANITE CURB
TYP	TYPICAL
	DETECTABLE WARNING PANEL
	CEMENT CONCRETE
	FIRE TRUCK ACCESS EXHIBIT
	VEHICLE TRAFFIC FLOW
	PROPOSED 6' HIGH SOLID VINYL FENCE
	PROPOSED TREE LINE
	PROPOSED SITE LIGHTING

CHI Y MAN
CIVIL
NO. 42441
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

09/26/2022

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9-26-2022

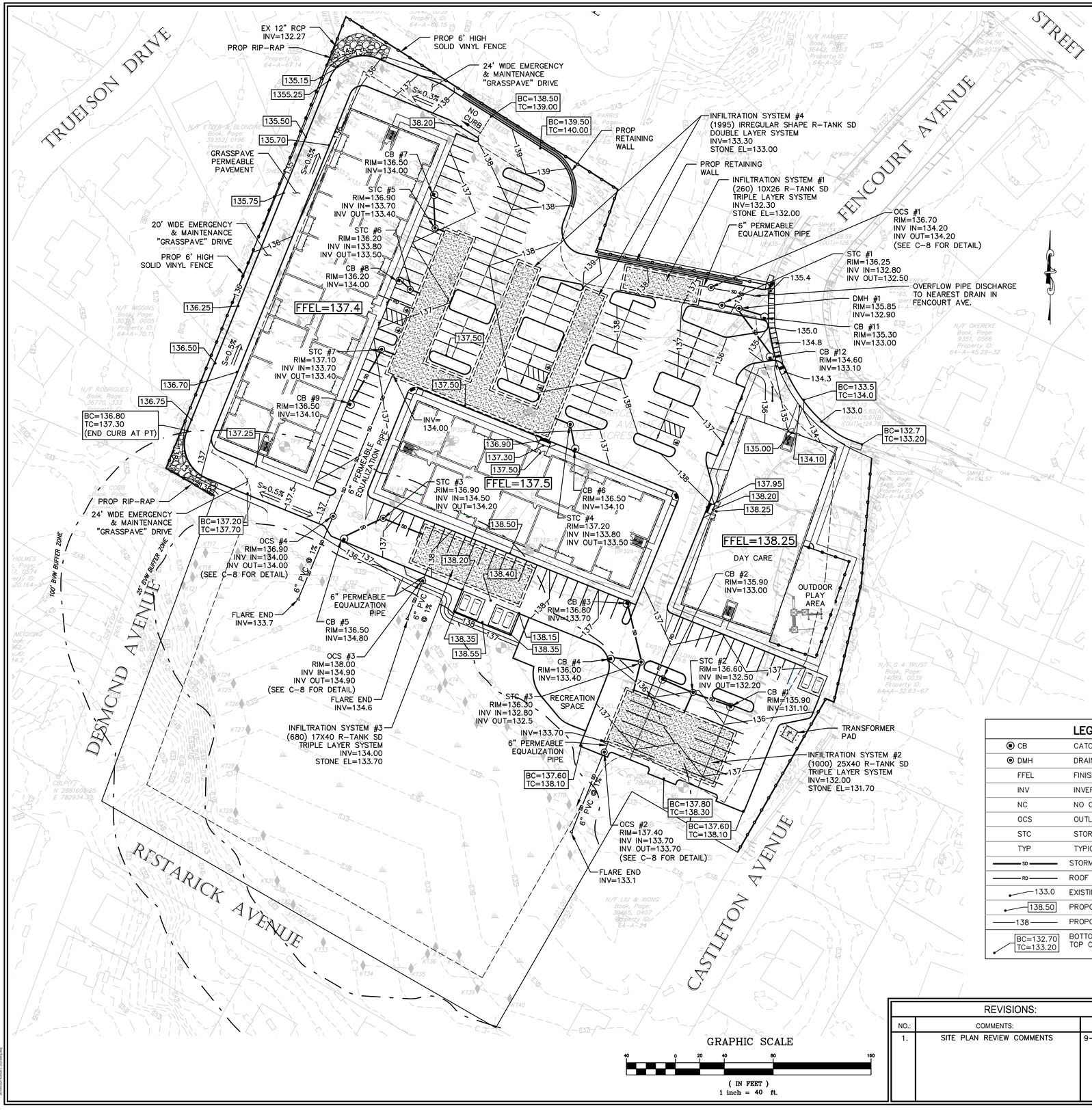
LAYOUT PLAN
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-06-2022
LATEST REVISION: 9-26-2022
SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
C-2



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

TEST PIT #1 (9-10-2021)

DEPTH(IN)	HORIZON	SOIL TEXTURE	COLOR	OTHER
0-13	A	FILL		
13-36	B	FILL		
36-72	C	COARSE SANDY LOAM	10Y 4/3	FRIABLE 5% COBBLE SOME BOULDER

WEEPING @60"

TEST PIT #2 (9-10-2021)

DEPTH(IN)	HORIZON	SOIL TEXTURE	COLOR	OTHER
0-36	A	FILL		
36-92	B	FINE SAND	10YR 4/3	LIKE BEACH SAND

NO GROUNDWATER
NO WEEPING
NO MOTTLE

TEST PIT #3 (9-10-2021)

DEPTH(IN)	HORIZON	SOIL TEXTURE	COLOR	OTHER
0-13	A	FILL		
13-36	B	FILL		
36-100	C	LOAMY SAND	10Y 4/3	FINE FRIABLE 1% COBBLE

WEEPING @63"

TEST PIT #4 (9-10-2021)

DEPTH(IN)	HORIZON	SOIL TEXTURE	COLOR	OTHER
0-42		SANDY LOAM		FILL LOAM
42-46	A	SANDY LOAM		BURIED A
46-60	B	LOAMY SAND		
60-90	C	FINE SAND	10YR 5/3	3% COBBLE

WEEPING @60"

TEST PIT #5 (9-10-2021)

DEPTH(IN)	HORIZON	SOIL TEXTURE	COLOR	OTHER
0-12			10YR 3/2	TOP SOIL FILL LOAM
12-26	A	SANDY LOAM	10YR 3/2	
26-36	B	LOAMY SAND	10YR 3/2	
36-80	C	COARSE SAND	10YR 4/4	FRIABLE, 5% COBBLE

WEEPING @69"
NO MOTTLE

TEST PIT #6 (9-10-2021)

DEPTH(IN)	HORIZON	SOIL TEXTURE	COLOR	OTHER
0-12	A	SANDY LOAM	10YR 3/3	
12-27	B	SANDY LOAM	10YR 4/6	
27-96	C	COARSE SAND	10YR 4/4	FRIABLE, 5% COBBLE

NO WEEPING
NO MOTTLE

LEGEND

CB	CATCH BASIN
DMH	DRAIN MANHOLE
FFEL	FINISHED FLOOR ELEVATION
INV	INVERT
NC	NO CURB
OCS	OUTLET CONTROL STRUCTURE
STC	STORMCEPTOR
TYP	TYPICAL
SD	STORM DRAIN PIPE
RD	ROOF DRAIN PIPE
133.0	EXISTING SPOT ELEVATION
138.50	PROPOSED SPOT ELEVATION
138	PROPOSED CONTOUR
BC=132.70 TC=133.20	BOTTOM OF CURB TOP OF CURB

COMMONWEALTH OF MASSACHUSETTS
CHI Y MAN
CIVIL
NO. 45441
REGISTERED
PROFESSIONAL ENGINEER

09/26/2022

STORMWATER SYSTEM ELEVATIONS

	SYSTEM #1	SYSTEM #2	SYSTEM #3	SYSTEM #4	
MIN. GROUND ELEVATION	137.0	136.0	137.5	136.7	
TOP OF STONE	135.0	134.7	136.0	135.3	
TOP OF CHAMBER	134.5	134.2	135.5	134.8	
BOTTOM OF CHAMBER	132.3	132.0	134.0	133.3	
BOTTOM OF STONE	132.0	131.7	133.7	133.0	
OVERFLOW OUTLET	134.2	133.7	134.9	134.0	
EST. GWT	N/A	N/A	131.7	131.0	

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9-26-2022

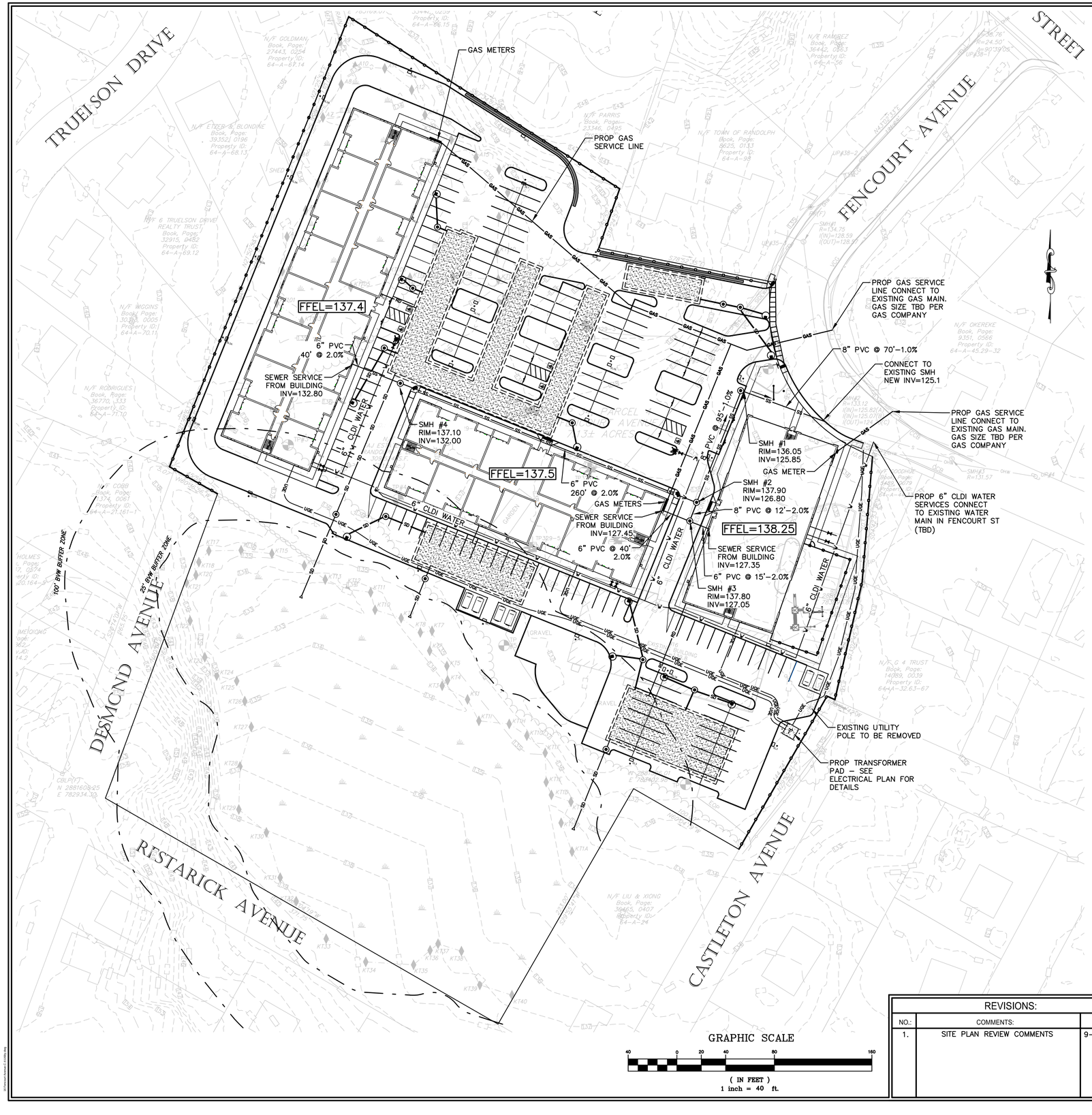
GRADING AND DRAINAGE PLAN
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-06-2022
LATEST REVISION: 9-26-2022
SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
C-3



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

LEGEND	
CB	CATCH BASIN
DMH	DRAIN MANHOLE
FFEL	FINISHED FLOOR ELEVATION
INV	INVERT
NC	NO CURB
OCS	OUTLET CONTROL STRUCTURE
STC	STORMCEPTOR
TYP	TYPICAL
SD	PROPOSED STORM DRAIN
RD	PROPOSED ROOF DRAIN
GAS	PROPOSED GAS
SS	PROPOSED SANITARY SEWER
UGE	PROPOSED UNDERGROUND ELECTRIC
W	PROPOSED WATER
	PROPOSED FIRE HYDRANT
	PROPOSED WATER VALVE
	PROPOSED SITE LIGHTING

09/26/2022

CHI Y MAN
COMMONWEALTH OF MASSACHUSETTS
CIVIL
NO. 45441
REGISTERED
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REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9-26-2022

UTILITY PLAN
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY
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DATE: 9-06-2022
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PREPARED FOR:
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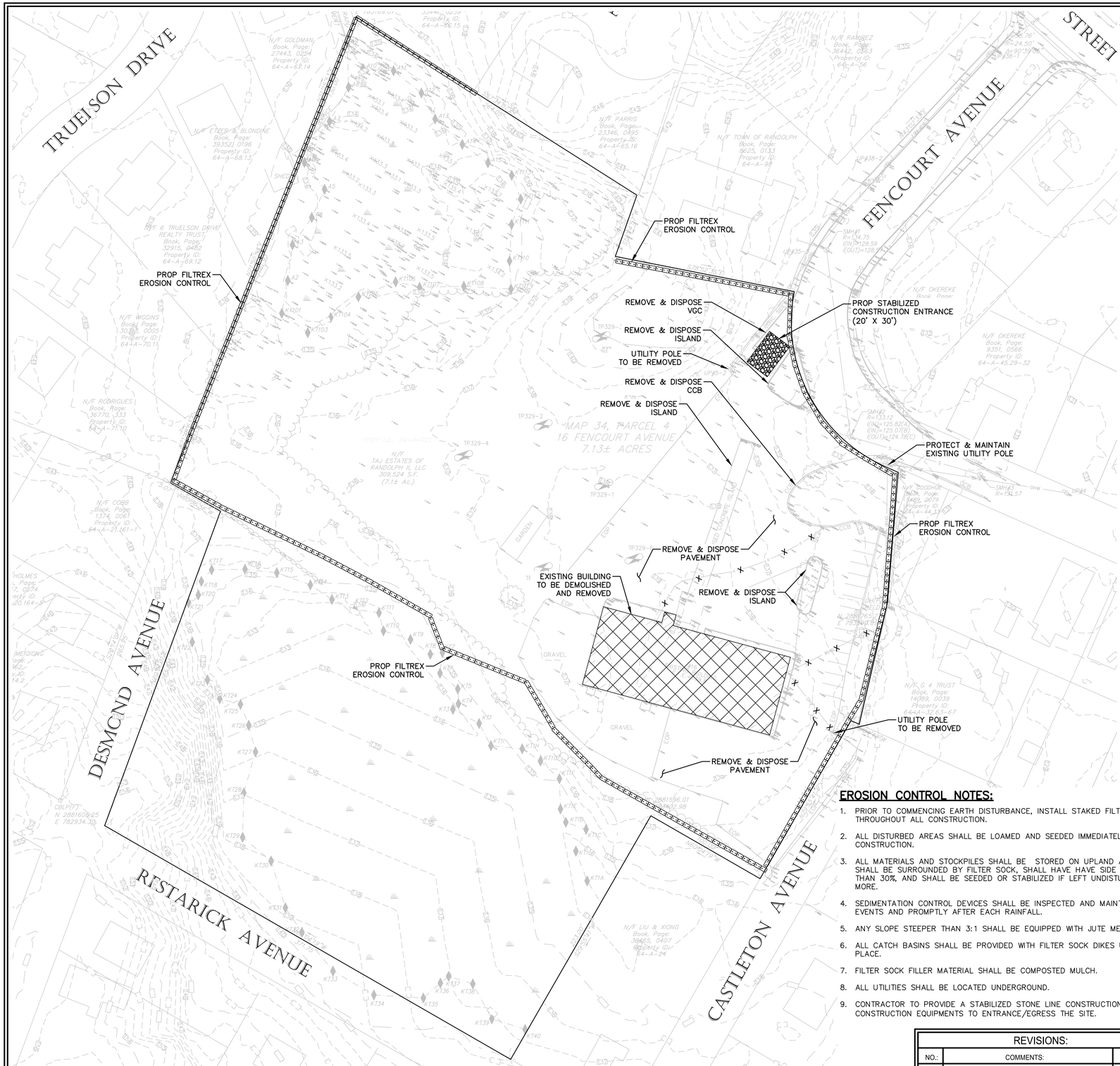
SHEET
C-4

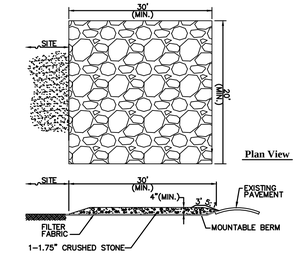


DEMOLITION NOTES:

1. SITE PREPARATION AND DEMOLITION SHALL INCLUDE THOSE AREAS WITHIN THE LIMIT OF WORK LINE AS SHOWN ON THE CONTRACT DOCUMENTS.
2. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
3. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL COORDINATE SITE DEMOLITION EFFORTS WITH ALL TRADES THAT MAY BE AFFECTED BY THE WORK.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS REQUIRED TO FACILITATE CONSTRUCTION, AND LEGALLY DISPOSED OF OFFSITE BY CONTRACTOR.
6. UTILITY PIPES DESIGNATED TO BE ABANDONED IN PLACE SHALL BE CAPPED IN PLACE.
7. UTILITY PIPES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF THE ENTIRE LENGTH OF PIPE AND BACKFILL AND 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
8. UTILITY STRUCTURES DESIGNATED TO BE ABANDONED IN PLACE SHALL HAVE THEIR CAST IRON CASTINGS REMOVED AND DISPOSED, INLET AND OUTLET PIPES PLUGGED, THE BOTTOM OF THE STRUCTURES SHALL BE BROKEN, THE VOID OF THE STRUCTURES SHALL BE BACKFILLED AND COMPACTED TO 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
9. UTILITY STRUCTURES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF CAST IRON CASTINGS, PLUGGING OF INLET AND OUTLET PIPES, REMOVAL OF THE STRUCTURE, AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
10. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFFSITE.
11. AT ALL LOCATIONS WHERE EXISTING CURBING, CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ROADWAY ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
12. EXTEND DESIGNATED LIMIT OF WORK AS NECESSARY TO ACCOMPLISH ROUGH GRADING, EROSION CONTROL, TREE PROTECTION, AND SITE WORK AS REQUIRED BY THESE DRAWINGS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. THE CONTRACTOR SHALL LEAVE THE SITE IN SAFE, CLEAN, AND LEVEL CONDITION UPON COMPLETION OF THE SITE DEMOLITION WORK.
14. REMOVE AND STOCKPILE ALL EXISTING SITE LIGHTS, BENCHES, TRASH RECEPTACLES, TRAFFIC SIGNS, GRANITE CURB, AND OTHER SITE IMPROVEMENTS WITHIN LIMIT OF WORK LINE UNLESS OTHERWISE NOTED.
15. ALL EXISTING TREES AND SHRUBS TO REMAIN SHALL BE PROTECTED AND MAINTAINED THROUGHOUT THE TIME OF CONSTRUCTION, AS SPECIFIED AND DIRECTED BY THE LANDSCAPE ARCHITECT/ENGINEER/OWNER.
16. BEFORE ANY TREES OR SHRUBS ARE REMOVED, THE CONTRACTOR SHALL ARRANGE A CONFERENCE ON THE SITE WITH THE OWNER OR OWNER'S REPRESENTATIVE TO IDENTIFY TREES AND SHRUBS THAT ARE TO BE REMOVED, AS WELL AS THOSE WHICH ARE TO BE PROTECTED. DO NOT COMMENCE CLEARING OPERATIONS WITHOUT A CLEAR UNDERSTANDING OF EXISTING CONDITIONS TO BE PRESERVED.
17. THE CONTRACTOR SHALL REMOVE FROM THE AREA OF CONSTRUCTION PAVEMENT, CONCRETE, CURBING, POLES AND FOUNDATIONS, ISLANDS, TREE BERMS AND OTHER FEATURES WITHIN THE LIMITS OF CONSTRUCTION AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION WHETHER SPECIFIED ON THE DRAWINGS OR NOT.
18. CONTRACTOR TO PROVIDE TEMPORARY CHAIN LINK FENCE WITH FABRIC AROUND SITE ALL NECESSARY TO PROTECT PUBLIC SAFETY AND DUST CONTROL.

EROSION CONTROL NOTES:

1. PRIOR TO COMMENCING EARTH DISTURBANCE, INSTALL STAKED FILTER SOCK AND MAINTAIN THROUGHOUT ALL CONSTRUCTION.
2. ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
3. ALL MATERIALS AND STOCKPILES SHALL BE STORED ON UPLAND AREAS. STOCKPILES SHALL BE SURROUNDED BY FILTER SOCK, SHALL HAVE HAVE SIDE SLOPES NO GREATER THAN 30%, AND SHALL BE SEEDED OR STABILIZED IF LEFT UNDISTURBED FOR TWO WEEKS OR MORE.
4. SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED AND MAINTAINED PRIOR TO ANY EVENTS AND PROMPTLY AFTER EACH RAINFALL.
5. ANY SLOPE STEEPER THAN 3:1 SHALL BE EQUIPPED WITH JUTE MESH SLOPE STABILIZATION.
6. ALL CATCH BASINS SHALL BE PROVIDED WITH FILTER SOCK DIKES UNTIL BASE COURSE IS IN PLACE.
7. FILTER SOCK FILLER MATERIAL SHALL BE COMPOSTED MULCH.
8. ALL UTILITIES SHALL BE LOCATED UNDERGROUND.
9. CONTRACTOR TO PROVIDE A STABILIZED STONE LINE CONSTRUCTION ENTRANCE FOR CONSTRUCTION EQUIPMENTS TO ENTRANCE/EGRESS THE SITE.



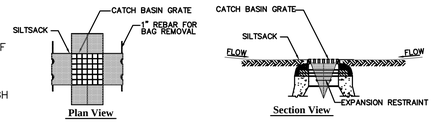
Cross-section

Notes:

1. ENTRANCE WIDTH SHALL BE A TWENTY-FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.
3. STABILIZED CONSTRUCTION EXIT SHALL BE REMOVED PRIOR TO FINAL FINISH MATERIALS BEING INSTALLED.

Stabilized Construction Exit

N.T.S.



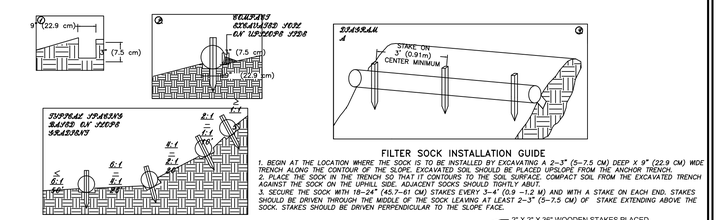
Notes:

1. INSTALL SILTSACK IN ALL CATCH BASINS WHERE INDICATED ON THE PLAN BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND HAY BALES HAVE BEEN REMOVED.
2. GRATE TO BE PLACED OVER SILTSACK.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED

Siltsack Sediment Trap

N.T.S.

09/26/2022



FILTER SOCK INSTALLATION GUIDE

1. BEGIN AT THE LOCATION WHERE THE SOCK IS TO BE INSTALLED BY EXCAVATING A 2-3" (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UPSLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE SOCK IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE SOCK ON THE UPHILL SIDE. ADJACENT SOCKS SHOULD TIGHTLY ABUT.
3. SECURE THE SOCK WITH 18-24" (45.7-61 CM) STAKES EVERY 3-4' (0.9 -1.2 M) AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE SOCK LEAVING AT LEAST 2-3" (5-7.5 CM) OF STAKE EXTENDING ABOVE THE SOCK. STAKES SHOULD BE DRIVEN PERPENDICULAR TO THE SLOPE FACE.

Filtrex Erosion Control

NTS

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9-26-2022

DEMOLITION & EROSION CONTROL PLAN
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY	DATE: 9-06-2022
DESIGNED BY: CYM	LATEST REVISION: 9-26-2022
CHECKED BY: CYM	SCALE: 1" = 40'

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
C-5

Commonwealth of Massachusetts
City/Town of Randolph

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 329-1 (Hole #) 3/29/21 (Date) ____ (Time) 45 - cloudy (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) ____ Vegetation ____ Surface Stones (e.g., cobbles, stones, boulders, etc.) ____ Slope (%) ____
   Description of Location: ____
2. Soil Parent Material: ____ Landform ____ Position on Landscape (SU, SH, BS, FS, TS) ____
3. Distances from: Open Water Body ____ feet; Drainage Way ____ feet; Wetlands ____ feet; Property Line ____ feet; Drinking Water Well ____ feet; Other ____ feet
4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If yes: ____ Depth Weeping from Pit ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-96	FILL	-	-	-	-	-	-	-	-	-	-
96-122	C	LS	10YR 4/3	102"	10YR 6/8	40%	15%	15%	M	V. Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Randolph

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 329-2 (Hole #) 3/29/21 (Date) ____ (Time) 45 - cloudy (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use: (e.g., woodland, agricultural field, vacant lot, etc.) ____ Vegetation ____ Surface Stones (e.g., cobbles, stones, boulders, etc.) ____ Slope (%) ____
   Description of Location: ____
2. Soil Parent Material: ____ Landform ____ Position on Landscape (SU, SH, BS, FS, TS) ____
3. Distances from: Open Water Body ____ feet; Drainage Way ____ feet; Wetlands ____ feet; Property Line ____ feet; Drinking Water Well ____ feet; Other ____ feet
4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☒ Yes ☐ No If yes: 92" Depth Weeping from Pit 98" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-24	FILL	-	-	-	-	-	-	-	-	-	-
24-32	A	FSL	10YR 3/2	-	-	-	<5%	<5%	Cr	Friable	
32-46	B	SL	2.5Y 6/8	-	-	-	<5%	<5%	Sabk	Friable	
46-80	C1	LS	10YR 4/2	64"	10YR 6/8	50%	5%	5%	M	V. Friable	
80-128	C2	M. Sand	10YR 5/2	-	-	-	25%	10%	SG	Loose	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Randolph

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 329-3 (Hole #) 3/29/21 (Date) ____ (Time) 45 - cloudy (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) ____ Vegetation ____ Surface Stones (e.g., cobbles, stones, boulders, etc.) ____ Slope (%) ____
   Description of Location: ____
2. Soil Parent Material: ____ Landform ____ Position on Landscape (SU, SH, BS, FS, TS) ____
3. Distances from: Open Water Body ____ feet; Drainage Way ____ feet; Wetlands ____ feet; Property Line ____ feet; Drinking Water Well ____ feet; Other ____ feet
4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If yes: ____ Depth Weeping from Pit ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-8	A / FILL	FSL	10YR 3/2	-	-	-	<5%	<5%	Cr	Friable	
8-132	C	LS	10YR 4/3	-	-	-	20%	30%	M	V. Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Randolph

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 329-4 (Hole #) 3/29/21 (Date) ____ (Time) 45 - cloudy (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use: (e.g., woodland, agricultural field, vacant lot, etc.) ____ Vegetation ____ Surface Stones (e.g., cobbles, stones, boulders, etc.) ____ Slope (%) ____
   Description of Location: ____
2. Soil Parent Material: ____ Landform ____ Position on Landscape (SU, SH, BS, FS, TS) ____
3. Distances from: Open Water Body ____ feet; Drainage Way ____ feet; Wetlands ____ feet; Property Line ____ feet; Drinking Water Well ____ feet; Other ____ feet
4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☒ Yes ☐ No If yes: 108" Depth Weeping from Pit 118" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-46	FILL	-	-	-	-	-	-	-	-	-	-
46-56	A	FSL	10YR 3/2	-	-	-	<5%	<5%	Cr	Friable	
56-64	B	SL	2.5Y 6/8	-	-	-	<5%	<5%	Sabk	Friable	
64-134	C	Sand	10YR 5/2	86"	10YR 6/8	40%	5%	5%	SG	Loose	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Randolph

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 329-5 (Hole #) 3/29/21 (Date) ____ (Time) 45-cloudy (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) ____ Vegetation ____ Surface Stones (e.g., cobbles, stones, boulders, etc.) ____ Slope (%) ____
   Description of Location: ____
2. Soil Parent Material: ____ Landform ____ Position on Landscape (SU, SH, BS, FS, TS) ____
3. Distances from: Open Water Body ____ feet; Drainage Way ____ feet; Wetlands ____ feet; Property Line ____ feet; Drinking Water Well ____ feet; Other ____ feet
4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☒ Yes ☐ No If yes: 76" Depth Weeping from Pit 90" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-56	FILL	-	-	-	-	-	-	-	-	-	-
56-60	A	FSL	10YR 2/1	-	-	-	<5%	<5%	Cr	Friable	
60-68	B	C. Sand	10YR 6/8	-	-	-	15%	10%	SG	Loose	
68-94	C	Sand	10YR 5/3	72"	10YR 6/8	40%	20%	10%	SG	Loose	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Randolph

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 329-1 (Hole #) 3/29/21 (Date) ____ (Time) 45 - cloudy (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) ____ Vegetation ____ Surface Stones (e.g., cobbles, stones, boulders, etc.) ____ Slope (%) ____
   Description of Location: ____
2. Soil Parent Material: ____ Landform ____ Position on Landscape (SU, SH, BS, FS, TS) ____
3. Distances from: Open Water Body ____ feet; Drainage Way ____ feet; Wetlands ____ feet; Property Line ____ feet; Drinking Water Well ____ feet; Other ____ feet
4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil ☒ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If yes: ____ Depth Weeping from Pit ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-96	FILL	-	-	-	-	-	-	-	-	-	-
96-122	C	LS	10YR 4/3	102"	10YR 6/8	40%	15%	15%	M	V. Friable	

Additional Notes:

09/26/2022

CHI Y MAN
CIVIL
NO. 45441
REGISTERED
PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9–26–2022

DETAILS 1
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-06-2022
LATEST REVISION: 9-26-2022
SCALE: AS SHOWN

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING

1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
C-6

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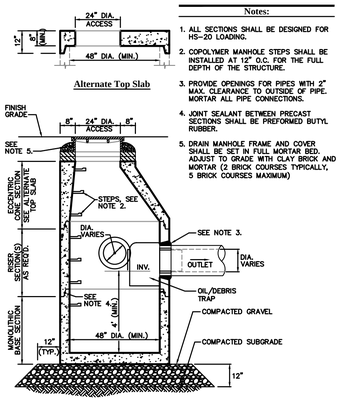
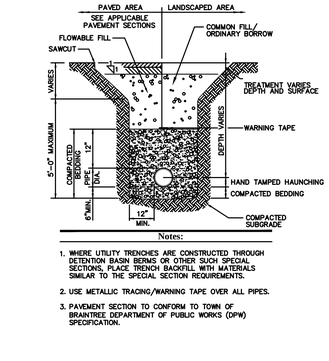


Notes:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
3. PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
5. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM)

Drain Manhole (DMH) with Oil Debris/Trap

N.T.S.

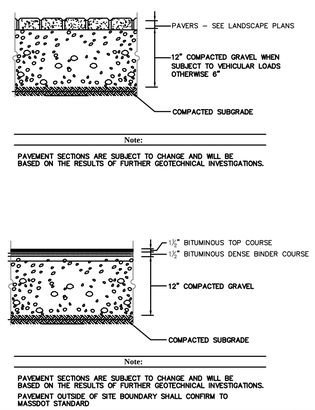


Notes:

1. WHERE UTILITY TRENCHES ARE CONSTRUCTED THROUGH DETENTION BASIN BERMS OR OTHER SUCH SPECIAL SECTIONS, PLACE TRENCH BACKFILL WITH MATERIALS SIMILAR TO THE SPECIAL SECTION REQUIREMENTS.
2. USE METALLIC TRACING/WARNING TAPE OVER ALL PIPES.
3. PAVEMENT SECTION TO CONFORM TO TOWN OF BRAINTREE DEPARTMENT OF PUBLIC WORKS (DPW) SPECIFICATION.

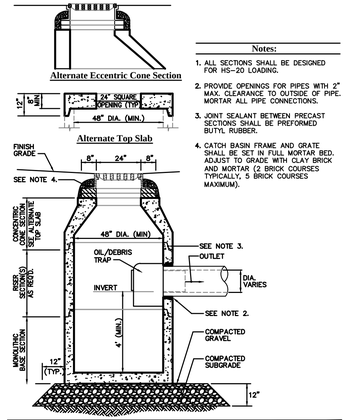
Utility Trench

N.T.S.



Bituminous Concrete Pavement Section

N.T.S.

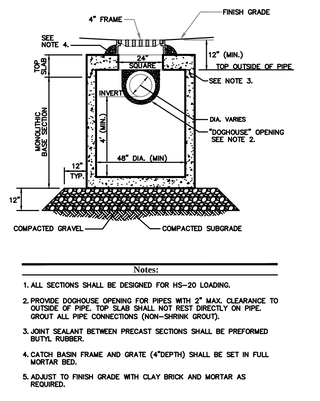


Notes:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM).

Catch Basin (CB) With Oil/Debris Trap

N.T.S.



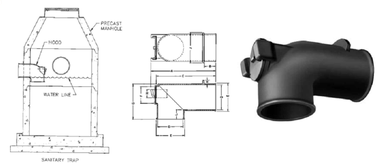
Notes:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE DOGHOUSE OPENING FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. TOP SLAB SHALL NOT REST DIRECTLY ON PIPE. GROUT ALL PIPE CONNECTIONS (NON-SHRINK GROUT).
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE (4"DEPTH) SHALL BE SET IN FULL MORTAR BED.
5. ADJUST TO FINISH GRADE WITH CLAY BRICK AND MORTAR AS REQUIRED.

Catch Basin (CB) Shallow Cover

N.T.S.

R-3705 Series
Catch Basin Trap



Cast or grouted in manhole wall. Pipe bell is not the structural support.
Specify whether gas sealed cleanout cover is required. Will be furnished plain if not requested.

Dimensions in inches

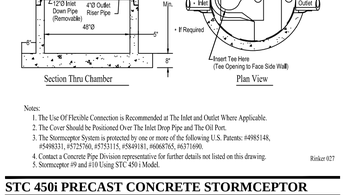
Catalog No.	A	B	C	D	E	F	G	H	J	K	L
R-3705-4	23 1/2	10	22	4	5 1/4	3	9	2	6	1 1/2	4 11/16
R-3705-6	25 3/4	9 1/4	24	6	7 1/2	4	11	2 1/2	8	1	4 13/16
R-3705-8	28	8 1/2	26	8	9 1/2	5	13	3	11	1 3/4	4 5/8
R-3705-10	28 1/2	5 1/2	26	10	11 1/2	6	16	3 1/2	13	2	–
R-3705-12	31 1/4	6	28 5/8	12	13 5/8	8	18	4	14	2	6
R-3705-15	34	6	31 1/2	15	16 5/8	8	21 1/4	4	16	2	5 5/8

Notes:

1. PRODUCT FROM NEENAH ENTERPRISES, INC , MODEL NUMBER R-3705

Catch Basin Trap

N.T.S.



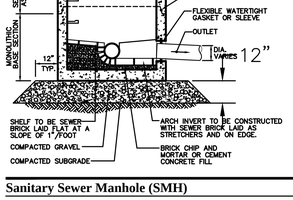
Notes:

1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable.
2. The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.
3. The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.
4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.
5. Stormceptor #9 and #10 Using STC 450 i Model.

Rinker 027

STC 450i PRECAST CONCRETE STORMCEPTOR

N.T.S.

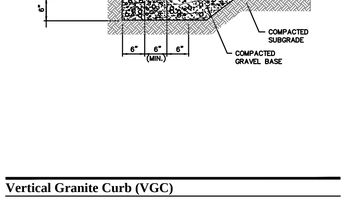


Notes:

1. STRUCTURES SHALL BE PRECAST CONCRETE, DESIGNED FOR HS-20 LOADING.
2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
3. EXTERIOR SURFACES SHALL BE GIVEN TWO COATS OF BITUMINOUS WATER-PROOFING MATERIAL.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
5. STANDARD SEWER MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH SEWER BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM)

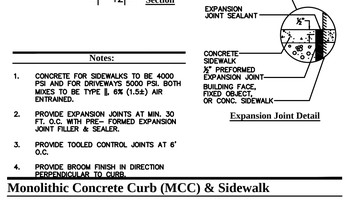
Sanitary Sewer Manhole (SMH)

N.T.S.



Vertical Granite Curb (VGC)

N.T.S.

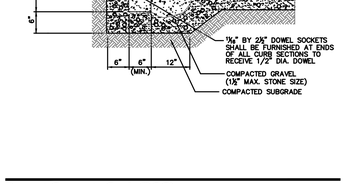


Notes:

1. CONCRETE FOR SIDEWALKS TO BE 4000 PSI AND FOR DRIVEWAYS 5000 PSI, BOTH MIXES TO BE TYPE I, 6% (1.5±) AIR ENTRAINED.
2. PROVIDE EXPANSION JOINTS AT MIN. 30 FT. O.C. WITH PRE- FORMED EXPANSION JOINT FILLER & SEALER.
3. PROVIDE TOOLED CONTROL JOINTS AT 6' O.C.
4. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.

Monolithic Concrete Curb (MCC) & Sidewalk

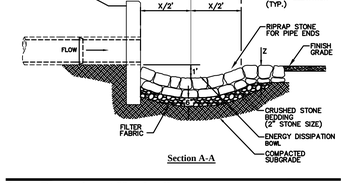
N.T.S.



Precast Concrete Curb (PCC)

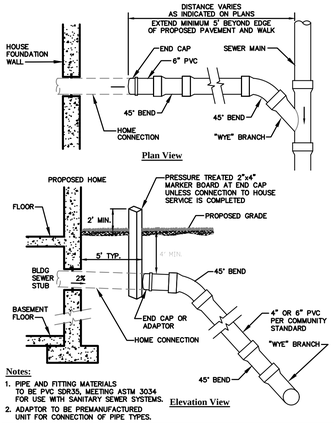
N.T.S.

HEADWALL NO.	X (FT)	Y (FT)	Z (FT)	STONE DIA. (Dia) (INCH)
RIPRAP 1	5	5	0.5	6
RIPRAP 2	5	5	0.5	6



Stone Protection at Headwall

N.T.S.

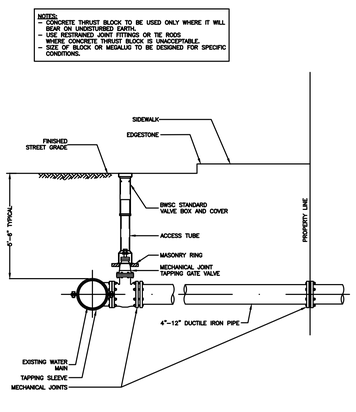


Notes:

1. PIPE AND FITTING MATERIALS TO BE PVC SDR35, MEETING ASTM 3034 FOR USE WITH SANITARY SEWER SYSTEMS.
2. ADAPTOR TO BE PREMANUFACTURED UNIT FOR CONNECTION OF PIPE TYPES.

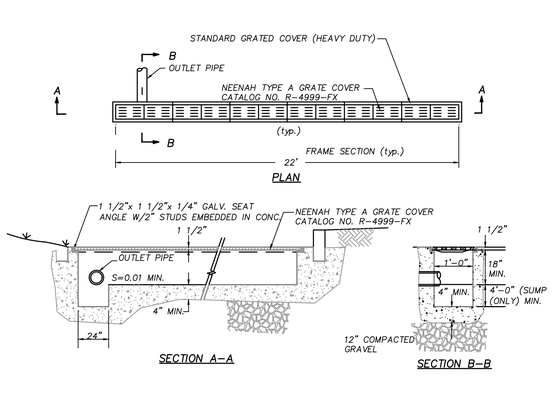
Typical Wye and Chimney Detail (Residential)

N.T.S.



Water Connection to Existing Main

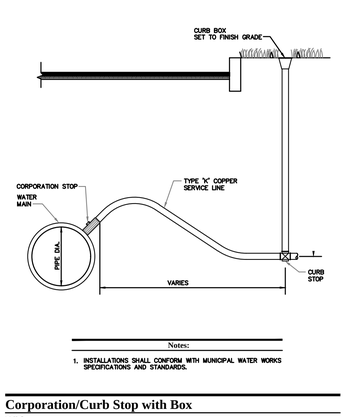
N.T.S.



TRENCH DRAIN DETAIL

(W/ Heavy Duty Frame and Grated Cover) MANUFACTURER: NEENAH FOUNDRY CO. OR APPROVED EQUAL

NOTE: PROVIDE BOTTOM OUTLET, LENGTH L = 21'-0"

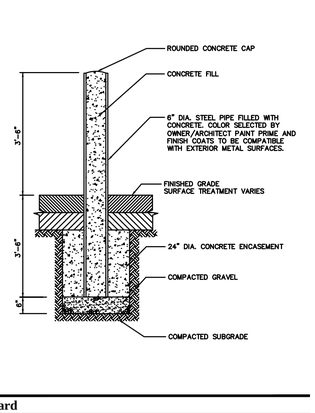


Notes:

1. INSTALLATIONS SHALL CONFORM WITH MUNICIPAL WATER WORKS SPECIFICATIONS AND STANDARDS.

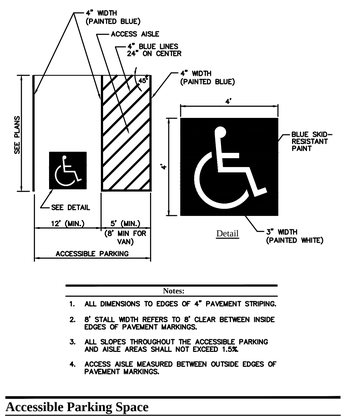
Corporation/Curb Stop with Box

N.T.S.



Bollard

N.T.S.



Notes:

1. ALL DIMENSIONS TO EDGES OF 4" PAVEMENT STRIPING.
2. 8' STALL WIDTH REFERS TO 8' CLEAR BETWEEN INSIDE EDGES OF PAVEMENT MARKINGS.
3. ALL SLOPES THROUGHOUT THE ACCESSIBLE PARKING AND AISLE AREAS SHALL NOT EXCEED 1.5%
4. ACCESS AISLE MEASURED BETWEEN OUTSIDE EDGES OF PAVEMENT MARKINGS.

Accessible Parking Space

N.T.S.

09/26/2022

COMMONWEALTH OF MASSACHUSETTS — CHI Y MAN — CIVIL — NO. 45441 — REGISTERED PROFESSIONAL ENGINEER

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9-26-2022

DETAILS 2
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM

DATE: 9-06-2022
LATEST REVISION: 9-26-2022

HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING

1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

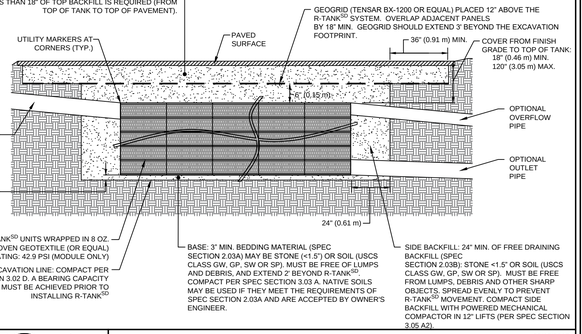
PREPARED FOR:
PERMITTING

SHEET
C-7

© 2008 Rinker Materials

TOTAL COVER: 18" MINIMUM AND 120" MAXIMUM. FIRST 12" MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12" COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 10'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 10' OR LESS THAN 18" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:
1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK^{SD} MODULE SHEET.
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. FOR INFILTRATION APPLICATIONS, GEOTEXTILE ENVELOPING R-TANK SHALL BE ACF M200 (PER SPEC SECTION 2.02A) AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK^{SD} FOOTPRINT.



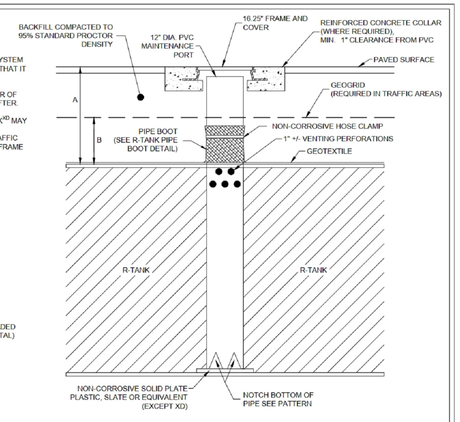
09/13/2017

ACF ENVIRONMENTAL — LET'S GET IT DONE

R-TANK^{SD} & HS-20 LOADS - SECTION VIEW

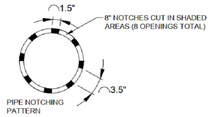
FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

NOTES
- THIS PORT IS USED TO PUMP WATER INTO THE SYSTEM AND RE-SUSPEND ACCUMULATED SEDIMENT SO THAT IT MAY BE PUMPED OUT.
- MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
- ONLY R-TANK^{SD}, R-TANK^{SD} 50, R-TANK^{HD}, AND R-TANK^{HD} MAY BE USED IN TRAFFIC APPLICATIONS.
- IF MAINTENANCE PORT IS LOCATED IN A NON-TRAFFIC AREA, A PLASTIC CAP CAN BE USED IN LEU OF A FRAME AND COVER WITH CONCRETE COLLAR.



DEPTH SUMMARY

TYPE	A	B
R-TANK^{SD}	12" MIN - 36" MAX	AS SHOWN ON PLANS
R-TANK^{HD}	20" MIN - 6.99' MAX	12"
R-TANK^{SD}	18" MIN - 9.99' MAX	12"
R-TANK^{HD}	12" MIN - 5.00' MAX	12"
R-TANK^{SD}	6" MIN - 16.67' MAX	N/A



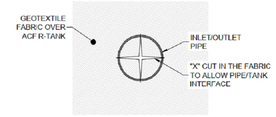
09/14/20

ACF ENVIRONMENTAL — LET'S GET IT DONE

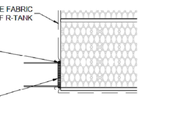
R-TANK MAINTENANCE PORT

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

CUT AN "X" IN THE FABRIC ENVELOPE THAT IS SLIGHTLY LARGER THAN THE PIPE. PULL THE FABRIC FLAPS AROUND THE PIPE, AND SEAL WITH A STAINLESS STEEL BAND.

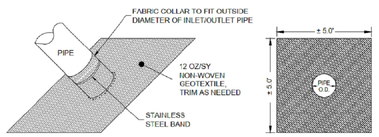


END VIEW OF PIPE/FABRIC CONNECTION



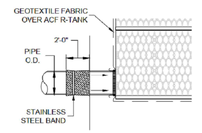
SIDE VIEW OF PIPE/FABRIC CONNECTION

AFTER TANK WRAP IS SECURED TO PIPE, SLIDE BOOT AGAINST R-TANK AND SECURE WITH SECOND STAINLESS STEEL BAND, THEN ATTACH BOOT FLAP TO TANK ENVELOPE FABRIC WITH DUCT TAPE OR OTHER ADHESIVE.



GEOTEXTILE BOOT

FRONT VIEW OF GEOTEXTILE BOOT



SIDE VIEW OF GEOTEXTILE BOOT

07/26/19

ACF ENVIRONMENTAL — LET'S GET IT DONE

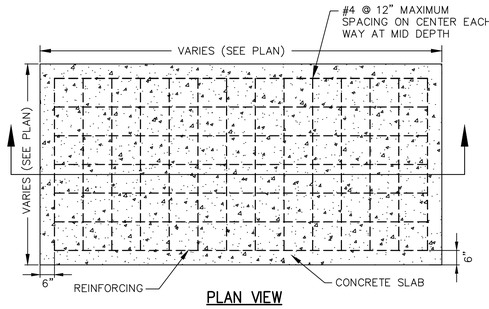
R-TANK TYPICAL INLET/OUTLET W/ GEOTEXTILE BOOT

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

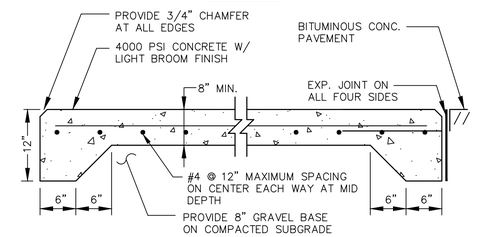
STORMWATER SYSTEM ELEVATIONS				
	SYSTEM #1	SYSTEM #2	SYSTEM #3	SYSTEM #4
MIN. GROUND ELEVATION	137.0	136.0	137.5	136.7
TOP OF STONE	135.0	134.7	136.0	135.3
TOP OF CHAMBER	134.5	134.2	135.5	134.8
BOTTOM OF CHAMBER	132.3	132.0	134.0	133.3
BOTTOM OF STONE	132.0	131.7	133.7	133.0
OVERFLOW OUTLET	134.2	133.7	134.9	134.0
EST. GWT	N/A	N/A	131.7	131.0

Outlet Control Structure Detail
N.T.S.

Outlet Control Structure Weir Detail
N.T.S.



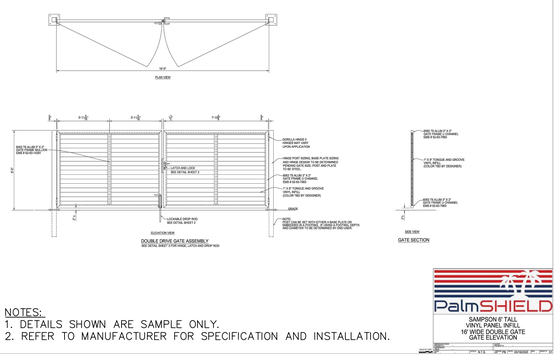
PLAN VIEW



SECTION

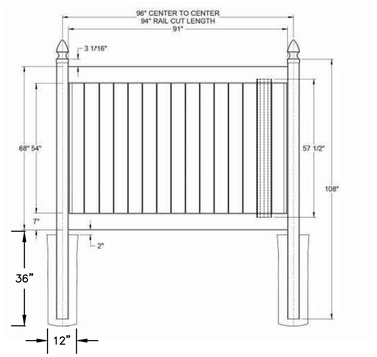
NOTES:
1. ALL REINFORCEMENT BARS SHALL BE EPOXY COATED.
2. SLAB SHALL HAVE A CONTROL JOINT AT THE MID-POINT OF THE WIDTH.

Cement Concrete Dumpster Pad
N.T.S.



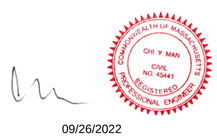
NOTES:
1. DETAILS SHOWN ARE SAMPLE ONLY.
2. REFER TO MANUFACTURER FOR SPECIFICATION AND INSTALLATION.

Dumpster Enslosure Detail
N.T.S.



NOTES:
1. DETAILS SHOWN ARE SAMPLE ONLY.
2. REFER TO MANUFACTURER FOR SPECIFICATION AND INSTALLATION.

6' High White Vinyl Privacy Fence
N.T.S.



09/26/2022

REVISIONS:		
NO.:	COMMENTS:	DATE:
1.	SITE PLAN REVIEW COMMENTS	9-26-2022

DETAILS 3
16 Fencourt Ave
RANDOLPH, MASSACHUSETTS

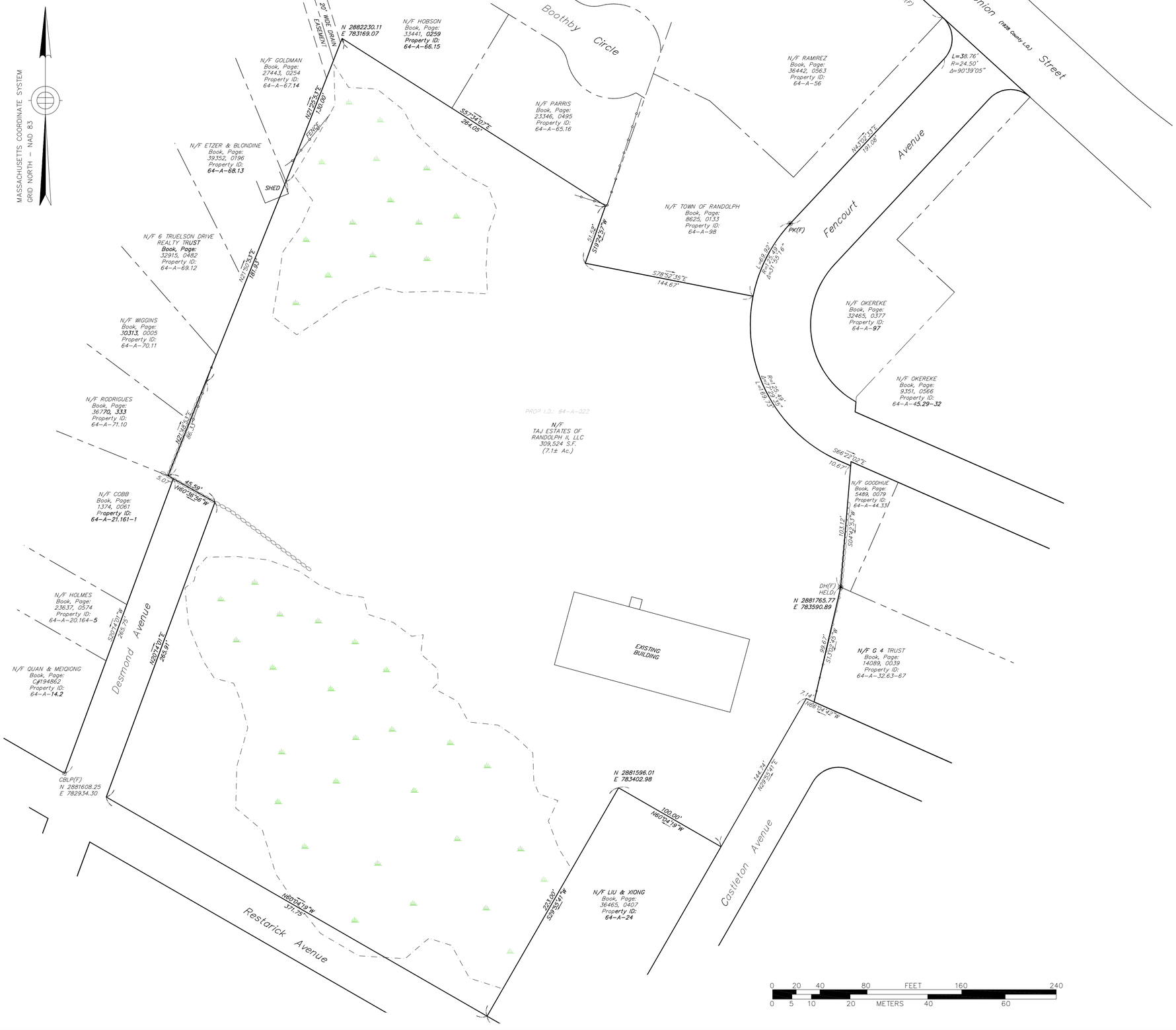
DRAWN BY: JKY
DESIGNED BY: CYM
CHECKED BY: CYM
DATE: 9-06-2022
LATEST REVISION: 9-26-2022

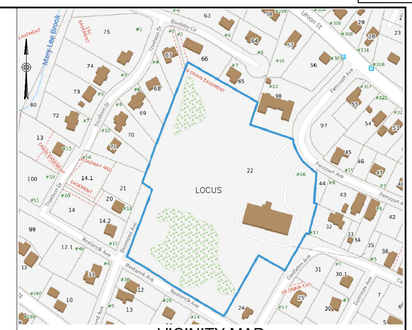
HARDY + MAN DESIGN GROUP, PC
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTING
1285 WASHINGTON STREET
WEYMOUTH, MA
(781) 335-1464

PREPARED FOR:
PERMITTING

SHEET
C-8

Drawings and Specifications as Instruments of Service





VICINITY MAP
N.T.S.

NOTES:

1. THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS–OF–WAY, RESTRICTIONS, RESERVATIONS, OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.
2. THIS SITE IS NOT WITHIN A SPECIAL HAZARD FLOOD ZONE AS DESIGNATED BY F.I.R.M. NUMBER 25021C0219E EFFECTIVE DATE JULY 17, 2012.

ASSESSOR'S REFERENCE: 64–A–022

OWNER: TAJ ESTATES OF RANDOLPH II, LLC

DEED REFERENCE: BOOK 39214, PAGE 555

LOT AREA: 7.1±Ac.

PLAN REFERENCES:
Plan # 362–1527
Plan # 56–26.71
Plan # 201–28
Plan # 28221–A
Plan # 37408–A
Plan # 40430–A
Plan # 40430–B
Plan # D1901–203
Plan # D3469–96
Plan # D4137–680
Plan # D4346–565
Plan # D4346–570
Plan # D4368–227
Plan # D4401–300–B
Plan # D4721–80
Plan # D5755–405
Plan # D6303–269
UNION STREET COUNTY LAYOUT DATED JUNE 19, 1928 – 3 SHEETS

COMMONWEALTH OF MASSACHUSETTS
GREGORY A. BUNAVICZ
No. 50300
PROFESSIONAL LAND SURVEYOR

Gregory A. Bunavicz
PROFESSIONAL LAND SURVEYOR

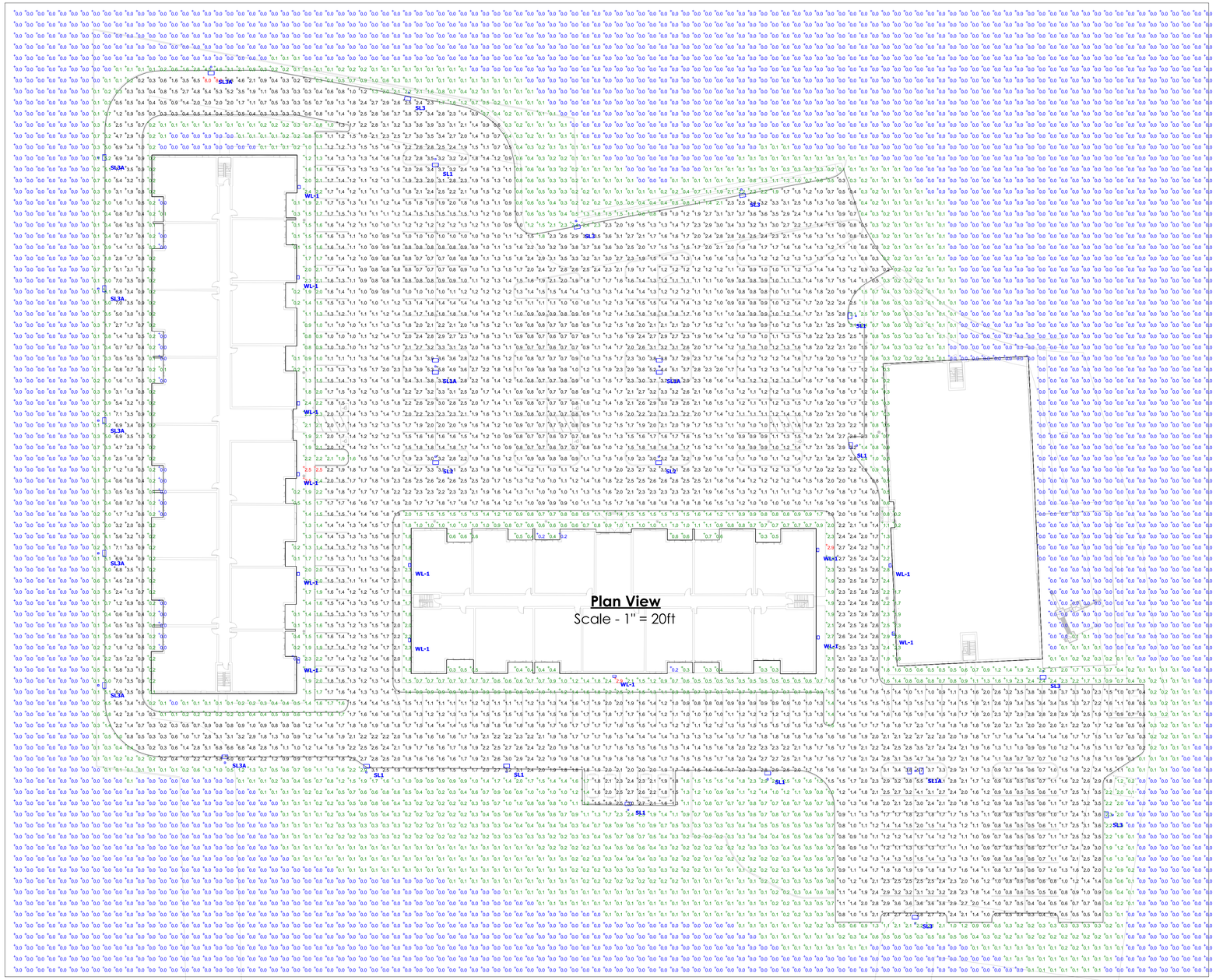
BORDERLAND ENGINEERING, INC.
61b Pleasant Street
Randolph, MA 02368
office 781-963-9500
fax 888-566-4131

PLAN OF LAND
IN
RANDOLPH, MASSACHUSETTS
16 FENCOURT AVENUE

PREPARED FOR: HARDY + MAN DESIGN GROUP, PC
1285 WASHINGTON STREET
WEYMOUTH, MA 02189

DRAWING SCALE: I INCH = 40 FEET

DATE: AUGUST 13, 2022 PROJECT NUMBER: P2225



Plan View
Scale - 1" = 20ft

SCHEDULE

Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Light Loss Factor	Wattage
	SL1	7	Lithonia Lighting	DSX0 LED P4 30K T4M MVOLT	DSX0 Area Light | Type 4 Distribution | Single Head Pole @ 90° Mounted @ 20'-0" AFG	0.9	92
	SL1A	3	Lithonia Lighting	DSX0 LED P4 30K T4M MVOLT	DSX0 Area Light | Type 4 Distribution | Double Head Pole @ 180° Mounted @ 20'-0" AFG	0.9	184
	SL2	2	Lithonia Lighting	DSX0 LED P4 30K T3M MVOLT	DSX0 Area Light | Type 3 Distribution | Single Head Pole @ 90° Mounted @ 20'-0" AFG	0.9	92
	SL3	6	Lithonia Lighting	DSX0 LED P4 30K BLC MVOLT	DSX0 Area Light | Back Light Control Distribution | Single Head Pole @ 90° Mounted @ 20'-0" AFG	0.9	92
	SL3A	7	Lithonia Lighting	DSX0 LED P2 30K BLC MVOLT	DSX0 Area Light | Back Light Control Distribution | Single Head Pole @ 90° Mounted @ 10'-0" AFG	0.9	49
	WL-1	13	Lithonia Lighting	WDGE2 LED P3 30K 80CRI T4M	Wedge 2 Wall pack | Type 4 Distribution | Mounted @ 12'-0" AFG	0.9	32.1375

NOTES:

-REFLECTANCES ASSUMED:
GROUND: 20

- MOUNTING HEIGHTS:
- AREA LIGHTS @ 20'-0" AFG
- TYPE SL3A @ 10'-0" AFG
- WALL PACKS @ 12'-0" AFG

- TASK HEIGHT: AFG
- CALCULATION POINT SPACING: 6'X6' OC

DISCLAIMER:

-THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION. VALUES REPRESENTED ARE AN APPROXIMATION GENERATED FROM MANUFACTURERS PHOTOMETRIC IN-HOUSE OR INDEPENDANT LAB TEST WITH DATA SUPPLIED BY LAMP MANUFACTURERS.

STATISTICS

DESCRIPTION	SYMBOL	AVG.	MAX	MIN.	MAX/MIN	AVG/MIN
Boundary	+	0.8 fc	8.0 fc	0.0 fc	N/A	N/A
Building Perimeter	+	0.8 fc	2.5 fc	0.0 fc	N/A	N/A
Building Perimeter	+	1.1 fc	2.9 fc	0.2 fc	14.5:1	5.5:1
Pavement	+	1.6 fc	8.0 fc	0.0 fc	N/A	N/A

16 Fencourt Ave.
Randolph, MA
08-24-2022

Designer
Benjamin P. Rowe
Date
08/22/2022
Scale
Not to Scale
Drawing No.
Job No.

1 SECOND LEVEL
1/64" = 1'-0"

PROJECT:
16 FENCOURT AVE. APARTMENTS
TAJ ESTATES
16 FENCOURT AVE.
RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA. 02035
P. 508-241-2122 F. 508-455-4466 WWW.DC-ARCHITECT.COM

STAMP:
DENNIS M. COLWELL REGISTERED ARCHITECT No. 50218 FOXBOROUGH MASSACHUSETTS COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE: AS NOTED

DRAWN BY: SW | CHECKED BY: DMC

DRAWING TITLE:
SECOND LEVEL

DRAWING NUMBER:
A1.1

1 THIRD LEVEL
1/64" = 1'-0"

PROJECT:
16 FENCOURT AVE. APARTMENTS
TAJ ESTATES
16 FENCOURT AVE.
RANDOLPH, MA. 02368

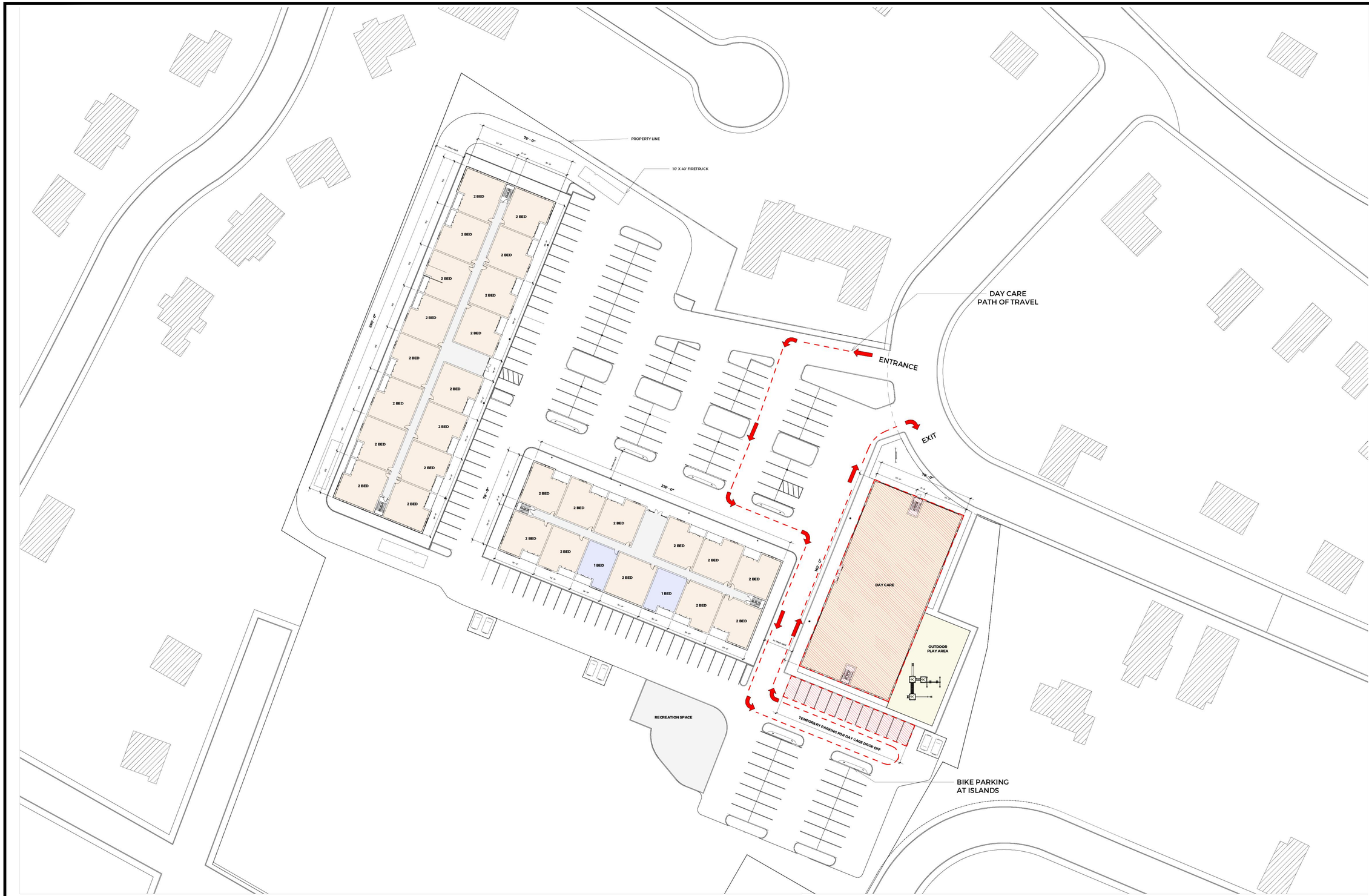
PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA. 02035
P. 508-241-2122 F. 508-455-4466 WWW.DC-ARCHITECT.COM

STAMP:
REGISTERED ARCHITECT
DENNIS M. COLWELL
No. 50216
FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE: AS NOTED
DRAWN BY: SW CHECKED BY: DMC
DRAWING TITLE: THIRD LEVEL
DRAWING NUMBER: A1.2



1 GROUND LEVEL Copy 1
1/32" = 1'-0"

PROJECT:
16 FENCOURT AVE. APARTMENTS
TAJ ESTATES
16 FENCOURT AVE.
RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA. 02035
P. 508-241-2122 F. 508-455-4466 WWW.DC-ARCHITECT.COM

STAMP:
REGISTERED ARCHITECT
DENNIS M. COLWELL
No. 50216
FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE:

DRAWN BY: SW CHECKED BY: DMC

DRAWING TITLE:
ENTRANCE

DRAWING NUMBER:
A1.3

PROJECT:

16 FENCOURT AVE. APARTMENTS

TAJ ESTATES

16 FENCOURT AVE.

RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA 02035
P. 508-241-2122 F. 508-455-4466 WWW.DC-ARCHITECT.COM

STAMP:

REGISTERED ARCHITECT
DENNIS A. COLWELL
No. 50218
FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE:

DRAWN BY: SW CHECKED BY: DMC

DRAWING TITLE:

ENTRANCE VIEW

DRAWING NUMBER:

A1.4

PROJECT:

16 FENCOURT AVE. APARTMENTS

TAJ ESTATES

16 FENCOURT AVE.

RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA 02035
P. 508-241-2122 F. 508-455-4466 WWW.DC-ARCHITECT.COM

STAMP:

REGISTERED ARCHITECT
DENNIS M. COLWELL
No. 50216
FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE:

DRAWN BY: SW | CHECKED BY: DMC

DRAWING TITLE:

ENTRANCE ARIEL VIEW

DRAWING NUMBER:

A1.5

PROJECT:

16 FENCOURT AVE. APARTMENTS

TAJ ESTATES

16 FENCOURT AVE.

RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA. 02035
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DENNIS M. COLWELL REGISTERED ARCHITECT No. 50218 FOXBOROUGH MASSACHUSETTS COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE:

DRAWN BY: SW CHECKED BY: DMC

DRAWING TITLE:

ARIEL VIEW

DRAWING NUMBER:

A1.6

PROJECT:

16 FENCOURT AVE. APARTMENTS

TAJ ESTATES

16 FENCOURT AVE.

RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA 02035
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DENNIS M. COLWELL JR.
No. 50218
FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE:

DRAWN BY: SW CHECKED BY: DMC

DRAWING TITLE:

AERIAL VIEW

DRAWING NUMBER:

A1.7

PROJECT:

16 FENCOURT AVE. APARTMENTS

TAJ ESTATES

16 FENCOURT AVE.

RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
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FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE:

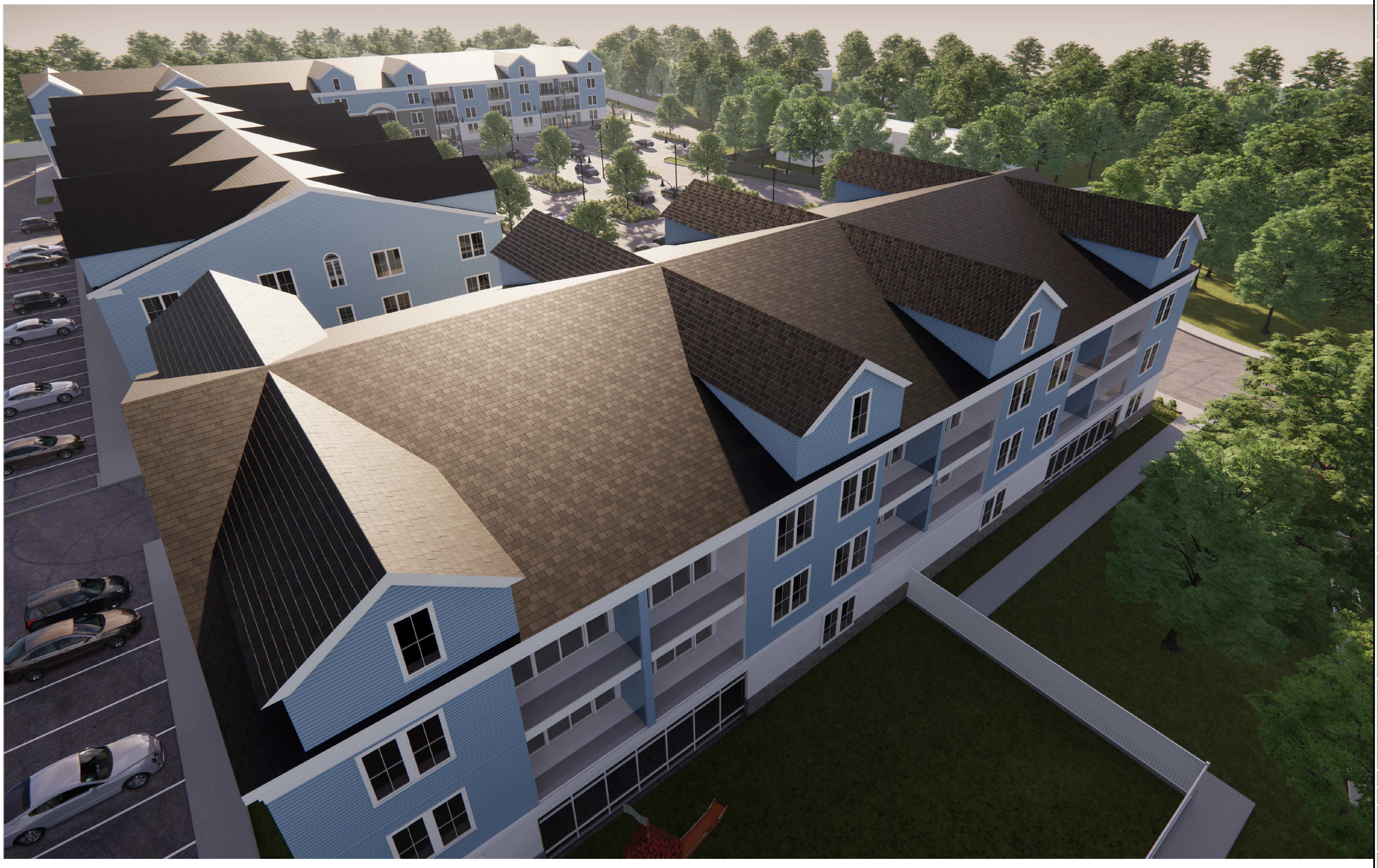
DRAWN BY: SW CHECKED BY: DMC

DRAWING TITLE:

GROUND LEVEL VIEW

DRAWING NUMBER:

A1.8



PROJECT:

16 FENCOURT AVE. APARTMENTS

TAJ ESTATES

16 FENCOURT AVE.

RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

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COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE: AS NOTED

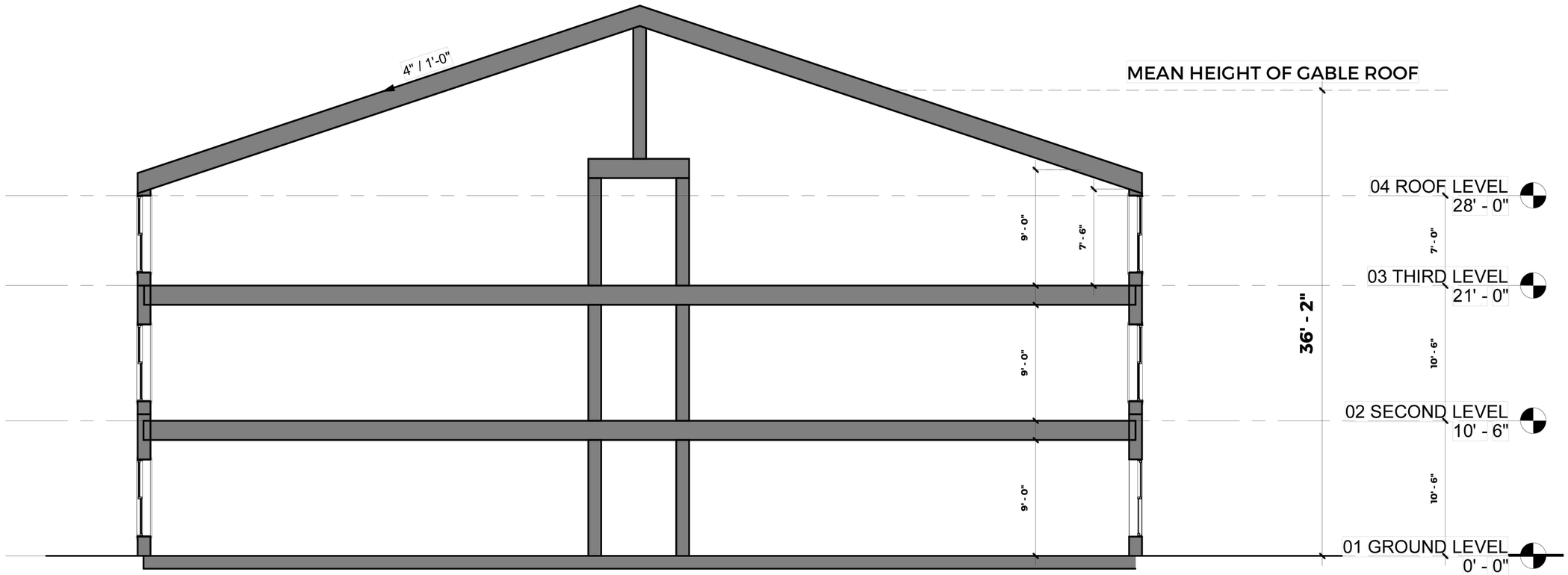
DRAWN BY: SW | CHECKED BY: DMC

DRAWING TITLE:

ARIEL VIEW

DRAWING NUMBER:

A1.9



1 SECTION
1/8" = 1'-0"

PROJECT:
16 FENCOURT AVE. APARTMENTS
TAJ ESTATES
16 FENCOURT AVE.
RANDOLPH, MA. 02368

PROJECT NUMBER: 21269

DENNIS COLWELL ARCHITECTS
132 CENTRAL STREET, SUITE 203, FOXBOROUGH, MA 02035
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STAMP:
REGISTERED ARCHITECT
DENNIS A. COLWELL
No. 50218
FOXBOROUGH
MASSACHUSETTS
COMMONWEALTH OF MASSACHUSETTS

ISSUE:	DATE:
PRELIMINARY	07.19.2022

DRAWING SCALE: AS NOTED

DRAWN BY: SW | CHECKED BY: DMC

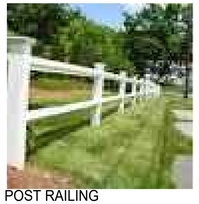
DRAWING TITLE:
BUILDING SECTION

DRAWING NUMBER:
A10

WHITE VINYL FENCE (OPTION 1)

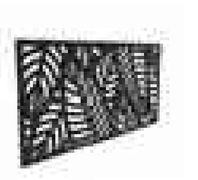
BENCH (OPTION 1)

GRILL STATION

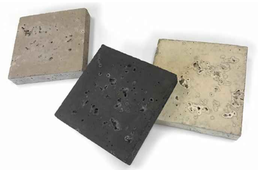


POST RAILING

BENCH OPTION (2)



FENCE (OPTION 2)



PERMEABLE PAVERS

ENTRY SIGN

PLANT LIST			
SYMBOL	QUANTITY	COMMON NAME BOTANICAL NAME	SIZE & SPECIFICATIONS
CANOPY TREE			
	CF 2	WHITE DOGWOOD CORNUS FLORIDA	6-12' HT
	TC 5	GREEN SPIRE LITTLELEAF LINDEN TILIA CORDATA 'GREENSPIRE'	5-6' HT
	SR 7	IVORY SILK JAPANESE TREE LILAC SYRINGA RETICULATA 'IVORY SILK'	6'-12' HT
	PR 3	BLUE SPRUCE PICEA RUNGENS 'COLORADO GREEN'	5-6' HT
	AR 12	RED MAPLE ACER RUBRUM	12' HT
	JV 57	EASTERN REDCEDAR JUNIPERUS VIRGINIANA	12' HT
SHRUBS			
	BH 47	NIKKO BLUE HYDRANGEA HYDRANGEA MACROPHYLLA 'NIKKO BLUE'	2 GAL
	RPE 35	P.J.M.ELITE RHODODENDRON RHODODENDRON 'P.J.M. ELITE'	2 GAL
	CA 21	RED TWIG DOGWOOD CORNUS ALBA 'SIBIRICA'	5 GAL
	MS 19	RED CLOUD® MAIDEN GRASS MISCANTHUS SINENSIS 'EMPMIS01'	2.5" POT
	HM 106	ALL GOLD JAPANESE FOREST GRASS HAKONECHLOA MACRA 'ALL GOLD'	1 GAL
	MG 28	SWEET GALE MYRICA GALE	2 GAL
	HV 311	EVERYDAYLILY® CREAM DAYLILY HEMEROCALLIS X 'VER00112' PP	1 GAL
	TM 18	TAUNTON'S YEW TAXUS X MEDIA 'TAUNTONII'	2 GAL
	HW 33	CORAL BELLS HEUCHERA 'WILD ROSE'	1 QUART
	IG 801	COMPACT INKBERRY ILEX GLABRA 'COMPACTA'	18" HT
GROUND COVER			
	16658 SF	MEADOW MIX RESTORATION 75% SLOPE MIX 25% WILD FLOWER MIX	HYDROSEED
	2234 SF	MULCH	HEMLOCK/PINE BARK

NOTE:
1.ALL LAWN AREAS WITHIN LAWN LIMIT LINES TO RECEIVE 6" OF TOPSOIL PRIOR TO SODDING OPERATIONS. ONCE TOPSOIL HAS BEEN PLACED, CONSTRUCTION ACTIVITY OF ANY KIND (EXCLUDING LANDSCAPING) SHALL NOT BE PERMITTED ON OR ACROSS ANY PLANTING AREA. CONTRACTOR SHALL FULLY EXCAVATE ANY PLANTING AREA THAT IS DISTURBED AND REPLACE WITH TOPSOIL. SCARIFY SOIL TO DEPTH OF 3 +/- INCHES PRIOR TO APPLICATION

2. HYDROSEEDING IS ACCEPTABLE. APPLY WITH APPROVED EQUIPMENT DESIGNED FOR PROFESSIONAL HYDROSEEDING APPLICATIONS AT RECOMMENDED RATES. SUPPLY A CATALOGUE CUT FOR SPECIES MIX

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

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TAJ ESTATES OF RANDOLPH

16 FENCOURT AVENUE
RANDOLPH
02368
MA

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NATIVEtec
ARCHITECTURE
CIVIL
ENVIRONMENTAL
LANDSCAPE ARCHITECTURE
LAND SURVEYING
31 Munroe Street
Lynn, Massachusetts 01901
TEL. 617.437.6461

CONSULTANT:

SEAL:

MASSACHUSETTS
ROBERT E. MARINI
No. 3109
REGISTERED LANDSCAPE ARCHITECT

This item has been electronically signed and sealed by _____ on the date adjacent to the seal using a SHA authentication code.

Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

REVISION: 1

NO:	DATE:	DESCRIPTION:

DRAWING TITLE:
PROPOSED LANDSCAPE PLAN

DRAWN BY: YLZ
CHECKED BY: REM
SCALE: 1"=30-0"
DATE: 09/27/2022
PROJECT NO.:

DRAWING NO.:
L-100

PROJECT LOCATION:
Date: 8/26/2022 - C:\Users\Bob\NativeTEC Dropbox\robert Marini\New England\16 Fencourt - Randolph\Landscape\2022.09.27_16 Fencourt Avenue_Landscape Plan.dwg

classifieds

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Adopt Me Pets
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Yorkshire Terrier Puppies AKC 2 Males Kitchen breed $2,600. AKC Registration Available. Call 508-746-3193

Assorted Stuff
all kinds of things...

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Amana Electric Stove good cond $125, Frigidaire dishwasher $75 & lap top computers $50 each. 781-964-6819

Wanted to Buy

WOW!
$$$ CASH $$$
FOR RECORD ALBUMS
33LP's & 45's wanted.
Call George 617-633-2682

CASH FOR TOOLS
Hand/Pwr, Carpenters, Machinists, Mechanics, Plumbers, Rollaways.
1-800-745-8665

LITTLE RICHIE'S ANTIQUES
Records, musical instr., cameras, toys, silver, gold, old signs, tools, furn, costume jewelry, coins, military, swords.
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COSTUME JEWELRY WANTED
Necklaces, Earrings, Bracelets & Rings.
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$$CASH PAID$$
617-888-5991

CONCERT T-SHIRTS WANTED
Pre-1999 Rock, Bands, Country, etc. HARLEY DAVIDSON T-SHIRTS.
$$CASH PAID$$
617-888-5991

Music & Celebrity Memorabilia Wanted:
Posters, Autographs, Props, etc. $$ CASH PAID$$
617-888-5991

Garage sales Market
neighborly deals...

Garage Sales

MOVING SALE
Duxbury Moving Sale
Oct 21-22 Fri/Sat, 10am-3pm
66 Hall's Brook Way. Furn., Glass, China, Nautical, Art, prints, household, tools, etc

PHOTOS say more than words, add a PHOTO to your ad!

Professional Service
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Clean Up and Removal

JUNK REMOVAL
617-233-6476
SCOTT

Landscaping

CLOVER LANDSCAPING
Fall clean-ups, lawn maint.
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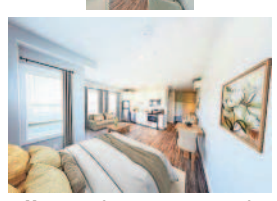
Real Estate Rentals

PUBLISHER'S NOTICE
All real estate advertised herein is subject to the Federal Fair Housing Act, which makes it illegal to advertise any preference, limitation, or discrimination because of race, color, religion, sex, handicap, familial status, or national origin, or intention to make any such preference, limitation, or discrimination. "We will not knowingly accept any advertising for real estate which is in violation of the law. All persons are hereby informed that all dwellings advertised are available on an equal opportunity basis.

EQUAL HOUSING OPPORTUNITY

Apartments



Hull Brand, new 1BR and studio apartments available waterfront on Nantasket Ave in Hull. White kitchens with quartz countertops, stainless steel appliances with tiled bathroom. Each with a balcony with views of the ocean or bay and some with both. Secure building with parking and laundry onsite. Large windows and sliders. Wake up to the sunrise over the ocean while enjoying the beach at your front door. Starting at $1,900. Contact us at 781-773-1501 or visit www.oceanbaynantasket.com

Your Source Public Notices
for the latest...

Public Notices

16 FENCOURT AVE
LEGAL NOTICE
NOTICE OF PUBLIC HEARING
16 FENCOURT AVE

The Randolph Town Council, in its capacity as the Special Permit Granting Authority pursuant to M.G.L. ch. 40A, section 9 and the Town Zoning Ordinance Section 200-14.3 will hold a public hearing on Monday, November 7, 2022 at 6:15 PM on the Special Permit Application of Applicant Taj Estates of Randolph II, LLC, for a proposed development to be located at 16 Fencourt Avenue in Randolph consisting of three (3) multi-level buildings, which will house a total of 107 single and two-bedroom apartment units, together with accessory commercial space. The Town Council will also conduct Site Plan and Design Review for the proposed development during this public hearing.

The Proposed Special Permit would concern the property that is identified on Assessors map 64, Block A, Parcel 22. The property is located in the Union Crossing Transit District.

The Public Hearing will be a virtual hearing that may be attended via the internet by Zoom or by phone. Details on how to attend the virtual hearing will be available on the town website calendar.

For more information, to review the application and/or to review the proposed location map, please send an email to NOliveras@randolph-MA.gov. Physical copies are also available at the Town Clerk's office.

AD# 7947479
PL 10/22 & 10/29/2022

20 HOLLY RD
LEGAL NOTICE

A Public Hearing will be held on Wednesday November 2, 2022 at 7:00 p.m. in the Heritage Meeting Room at Holbrook Town Hall first floor and also via ZOOM to hear the following petition(s) requesting a Variance and/or a Special Permit from the Holbrook Zoning By-Laws.

#22-08 Petitioner(s): Nancy Wilson of 20 Holly Rd., Holbrook, MA requests side and rear variances at said address to construct additional living space to her current home. The petitioner requests relief under Holbrook Zoning By-Laws Section 4.0 Dimensional Regulations. Assessor's Plan 40 Lot 337.

#22-09 Petitioner(s): Nancy Wilson of 20 Holly Rd, MA requests a Special Permit to construct additional living space in a Flood Plain at said address. The petitioner requests relief under Holbrook Zoning By-Laws Section 9.0, 9.1.2 (2). Assessor's Plan 40 Lot 337.

HOLBROOK ZONING BOARD OF APPEALS
Keith O'Brien, Chairman

HCAM is inviting you to a scheduled Zoom meeting.

Topic: ZBA: 11-2-22
Time: Nov 2, 2022 07:00 PM Eastern Time (US and Canada)

Join Zoom Meeting
https://us06web.zoom.us/j/84913172206?pwd=QTNjWUUxa0h4bW83RXk5dzY0eDJNQT09

Meeting ID: 849 1317 2206
Passcode: 920423
One tap mobile
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+13017158592,,84913172206#,,,,*920423# US (Washington DC)

AD# 7922878
PL 10/15 & 10/22/2022

67 Littlefield St
LEGAL NOTICE
QUINCY CONSERVATION COMMISSION

In accordance with the second paragraph of Massachusetts General Laws, Chapter 131, Section 40, and the Quincy Wetlands Protection Ordinance, you are hereby notified of the following:
The Quincy Conservation Commission will hold a public hearing: On Wednesday: November 2nd. 2022 At 7:30 p.m. in the Meeting Room, 1st floor, 1305 Hancock Street, Quincy, MA 02169 regarding a Request for Determination of Applicability filed under the Massachusetts Wetlands Protection Act, (G.L. C 131, Sec. 40) and the Quincy Wetlands Protection Ordinance and Regulations (Section 24-1).
Johny Kwan 67 Littlefield St.

The applicant proposes to
Plans and specifications and can be viewed online at https://quincyma.viewpointcloud.com/ . For further assistance, please contact the Conservation Commission at 617 376-1449. All interested persons are invited to the public hearing.

AD# 7947440
PL 10/22/2022

CHUCNIN FOUNDATION
LEGAL NOTICE

"The annual return of The Walter & Naomi Chucnin Foundation is available at the address below for inspection during normal business hours by any citizen who so requests within 180 days after publication of this notice by Helaine Hartman. Contact Roy S. Schreiber, CPA, 9 Washington Place, Sharon, MA 02067. 781/784-2929"

AD# 7948858
PL 10/22/2022

GOOD EATS KITCHEN
LEGAL NOTICE
Notice

The Massachusetts State Lottery Commission (MSLC) has received a KENO License application from:

Good Eats Kitchen and Bar
1229 Washington St
Weymouth, MA

Estimated weekly traffic: (number of people):500
Current No. of Cashier positions selling Lottery products: 0
Percentage of floor space currently devoted to Lottery sales: 0%
Percentage of floor space for KENO sales: 5%
Estimated annual gross revenues of current Lottery products: $0
Estimated percentage of gross revenues from sales of Lottery products: 7%
Estimated net income to be derived by sales of KENO products at this location: $6,000

Written objection to the application, by the Local Licensing Authority, must be received by Gregory Polin, General Counsel, Legal Department, Massachusetts State Lottery, 150 Mount Vernon St., Dorchester, MA 02125 – 3573.

AD# 7948940
PL 10/22/2022

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Sale of Real Estate Under M.G.L.c 183: A6
HALIFAX
2 Bedroom Condo
9 Lydon Lane, #C2, Halifax, MA
Tuesday, October 25, 2022 @ 1PM
974+/- sf condo in Halifax Condominium believed to have 4 rooms, 2 bedrooms & 1.5 baths. **Terms of Sale: A deposit of $5,000** by cash, certified or bank check required at the time & place of sale & balance due within 30 days. All other terms announced at sale. **Neither Auctioneer nor Attorney make any representations or warranties as to the accuracy of the information contained herein.** Pamela M. Jonah, Esq., Marcus, Errico, Emmer & Brooks, P.C., Braintree, MA. ***Attendees are expected to follow current state and CDC COVID-19 guidelines.***

Sale of Real Estate Under M.G.L.c 183: A6
DUXBURY
2 Bedroom Condo
53 Bay Farm Rd., Unit 53-4, Duxbury, MA
Thursday, October 27, 2022 @ 10AM
1,695 +/- sf 2-story condo in Bay Farm Townhouse Condominium believed to have 5 rooms, 2 bedrooms & 3.5 bathroom w/fireplace. **Terms of Sale: A deposit of $10,000** by certified or bank check required at the time & place of sale & balance due within 30 days. All other terms announced at sale. **Neither Auctioneer nor Mortgagee nor Attorney make any representations or warranties as to the accuracy of the information contained herein.** Erik Shaughnessy, Esq., Mirrione, Shaughnessy, Uitti, LLC, Quincy, MA. ***Attendees are expected to follow current state and CDC COVID-19 guidelines***
NW-32738432

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BUY IT
FIND IT

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Assorted Stuff
all kinds of things...

General Merchandise

SEBO AIR BELT K3 Vacuum cleaner w/all attachments. Purchased in April 2022 Org price $829. Asking price $550. Used 6 times in excellent condition. Selling due to personal mobility issues Call 781-630-3205.

Wanted to Buy

WOW!
$$$ CASH $$$
FOR RECORD ALBUMS
33LP's & 45's wanted.
Call George 617-633-2682

CASH FOR TOOLS
Hand/Pwr, Carpenters, Machinists, Mechanics, Plumbers, Rollaways.
1-800-745-8665

LITTLE RICHIE'S ANTIQUES
Records, musical instr., cameras, toys, silver, gold, old signs, tools, furn, costume jewelry, coins, military, swords.
★ CASH PAID ★
50 Hancock St.
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781-380-8165
littlerichiesantiques.com

WANTED

COSTUME JEWELRY WANTED
Necklaces, Earrings, Bracelets & Rings.
Also Buying Gold & Silver.
$$CASH PAID$$
617-888-5991

CONCERT T-SHIRTS WANTED
Pre-1999 Rock, Bands, Country, etc. HARLEY DAVIDSON T-SHIRTS.
$$CASH PAID$$
617-888-5991

Music & Celebrity Memorabilia Wanted:
Posters, Autographs, Props, etc. $$ CASH PAID$$
617-888-5991

Garage sales Market
neighborly deals...

Garage Sales

Circle Me!
Braintree, East Middle School 305 River St., Sat Oct 29th, 9a-1p, GIANT yard sale, Theater Guild Fund Raiser

WEYMOUTH RUMMAGE SALE: First Church in Weymouth, 17 Church St. Friday, 10/28, 7pm - 9pm & Saturday, 10/29, 9am-11am White Elephant table, Coffee/Donuts sale.

Professional Service
all your needs...

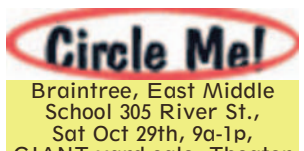
Clean Up and Removal

JUNK REMOVAL
617-233-6476
SCOTT

Landscaping

CLOVER LANDSCAPING
Fall clean-ups, lawn maint.
Weymouth & surr. areas.
Free Est/ Insured.
781-706-0060

Homes



Triple M

CANNABIS JOB OPPORTUNITIES

Triple M, a vertically-integrated cannabis company with Medical and Adult Use dispensaries is seeking dedicated, dynamic individuals to join our Plymouth & Mashpee teams.

NOW HIRING:
Cannabis Trimmers
Retail Dispensary Agents
(Full-time opportunities)

Triple M is committed to social equity and building a pathway for individuals to enter the cannabis industry, regardless of their experience. Triple M is specifically seeking to hire women, persons of color, veterans, persons with disabilities, members of the LGBTQ+ community, and any person residing in our neighboring communities of disproportionate impact of Wareham, Abington, Braintree, Brockton and Taunton.

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PLYMOUTH
9 Collins Ave
Plymouth, MA
508-747-1970

MASHPEE
29 Echo Rd
Mashpee, MA
508-477-0001

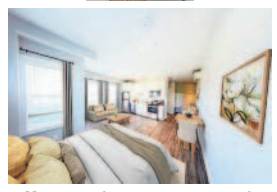
To apply, please send your resume & cover letter to
careers@triplem-llc.com.

TRIPLEMDISPENSARY.COM

Real Estate Rentals

PUBLISHER'S NOTICE
All real estate advertised herein is subject to the Federal Fair Housing Act, which makes it illegal to advertise any preference, limitation, or discrimination because of race, color, religion, sex, handicap, familial status, or national origin, or intention to make any such preference, limitation, or discrimination. "We will not knowingly accept any advertising for real estate which is in violation of the law. All persons are hereby informed that all dwellings advertised are available on an equal opportunity basis.

Apartments



Hull Brand, new 1BR and studio apartments available waterfront on Nantasket Ave in Hull. White kitchens with quartz countertops, stainless steel appliances with tiled bathroom. Each with a balcony with views of the ocean or bay and some with both. Secure building with parking and laundry onsite. Large windows and sliders. Wake up to the sunrise over the ocean while enjoying the beach at your front door. Starting at $1,900. Contact us at 781-773-1501 or visit www.oceanbaynantasket.com

Your Source Public Notices
for the latest...

Public Notices

16 FENCOURT AVE
LEGAL NOTICE
NOTICE OF PUBLIC HEARING
16 FENCOURT AVE

The Randolph Town Council, in its capacity as the Special Permit Granting Authority pursuant to M.G.L. ch. 40A, section 9 and the Town Zoning Ordinance Section 200-14.3 will hold a public hearing on Monday, November 7, 2022 at 6:15 PM on the Special Permit Application of Applicant Taj Estates of Randolph II, LLC, for a proposed development to be located at 16 Fencourt Avenue in Randolph consisting of three (3) multi-level buildings, which will house a total of 107 single and two-bedroom apartment units, together with accessory commercial space. The Town Council will also conduct Site Plan and Design Review for the proposed development during this public hearing.

The Proposed Special Permit would concern the property that is identified on Assessors map 64, Block A, Parcel 22. The property is located in the Union Crossing Transit District.

The Public Hearing will be a virtual hearing that may be attended via the internet by Zoom or by phone. Details on how to attend the virtual hearing will be available on the town website calendar.

For more information, to review the application and/or to review the proposed location map, please send an email to NOliveras@randolph-MA.gov. Physical copies are also available at the Town Clerk's office.

AD# 7947479
PL 10/22 & 10/29/2022

391 NORTH MAIN ST
TOWN OF RANDOLPH
LEGAL NOTICE

The Randolph Licensing Board will hold a public hearing on Wednesday, November 9, 2022, at 4:10 p.m. in Chapin Hall, 2nd floor, Town Hall, 41 South Main Street, Randolph, MA, 02368, on the application of Rockland Auto Brokers to amend the Class 2 license at 391 North Main Street.

This meeting will also be a virtual hearing that may be attended via the internet by Zoom or by telephone conference. Details on how to attend the virtual hearing will be available on the town's website.
RANDOLPH LICENSING BOARD
Ronald Lum, Chairman
AD#7975828
PL 10/29/2022

430 NORTH ST
TOWN OF RANDOLPH
LEGAL NOTICE

The Randolph Licensing Board will hold a public hearing on Wednesday, November 9, 2022, at 4:25 p.m. in Chapin Hall, 2nd floor, Town Hall, 41 South Main Street, Randolph, MA, 02368, on the application of Randolph Sunoco Inc. to obtain a Class 2 license at 430 North Street.

This meeting will also be a virtual hearing that may be attended via the internet by Zoom or by telephone conference. Details on how to attend the virtual hearing will be available on the town's website.
RANDOLPH LICENSING BOARD
Ronald Lum, Chairman
AD#7975918
PL 10/29/2022

667 NORTH ST
LEGAL NOTICE

The Randolph Licensing Board will hold a public hearing on Wednesday, November 9, 2022, at 4:45 p.m. in Chapin Hall, 2nd floor, Town Hall, 41 South Main Street, Randolph, MA, 02368, on the application of Noraiz Inc. dba 7-Eleven 37482 for a request for a Beer & Wine License at 667 North Street.

This meeting will also be a virtual hearing that may be attended via the internet by Zoom or by telephone conference. Details on how to attend the virtual hearing will be available on the town's website.
RANDOLPH LICENSING BOARD
Ronald Lum, Chairman
AD#7975966
PL 10/29/2022

PHOTOS say more than words, add a PHOTO to your ad!

Public Notices

RFQ GENERAL CONTRACTORS
LEGAL NOTICE
REQUEST FOR QUALIFICATIONS
AND STATEMENT OF QUALIFICATIONS
"General Contractor and Subcontractors Prequalification"
for the Stoughton Fire Station No. 1 Project

The Town of Stoughton is hereby soliciting responses to the "Request for Qualifications and Statement of Qualifications" in conjunction with the prequalification of General Contractors and Filed Subcontractors for the construction of the Stoughton Fire Station No 1 Project. The prequalification process is being conducted in accordance with 810 CMR §§9.00 and 10.00 and pursuant to M.G.L. c. 149, §§44A through 44J and invites qualified contractors to submit responses to the RFQ.

The guidelines may be obtained on or after November 2, 2022 by contacting the Owner's Project Manager, Pomroy Associates LLC, PO Box 445, East Bridgewater MA 02333, c/o Richard Pomroy via e-mail at rpomroy@PomroyAssociates.com.

An original, one (1) copy and one (1) electronic version of the responses to the "Request for Qualifications and Statement of Qualifications" must be submitted with all information as required in the "Request for Qualifications and Statement of Qualifications".

Responses must be submitted in a sealed envelope and must be labeled on the outside as: "General Contractor and Subcontractor Prequalification for the Stoughton Fire Station No 1 Project", and delivered to:

Town of Stoughton
c/o the Procurement Officer
3rd Floor
10 Pearl Street
Stoughton, MA 02072

Complete proposal packages must be received at the above address by:

Date: November 22, 2022
Time: 2:00 pm Eastern Standard Time

All proposals received after the stated opening date and time will be judged to be unacceptable and will be returned unopened to the sender. No facsimile or e-mail delivery of proposals is permitted.

AD# 7972764
PL 10/29/2022

Homes

111 Macdonald Way, Heating Renovations
LEGAL NOTICE
ADVERTISEMENT

THIS PROJECT IS BEING ELECTRONICALLY BID AND HARD COPY BIDS WILL NOT BE ACCEPTED. Please review the instructions in the bid documents on how to register as an electronic bidder. The bids are to be prepared and submitted at www.biddocsonline.com. Tutorials and instructions on how to complete the electronic bid documents are available online (click on the "Tutorial" tab at the bottom footer).

The PEMBROKE HOUSING AUTHORITY, the Awarding Authority, invites sealed bids from General Contractors for the HEATING RENOVATIONS – PHASE IV AT MACDONALD WAY (MA-111) in PEMBROKE, Massachusetts, in accordance with the documents prepared by BLW ENGINEERS, INC. dated October 21, 2022.

The Project consists of: REPLACE EXISTING GAS FIRED HYDRONIC BOILERS AND EXISTING CIRCULATOR PUMPS AT A HOUSING DEVELOPMENT
The work is estimated to cost $56,000.

General Bids will be received until November 17, 2022 at 11:00 AM and publicly opened, forthwith online.

SUBTRADES
NONE
All Bids should be submitted electronically online at www.biddocsonline.com and received no later than the date and time specified above.
General bids shall be accompanied by a bid deposit that is not less than five (5%) of the greatest possible bid amount, and made payable to the PEMBROKE HOUSING AUTHORITY. The Payment Bond is for only 50% of the contract price. All Bids must include a completed Representations, Certifications and Other Statements (HUD-5369A), Previous Participation Certification (HUD-2530), and a Non-Collusive Affidavit.

Bid Forms and Contract Documents will be available for pick-up at www.biddocsonline.com (may be viewed electronically and hardcopy requested) or at Nashoba Blue, Inc. at 433 Main Street, Hudson, MA 01749 (978-568-1167).

There is a plan deposit of $50.00 per set (maximum of 2 sets) payable to BidDocs Online Inc.

Deposits may be electronically paid or must be a check. This deposit will be refunded for up to two sets for general bidders and for one set for sub-bidders upon return of the sets in good condition within thirty days of receipt of general bids. Otherwise, the deposit shall be the property of the Awarding Authority.

Additional sets may be purchased for SAME AS PLAN DEPOSIT.

Bidders requesting Contract Documents to be mailed to them shall include a separate check for $40.00 per set for UPS Ground (or $65.00 per set for UPS overnight), payable to BidDocs ONLINE, Inc., to cover mail handling costs.

The Pre-Bid Conference and site visit will be on November 9, 2022 at 11:00 AM at PEMBROKE HOUSING AUTHORITY, MACDONALD WAY DEVELOPMENT AT 111 MACDONALD WAY, COMMUNITY BUILDING, PEMBROKE, MA 02359. Respondents will be required to wear masks and gloves while in the building and shall practice social distancing protocols.

The Contract Documents may be seen, but not removed at:
Nashoba Blue Inc.
433 Main Street
Hudson, MA 01749
978-568-1167

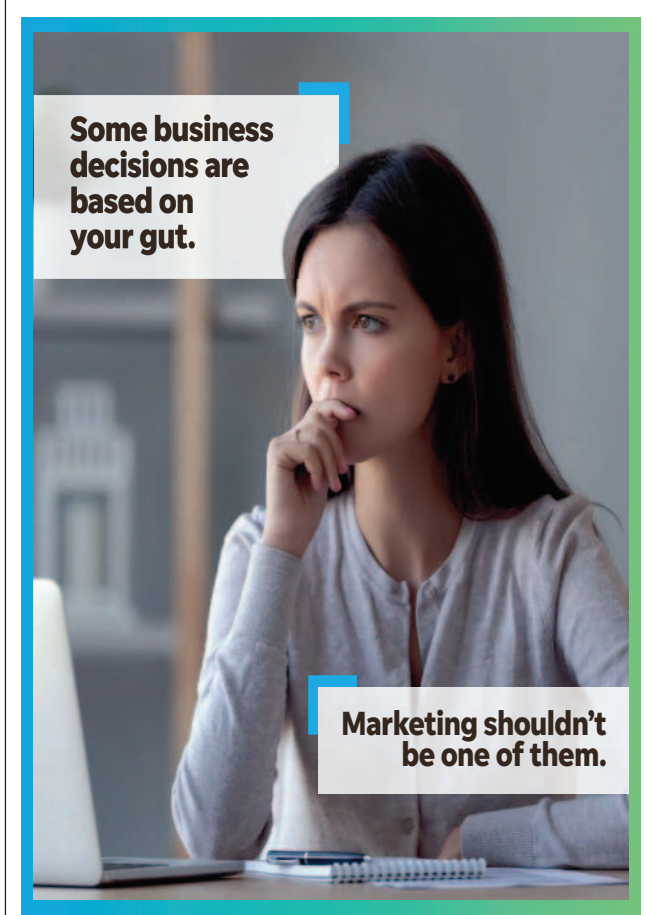
Bids are subject to M.G.L. c.149 §44A-J & to minimum wage rates as required by M.G.L. c.149 §§26 to 27H inclusive, housing and Urban Development Act of 1968, Equal Opportunity provisions of Executive Order 11246, Non-Discrimination provision of Title VI of the Civil Rights Act of 1964, Labor Standards of the Davis-Bacon Act and related acts and Contract work Hours Standard Act, and prevailing wage determinations as issued by the U.S. Secretary of Labor. The work performed under this contract is funded in part through the Housing and Community Development Act of 1974 and is subject to all provisions and regulations issued pursuant to this act. This project is covered by Section 3 of the HUD Act of 1968.

All Bids for the project are subject to the provision of the Massachusetts General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L inclusive as amended.

RIGHT OF THE AWARDING AUTHORITY TO REJECT BIDS
The right is reserved by the Pembroke Housing Authority to reject any or all Bids, if it be in their interest to do so.

MINIMUM WAGE RATES
Bids are subject to M.G.L. c.149 §44A-J and to minimum wage rates as required by M.G.L. c.149 §26 to 27H inclusive and to the Federal Davis-Bacon wage rates and Related Acts.

AD# 7977052
PL 10/29/2022



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Driveways, Walkways, Residential/Commercial
Contact us at: 508-840-0445 • Awnconstruction@gmail.com

LAW OFFICE

KEVIN M. REILLY

19 South Main Street
Randolph, Massachusetts 02368
Tel. (781) 961-7313
Fax. (781) 961-7343
kreilly@reillyberch.com

November 3, 2022

Town Council
Town of Randolph
Town Hall
41 South Main Street
Randolph, MA 02368

Att: William Alexopoulos, President

Re: 16 Fencourt Avenue, Randolph, MA
Application for Special Permit

Dear Mr. Alexopoulos and Members:

As I have previously advised the Council Clerk, I will be unavailable to attend the Public Hearing regarding the above-referenced matter which has been scheduled for Monday, November 7, 2022. That being the case, I am respectfully requesting that following its opening, the Hearing be continued until December 5, 2022 or to such later Meeting as the Council may elect.

Thank you for your kind consideration in this matter.

Very truly yours,

Kevin M. Reilly

KMR:rk

Natalie Oliveras <noliveras@randolph-ma.gov>

Proposed development located at 16 Fencourt Avenue

1 message

Cheryl Askeland <c.askeland@verizon.net> Mon, Nov 7, 2022 at 8:40 PM
Reply-To: Cheryl Askeland <c.askeland@verizon.net>
To: "NOliveras@Randolph-MA.gov" <NOliveras@randolph-ma.gov>

To Randolph Town Council or whom it may concern,

With regards to the property located at 16 Fencourt Avenue in Randolph, special permit location, which is being proposed for development consisting of 3 multi-level buildings of apartments, together with accessory commercial space. I have major concerns regarding said development. My property is one of many which is located within feet of that location.

#1). I would like to say that I do not agree with the developer being able to come close to or even into the wet land zone area. Wet lands are protected for a good reason, on a daily basis it is not unusual to see deer, wild turkeys and other wild life in that area, which backs up to my back yard. I believe that area should not be disturbed as it would force the wild life out of there and possibly into more public areas which could be dangerous for the wild life as well as residents.

#2). I am also concerned that any development into the wet lands would cause possible damage to residents properties because the water table is obviously not deep there and we have had issues in the past with water coming into our basements, and our backyards being flooded in the rainy season. It does not happen a lot, but it has and does happen from time to time. I worry that this may happen more, or even worse than in the past if the developer is allowed to touch the wet lands in any way.

#3). I am also concerned with security and privacy issues because of this project. I have lived here since 1996 and we have not had any problems in our neighborhood which has been a quiet one. I worry about people cutting through our backyards/properties. The proposed buildings are going to be multi-level and this also creates a privacy issue for those of us who are so close to this proposed development and I would like to know how that will be handled. I know that I and some of my neighbors are not happy with the idea of anyone in those tall buildings being able to have a clear view into our properties/houses.

#4). Another concern is how this development is going to affect our property values. How would a high rise housing project affect the property values here?

I would ask that the town not allow the developer to encroach upon the wet lands that are between mine and my neighbors properties and the development being proposed. I also would ask that the developer be required to put up a tall privacy fence between their buildings and the wet land, and at least 10 feet out from the wet land zone area.

I don't know if the town council is aware of this, but there are red ribbons that have been put up on the trees within the wet land zone that are almost to our property lines! I would like to know who is going to be responsible for property damages due to this development if or when there are any?

I unfortunately missed the first part of the town meeting and do not know if or what was said with regards to this property development. Is it possible to find out what was said and decisions were made if any with regards to this issue?

Thank you,
Cheryl Askeland
6 Truelson Drive
Randolph, MA

LAW OFFICE

KEVIN M. REILLY

19 South Main Street
Randolph, Massachusetts 02368
Tel. (781) 961-7313
Fax. (781) 961-7343
kreilly@reillyberch.com

December 5, 2022

Town Council
Town of Randolph
Town Hall
41 South Main Street
Randolph, MA 02368

Att: William Alexopoulos, President

Re: 16 Fencourt Avenue, Randolph, MA
Application for Special Permit

Dear Mr. Alexopoulos and Members:

As I am sure you are aware, the Applicant has had an initial meeting with the Plan Review Authority ("PRA") appointed by the Town Council to review the proposed development on Fencourt Avenue. We anticipate that several additional meetings with the PRA will be required to complete their process. That being the case, I am respectfully requesting that the Public Hearing on this matter before the Town Council, currently continued until this evening, be further continued until your latest Agenda in January, 2023 or to such later Meeting as the Council may elect.

Thank you for your kind consideration in this matter.

Very truly yours,

Kevin M. Reilly

KMR:rk

Council Order: 2022-050 **Introduced by: Town Manager Brian Howard**
November 7, 2022

Amendment of Section 147-9(D) of the
General Ordinances of the Town of Randolph
Concerning Violations, Penalties and Fines
Relating to Trash and Refuse Disposal

To see if the Randolph Town Council will vote to amend Section 147-9(D) of the general ordinances of the Town of Randolph concerning violations, penalties and fines relating to trash and refuse disposal, as follows:

Delete the following language from Section 147-9(D):

(1) Section 147-9A: two hundred ($200.00) dollars.
(2) Section 147-9B: two hundred ($200.00) dollars.
(3) Section 147-9C: two hundred ($200.00) dollars.

And replace the deleted language with the following:

(1) Section 147-9A: three hundred ($300.00) dollars.
(2) Section 147-9B: three hundred ($300.00) dollars.
(3) Section 147-9C: three hundred ($300.00) dollars.

Govt Public Notices

Originally published at patriotledger.com on 11/29/2022

RANDOLPH PUBLIC HEARING 12/5/2022
LEGAL NOTICE
Town of Randolph
Notice of Public Hearing 12/5/2022

The Randolph Town Council will conduct a public hearing on Monday, December 5, 2022 at 6:15 PM via ZOOM on Council Order: 2022-050 to amend section 147-9(D) of the General Ordinances of the Town of Randolph Concerning Violations, Penalties and Fines Relating to Trash and Refuse Disposal, as follows: Delete the following language from Section 147-9(D): (1) Section 147-9A: two hundred ($200) dollars; (2) Section 147-9B: two hundred ($200) dollars, (3) Section 147-9C: two hundred ($200) dollars," and replace the deleted language with the following: "(1) Section 147-9A: three hundred ($300.00) dollars; (2) Section 147-9B: three hundred ($300.00) dollars; (3) Section 147-9C: three hundred ($300.00) dollars."

Additional Information on this Council Order may be found on the Town of Randolph website and is also available through the Randolph Town Clerk's office. The link to connect to the meeting may be found on the Town of Randolph website calendar.

#8063840
PL 11/29/22

Complete Streets Policy

Whereas, the Town of Randolph seeks to provide transit options for users of all modes of transportation and all abilities with safe rights-of-way, intersections, sidewalks and crossings, informative and supportive signage;

Whereas, Complete Streets is an approach to community transportation using design principles to ensure safety, comfort, and accessibility for users of all ages, abilities, and income level;

Whereas, the Massachusetts Department of Transportation has developed the "Complete Streets Funding Program", which provides funding to municipalities to design and implement a plan to make their streets safe and accessible for all users;

Whereas, a municipality that desires to receive funding from Complete Streets for its plan must adopt a Complete Streets Policy;

Whereas, the Complete Streets Plan for Randolph will support community stability, provide accessible and efficient connections between home, school, work, recreation, and retail destinations by improving the pedestrian and vehicular environments throughout the community; and

Whereas, the Town of Randolph desires to participate in the Massachusetts Complete Streets Program and receive funding for its Plan.

THEREFORE, be it now ordered that the Town Council for the Town of Randolph adopts this Complete Streets Policy, effective **December 5, 2022**

Christos Alexopoulos

Ryan Egan

William Alexopoulos

Jesse Gordon

Richard Brewer

Katrina Huff-Larmond

James F. Burgess, Jr.

Kevin O'Connell

Natacha Clerger

VISION AND PURPOSE

The Town of Randolph recognizes that users of various modes of transportation, including pedestrian, cyclists, transit and school bus riders, motorists, delivery personnel and emergency responders are legitimate users of streets and benefit from safe facilities and infrastructure. Further, the Town recognizes that all projects affecting transportation and traffic circulation are opportunities to implement Complete Streets principles. The Town shall carefully consider context, sensitivity, and roadway character, while planning, designing, constructing, and maintaining these projects to provide for a comprehensive and integrated network of infrastructure for all who are affected by all of our transportation modes.

The Randolph Complete Streets policy, therefore, shall accommodate all infrastructure users by creating a network that meets the needs of individuals using a variety of transportation modes.

CORE COMMITMENT

The Town of Randolph Complete Streets Policy affirms the Town's roadway and walkway network must provide safety, comfort, and accessibility for all users, including people walking, biking, driving, riding transit, and operating commercial and emergency vehicles. Furthermore, the roadway and walkway network shall provide these characteristics for people of all ages and abilities.

All projects and phases of all publicly and privately funded transportation projects and those projects affecting traffic circulation shall be reviewed to determine the feasibility of incorporating Complete Streets elements.

Where practical, and within funding limitations, elements of Complete Streets shall be added to all municipal road repairs, upgrades and expansion projects, which will enhance safety, accessibility, and serviceability for all users. Procedures shall be established to identify opportunities to implement Complete Streets elements and to document the incorporation of these elements when conducting municipal road and walkway repairs, upgrades, and expansion projects.

Complete Streets principles will be incorporated into all publicly and privately funded projects, as appropriate. All transportation, infrastructure, and street design projects requiring funding or approval by the Town of Randolph, the state and/or federal government (e.g., Chapter 90 funds, MassWorks, MassTrails, Transportation Improvement Program (TIP), Community Development Block Grants (CDBG), Safe Routes to School Grants) shall adhere to the Randolph Complete Streets Policy as applicable. Private developments and related street design components or corresponding street-related components shall adhere to the Complete Streets policy. To the extent practical, state-owed roadways will comply with the Randolph Complete Streets policy, including the design, construction, and maintenance of such roadways within Town boundaries.

EXCEPTIONS

Transportation infrastructure projects may be excluded from compliance within this Policy where any of the following apply:

- Roadways where specific users are prohibited by law, such as an interstate or pedestrian malls. An effort will be made, in these cases, for mitigation elsewhere.
- The cost or impacts of implementation are disproportionate to the need or probable future use and/or a reasonable alternative to accommodate the need is available or planned.
- Constraints resulting from limitations of right-of-way and property rights, jurisdiction by other agencies, and natural features that restrict the feasibility and practicality of required enhancements.
- Modification of infrastructure in the Town's registered historic district(s) and designated scenic road(s) where enhancements may have a negative impact on the intent of those districts.

In order for an exception to be incorporated into a design, the exception must be presented for review and approval, to both the Planning Board and the Superintendent of the Department of Public Works. If both approve the exception, it is authorized. If both or either disapprove, it is denied. Appeals of such decisions, or if one body approves and one disapproves, may be brought before the Randolph Town Council for a final decision.

BEST PRACTICES

The Town of Randolph Complete Streets Policy will focus on developing a connected, integrated network that serves all users. Complete Streets will be integrated into policies, planning, and design of all types of public and private projects, including new construction, reconstruction, rehabilitation, repair, and maintenance of transportation facilities on streets and redevelopment projects.

Implementation of the Randolph Complete Streets Policy will be carried out cooperatively between all relevant departments within the Town, with multi-jurisdictional cooperation to the greatest extent possible, among private developers, and state, regional, and federal agencies.

The Randolph Complete Streets Policy affirms that a balanced design flexibility is a key aspect in the effort to improve accessibility and safety for all users of the road and walkway network while at the same time maintaining context sensitivity. This context sensitivity approach to the design process includes a range of goals by giving significant consideration to stakeholders and community values on a level plane with project need. It includes goals related to livability with greater participation of those affected in order to gain project consensus. The overall goal of this approach is to preserve and enhance scenic, aesthetic, historical, and environmental resources, while improving and maintaining accessibility, safety, mobility, and infrastructure conditions.

The latest design guidance, standards, laws, and recommendations available will be used in the implementation of Randolph's Complete Streets including:

- Complete Streets Study and Prioritization Plan
- Randolph's Master Plan, and Open Space and Recreation Plan
- Randolph's annual pavement management program
- All relevant Randolph ordinances, maps, subdivision regulations, Special Permit and Site Plan Review Regulations
- Mass. Department of Transportation Project Design and Development Guidebook
- U.S. Dept. of Transportation Federal Highway Administration's Manual on Uniform Traffic Design Controls
- MGL, chapter 90, sections 17C and 18B
- The Architectural Access Board (AAB) 521 CMR Rules and Regulations
- American Association of State Highway Transportation Officials (AASHTO) A policy on Geometric Design of Highway and Streets
- Any documents, plans and studies contextually applicable

PERFORMANCE MEASURES

The Town of Randolph shall review its Complete Streets practices annually. Success of the Complete Streets Program will be measured using, but not limited to, the following metrics:

- The total linear feet of walkway either expanded or repaired to restore to intended functionality.
- Total linear feet of roadway which have been enhance through roadway pavement reconstruction, rehabilitation, and/or preservation to improve functionality and safety of continued shared use.
- The number of locations where pavement markings, signage and/or some other method has been undertaken to improve functionality and safety of continued shared use.
- Specific enhancements suggested during public outreach efforts.

Such metrics will be summarized and included in the Town's annual report.

IMPLEMENTATION

The Town shall make consideration of Complete Streets practices a routine part of everyday operations; shall approach every transportation project and program as an opportunity to improve streets and the transportation network for all users; and shall work in coordination with other departments, agencies, committees, and jurisdictions to achieve the Complete Streets initiative.

The Complete Streets Policy will be carried out cooperatively within a multidisciplinary team and all relevant departments in the Town of Randolph that will include representation from the Department of Public Works, Planning Board, Conservation Commission, Board of Health, Recreation Department, Disabilities Commission and Town Council. Additional entities may be relevant to Complete Streets implementation.

Key responsibilities of implementation shall be:

- Developing proposed revisions to all appropriate zoning and subdivision codes, ordinances, procedures, rules, regulations, guidelines, programs, and templates to integrate Complete Streets principles in roadway projects;
- Recommending regulatory changes for ensuring the implementation of the Complete Streets Policy, and, where necessary, alter the existing practices and overcome barriers that may act as impediments to implementation;
- Regularly updating and soliciting feedback on the potential public projects with the general public to ensure community consideration and perspective;
- Integrating Complete Streets principles in all new planning documents, and as applicable, to the Randolph Master Plan, Open Space and Recreation Plan, laws, procedures, rules, regulations, and guidelines.

The Town will provide training for the Complete Streets staff, pertinent Town staff, and decision makers on the technical content of Complete Streets principles and best practices, and well as community engagement workshops and other appropriate means.

Council Order 2022-057

Introduced By: Town Manager Brian Howard
December 5, 2022

Request for the Town Council to Initiate
An Amendment to the Randolph Zoning Ordinance –
Chapter 200 of the General Code of the Town of Randolph –
Concerning Front Yard Setbacks As They Relate To Adjacent Historic Structures
Pursuant to M.G.L. ch. 40A, sec. 5

That the Town Council of the Town of Randolph hereby initiates an amendment to the Randolph Zoning Ordinance, Chapter 200 of the General Code of the Town of Randolph, concerning front yard setbacks as they relate to adjacent historic structures, pursuant to M.G.L. ch. 40A, Section 5, and hereby amends Section 200-28(A) of the Zoning Ordinance as indicated below:

§ 200-28 Front yards.

A. Residential districts.

(1) In a residential district, no building shall be erected within twenty-five (25) feet of the side line of any street, except as follows:

(a) No building shall be erected within forty-five (45) feet of the center line of any street which is less than forty (40) feet in width.

(b) No building shall be erected within forty (40) feet of the side lines of South Main Street or of the side lines of that part of North Main Street south of the Pond Street business area.

(c) If a residential lot abuts a lot with an historic structure, the front yard setback may be reduced to that of the historic structure but not less than ten (10) feet.

(2) No building in a residential district need be set back more than the average setback of the residence buildings on the abutting lots. A vacant lot, a lot occupied by a nonconforming use or a building set back more than the required distance shall be counted as though occupied by a building set back at the prescribed distance for the purpose of determining said average.

(3) No outdoor play area (an area designed or set aside for children in a child-care facility for recreation or play) shall be located closer to the street than the minimum requirements of this section.

Town of Randolph

PETITION FOR ZONING AMENDMENT

~Clerk's Use~

Date referred to Planning ____/____/____

Order #_____

RESPECTFULLY SUBMITTED TO TOWN COUNCIL BY *(check one)*

☐ TOWN COUNCIL ☐ BOARD OF APPEALS ■ PLANNING BOARD

☐ SUBJECT LAND OWNER(s)*

PETITIONER'S NAME Planning Board & Historical Commission

AGENT/REPRESENTATIVE/CONTACT *(if any)* Michelle Tyler & Henry Cooke

ADDRESS 41 South Main Street

PHONE 781-961-0936 EMAIL mtyler@randolph-ma.gov

REASON FOR PROPOSED AMENDMENT *(attach additional justification as warranted)*

See the attached narrative for the recommendations from the Planning Board and Historical Commission based on the objectives of the Comprehensive Master Plan

PETITIONER'S SIGNATURE Michelle R Tyler DATE 11-15-2022

**all parties must sign*

ZONING TEXT AMENDMENT *(if applicable)*

ARTICLE(s)/SECTION(s) 200-28, _____, _____, _____

■ *REQUIRED: attach proposed ordinance TEXT using exact wording. Use strikethrough to show text to be deleted and bold to indicate text to be added*

ZONING MAP AMENDMENT *(if applicable)*

PROPERTY LOCATION/STREET ADDRESS_____

CURRENT ZONING _____ TOTAL ACREAGE TO BE REZONED _____

PROPOSED ZONING _____

ASSESSOR'S MAP(s) & PARCEL(s) _____

CURRENT USE(s) _____

ANTICIPATED USE *(if known)* _____

DESCRIPTION OF EXISTING LAND USES OF SURROUNDING AREA_____

_____

_____

☐ *REQUIRED: attach MAPS clearly showing existing & proposed zoning districts, including parcel lot lines (8.5 x 11" preferred size)*

The Natural and Cultural Resources section of the Comprehensive Master Plan outlines recommendations for amendment to Zoning Ordinances and General Ordinances as they relate to historic properties. Specifically, objective NHC2 suggests:

- *Amend Residential District Setback Provision, Section 200-28. A (2), and allow for relief from strict adherence to the 25' setback to match the setback of adjacent historic houses.*

Objective NHC2 suggests:

- *Change threshold of Demolition Delay Ordinance to the national standard of 50 years old or older, and extend the delay period to nine months or more.*

The Planning Board and the Historical Commission, through meetings of the separate boards and through a joint meeting of the two boards evaluated both recommendations and the impacts of adopting such amendments.

The boards collectively recommend the amendment to setbacks and provide the proposed amendment to **Zoning Ordinance section 200-28 Front Yards**.

The boards collectively disagree with amending the threshold for demolition delay from the current 100 years to 50 years appreciating the significant impact it would have on a large number of parcels in the community. They recommend retaining the threshold at 100 years but modifying the length of time to receive a demolition permit from six (6) months to nine (9) months by amending **General Ordinance 87-3 Procedure**.

Council Order: 2022-057 **Introduced by: Councilor Jesse Gordon**
December 5, 2022

Amendment of Section 9-4 of the
General Ordinances of the Town of Randolph
Concerning The Community Preservation Committee

To see if the Randolph Town Council will vote to amend Section 9-4 of the general ordinances of the Town of Randolph concerning the duties of the Community Preservation Committee as follows:

Delete Section 9-4 and replace it with the following:

§ 9-4 Duties of the Community Preservation Committee.

A. The Randolph Community Preservation Committee shall study the needs, possibilities and resources of the Town regarding community preservation. The Committee shall consult with existing municipal boards and hold one (1) or more public informational hearing(s) yearly on the needs, possibilities and resources of the Town regarding community preservation. This meeting shall be publicly posted, in the local newspaper, for each of two (2) weeks preceding a hearing.

B. The Randolph Community Preservation Committee shall maintain a list of each community preservation grant that is awarded by the Town of Randolph, on an annual basis. The Committee shall maintain a master list of all such grants that have been awarded, starting with grants awarded in 2017, and shall make that list publicly available in a form that can be searched by keyword.

C. The Randolph Community Preservation Committee shall compile a guide for recipients of Town of Randolph community preservation grants. The guide shall include information on how funds will be disbursed to the grant-recipient, how funds may be spent, and how grant fund spending must be documented and accounted for. The guide shall also include information for applicants on how to meet criteria for successful applications, and on how to re-apply or amend unsuccessful applications.