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allenmajor.com

ALLEN & MAJOR ASSOCIATES, INC.

October 5, 2021

To:
Brooke Hultgren, Department Assistant
Leicester Development and Inspectional Services
3 Washburn Square
Leicester, Massachusetts 01524

A&M Project #: 2889-01

Re: Definitive Subdivision Plan
651 Main Street
Map 21/Parcel B5.1

Copy:

Dear Ms. Hultgren

On behalf of our client, MKEP 770, LLC, the Applicant, Allen & Major Associates, Inc. is filing a Preliminary Subdivision Plan for the construction of a proposed subdivision off Main Street in Leicester, Massachusetts. The project includes land depicted on the Assessor's Map #21 as Parcel B5.1 (651 Main Street), owned by E.F.G. Realty Trust. The plans submitted intend to depict the land encompassing the subdivision based on the Existing Conditions Plan created by Allen & Major Associates, Inc. Dated: July 16, 2021.

It is the intent of the applicant to subdivide the existing parcel into five separate lots, four (4) of which will be fee-simple lots have direct access to Main Street meeting the current zoning requirements. The fifth and final lot will encompass the remaining land area and will be developed into a private residential development consisting of a mix of 2 and 3 family townhomes. The Project proposes to construct 103-units of mixed single-family residential housing consisting of approximately 1,600 square feet. The combination of these units are mixed as one (1) single unit house, six (6) duplexes, and thirty (30) 3-unit multi-family houses. Access/egress to 96-units is serviced by the Project's proposed subdivision roadway which connects to the southerly side of Main Street. An additional 7-units, in the form of three (3) duplexes and the single unit house, directly access Main Street with standard residential driveways.

The project property is approximately 29.78 acres and is located along the southwestern side of Main Street. The majority of the property consists of mainly woodland and brush, with a brook and small wetland pockets near the property's boundary. Electrical utility lines and a tower are located at the southwestern portion of the parcel. As stated above, the existing electrical utility lines will be separated from the development and protected by a 250 foot electric easement.

As part of the proposed development, three interconnected roadways will be constructed to provide access to the individual dwelling units. Although the project will remain private under a home owner association model, the roadways are proposed to be 28-feet wide with a sidewalk to be in harmony with the local subdivision requirements. The primary access will be situated along Main Street approximately 500 feet southeast of Waite Street intersection with a secondary access via an extension of Colonial Drive. Gated emergency access is proposed via an existing residential driveway to #747 Main Street on the westerly end of the property

Along with the construction of the proposed roadway, several other utility improvements will be provided as part of the overall development. The project stormwater management system will be addressed through the construction of a closed drainage system which includes catchbasins and drainage manholes to capture the surface runoff. Through the use of hydrodynamic separator treatment devices, the collected stormwater will then be directed to one of several detention systems for peak rate mitigation and stormwater treatment. A comprehensive review of the drainage system and watersheds has been performed and the Grading & Drainage Plan depicts the anticipated drainage system for the project. A full stormwater analysis has been provided as part of the Definitive Subdivision submittal.

Environmental Analysis

As this proposed subdivision will be creating frontage potentially allowing ten (10) or more family units, an Environmental Analysis has been provided herein. Many of the items outlined within the Environmental Analysis have be detailed within other plans or within the stormwater report, below is a summary of the specific items of concern.

a.) The same data as on the Definitive Plan
Refer to plans prepared by A&M dated October 5, 2021 consisting of approximately 21 sheets.

b.) Topography at two foot contour intervals, with graphic drainage analysis; indication of annual high water mark, location of existing structures, including fences and walls, and watershed boundaries.
Topographic information is shown on Sheet V-101 including existing structures, fences, walls and delineated resource areas. The existing and proposed watershed plan were prepared and included within the submitted Stormwater Report, refer to Sheet WS-1 and WS-2.

c.) Vegetation cover analysis, including identification of general cover type (wooded, cropland, brush, wetland, etc.); location of all major tree groupings, plus other outstanding trees or other botanical features; important wildlife habitats; and identification of areas not to be disturbed by construction.
The vast majority of the site consists of wooded cover with some areas of grass and brush. There are also several areas of delineated resource areas adjacent to Colonial Drive and Henshaw Street. Additional, the southwest section of the property is bisected by an existing electrical transmission line easement. The areas can be seen on Sheet V-101. As part of the stormwater analysis for the project both the existing and proposed surface covers were calculated. A summary of these area are listed below and additional information can be found in the stormwater report in Section 4 and Section 5.

Existing

Area (acres)	Description (subcatchment-numbers)
1.734	>75% Grass cover, Good
2.164	Brush, Good
0.071	Paved parking
25.418	Woods, Good

Proposed

Area (acres)	Description (subcatchment-numbers)
15.096	1/2 acre lots, 25% imp
4.812	>75% Grass cover, Good
2.065	Brush, Good
2.919	Paved parking
4.293	Woods, Good

The proposed 103 dwelling units are encompassed within the proposed ½ acre lot subcatchments area which constitutes approximately 12.7% of the lot. Based upon the HydroCAD analysis included in the Drainage Report, the project site will be approximately 22.93% impervious cover. Refer to Drainage Report for additional information.

d.) Soil types, based on United State Department of Agriculture (USDA) soils study; approximate ground water level, location and results of soil percolation or other sub surface tests.

As the project is proposed to be on municipal sewer, soil percolation tests were not performed on the site. Published soil information from USDA and NRSC were utilized to approximate a design infiltration rate for the proposed roof drainage infiltration system.

e.) Visual analysis, including analysis of scenic vistas, and locations of visual prominence.
Although the project is situated on an elevated portion of the site, there are no significant scenic vistas that will be created nor impacted as part of the project.

f.) Location of surface water bodies, wetlands, aquifer or recharge areas for existing or potential drinking water supplies.
The vast majority of the site consists of wooded cover with some areas of grass and brush. There are also several areas of delineated resource areas adjacent to Colonial Drive and Henshaw Street. Additional, the southwest section of the property is bisected by an existing electrical transmission line easement. The areas can be seen on Sheet V-101.

The following narrative will set to document the following, with reference to the above maps as germane.

a) Impact upon surface water quality and level.
As part of the proposed project, impacts to surface water quality will be enhanced through the implementation of a new stormwater collection system. The stormwater collection system is a series of inlets located at low points within the limits of the paved area. All of the proposed on-site catch basins incorporate a deep sump and hooded outlet. The catch basins are connected by a closed gravity pipe network that pass through proprietary separators prior to entering the pipe detention systems or gabion walls.

The proposed stormwater management system has been designed to remove 80% of the average annual post-construction load for each treatment train. The TSS removal calculations can be seen within the appendix of the stormwater report. Structural Pretreatment BMPs consisting of Deep sump catch basins, also known as oil and grease or hooded catch basins, are underground retention systems designed to remove trash, debris, and coarse sediment from stormwater runoff, and serve as temporary spill containment devices for floatables such as oils and greases. Further treatment is provided via a proprietary separator this is a flow-through structure with a settling or separation unit to remove sediments and other pollutants. They typically use the power of swirling or flowing water to separate floatables and coarser sediments, are typically designed and manufactured by private businesses, and come in different sizes to accommodate different design storms and flow conditions.

As a further management system, a Long-Term Operation & Maintenance (O&M) Plan has been developed for the proposed stormwater management system and is included within the stormwater report. The purpose of the O&M is to identify potential sources of pollution that may affect the quality of stormwater discharges, and to describe the implementation of practices to reduce the pollutants in stormwater discharges.

b.) Impact upon ground water quality and level.
As indicated above, the proposed project, impacts to surface water quality will be enhanced through the implementation of a new stormwater collection system which will provide for pretreatment. The existing annual recharge for the site has been approximated in the proposed condition. Groundwater recharge will be provided through the use of proposed dry wells that are designed to meet this requirement. The proposed Recharge Volume is based on the Static Method per the MA DEP Stormwater Management Standards, Volume 3, Chapter 1. See the appendix located at section 6 of this report for stormwater recharge calculations.

c.) Effects on important wildlife habitats, outstanding botanical features, scenic or historic sites or buildings.
The property contains several areas subject to the Wetland Protection Act, all of which being outside direct impacts associated with the proposed roadway construction. These areas have been delineated by Gove Environmental Services, Inc. and are depicted on the Proposed Subdivision Plan. Some of the proposed drainage detention/infiltration basins are proposed to be located within the buffer zone and a filing with the Conservation Commission will be required. This will be made concurrent with the Definitive Subdivision review process.

Upon review of the Commonwealth's published data, there were no Areas of Critical Environmental Concern (ACEC); Outstanding Resource Waters (ORWs) nor areas of Priority and Protected Habitat for rare and endangered species located within the project limits. See Exhibit 3.4 within the submitted stormwater report.

d.) Capability of soils and vegetative cover to support proposed development without erosion, silting or other instability.

Existing Soil Conditions: The on-site soils were identified using the USDA Natural Resources Conservation Services (NRCS) Soil Survey for Worcester County. The site contains a range of soil types including: Ridgebury, Whitman, Paxton, Woodbridge, Charlton, Canton, and Udorthents. The majority of the site is made up of Paxton fine sandy loam. A copy of the NRCS Custom Soil Resource Report is included in the appendix of the stormwater report.

A plan to control construction-related impacts, including erosion, sedimentation and other pollutant sources during construction has been developed. A detailed Erosion and Sedimentation Control Plan is included in the Permit Drawings. Refer to Sheet C-100 for location of proposed erosion control measure and Section 2 of the Stormwater Report for additional information. The proponent will prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) prior to commencement of construction activities that will result in the disturbance of one acre of land or more.

The proposed stormwater management system for the site will control the Peak Rate of Runoff through the use of deep sump catch basins, pipe detention systems, a detention basin, outlet control structures, and gabion walls (level spreaders). These systems have been designed in accordance with the MA DEP Stormwater Management Policy to recharge groundwater and reduce rate of runoff from the parcel.

e.) Relationship to Massachusetts General Laws, Chapter 131, Sections 40, (Wetlands Protection Act) and Town Wetland Bylaw.

The property contains several areas subject to the Wetland Protection Act, all of which being outside direct impacts associated with the proposed roadway construction. These areas have been delineated by Gove Environmental Services, Inc. and are depicted on the Proposed Subdivision Plan. Some of the proposed drainage detention/infiltration basins are proposed to be located within the buffer zone and a filing with the Conservation Commission will be required. This will be made concurrent with the Definitive Subdivision review process.

f.) The report shall estimate the proposed traffic flow in relation to the roadways giving access to the subdivision.

The property contains several areas subject to the Wetland Protection Act, all of which being outside direct impacts associated with the proposed roadway construction. These areas have been delineated by Gove Environmental Services, Inc. and are depicted on the Proposed Subdivision Plan. Some of the proposed drainage detention/infiltration basins are proposed to be located within the buffer zone and a filing with the Conservation Commission will be required. This will be made concurrent with the Definitive Subdivision review process.

g.) The report shall estimate the effect of the project on public services, such as water, sewer, schools, police, fire and highway department.

<u>Traffic</u>

TEC, Inc. (TEC) has been retained by MKEP 770, LLC (the "Applicant") to prepare a Traffic Impact Assessment (TIA) associated with the proposed Skyview Estates (the "Project"). Traffic generated by the proposed residential development was determined based on the "Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition". The trip generation rates were based on Land Use Code 270, defined as a Residential Planned Unit Development. The estimated vehicle trips generated are shown in the following table:

The estimated vehicle trips are shown in the following tables:

Weekday	Total	Incoming	Outgoing
Daily	742	273	273
AM Peak	49	15	34
PM Peak	59	34	25

TEC has evaluated the traffic operations for the study area under existing and future conditions consistent with the Transportation Impact Assessment (TIA) Guidelines issued by the Massachusetts Department of Transportation (MassDOT) and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The future year examines traffic operations under a 7-year planning horizon (2028) for traffic-volume projections, which includes an evaluation of the build conditions (with site traffic added). A copy of the report has been included in this submission. Additionally, as part of the permitting process, a driveway access permit has been initiated through the Massachusetts Department of Transportation as Main Street, aka Route 9 as is currently under review.

<u>Police, Fire & Highway Department</u>
Based on email correspondence received from Fire Chief Dupuis and Police Chief Antanavica, they have both met on site to review the proposed project and do not have any concerns at this time. Street lighting is being proposed which will help deter suspicious activities from taking place within the development. The project proposes a new municipal water service, including strategic placement of fire hydrants throughout the development to lessen the burden on any potential firefighting activities that may occur.

<u>Schools</u>
All of the 103 units, will have a layout which places the living quarters all on the first floor including 2 bedrooms and 1 office area (that could be a bedroom). Based on the new alignment of the project, the spacing of the proposed homes and interior configuration of the homes, this is more conducive to young professionals or older couples without children, so it is presumed that these units would not have an impact on the school system.

It is anticipated that approximately 15% of the units will be marketed or sold with an option to expand the unit layout to include a total of 4 bedrooms which is more desirable for potential families with children. Based upon this presumption and the local average of 2.0 children per dwelling unit, it is anticipated that the project could produce 32 school age children. Based on discussion with school superintendents office about the impact on the schools for 103 homes. Here is what she said and the reports from the state.

1. K-4 would put a strain on the system, the school is at capacity.
2. Middle School - They can handle the new homes.
3. High School - They can handle the new homes.

Special Permit Criteria Evaluation

1. *Such use will not nullify or substantially derogate from the intent and purpose of this Bylaw;*
   The proposed use (duplex & townhouse) will not alter the general character of the surrounding area nor impair the intent or purpose of said bylaw because the proposed use conforms to the existing residential dwellings in the area. Although there are proposed to be 103 units of slightly varying size and configuration, the same general characteristics will be consistent, including separated building entrances and buffered driveways to aid in the appearance of each being a separate unit.

2. *Such use will not constitute a nuisance; and*
   As the proposed project is for a residential development in accordance with Town standards, it will not constitute a nuisance to the surrounding area. Through the development of comprehensive stormwater management system, the site will control post development stormwater flows to below predevelopment conditions. Additionally, an extensive erosion control plan has been prepared, included a construction phase protections to prevent erosion concerns to abutting properties.

3. *Such use will not adversely affect the neighborhood in which the lot is situated.*
   The proposed residential development which includes of mixed single-family residential housing, including one (1) single unit house, six (6) duplexes, and thirty (30) 3-unit multi-family houses will not adversely affect the surrounding neighborhoods as the layout has been designed to provide a consolidated entrance to the project along Main Street (Route 9). The proposed duplex home, although connected, are designed to provide a sense of separation through the placement of interior spaces as well as landscape buffers.

4. *Such use complies with the Standards for Site Plan Approval in the Leicester Zoning Bylaw.*
   The proposed use (duplex & townhouse) will not alter the general character of the surrounding area nor impair the intent or purpose of said bylaw because the proposed use conforms to the existing residential dwellings in the area.

5. *Provision shall be made for convenient and safe vehicular and pedestrian circulation within the site and in relation to adjacent streets and property. The service level of adjacent streets shall not be significantly reduced due to added traffic volume or type of traffic in accordance with the most recent edition of the Massachusetts Highway Department Highway Capacity Manual;*
   The proposed residential development will be interconnected with paved roadways meeting the width of required by the subdivision regulations, including the installation of paved sidewalks. The added traffic volume is not anticipated to negatively impact the existing network. Please refer to Traffic Impact Analysis prepared by TEC, Inc.

6. *The proposed use shall not overload the capacity of water and sewer systems, storm water drainage, solid waste disposal facilities, and other public facilities;*
   Both water and sewer will be provided through municipal services. In a letter obtained from Cherry Valley Sewer District, the project is available for hook-up to the public sewer system. The project proposes sewer manholes to be placed within the newly aligned roadways at various locations to collect sewage and direct it to the existing municipal sewer system along Main Street. In a letter obtained from Leicester Water Supply District, there is adequate water supply for the proposed development. Domestic water for the property is intended to be sourced from the existing municipal water main within Main Street.

7. *The design of the project shall provide for adequate methods of disposal of sewage, refuse, or other wastes generated by the proposed use;*
   The subject is serviced by municipal sewer and a new collection system has been designed to service the individual building units. As the project will remain private under a home owner association model, trash

collection will be handled by a private trash hauler. The project proposes the installation of several dumpster enclosures throughout the project and which will be screened from view.

8. *The project shall comply with all applicable environmental laws and regulations;*
The project will comply with applicable environmental laws and regulations through the implementation of comprehensive stormwater management system and permitting through the local conservation commission.

9. *The proposed project shall be consistent with Leicester's Master Plan; and,*
As the proposed project is for a residential development in accordance with Town standards and is consistent with Leicester's Master Plan..

Site Plan Review Criteria (Section 5.2.05 of the Zoning By-law)

A. *The use complies with all the provisions of the Leicester Zoning By-Law;*
The proposed use (duplex & townhouse) will not alter the general character of the surrounding area nor impair the intent or purpose of said bylaw because the proposed use conforms to the existing residential dwellings in the area.

B. *The use will not materially endanger or constitute a hazard to the public health;*
As the proposed project is for a residential development in accordance with Town standards, it will not constitute a nuisance or hazard to the surrounding area or public health.

C. *The use will not create undue traffic congestion or unduly impair pedestrian safety;*
The project Traffic engineer, TEC has evaluated the traffic operations for the study area under existing and future conditions consistent with the Transportation Impact Assessment (TIA) Guidelines issued by the Massachusetts Department of Transportation (MassDOT) and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The future year examines traffic operations under a 7-year planning horizon (2028) for traffic-volume projections, which includes an evaluation of the build conditions (with site traffic added).

D. *Sufficient off-street parking exists or will be provided to serve the use;*
The proposed homes have been developed with a two stall garage and a driveway which could feasibly accommodate up to two additional vehicles for a total or four.

E. *The use can be adequately served by water, sewer, and other necessary utilities, or if these are unavailable, that they will be brought to the site at the owner's expense; or, the Planning Board is satisfied that the proposed alternatives will comply with all applicable regulations;*
Both water and sewer will be provided through municipal services. In a letter obtained from Cherry Valley Sewer District, the project is available for hook-up to the public sewer system. The project proposes sewer manholes to be placed within the newly aligned roadways at various locations to collect sewage and direct it to the existing municipal sewer system along Main Street. In a letter obtained from Leicester Water Supply District, there is adequate water supply for the proposed development. Domestic water for the property is intended to be sourced from the existing municipal water main within Main Street.

F. *The use will not result in a substantial increase of volume or rate of surface water runoff to neighboring properties and streets, nor will result in pollution or degradation to surface water or ground water;*
A plan to control construction-related impacts, including erosion, sedimentation and other pollutant sources during construction has been developed. A detailed Erosion and Sedimentation Control Plan is included in the Permit Drawings. Refer to Sheet C-100 for location of proposed erosion control measure and Section 2 of the Stormwater Report for additional information. The proponent will prepare and submit a Stormwater

Pollution Prevention Plan (SWPPP) prior to commencement of construction activities that will result in the disturbance of one acre of land or more.
The proposed stormwater management system for the site will control the Peak Rate of Runoff through the use of deep sump catch basins, pipe detention systems, a detention basin, outlet control structures, and gabion walls (level spreaders). These systems have been designed in accordance with the MA DEP Stormwater Management Policy to recharge groundwater and reduce rate of runoff from the parcel.

G. *The use will not result in any undue disturbance to adjoining property owners or the Town caused by excessive or unreasonable noise, smoke, vapors, fumes, dust, glare, etc.*
The proposed residential development which includes of mixed single-family residential housing will not cause excessive or unreasonable noise, smoke, vapors, fumes, dust, glare, etc.

As part of this submittal, and in effort to provide comprehensive review for the Definitive Subdivision submittal, a preliminary list of waivers to the Leicester Subdivision Regulations is being submitted herewith. The applicant reserves the right to amend the list of waivers as needed during the Definitive Subdivision design and review process.

Waivers:

Section V.A.1.f - Minimum center line radii. 200' min. Required

To allow center line radius of 120’ and 135’. This happens along centerline at the following locations:

Colonial Extension	Sta 0+36.10 to 1+58.59	Radius = 120’
Colonial Extension	Sta 2+94.62 to 4+63.02	Radius = 120’
Skyview Terrace	Sta 2+69.81 to 3+54.73	Radius = 120’
Skyview Drive	Sta 11+29.41 to 14.50.18	Radius = 120’
Skyview Drive	Sta 18+44.86 to 20.16.05	Radius = 135’

A truck turning simulation has been prepared illustrating that fire apparatus can maneuver the roadway network without impacts to oncoming vehicles.

Section V.A.3.a - maximum street grade. 10%

To allow a roadway grade steeper that 10%. This happens along centerline at the following locations:

Skyview Drive	Sta 0+90.00 to 4+67.00	Slope = 14%
Colonial Extension	Sta 0+90.00 to 3+97.00	Slope = 13.27%
Emergence Access	Sta 1+20.00 to 3+60.00	Slope = 13.60%

Section VI.B.1a – reinforced concrete storm drainage piping required

A waiver is requested to utilize high density polypropylene (HDPE) drainage lines or approved equal within the drainage system of the subdivision.

Section VI.C.4 - velocities shall be between 2 and 10 feet per second

A waiver is requested allow water velocity within the closed stormwater system to exceed 10 feet per second for several of the proposed pipe runs due to the topography of the existing parcel. Actual velocities associated with the waiver request vary from 11.92 fps to 14.0 fps which is less than the manufactures recommendation for scour within the piping network.

Section VI.e.3 - street lighting required

To allow street lighting to be installed as private driveway light. Each lot shall be provided with a standard lamp post light on the lot near the intersection of the driveway with the street right-of-way line. Each lot light shall be placed on a dusk till dawn timer and shall be maintained by the individual property owner in perpetuity as stated in the proposed covenants.

Section VI.l - Street trees shall be installed on both sides of the roadway

To allow for street tree plantings to be installed on one side only. Since the minimum right of way is fully consumed by street paving and sidewalks along each side, there is not sufficient area for the installation of street trees within the right-of-way. It is being requested that street trees be incorporated into the individual landscaping of the private lots near the intersection of the driveway with the street right-of-way.

Section VI.G.1 - Sidewalks shall be installed on both sides of all streets within a subdivision

A waiver is requested to install sidewalks on only 1 side of the roadway due to the steep terrain of the proposed subdivision and lack of connection to a municipal sidewalk along Main Street (aka Route 9)

At this time, Allen & Major Associates, Inc. is requesting to be placed on the agenda for the next available meeting of the Planning Board to discuss this Preliminary Subdivision Plan. Representatives of this office and the owner/applicant will attend to present the plan and address any concerns raised by the Board at that time. We thank you in advance for your anticipated cooperation regarding this project and look forward to meeting to discuss the plans.

Very Truly Yours,
ALLEN & MAJOR ASSOCIATES, INC.

Michael Malynowski

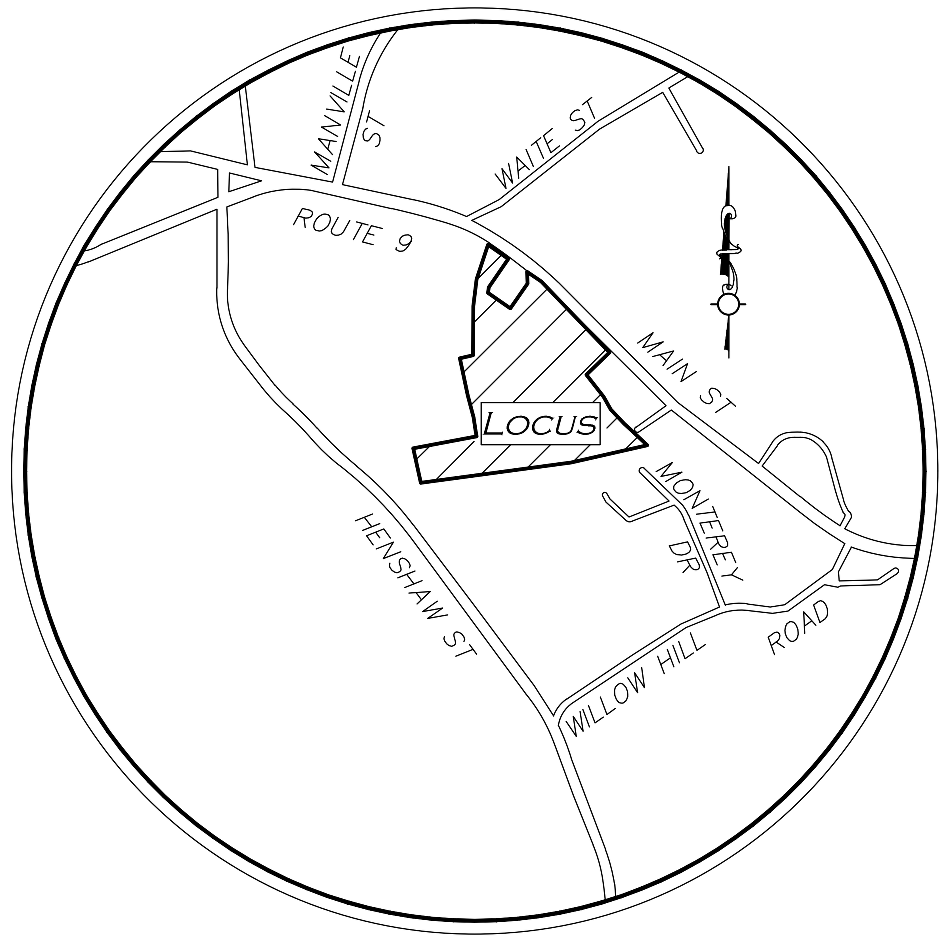
Michael Malynowski, PE
Senior Project Manager

DEFINITIVE SUBDIVISION PLANS FOR

SKYVIEW ESTATES

MAIN STREET

LEICESTER, MA 01611



LOCUS MAP
NOT TO SCALE

FOR REGISTRY USE ONLY

CONDITIONS OF APPROVAL ARE CONTAINED IN THE WRITTEN DECISION OF THE PLANNING BOARD ENTITLED, "CERTIFICATE OF APPROVAL OF A DEFINITIVE SUBDIVISION PLAN" DATED ____________ 2021 AND RECORDED IN THE WORCESTER DISTRICT REGISTRY OF DEEDS IN BOOK _____ PAGE _____.

THE CONSTRUCTION OF WAYS AND INSTALLATION OF SERVICES SHOWN ON THIS PLAN ARE SECURED BY WAY OF A COVENANT, DATED ____________ TO BE RECORDED HEREWITH.

APPROVAL OF THE LEICESTER PLANNING BOARD IS FOR _____ YEARS ONLY. IN THE EVENT THE WAYS AND SERVICES SHOWN ON THIS PLAN ARE NOT CONSTRUCTED AND INSTALLED WITHIN YEARS _______ FROM THE DATE OF ENDORSEMENT, THE BOARD'S APPROVAL IS RESCINDED, AND THIS PLAN IS AND SHALL BE NULL AND VOID.

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET THE REGISTRY OF DEEDS REQUIREMENTS AND ARE NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO THE CURRENT TOWNS OF LEICESTER ASSESSOR'S RECORDS.

I CERTIFY THIS PLAN HAS BEEN PREPARED IN CONFORMITY THE THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

ISSUED FOR
PLANNING BOARD REVIEW
OCTOBER 5, 2021

PROFESSIONAL LAND SURVEYOR FOR
ALLEN & MAJOR ASSOCIATES, INC.

AGENT:
RE/MAX PATRIOT REALTY
55 MEAD STREET
LEOMINSTER, MA 01453

APPLICANT
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

OWNER
E F G REALTY TRUST
EDGAR GREENEY, JR - TRUSTEE
76 MCCLELLAN STREET
AMHERST, MA 01002

CIVIL ENGINEER / SURVEYOR:
ALLEN & MAJOR ASSOCIATES, INC.
100 COMMERCE WAY, SUITE 5
WOBURN, MA 01801

ENVIRONMENTAL CONSULTANT
GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DR BLDG 2 UNIT H
EXETER NH 03833-7507

LEICESTER PLANNING BOARD WAIVERS REQUESTED

SECTION V.A.1.f – MINIMUM CENTER LINE RADII. 200' MIN. REQUIRED
TO ALLOW CENTER LINE RADIUS OF 120' AND 135'

SECTION V.A.3.a – MAXIMUM STREET GRADE 10%
TO ALLOW FOR A STREET GRADE OF NO MORE THAN 14%

SECTION VI.B.1A –REINFORCED CONCRETE STORM DRAINAGE PIPING REQUIRED
A WAIVER IS REQUESTED TO UTILIZE HIGH DENSITY POLYPROPYLENE (HDPE) DRAINAGE LINES OR APPROVED EQUAL WITHIN THE DRAINAGE SYSTEM OF THE SUBDIVISION.

SECTION VI.C.4 – VELOCITIES SHALL BE BETWEEN 2 AND 10 FEET PER SECOND
A WAIVER IS REQUESTED ALLOW WATER VELOCITY WITHIN THE CLOSED STORMWATER SYSTM FROM 11.92 FPS TO 14.0 FPS WHICH IS LESS THAN THE MANUFACTURES RECOMMENDATION FOR SCOUR WITHIN THE PIPING NETWORK.

SECTION VI.E.3 – STREET LIGHTING REQUIRED
TO ALLOW STREET LIGHTING TO BE INSTALLED AS PRIVATE DRIVEWAY LIGHT

SECTION VI.L STREET TREES SHALL BE INSTALLED ON BOTH SIDES OF THE ROADWAY
TO ALLOW FOR STREET TREE PLANTINGS TO BE INSTALLED ON ONE SIDE ONLY

SECTION VI.G.1 – SIDEWALKS SHALL BE INSTALLED ON BOTH SIDES OF ALL STREETS WITHIN A SUBDIVISION
A WAIVER IS REQUESTED TO INSTALL SIDEWALKS ON ONLY 1 SIDE OF THE ROADWAY DUE TO THE STEEP TERRAIN OF THE PROPOSED SUBDIVISION AND LACK OF CONNECTION TO A MUNICIPAL SIDEWALK ALONG MAIN STREET (AKA ROUTE 9)

GENERAL NOTES

1. THE OWNER OF RECORD:

   LOT 21–B5.1
   EFG REALTY TRUST
   76 MCCLELLAN STREET
   AMHERST, MA 01002
   BOOK 16761, PAGE 78

2. ZONING DISTRICT: BUSINESS (B) AND SUBURBAN AGRICULTURAL (SA) DISTRICT TO THE SOUTH & WEST
   LOT SIZE: 22,500 SF
   LOT FRONTAGE: 100 FT.
   FRONT SETBACK: 25 FT.
   SIDE SETBACK: 15 FT.
   REAR SETBACK: 25 FT.

3. EXISTING USE OF LOT 21–B5.1 IS VACANT LAND.

4. NO PORTION OF THE PROPERTY IS WITHIN THE 100 YEAR FLOOD BOUNDARY HAZARD ZONE AS SHOWN ON THE FLOOD INSURANCE RATE MAP #25027C0782E WITH AN EFFECTIVE DATE: JULY 14, 2011 FOR THE CITY OF LEICESTER.

LIST OF DRAWINGS

ISSUED FOR DEFINITIVE SUBDIVISION: JULY 16, 2021

UPDATES PER PEER REVIEW & LAYOUT CHANGE: OCT. 5, 2021

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	NONE	DWG. :	C-2889-01_Cover
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: COVER

SHEET No. C

0 OF 22

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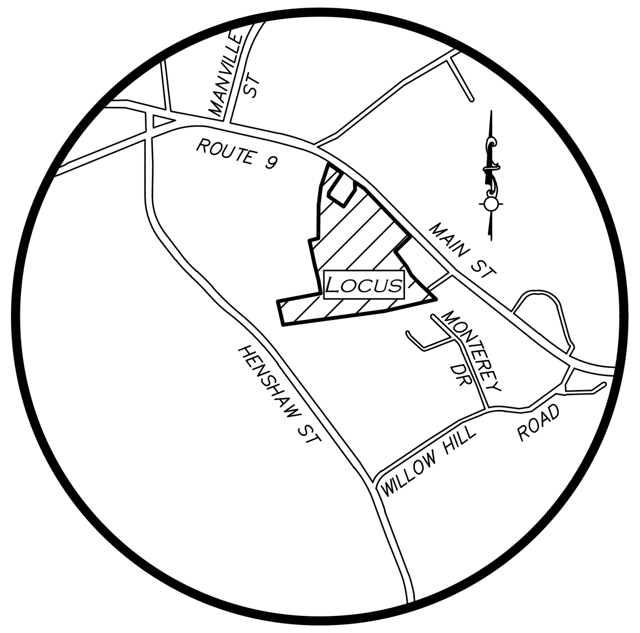
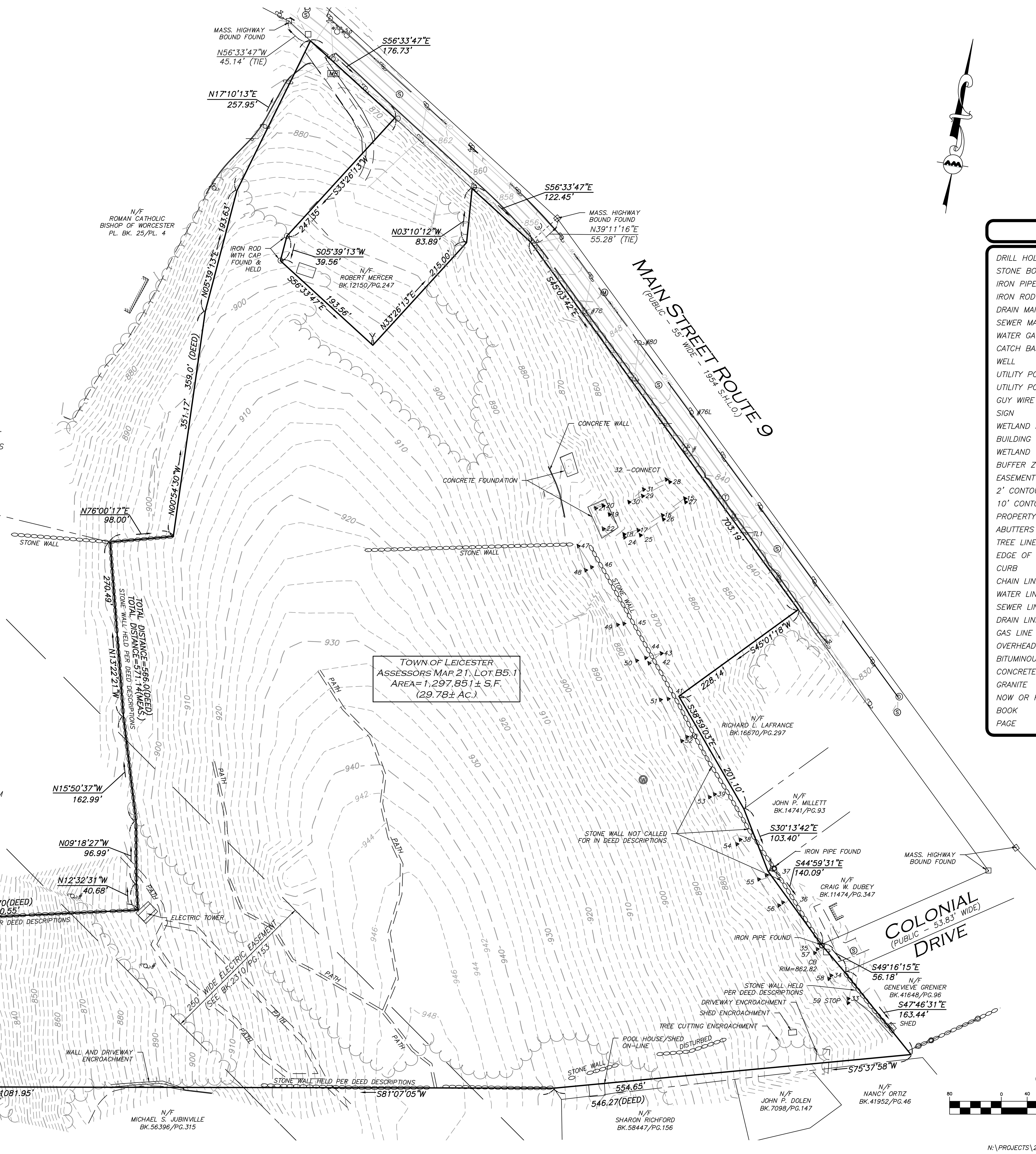


LOCUS MAP
(NOT TO SCALE)



FOR REGISTRY USE ONLY

UTILITY STATEMENT

THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. ALLEN & MAJOR ASSOCIATES, INC. (A&M) MAKES NO GUARANTEE THAT THE UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. A&M FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. A&M HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

LOCUS REFERENCES

- TOWN OF LEICESTER ASSESSORS MAP 51, LOT B5.1
- RECORD OWNER: EFG REALTY TRUST
- DEED BOOK 16761, PAGE 78
- DEED BOOK 12150, PAGE 247
- DEED BOOK 3160, PAGE 136
- DEED BOOK 3142, PAGE 185
- DEED BOOK 3133, PAGE 297
- DEED BOOK 3117, PAGE 204
- DEED BOOK 3096, PAGE 487
- DEED BOOK 3085, PAGE 328
- DEED BOOK 3085, PAGE 318
- DEED BOOK 3075, PAGE 346
- DEED BOOK 3053, PAGE 61
- DEED BOOK 3052, PAGE 600
- DEED BOOK 3052, PAGE 599
- DEED BOOK 2310, PAGE 153

PLAN REFERENCES

- PLAN BOOK 25, PLAN 4
- PLAN BOOK 178, PLAN 33
- PLAN BOOK 254, PLAN 110
- PLAN BOOK 281, PLAN 59
- PLAN BOOK 357, PLAN 112
- PLAN BOOK 619, PLAN 99
- PLAN BOOK 775, PLAN 2
- PLAN BOOK 794, PLAN 34

NOTES

1. NORTH ARROW IS BASED ON MASSACHUSETTS GRID COORDINATE SYSTEM (MAINLAND ZONE) (NAD 83).
2. BOOK/PAGE AND PLAN REFERENCES ARE TAKEN FROM WORCESTER (SOUTH) REGISTRY OF DEEDS IN WORCESTER, MA.
3. VERTICAL DATUM IS NAVD 88.
4. CONTOUR INTERVAL IS ONE FOOT (1').

LEGEND

DRILL HOLE (DH)	
STONE BOUND (SB)	
IRON PIPE (IP)	
IRON ROD (IR)	
DRAIN MANHOLE (DMH)	
SEWER MANHOLE (SMH)	
WATER GATE	
CATCH BASIN (CB)	
WELL	
UTILITY POLE W/LIGHT	
UTILITY POLE	
GUY WIRE	
SIGN	
WETLAND FLAG	A31
BUILDING	
WETLAND	
BUFFER ZONE	
EASEMENT LINE	
2' CONTOUR	858
10' CONTOUR	860
PROPERTY LINE	
ABUTTERS LINE	
TREE LINE	
EDGE OF PAVEMENT	
CURB	
CHAIN LINK FENCE	x
WATER LINE	W
SEWER LINE	S
DRAIN LINE	D
GAS LINE	G
OVERHEAD WIRES	OHW
BITUMINOUS	BIT.
CONCRETE	CONC.
GRANITE	GRAN.
NOW OR FORMERLY	N/F
BOOK	BK.
PAGE	PG.

WE HEREBY CERTIFY THAT:

THIS PLAN IS THE RESULT OF AN ACTUAL ON THE GROUND SURVEY PERFORMED ON OR BETWEEN JANUARY 10, 2021 AND FEBRUARY 9, 2021.

THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS DATED JANUARY 1, 1976 AND REVISED JANUARY 12, 1988.

ACCORDING TO DEEDS AND PLANS OF RECORD, THE PROPERTY LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIP, AND THE LINES OF THE STREETS OR WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS AND WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR THE DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

THE ABOVE CERTIFICATION IS INTENDED TO MEET REGISTRY OF DEEDS REQUIREMENTS FOR THE RECORDING OF PLANS AND IS NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT TOWN OF LEICESTER ASSESSOR'S INFORMATION.

THE ABOVE IS CERTIFIED TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF.

ALLEN & MAJOR ASSOCIATES, INC.

PROFESSIONAL LAND SURVEYOR FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT:

MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:

651 MAIN STREET
LEICESTER, MA

PROJECT NO. 2889-01		DATE:	03/08/21
SCALE:	1" = 80'	DWG. NAME:	S-2889-01-EC
DRAFTED BY:	AJR	CHECKED BY:	NIL

PREPARED BY:

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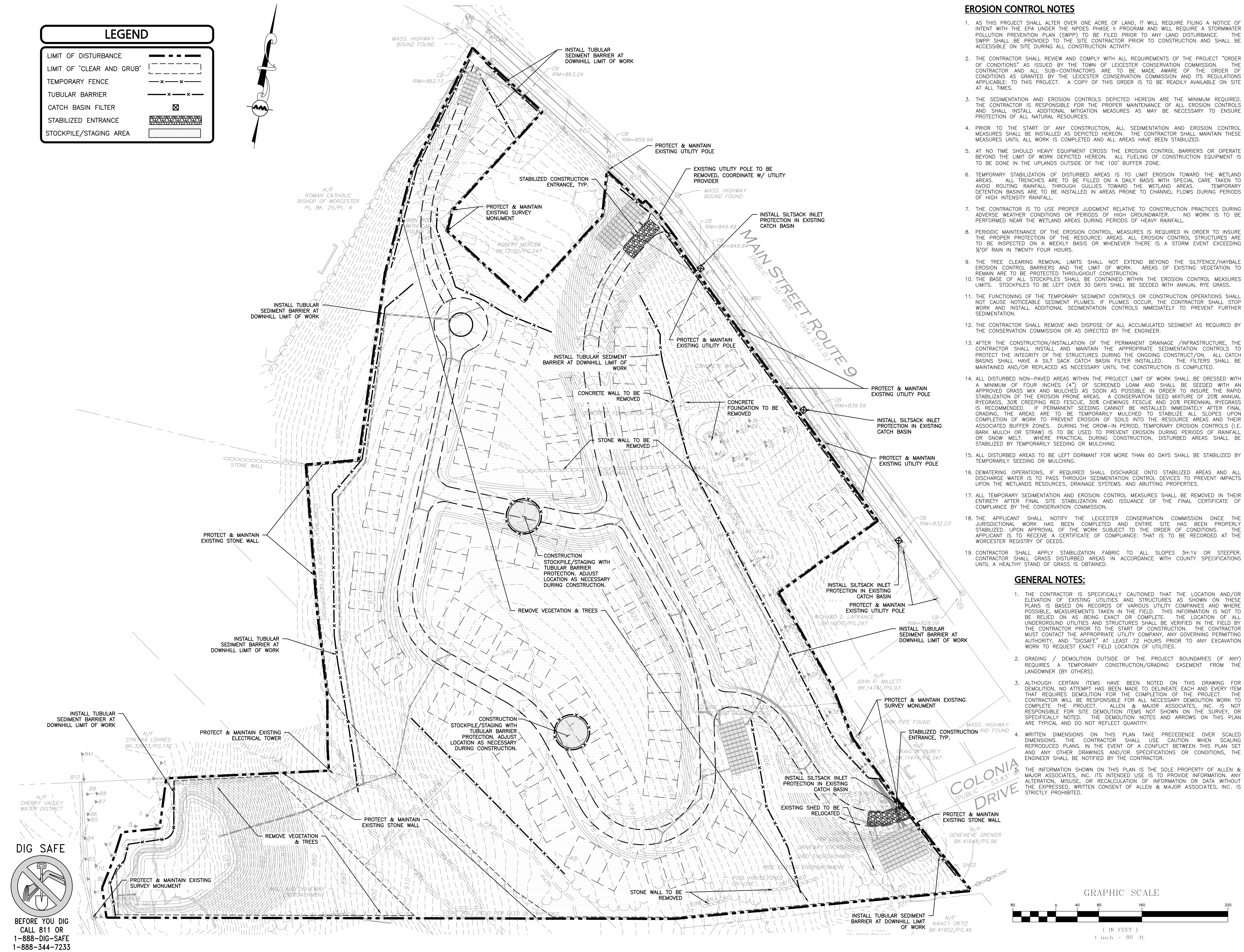
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:	SHEET No.
EXISTING CONDITIONS	V-101

N:\PROJECTS\2889-01\SURVEY\DRAWINGS\CURRENT\S-2889-01-EC.DWG



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EROSION CONTROL NOTES

1. AS THIS PROJECT SHALL ALTER OVER ONE ACRE OF LAND, IT WILL REQUIRE FILING A NOTICE OF INTENT WITH THE EPA UNDER THE NPDES PHASE II PROGRAM AND WILL REQUIRE A STORMWATER POLLUTION PREVENTION PLAN (SWPP) TO BE FILED PRIOR TO ANY LAND DISTURBANCE. THE SWPP SHALL BE PROVIDED TO THE SITE CONTRACTOR PRIOR TO CONSTRUCTION AND SHALL BE ACCESSIBLE ON SITE DURING ALL CONSTRUCTION ACTIVITY.

2. THE CONTRACTOR SHALL REVIEW AND COMPLY WITH ALL REQUIREMENTS OF THE PROJECT "ORDER OF CONDITIONS" AS ISSUED BY THE TOWN OF LEICESTER CONSERVATION COMMISSION. THE CONTRACTOR AND ALL SUB-CONTRACTORS ARE TO BE MADE AWARE OF THE ORDER OF CONDITIONS AS GRANTED BY THE LEICESTER CONSERVATION COMMISSION AND ITS REGULATIONS APPLICABLE: TO THIS PROJECT. A COPY OF THIS ORDER IS TO BE READILY AVAILABLE ON SITE AT ALL TIMES.

3. THE SEDIMENTATION AND EROSION CONTROLS DEPICTED HEREON ARE THE MINIMUM REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER MAINTENANCE OF ALL EROSION CONTROLS AND SHALL INSTALL ADDITIONAL MITIGATION MEASURES AS MAY BE NECESSARY TO ENSURE PROTECTION OF ALL NATURAL RESOURCES.

4. PRIOR TO THE START OF ANY CONSTRUCTION, ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED AS DEPICTED HEREON. THE CONTRACTOR SHALL MAINTAIN THESE MEASURES UNTIL ALL WORK IS COMPLETED AND ALL AREAS HAVE BEEN STABILIZED.

5. AT NO TIME SHOULD HEAVY EQUIPMENT CROSS THE EROSION CONTROL BARRIERS OR OPERATE BEYOND THE LIMIT OF WORK DEPICTED HEREON. ALL FUELING OF CONSTRUCTION EQUIPMENT IS TO BE DONE IN THE UPLANDS OUTSIDE OF THE 100' BUFFER ZONE.

6. TEMPORARY STABILIZATION OF DISTURBED AREAS IS TO LIMIT EROSION TOWARD THE WETLAND AREAS. ALL TRENCHES ARE TO BE FILLED ON A DAILY BASIS WITH SPECIAL CARE TAKEN TO AVOID ROUTING RAINFALL THROUGH GULLIES TOWARD THE WETLAND AREAS. TEMPORARY DETENTION BASINS ARE TO BE INSTALLED IN AREAS PRONE TO CHANNEL FLOWS DURING PERIODS OF HIGH INTENSITY RAINFALL.

7. THE CONTRACTOR IS TO USE PROPER JUDGMENT RELATIVE TO CONSTRUCTION PRACTICES DURING ADVERSE WEATHER CONDITIONS OR PERIODS OF HIGH GROUNDWATER. NO WORK IS TO BE PERFORMED NEAR THE WETLAND AREAS DURING PERIODS OF HEAVY RAINFALL.

8. PERIODIC MAINTENANCE OF THE EROSION CONTROL. MEASURES IS REQUIRED IN ORDER TO INSURE THE PROPER PROTECTION OF THE RESOURCE: AREAS. ALL EROSION CONTROL STRUCTURES ARE TO BE INSPECTED ON A WEEKLY BASIS OR WHENEVER THERE IS A STORM EVENT EXCEEDING ½"OF RAIN IN TWENTY FOUR HOURS.

9. THE TREE CLEARING REMOVAL LIMITS SHALL NOT EXTEND BEYOND THE SILTFENCE/HAYBALE EROSION CONTROL BARRIERS AND THE LIMIT OF WORK. AREAS OF EXISTING VEGETATION TO REMAIN ARE TO BE PROTECTED THROUGHOUT CONSTRUCTION.

10. THE BASE OF ALL STOCKPILES SHALL BE CONTAINED WITHIN THE EROSION CONTROL MEASURES LIMITS. STOCKPILES TO BE LEFT OVER 30 DAYS SHALL BE SEEDED WITH ANNUAL RYE GRASS.

11. THE FUNCTIONING OF THE TEMPORARY SEDIMENT CONTROLS OR CONSTRUCTION OPERATIONS SHALL NOT CAUSE NOTICEABLE SEDIMENT PLUMES. IF PLUMES OCCUR, THE CONTRACTOR SHALL STOP WORK AND INSTALL ADDITIONAL SEDIMENTATION CONTROLS IMMEDIATELY TO PREVENT FURTHER SEDIMENTATION.

12. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL ACCUMULATED SEDIMENT AS REQUIRED BY THE CONSERVATION COMMISSION OR AS DIRECTED BY THE ENGINEER.

13. AFTER THE CONSTRUCTION/INSTALLATION OF THE PERMANENT DRAINAGE /INFRASTRUCTURE, THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE APPROPRIATE SEDIMENTATION CONTROLS TO PROTECT THE INTEGRITY OF THE STRUCTURES DURING THE ONGOING CONSTRUCT/ON. ALL CATCH BASINS SHALL HAVE A SILT SACK CATCH BASIN FILTER INSTALLED. THE FILTERS SHALL BE MAINTAINED AND/OR REPLACED AS NECESSARY UNTIL THE CONSTRUCTION IS COMPLETED.

14. ALL DISTURBED NON-PAVED AREAS WITHIN THE PROJECT LIMIT OF WORK SHALL BE DRESSED WITH A MINIMUM OF FOUR INCHES (4") OF SCREENED LOAM AND SHALL BE SEEDED WITH AN APPROVED GRASS MIX AND MULCHED AS SOON AS POSSIBLE IN ORDER TO INSURE THE RAPID STABILIZATION DF THE EROSION PRONE AREAS. A CONSERVATION SEED MIXTURE OF 20% ANNUAL RYEGRASS, 30% CREEPING RED FESCUE, 30% CHEWINGS FESCUE AND 20% PERENNIAL RYEGRASS IS RECOMMENDED. IF PERMANENT SEEDING CANNOT BE INSTALLED IMMEDIATELY AFTER FINAL GRADING, THE AREAS ARE TO BE TEMPORARILY MULCHED TO STABILIZE ALL SLOPES UPON COMPLETION OF WORK TO PREVENT EROSION OF SOILS INTO THE RESOURCE AREAS AND THEIR ASSOCIATED BUFFER ZONES. DURING THE GROW-IN PERIOD, TEMPORARY EROSION CONTROLS (I.E. BARK MULCH OR STRAW) IS TO BE USED TO PREVENT EROSION DURING PERIODS OF RAINFALL OR SNOW MELT. WHERE PRACTICAL DURING CONSTRUCTION, DISTURBED AREAS SHALL BE STABILIZED BY TEMPORARILY SEEDING OR MULCHING.

15. ALL DISTURBED AREAS TO BE LEFT DORMANT FOR MORE THAN 60 DAYS SHALL BE STABILIZED BY TEMPORARILY SEEDING OR MULCHING.

16. DEWATERING OPERATIONS, IF REQUIRED SHALL DISCHARGE ONTO STABILIZED AREAS AND ALL DISCHARGE WATER IS TO PASS THROUGH SEDIMENTATION CONTROL DEVICES TO PREVENT IMPACTS UPON THE WETLANDS RESOURCES, DRAINAGE SYSTEMS. AND ABUTTING PROPERTIES.

17. ALL TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE REMOVED IN THEIR ENTIRETY AFTER FINAL SITE STABILIZATION AND ISSUANCE OF THE FINAL CERTIFICATE OF COMPLIANCE BY THE CONSERVATION COMMISSION.

18. THE APPLICANT SHALL NOTIFY THE LEICESTER CONSERVATION COMMISSION ONCE THE JURISDICTIONAL WORK HAS BEEN COMPLETED AND ENTIRE SITE HAS BEEN PROPERLY STABILIZED. UPON APPROVAL OF THE WORK SUBJECT TD THE ORDER OF CONDITIONS. THE APPLICANT IS TO RECEIVE A CERTIFICATE OF COMPLIANCE: THAT IS TO BE RECORDED AT THE WORCESTER REGISTRY OF DEEDS.

19. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 3H:1V OR STEEPER. CONTRACTOR SHALL GRASS DISTURBED AREAS IN ACCORDANCE WITH COUNTY SPECIFICATIONS UNTIL A HEALTHY STAND OF GRASS IS OBTAINED.

GENERAL NOTES:

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIGSAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES.

2. GRADING / DEMOLITION OUTSIDE OF THE PROJECT BOUNDARIES (IF ANY) REQUIRES A TEMPORARY CONSTRUCTION/GRADING EASEMENT FROM THE LANDOWNER (BY OTHERS).

3. ALTHOUGH CERTAIN ITEMS HAVE BEEN NOTED ON THIS DRAWING FOR DEMOLITION, NO ATTEMPT HAS BEEN MADE TO DELINEATE EACH AND EVERY ITEM THAT REQUIRES DEMOLITION FOR THE COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL NECESSARY DEMOLITION WORK TO COMPLETE THE PROJECT. ALLEN & MAJOR ASSOCIATES, INC. IS NOT RESPONSIBLE FOR SITE DEMOLITION ITEMS NOT SHOWN ON THE SURVEY, OR SPECIFICALLY NOTED. THE DEMOLITION NOTES AND ARROWS ON THIS PLAN ARE TYPICAL AND DO NOT REFLECT QUANTITY.

4. WRITTEN DIMENSIONS ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS OR CONDITIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR.

5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

____

TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:

MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:

SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 80'	DWG. :	C-2889-01_Site-Prep
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: SITE PREPARATION PLAN

SHEET No. C-100

LEGEND

PROP. PROPERTY LINE	
CURB	
SIDEWALK	
ADA ACCESSIBLE RAMP	
BASELINE	
SIGN	
GRAVEL ACCESS	
ZONING DISTRICT LINE	

UNIT DENSITY CALCULATION

BUSINESS (B) AND SUBURBAN AGRICULTURAL (SA)

	Acres	SF		
Lot Area	29.74	1,295,474		

		Net Area Reduction Ratio	Net Area Reduction	Net Area Reduction
Wetland Buffer	140,808	0.0%	0	140,808
Electrical Easement	127,766	0.0%	0	127,766
slopes of 20% or greater	262,318	0.0%	0	262,318
				530,893
subdivision roads and infrastructure		20.0%		152,916

	Lot		Buffers		Roads		Allowable
Net Acreage	1,295,474	-	530,893	-	152,916	=	611,665

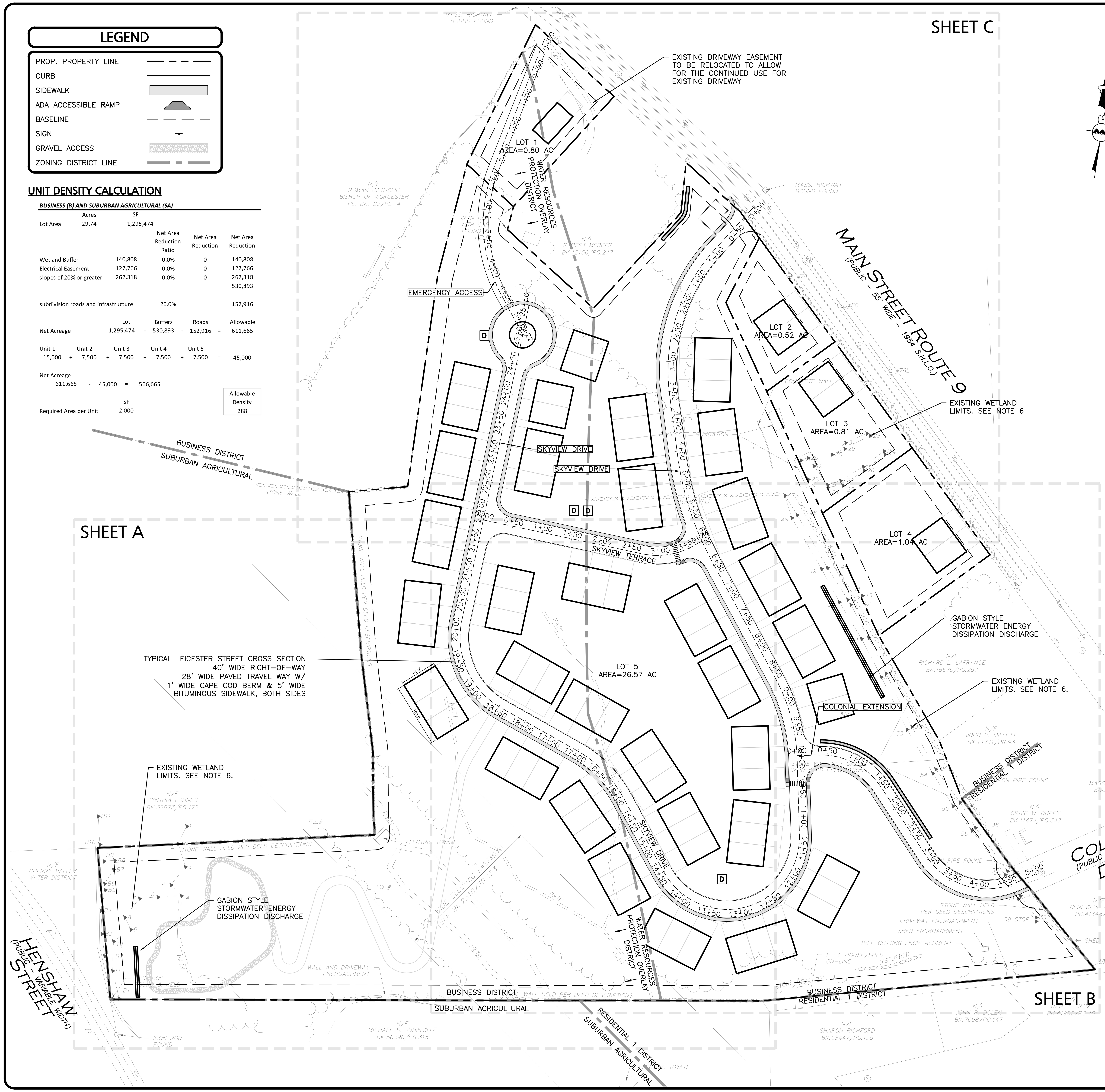
Unit 1		Unit 2		Unit 3		Unit 4		Unit 5		
15,000	+	7,500	+	7,500	+	7,500	+	7,500	=	45,000

Net Acreage

611,665 - 45,000 = 566,665

	SF
Required Area per Unit	2,000

Allowable Density 288



DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

FOR REGISTRY USE ONLY

GENERAL NOTES

1. THE OWNER OF RECORD:

   LOT 21–B5.1
   EFG REALTY TRUST
   76 MCCLELLAN STREET
   AMHERST, MA 01002
   BOOK 16761, PAGE 78

2. ZONING DISTRICT: BUSINESS (B) AND SUBURBAN AGRICULTURAL (SA) DISTRICT TO THE SOUTH & WEST
   - LOT SIZE: 22,500 SF
   - LOT FRONTAGE: 100 FT.
   - FRONT SETBACK: 25 FT.
   - SIDE SETBACK: 15 FT.
   - REAR SETBACK: 25 FT.

3. EXISTING USE OF LOT 21–B5.1 IS VACANT LAND.

4. NO PORTION OF THE PROPERTY IS WITHIN THE 100 YEAR FLOOD BOUNDARY HAZARD ZONE AS SHOWN ON THE FLOOD INSURANCE RATE MAP #25027C0782E WITH AN EFFECTIVE DATE: JULY 14, 2011 FOR THE CITY OF LEICESTER.

5. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF LEICESTER, MDOT, MADEP, MUTCD, AND AASHTO.

6. AREAS SUBJECT TO PROTECTION UNDER THE WETLANDS PROTECTION ACT HAVE BEEN DELINEATED BY GOVE ENVIRONMENTAL SERVICES INC IN 2021. THESE AREAS ARE DEPICTED ON THE PLANS BASED ON FIELD SURVEY LOCATION DURING THE TOPOGRAPHIC SURVEY.

7. ANY DAMAGE TO PRIVATE OR PUBLIC PROPERTIES DUE TO THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AND RESTORED BY THE CONTRACTOR AT THEIR OWN EXPENSE.

8. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS

9. ALL PROPERTY MARKERS AND STREET LINE MONUMENTS SHALL BE PROPERLY PROTECTED DURING CONSTRUCTION. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED AND RESTORED BY A SURVEYOR REGISTERED IN THE STATE OF MASSACHUSETTS AT THE CONTRACTORS EXPENSE.

10. IN ACCORDANCE WITH CHAPTER 82, SECTION 40, INCLUDING AMENDMENTS. ALL CONTRACTORS SHALL NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG–SAFE AT 1–888–344–7233 72 HOURS BEFORE ANY EXCAVATION.

11. A FIFTEEN FOOT (15') WIDE TEMPORARY SLOPE AND CONSTRUCTION EASEMENT SHALL BE PROVIDED PARALLEL AND ALONG THE ENTIRE PROPOSED RIGHT–OF–WAY ACROSS THE FRONTAGE OF EACH LOT THE TEMPORARY SLOPE AND CONSTRUCTION EASEMENT SHALL BE EXTINGUISHED UPON ACCEPTANCE OF THE ROADWAY BY THE TOWN OF LEICESTER.

12. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING A PRE–CONSTRUCTION MEETING WITH THE TOWN, THE APPROPRIATE UTILITY COMPANIES, THE OWNER AND OWNER'S REPRESENTATIVE. THE MEETING SHALL TAKE PLACE PRIOR TO THE START OF CONSTRUCTION AND THE CONTRACTOR MUST PROVIDE 48 HOURS NOTICE TO ALL ATTENDEES PRIOR TO THE START OF THE MEETING.

13. APPROPRIATE WARNING SIGNS, MARKERS, BARRICADES AND/OR FLAGMEN SHALL BE PROVIDED TO REGULATE TRAFFIC. CONSTRUCTION TRAFFIC CONTROL SHALL BE IMPLEMENTED PER THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE LOCAL AUTHORITY.

14. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

15. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED , WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

16. THE CONTRACTOR IS RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS OF THE SITE. THESE PLANS PREPARED BY ALLEN & MAJOR ASSOCIATES, INC., DO NOT EXTEND TO, NOR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THE EMPLOYEES, AGENTS OF REPRESENTATIVES IN PERFORMANCE OF THE WORK. THE SEAL OF THE ARCHITECT OR ENGINEER HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OF OBTAIN THE APPROPRIATE SAFETY SYSTEMS THAT MAY BE REQUIRED BY THE US OCCUPATIONAL SAFETY AND HEATH ADMINISTRATION (OSHA) AND/OR LOCAL REGULATIONS.

17. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE START OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DRAWINGS, SPECIFICATIONS, OR RELATIVE CODES, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT PRIOR TO START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AND/OR DESIGN INTENT OF THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.

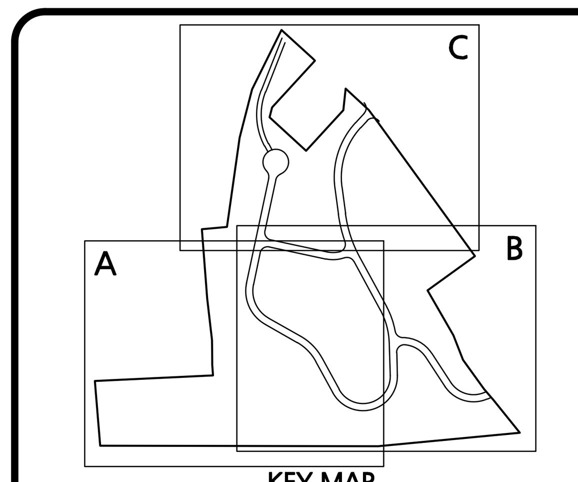
18. THE DESIGN ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF THE DESIGN ENGINEER WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES, OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.

19. PARKING REQUIREMENTS SHALL BE MET THROUGH THE CONSTRUCTION OF AN ATTACHED TWO CAR GARAGE FOR EACH RESIDENTIAL STRUCTURE.

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.



KEY MAP
NOT TO SCALE

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ______

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:

MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
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PROJECT:

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MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 80'	DWG. :	C-2889-01_Layout & Materials
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

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civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
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WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:

DEFINITIVE SUBDIVISION
KEY PLAN

SHEET No. C-101

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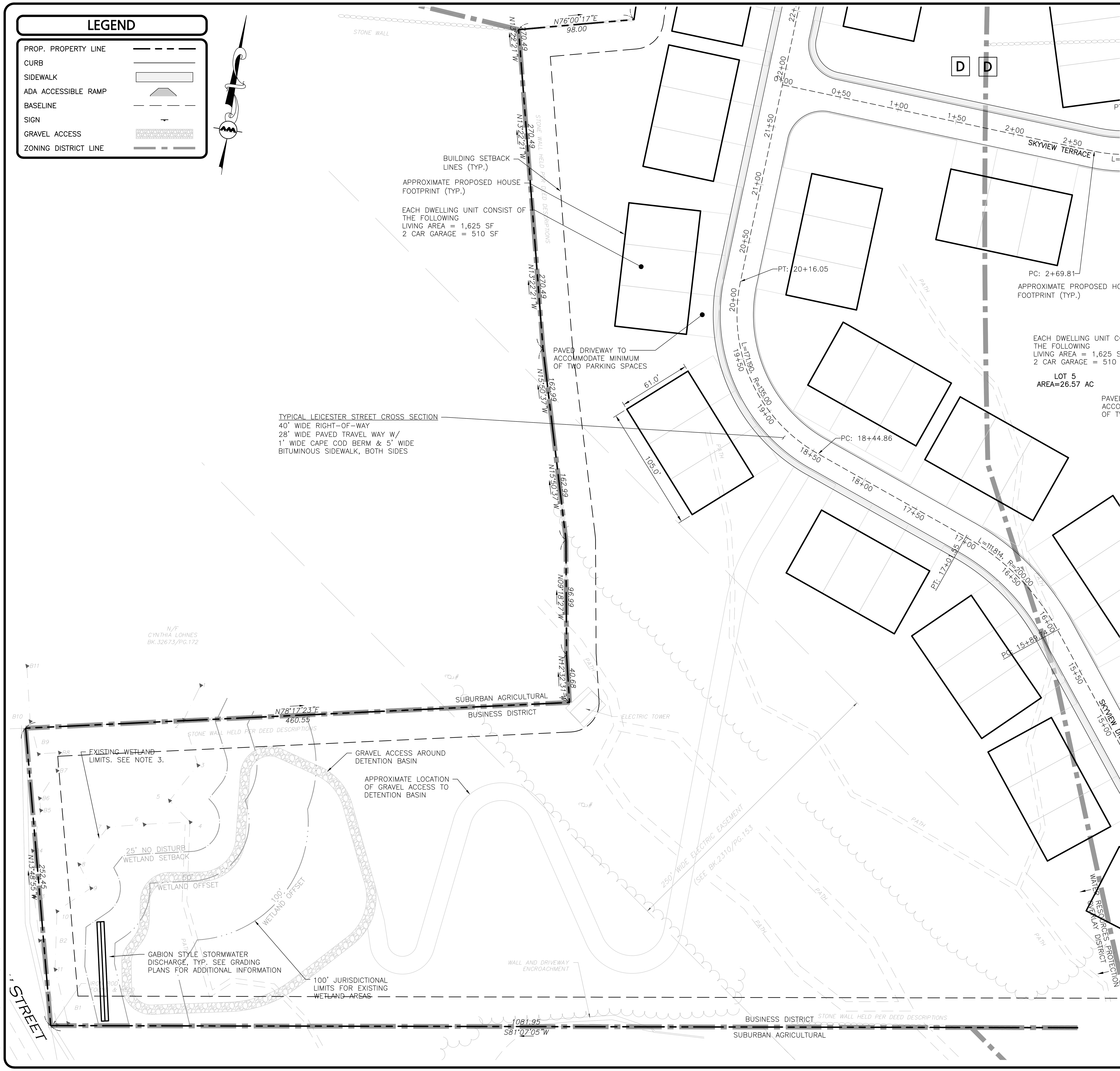

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CONDITIONS OF APPROVAL ARE CONTAINED IN THE WRITTEN DECISION OF THE PLANNING BOARD ENTITLED, "CERTIFICATE OF APPROVAL OF A DEFINITIVE SUBDIVISION PLAN" DATED ____________ 2021 AND RECORDED IN THE WORCESTER DISTRICT REGISTRY OF DEEDS IN BOOK _____ PAGE _____.

THE CONSTRUCTION OF WAYS AND INSTALLATION OF SERVICES SHOWN ON THIS PLAN ARE SECURED BY WAY OF A COVENANT, DATED ____________ TO BE RECORDED HEREWITH.

APPROVAL OF THE LEICESTER PLANNING BOARD IS FOR _____ YEARS ONLY. IN THE EVENT THE WAYS AND SERVICES SHOWN ON THIS PLAN ARE NOT CONSTRUCTED AND INSTALLED WITHIN YEARS _______ FROM THE DATE OF ENDORSEMENT, THE BOARD'S APPROVAL IS RESCINDED, AND THIS PLAN IS AND SHALL BE NULL AND VOID.

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET THE REGISTRY OF DEEDS REQUIREMENTS AND ARE NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO THE CURRENT TOWNS OF LEICESTER ASSESSOR'S RECORDS.

I CERTIFY THIS PLAN HAS BEEN PREPARED IN CONFORMITY THE THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

ISSUED FOR
PLANNING BOARD REVIEW
SEPTEMBER 17, 2021

PROFESSIONAL LAND SURVEYOR FOR ALLEN & MAJOR ASSOCIATES, INC.

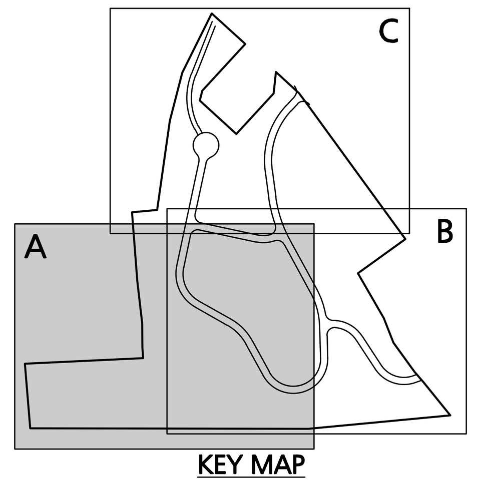
ZONING
BUSINESS (B) & SUBURBAN AGRICULTURAL (SA)

ITEM	REQUIRED
LOT AREA	22,500 S.F.
FRONTAGE	100 FEET
FRONT YARD	25 FEET
REAR YARD	25 FEET
SIDE YARD	15 FEET

GENERAL NOTES

1. NO PORTION OF THE PROPERTY IS WITHIN THE 100 YEAR FLOOD BOUNDARY HAZARD ZONE AS SHOWN ON THE FLOOD INSURANCE RATE MAP #25027C0782E WITH AN EFFECTIVE DATE: JULY 14, 2011 FOR THE CITY OF LEICESTER.
2. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF LEICESTER, MDOT, MADEP, MUTCD, AND AASHTO.
3. AREAS SUBJECT TO PROTECTION UNDER THE WETLANDS PROTECTION ACT HAVE BEEN DELINEATED BY GOVE ENVIRONMENTAL SERVICES INC IN 2021. THESE AREAS ARE DEPICTED ON THE PLANS BASED ON FIELD SURVEY LOCATION DURING THE TOPOGRAPHIC SURVEY.
4. A FIFTEEN FOOT (15') WIDE TEMPORARY SLOPE AND CONSTRUCTION EASEMENT SHALL BE PROVIDED PARALLEL AND ALONG THE ENTIRE PROPOSED RIGHT-OF-WAY ACROSS THE FRONTAGE OF EACH LOT THE TEMPORARY SLOPE AND CONSTRUCTION EASEMENT SHALL BE EXTINGUISHED UPON ACCEPTANCE OF THE ROADWAY BY THE TOWN OF LEICESTER.
5. IN ACCORDANCE WITH CHAPTER 82, SECTION 40, INCLUDING AMENDMENTS. ALL CONTRACTORS SHALL NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE AT 1-888-344-7233 72 HOURS BEFORE ANY EXCAVATION.
6. THE DRAINAGE AND UTILITY EASEMENTS DEPICTED HEREON ARE REQUIRED BY THE TOWN OF LEICESTER DEPARTMENT OF PUBLIC WORKS IN ORDER TO MAINTAIN THE DRAINAGE INFRASTRUCTURE (LINES, MANHOLES, SWALES. PONDS, ETC.) AND SHALL BE GRANTED TO THE TOWN OF LEICESTER.
7. ALL PROPOSED LOTS TO BE SERVICED BY MUNICIPAL WATER (LEICESTER WATER SUPPLY DISTRICT) AND MUNICIPAL SEWER (CHERRY VALLEY SEWER DISTRICT).
8. THE DESIGN ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF THE DESIGN ENGINEER WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES, OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.

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



KEY MAP
NOT TO SCALE

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG.:	C-2889-01_Layout & Materials
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
DEFINITIVE LAYOUT PLAN

SHEET No.
C-101A

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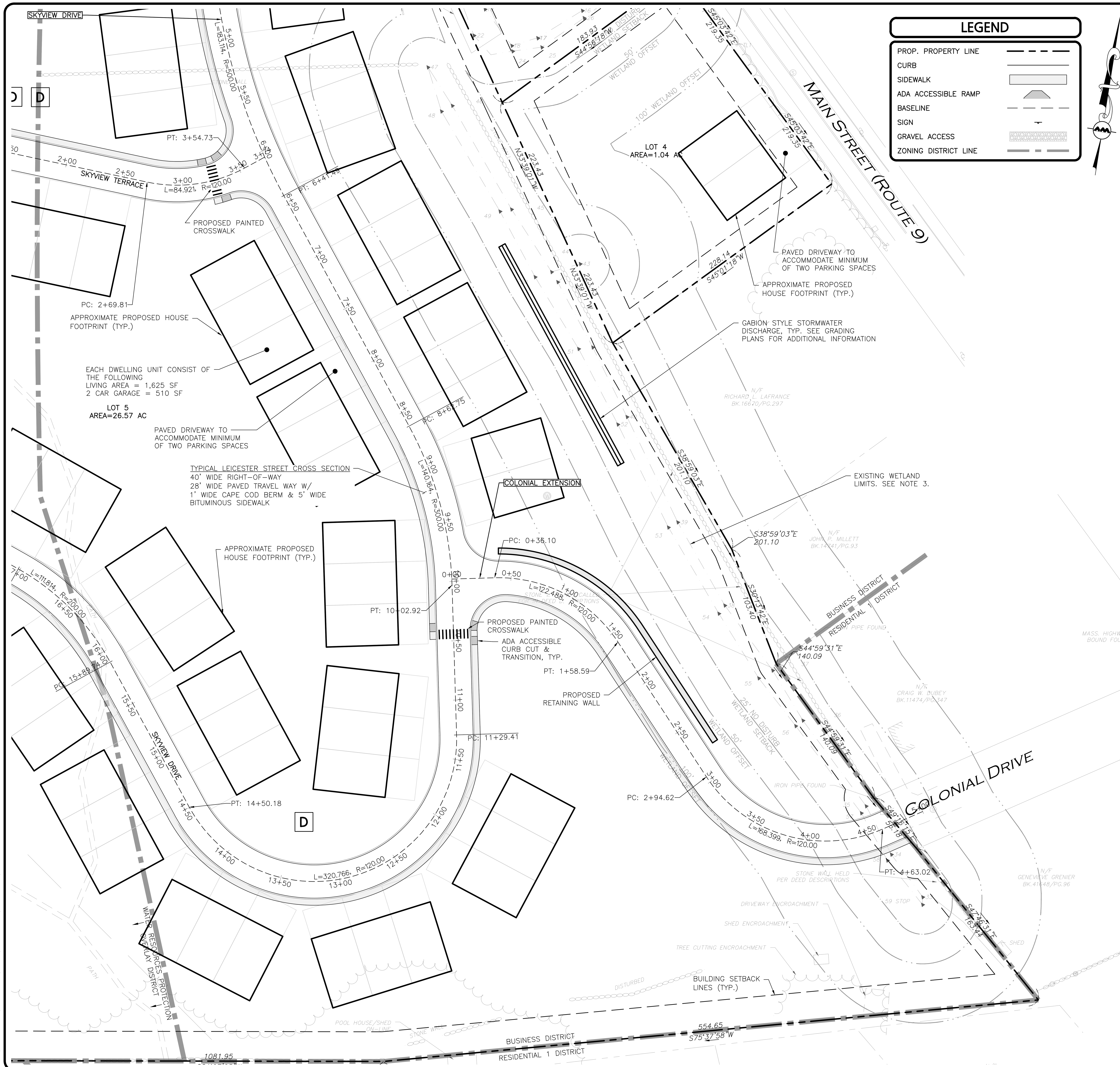

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ISSUED FOR
PLANNING BOARD REVIEW
SEPTEMBER 17, 2021

PROFESSIONAL LAND SURVEYOR FOR ALLEN & MAJOR ASSOCIATES, INC.

ZONING
BUSINESS (B) & SUBURBAN AGRICULTURAL (SA)

ITEM	REQUIRED
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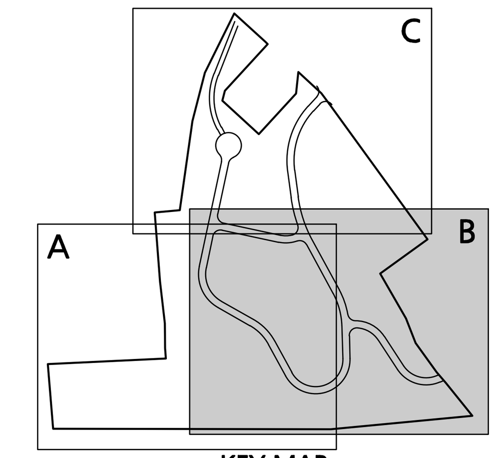

KEY MAP
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DATE: ______________

LEICESTER PLANNING BOARD

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TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
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REV	DATE	DESCRIPTION
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APPLICANT:

MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG. :	C-2889-01_Layout & Materials
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
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civil engineering ◆ land surveying
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DRAWING TITLE: DEFINITIVE LAYOUT PLAN

SHEET No. C-101B

5 OF 22

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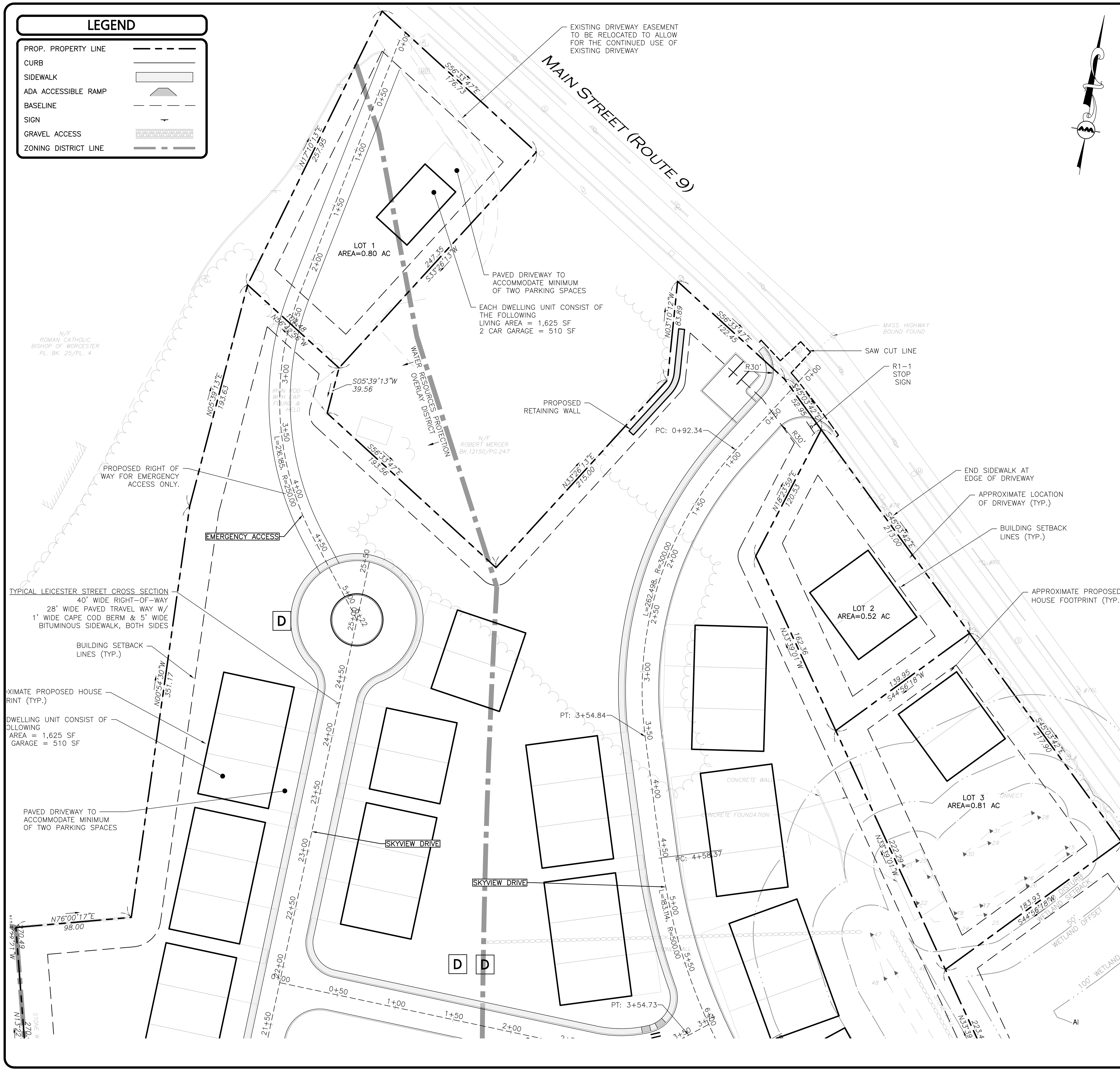

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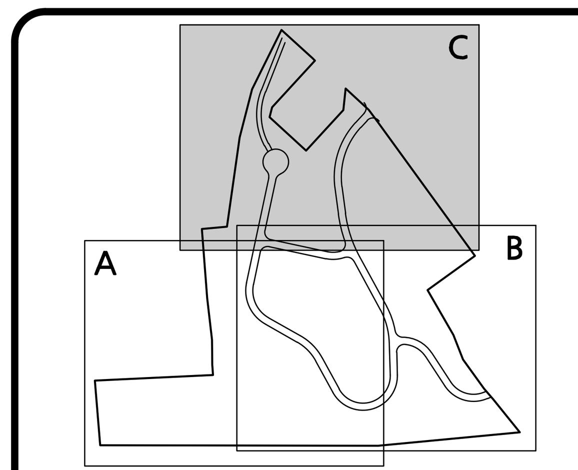

KEY MAP
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APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

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PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG.:	C-2889-01_Layout & Materials
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
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DRAWING TITLE: DEFINITIVE LAYOUT PLAN

SHEET No. C-101C

EROSION CONTROL NOTES

1. AS THIS PROJECT SHALL ALTER OVER ONE ACRE OF LAND, IT WILL REQUIRE FILING A NOTICE OF INTENT WITH THE EPA UNDER THE NPDES PHASE II PROGRAM AND WILL REQUIRE A STORMWATER POLLUTION PREVENTION PLAN (SWPP) TO BE FILED PRIOR TO ANY LAND DISTURBANCE. THE SWPP SHALL BE PROVIDED TO THE SITE CONTRACTOR PRIOR TO CONSTRUCTION AND SHALL BE ACCESSIBLE ON SITE DURING ALL CONSTRUCTION ACTIVITY.

2. THE CONTRACTOR SHALL REVIEW AND COMPLY WITH ALL REQUIREMENTS OF THE PROJECT "ORDER OF CONDITIONS" AS ISSUED BY THE TOWN OF LEICESTER CONSERVATION COMMISSION. THE CONTRACTOR AND ALL SUB-CONTRACTORS ARE TO BE MADE AWARE OF THE ORDER OF CONDITIONS AS GRANTED BY THE LEICESTER CONSERVATION COMMISSION AND ITS REGULATIONS APPLICABLE: TO THIS PROJECT. A COPY OF THIS ORDER IS TO BE READILY AVAILABLE ON SITE AT ALL TIMES.

3. THE SEDIMENTATION AND EROSION CONTROLS DEPICTED HEREON ARE THE MINIMUM REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER MAINTENANCE OF ALL EROSION CONTROLS AND SHALL INSTALL ADDITIONAL MITIGATION MEASURES AS MAY BE NECESSARY TO ENSURE PROTECTION OF ALL NATURAL RESOURCES.

4. PRIOR TO THE START OF ANY CONSTRUCTION, ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED AS DEPICTED HEREON. THE CONTRACTOR SHALL MAINTAIN THESE MEASURES UNTIL ALL WORK IS COMPLETED AND ALL AREAS HAVE BEEN STABILIZED.

5. AT NO TIME SHOULD HEAVY EQUIPMENT CROSS THE EROSION CONTROL BARRIERS OR OPERATE BEYOND THE LIMIT OF WORK DEPICTED HEREON. ALL FUELING OF CONSTRUCTION EQUIPMENT IS TO BE DONE IN THE UPLANDS OUTSIDE OF THE 100' BUFFER ZONE.

6. TEMPORARY STABILIZATION OF DISTURBED AREAS IS TO LIMIT EROSION TOWARD THE WETLAND AREAS. ALL TRENCHES ARE TO BE FILLED ON A DAILY BASIS WITH SPECIAL CARE TAKEN TO AVOID ROUTING RAINFALL THROUGH GULLIES TOWARD THE WETLAND AREAS. TEMPORARY DETENTION BASINS ARE TO BE INSTALLED IN AREAS PRONE TO CHANNEL FLOWS DURING PERIODS OF HIGH INTENSITY RAINFALL.

7. THE CONTRACTOR IS TO USE PROPER JUDGMENT RELATIVE TO CONSTRUCTION PRACTICES DURING ADVERSE WEATHER CONDITIONS OR PERIODS OF HIGH GROUNDWATER. NO WORK IS TO BE PERFORMED NEAR THE WETLAND AREAS DURING PERIODS OF HEAVY RAINFALL.

8. PERIODIC MAINTENANCE OF THE EROSION CONTROL. MEASURES IS REQUIRED IN ORDER TO INSURE THE PROPER PROTECTION OF THE RESOURCE: AREAS. ALL EROSION CONTROL STRUCTURES ARE TO BE INSPECTED ON A WEEKLY BASIS OR WHENEVER THERE IS A STORM EVENT EXCEEDING ½"OF RAIN IN TWENTY FOUR HOURS.

9. THE TREE CLEARING REMOVAL LIMITS SHALL NOT EXTEND BEYOND THE SILTFENCE/HAYBALE EROSION CONTROL BARRIERS AND THE LIMIT OF WORK. AREAS OF EXISTING VEGETATION TO REMAIN ARE TO BE PROTECTED THROUGHOUT CONSTRUCTION.
10. THE BASE OF ALL STOCKPILES SHALL BE CONTAINED WITHIN THE EROSION CONTROL MEASURES LIMITS. STOCKPILES TO BE LEFT OVER 30 DAYS SHALL BE SEEDED WITH ANNUAL RYE GRASS.

11. THE FUNCTIONING OF THE TEMPORARY SEDIMENT CONTROLS OR CONSTRUCTION OPERATIONS SHALL NOT CAUSE NOTICEABLE SEDIMENT PLUMES. IF PLUMES OCCUR, THE CONTRACTOR SHALL STOP WORK AND INSTALL ADDITIONAL SEDIMENTATION CONTROLS IMMEDIATELY TO PREVENT FURTHER SEDIMENTATION.

12. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL ACCUMULATED SEDIMENT AS REQUIRED BY THE CONSERVATION COMMISSION OR AS DIRECTED BY THE ENGINEER.

13. AFTER THE CONSTRUCTION/INSTALLATION OF THE PERMANENT DRAINAGE /INFRASTRUCTURE, THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE APPROPRIATE SEDIMENTATION CONTROLS TO PROTECT THE INTEGRITY OF THE STRUCTURES DURING THE ONGOING CONSTRUCT/ON. ALL CATCH BASINS SHALL HAVE A SILT SAC CATCH BASIN FILTER INSTALLED. THE FILTERS SHALL BE MAINTAINED AND/OR REPLACED AS NECESSARY UNTIL THE CONSTRUCTION IS COMPLETED.

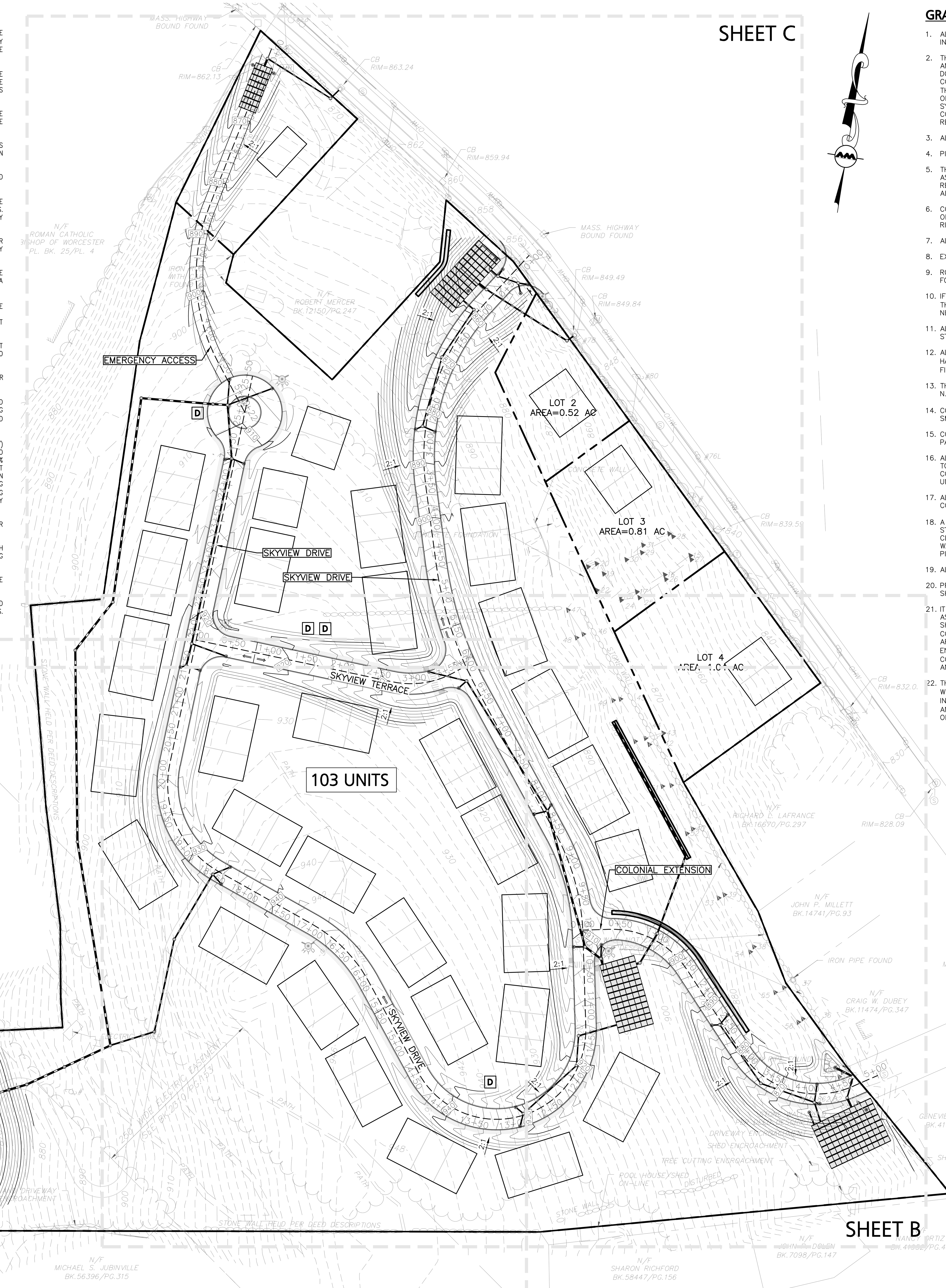
14. ALL DISTURBED NON-PAVED AREAS WITHIN THE PROJECT LIMIT OF WORK SHALL BE DRESSED WITH A MINIMUM OF FOUR INCHES (4") OF SCREENED LOAM AND SHALL BE SEEDED WITH AN APPROVED GRASS MIX AND MULCHED AS SOON AS POSSIBLE IN ORDER TO INSURE THE RAPID STABILIZATION DF THE EROSION PRONE AREAS. A CONSERVATION SEED MIXTURE OF 20% ANNUAL RYEGRASS, 30% CREEPING RED FESCUE, 30% CHEWINGS FESCUE AND 20% PERENNIAL RYEGRASS IS RECOMMENDED. IF PERMANENT SEEDING CANNOT BE INSTALLED IMMEDIATELY AFTER FINAL GRADING, THE AREAS ARE TO BE TEMPORARILY MULCHED TO STABILIZE ALL SLOPES UPON COMPLETION OF WORK TO PREVENT EROSION OF SOILS INTO THE RESOURCE AREAS AND THEIR ASSOCIATED BUFFER ZONES. DURING THE GROW-IN PERIOD, TEMPORARY EROSION CONTROLS (I.E. BARK MULCH OR STRAW) IS TO BE USED TO PREVENT EROSION DURING PERIODS OF RAINFALL OR SNOW MELT. WHERE PRACTICAL DURING CONSTRUCTION, DISTURBED AREAS SHALL BE STABILIZED BY TEMPORARILY SEEDING OR MULCHING.

15. ALL DISTURBED AREAS TO BE LEFT DORMANT FOR MORE THAN 60 DAYS SHALL BE STABILIZED BY TEMPORARILY SEEDING OR MULCHING.

16. DEWATERING OPERATIONS, IF REQUIRED SHALL DISCHARGE ONTO STABILIZED AREAS AND ALL DISCHARGE WATER IS TO PASS THROUGH SEDIMENTATION CONTROL DEVICES TO PREVENT IMPACTS UPON THE WETLANDS RESOURCES, DRAINAGE SYSTEMS. AND ABUTTING PROPERTIES.

17. ALL TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE REMOVED IN THEIR ENTIRETY AFTER FINAL SITE STABILIZATION AND ISSUANCE OF THE FINAL CERTIFICATE OF COMPLIANCE BY THE CONSERVATION COMMISSION.

18. THE APPLICANT JS TO NOTIFY THE LEICESTER CONSERVATION COMMISSION ONCE THE JURISDICTIONAL WORK HAS BEEN COMPLETED AND 1H£ ENTIRE SITE HAS B££N PROPERLY STABILIZED. UPON APPROVAL OF THE WORK SUBJECT TD THE ORDER OF CONDITIONS. THE APPLICANT IS TO RECEIVE A CERTIFICATE OF COMPLIANCE: THAT IS TO BE RECORDED AT THE WORCESTER REGISTRY OF DEEDS.



GRADING & DRAINAGE NOTES:

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3. ALL ELEVATIONS REFER TO NAVD 88.

4. PIPE DIMENSIONS ARE MEASURED FROM THE INSIDE FACE OF THE STRUCTURE.

5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

6. CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF EXISTING STRUCTURES INCLUDING REMOVAL OF ANY EXISTING UTILITIES SERVING THE STRUCTURE. UTILITIES ARE TO BE REMOVED TO THE RIGHT-OF-WAY.

7. ALL CUT OR FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED.

8. EXISTING AND PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 2 FOOT

9. ROOF DRAINS SHALL CONNECT TO NEAREST DRAIN STRUCTURE. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS.

10. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.

11. ALL STORM PIPE ENTERING STRUCTURES SHALL BE GROUTED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT.

12. ALL STORM SEWER MANHOLES IN PAVED AREAS SHALL BE FLUSH WITH PAVEMENT AND SHALL HAVE TRAFFIC BEARING RING & COVERS. MANHOLES IN UNPAVED AREAS SHALL BE 6" ABOVE FINISH GRADE. LIDS SHALL BE LABELED "DRAIN".

13. THE CONTRACTOR SHALL ADHERE TO ALL TERMS & CONDITIONS AS OUTLINED IN THE GENERAL N.P.D.E.S. PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.

14. CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.

15. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.

16. ALL UNSURFACED AREAS DISTURBED BY GRADING OPERATION SHALL RECEIVE 4 INCHES OF TOPSOIL. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 3H:1V OR STEEPER. CONTRACTOR SHALL GRASS DISTURBED AREAS IN ACCORDANCE WITH COUNTY SPECIFICATIONS UNTIL A HEALTHY STAND OF GRASS IS OBTAINED.

17. ALL CATCH BASINS ON-SITE SHALL BE EQUIPPED WITH HOODS AND 4 FOOT SUMPS AND SHALL CONFORM TO LOCAL DRAINAGE REQUIREMENTS.

18. A MINIMUM OF 18" VERTICAL CLEARANCE SHALL BE MAINTAINED WHERE WATER SERVICES CROSS STORM DRAIN LINES. WATER SERVICES SHALL BE ENCASED IN CONCRETE REGARDLESS OF CLEARANCE WHEN PASSING BELOW STORM DRAIN LINES. ENCASEMENT SHALL EXTEND ALONG WATER SERVICE A MINIMUM DISTANCE OF TEN FEET FROM THE CROSSING POINT OF THE OTHER PIPE AS MEASURED NORMALLY FROM ALL POINTS ALONG THE PIPE.

19. ALL DRAINAGE SHALL CONFORM TO LOCAL AND MADEP REQUIREMENTS.

20. PRIOR TO CONSTRUCTION OF IMPERVIOUS AREAS, ALL DRAINAGE STRUCTURES, PIPES AND BASINS SHALL BE INSTALLED AND INSPECTED FOR PROPER FUNCTION.

21. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE START OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DRAWINGS, SPECIFICATIONS, OR RELATIVE CODES, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT PRIOR TO START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AND/OR DESIGN INTENT OF THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.

22. THE DESIGN ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF THE DESIGN ENGINEER WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES, OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.

LEGEND

DRAIN MANHOLE	Ⓓ
CATCH BASIN	
DRAIN LINE	
10' CONTOUR	900
2' CONTOUR	896
DETENTION CHAMBER	
FLOW DIRECTION	⟹

SOIL TESTING NOTES:

1. ADDITIONAL TEST PITS SHALL BE DUG WITHIN THE FOOTPRINT OF EACH DRYWELL USED FOR STORMWATER INFILTRATION. A MINIMUM OF 2 VERTICAL FEET BELOW THE BOTTOM OF STONE ELEVATION. DURING EXCAVATION, DEPTHS TO BEDROCK AND/OR SEASONAL HIGH WATER SHALL BE OBSERVED AND RECORDED IF ENCOUNTERED. IF LEDGE, BEDROCK OR SIMILAR SUBSURFACE MATERIAL IS DISCOVERED WITHIN 2 VERTICAL FEET FROM THE DESIGNED BOTTOM STONE ELEVATION OF THE INFILTRATION SYSTEM, THE MATERIAL SHALL BE EXCAVATED AND REPLACED WITH CRUSHED STONE OF EQUAL DIAMETER THAT WILL BE USED TO CONSTRUCT THE INFILTRATION SYSTEM.

2. IN THE EVENT THE ON-SITE CONDITIONS ARE NOT CONSISTENT WITH THE MODELED INFILTRATION RATE, MODIFICATIONS TO THE SYSTEM MUST BE REVIEWED AND APPROVED BY THE TOWN'S ENGINEER AND BY THE PLANNING STAFF.

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

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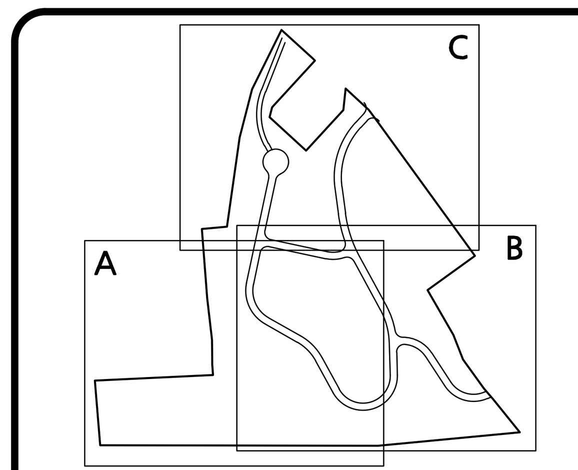
1-888-344-7233

R:\PROJECTS\2889-01\CIVIL\DRAWINGS\CURRENT\C-2889-01_GRADING & DRAINAGE.DWG



KEY MAP
NOT TO SCALE

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ______________________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

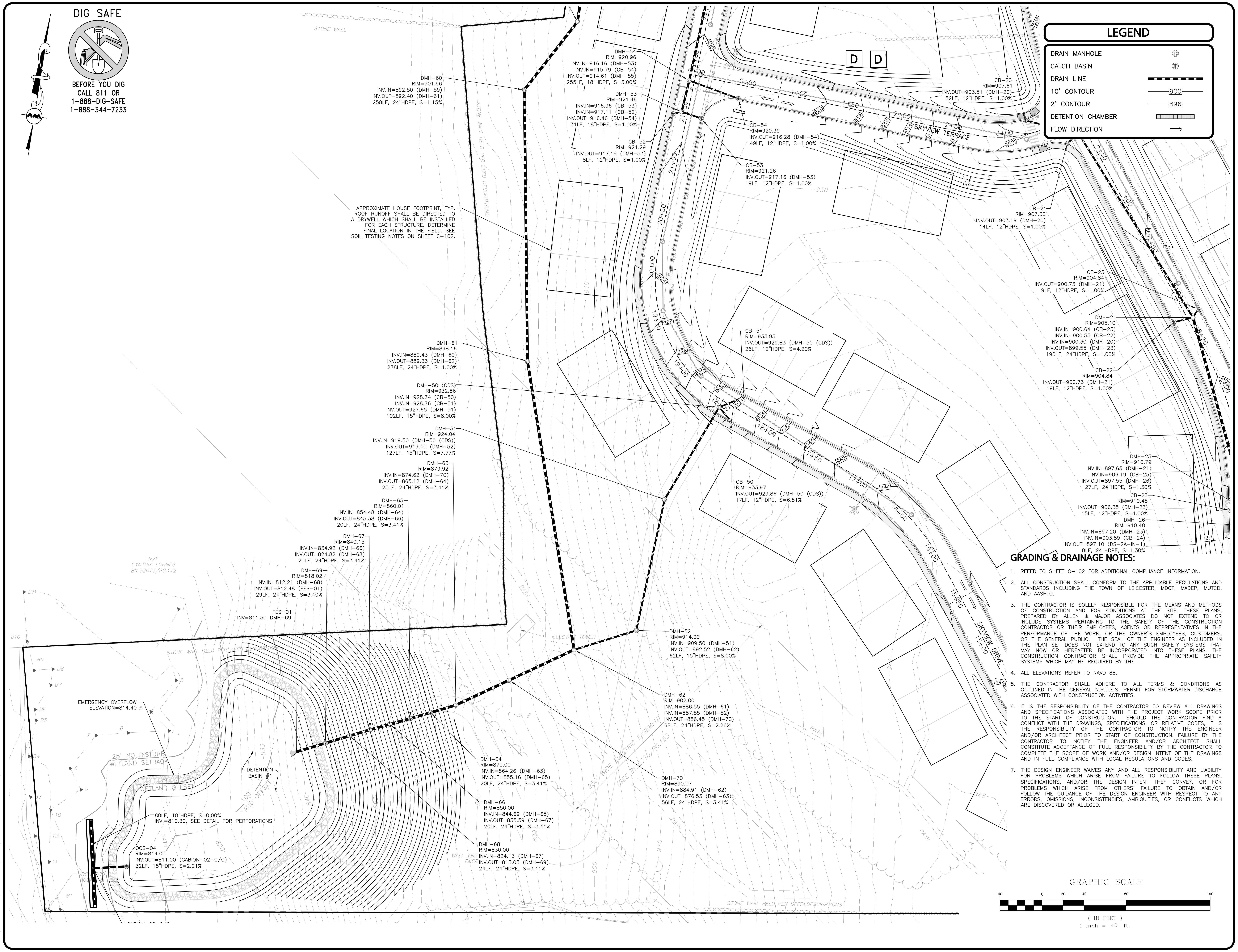
PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 80'	DWG. :	C-2889-01_Grading & Drainage
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
OVERALL GRADING & DRAINAGE PLAN

SHEET No.
C-102



GRADING & DRAINAGE NOTES:

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APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

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LEICESTER PLANNING BOARD

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TOWN CLERK – TOWN OF LEICESTER

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PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG. :	C2889-01_Grading & Drainage
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

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civil engineering ♦ land surveying
environmental consulting ♦ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
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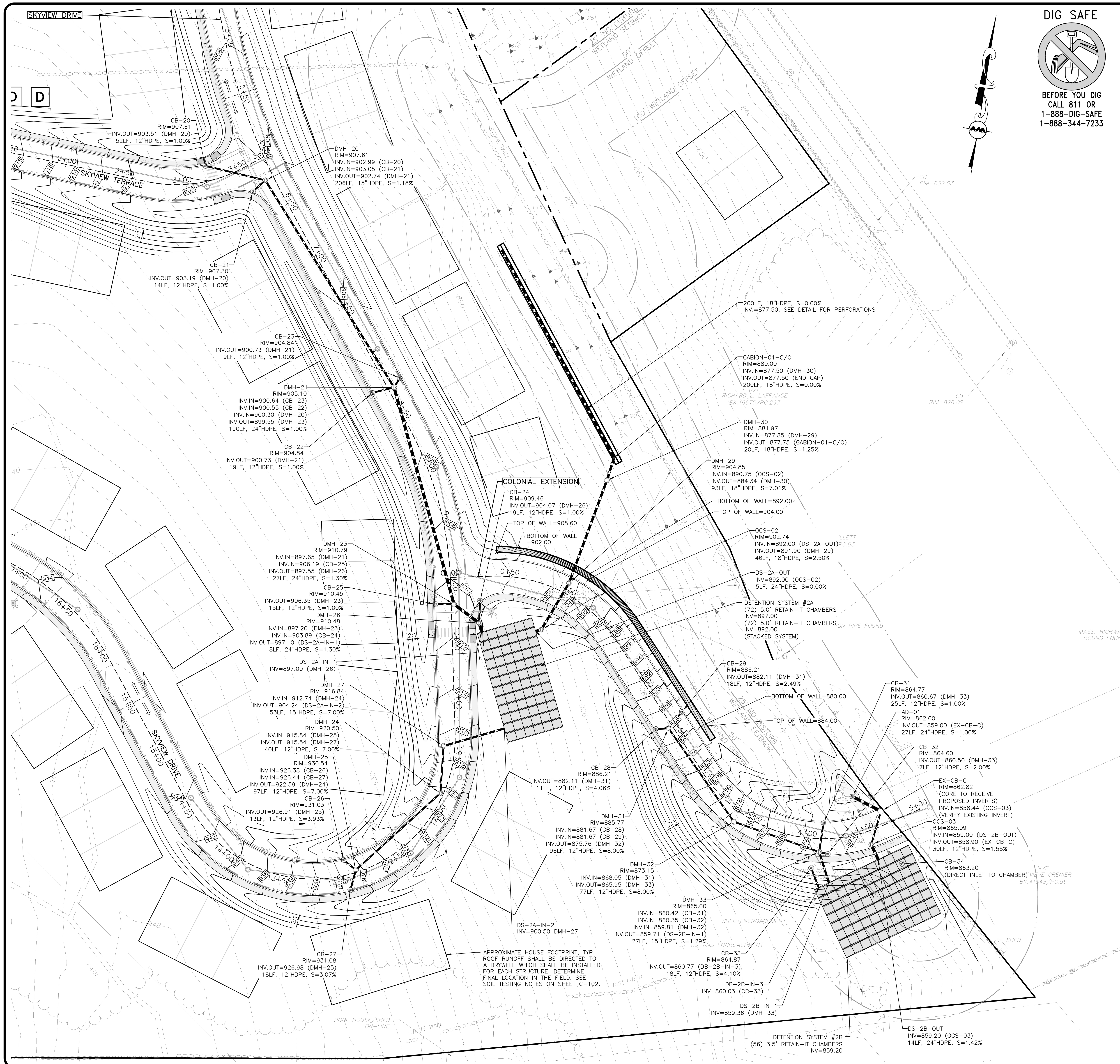
FAX: (781) 935-2896
WOBURN, MA ♦ LAKEVILLE, MA ♦ MANCHESTER, NH

DRAWING TITLE:
GRADING & DRAINAGE PLAN

SHEET No.
C-102A



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LEGEND

DRAIN MANHOLE	
CATCH BASIN	
DRAIN LINE	
10' CONTOUR	900
2' CONTOUR	896
DETENTION CHAMBER	
FLOW DIRECTION	

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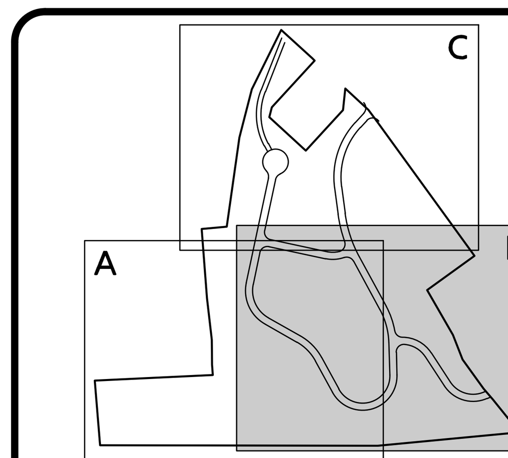
8. AREA DRAINS SHALL BE MINIUM 24" NYLOPLAST STRUCTURES WITH BEEHIVE GRATES AND 4' SUMPS.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.



KEY MAP
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LEICESTER PLANNING BOARD

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APPLICANT:
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265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
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WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
GRADING & DRAINAGE PLAN

SHEET No.
C-102B

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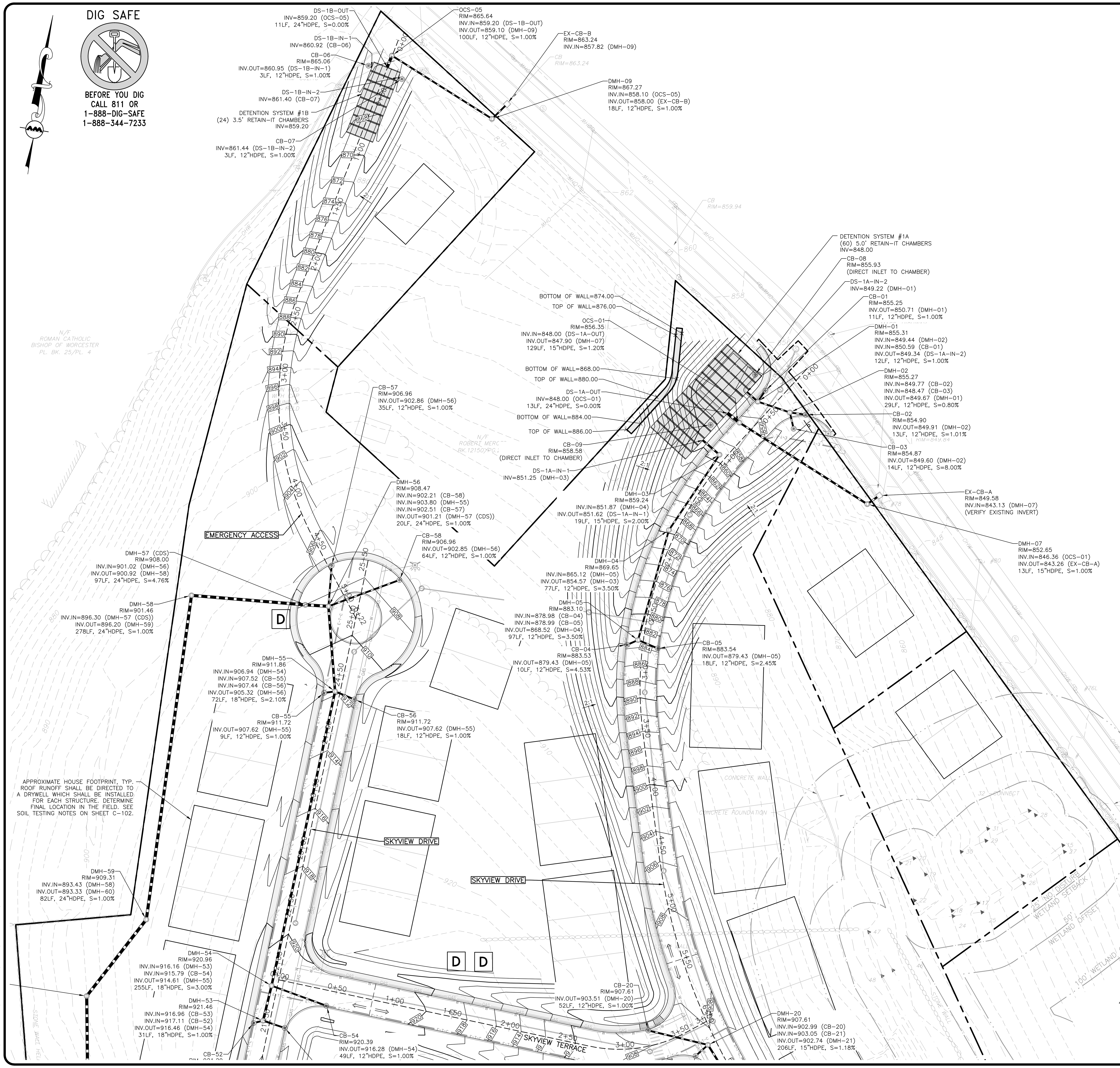

LEGEND

DRAIN MANHOLE	
CATCH BASIN	
DRAIN LINE	
10' CONTOUR	900
2' CONTOUR	896
DETENTION CHAMBER	
FLOW DIRECTION	⟹

GRADING & DRAINAGE NOTES:

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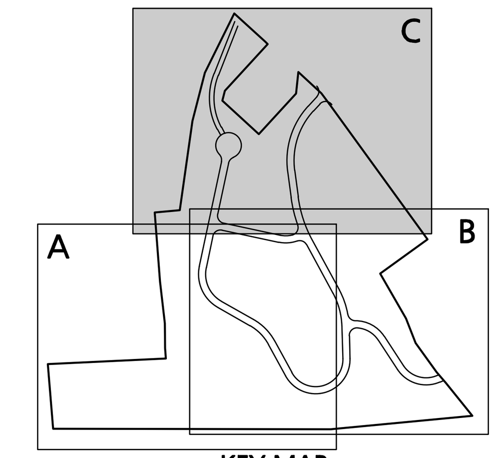

KEY MAP
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WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
GRADING & DRAINAGE PLAN

SHEET No.
C-102C

LEGEND

SEWER MANHOLE	
SEWER LINE	
WATER LINE	W
ELEC/TELE/CABLE CONDUIT	E-T-C
GAS LINE	GAS
HYDRANT	
UTILITY POLE	

DIG SAFE

BEFORE YOU DIG
CALL 811 OR
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1-888-344-7233

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GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

UTILITY NOTES:

1. A MINIMUM OF 10 FEET CLEAR HORIZONTALLY SHALL BE MAINTAINED BETWEEN WATER MAINS AND SANITARY SEWER MAINS AND/OR STORM DRAINS. WHENEVER CONDITIONS PREVENT A LATERAL SEPARATION OF 10 FEET TO A WATER MAIN, THE WATER MAIN SHALL BE LAID IN A SEPARATE TRENCH AND THE DIFFERENCE IN ELEVATION BETWEEN THE WATER MAIN AND THE SEWER MAIN SHALL BE AT LEAST 18 INCHES.
2. IN THE CASE THAT WATER MAINS CROSS SANITARY SEWER MAINS AND ARE SEPARATED BY LESS THAT 18" OF VERTICAL CLEARANCE, THE SEWER MAIN SHALL BE ENCASED IN CONCRETE FOR THE ENTIRE WIDTH OF THE TRENCH AND FOR A DISTANCE OF 8 LINEAR FEET CENTERED ON THE CROSSING.
3. THE CONTRACTOR SHALL REFER TO ARCHITECTS PLANS AND SPECIFICATIONS FOR ACTUAL LOCATION OF ALL ROOF DRAIN LATERALS AND UTILITY ENTRANCES TO INCLUDE SANITARY SEWER LATERALS, DOMESTIC AND FIRE PROTECTION WATER SERVICE, ELECTRIC, TELEPHONE, AND GAS SERVICE. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND COORDINATE WITH THE PROPER AGENCY THE LOCATION AND SCHEDULING OF CONNECTIONS WITH THEIR FACILITIES.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION. THE ENGINEER WILL THEN PROVIDE RESOLUTION TO UTILITY CONFLICTS WITHOUT DELAY.
5. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF LEICESTER, MADOT, MADEP, MUTCD, AND AASHTO.
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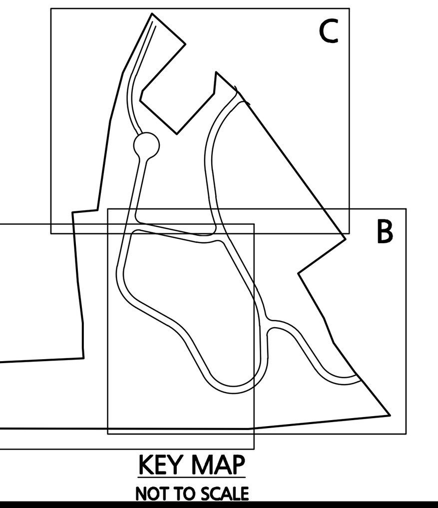
9. CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF EXISTING STRUCTURES INCLUDING REMOVAL OF ANY EXISTING UTILITIES SERVING THE STRUCTURE. UTILITIES ARE TO BE REMOVED TO THE RIGHT-OF-WAY.
10. LOCATION OF PROPOSED ELECTRICAL/COMMUNICATION SERVICE IS SCHEMATIC IN NATURE AND FOR COORDINATION PURPOSES ONLY. SPECIFIC ALIGNMENTS ARE TO BE DESIGNED BY OTHERS AND REVIEWED BY THE UTILITY PROVIDING SERVICE. PROPOSED ELECTRICAL SERVICE TO BE BURIED IN ACCORDANCE WITH THE CITY OF DOVER REGULATIONS AND ELECTRIC COMPANY.
11. LOCATION OF PROPOSED GAS MAIN IS SCHEMATIC IN NATURE AND FOR COORDINATION PURPOSES ONLY. SPECIFIC ALIGNMENTS ARE TO BE DESIGNED BY OTHERS AND REVIEWED BY THE UTILITY PROVIDING SERVICE. THIS WORK TO BE INCLUDED AS PART OF BASE BID FOR SITE WORK.
12. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE START OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DRAWINGS, SPECIFICATIONS, OR RELATIVE CODES, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT PRIOR TO START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AND/OR DESIGN INTENT OF THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
13. THE DESIGN ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF THE DESIGN ENGINEER WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES, OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.

STREET/LOT LIGHTING NOTES:

1. EACH GROUPING OF HOMES SHALL BE PROVIDED WITH A STANDARD LAMP POST LIGHT ON THE LOT NEAR THE INTERSECTION OF THE DRIVEWAY WITH THE STREET RIGHT-OF-WAY LINE. THE TYPE AND INSTALLATION SHALL BE AS DIRECTED BY THE TOWN OF LEICESTER PLANNING BOARD AND IN ACCORDANCE WITH THE STATE ELECTRICAL CODES.
2. EACH HOUSE LIGHT SHALL BE PLACED ON A DUSK TO DAWN TIMER AND SHALL BE MAINTAINED BY THE INDIVIDUAL PROPERTY OWNER AND MAINTAINED IN PERPETUITY AS STATED IN THE RECORDED COVENANTS.



KEY MAP
NOT TO SCALE

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE:

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 80'	DWG.:	C-2889-01_Utilities
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
OVERALL UTILITIES PLAN

SHEET No.
C-103

LEGEND

SEWER MANHOLE	
SEWER LINE	
WATER LINE	
ELEC/TELE/CABLE CONDUIT	
GAS LINE	
HYDRANT	
UTILITY POLE	

GENERAL PLAN NOTES:

1. REFER TO SHEET C-103 FOR ADDITIONAL COMPLIANCE INFORMATION.
2. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF LEICESTER, MDOT, MADEP, MUTCD, AND AASHTO.
3. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS AT THE SITE. THESE PLANS, PREPARED BY ALLEN & MAJOR ASSOCIATES DO NOT EXTEND TO OR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK, OR THE OWNER'S EMPLOYEES, CUSTOMERS, OR THE GENERAL PUBLIC. THE SEAL OF THE ENGINEER AS INCLUDED IN THE PLAN SET DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PROVIDE THE APPROPRIATE SAFETY SYSTEMS WHICH MAY BE REQUIRED BY THE
4. ALL ELEVATIONS REFER TO NAVD 88.
5. THE CONTRACTOR SHALL ADHERE TO ALL TERMS & CONDITIONS AS OUTLINED IN THE GENERAL N.P.D.E.S. PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE START OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DRAWINGS, SPECIFICATIONS, OR RELATIVE CODES, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT PRIOR TO START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AND/OR DESIGN INTENT OF THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
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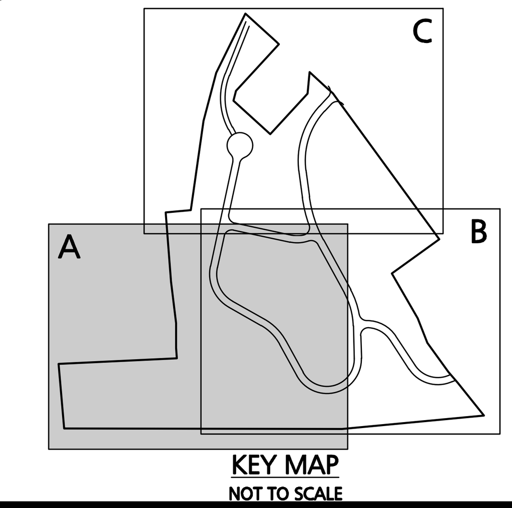


APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

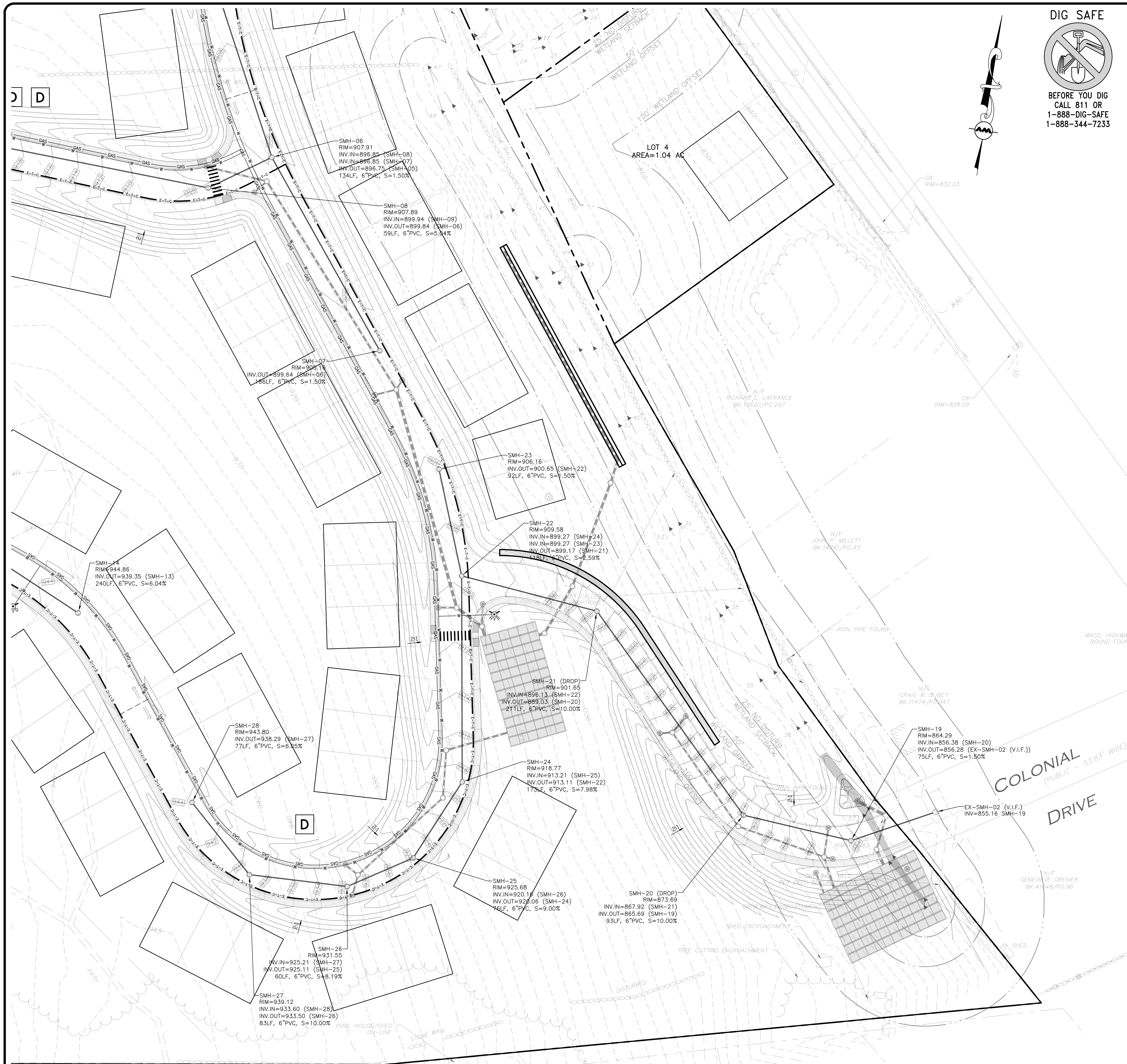
APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG.:	C-2889-01_Utilities
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
w w w . a l l e n m a j o r . c o m
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:	SHEET No.
GRADING & DRAINAGE PLAN	C-103A
	12 OF 22



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BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

LEGEND

SEWER MANHOLE	
SEWER LINE	
WATER LINE	W
ELEC/TELE/CABLE CONDUIT	E-T-C
GAS LINE	GAS
HYDRANT	
UTILITY POLE	

GENERAL PLAN NOTES:

1. REFER TO SHEET C-103 FOR ADDITIONAL COMPLIANCE INFORMATION.
2. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF LEICESTER, MDOT, MADEP, MUTCD, AND AASHTO.
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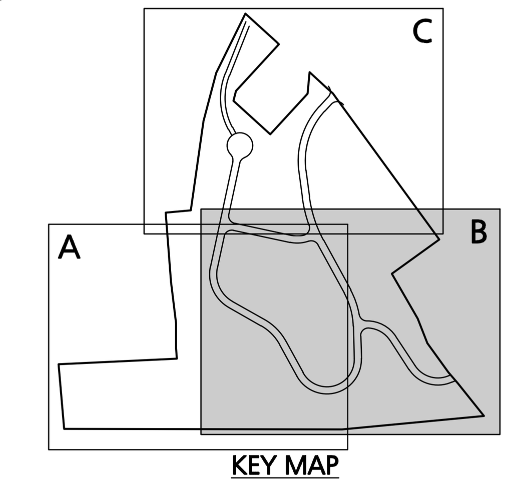
GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.



KEY MAP
NOT TO SCALE

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE:

LEICESTER PLANNING BOARD

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TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:

MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:

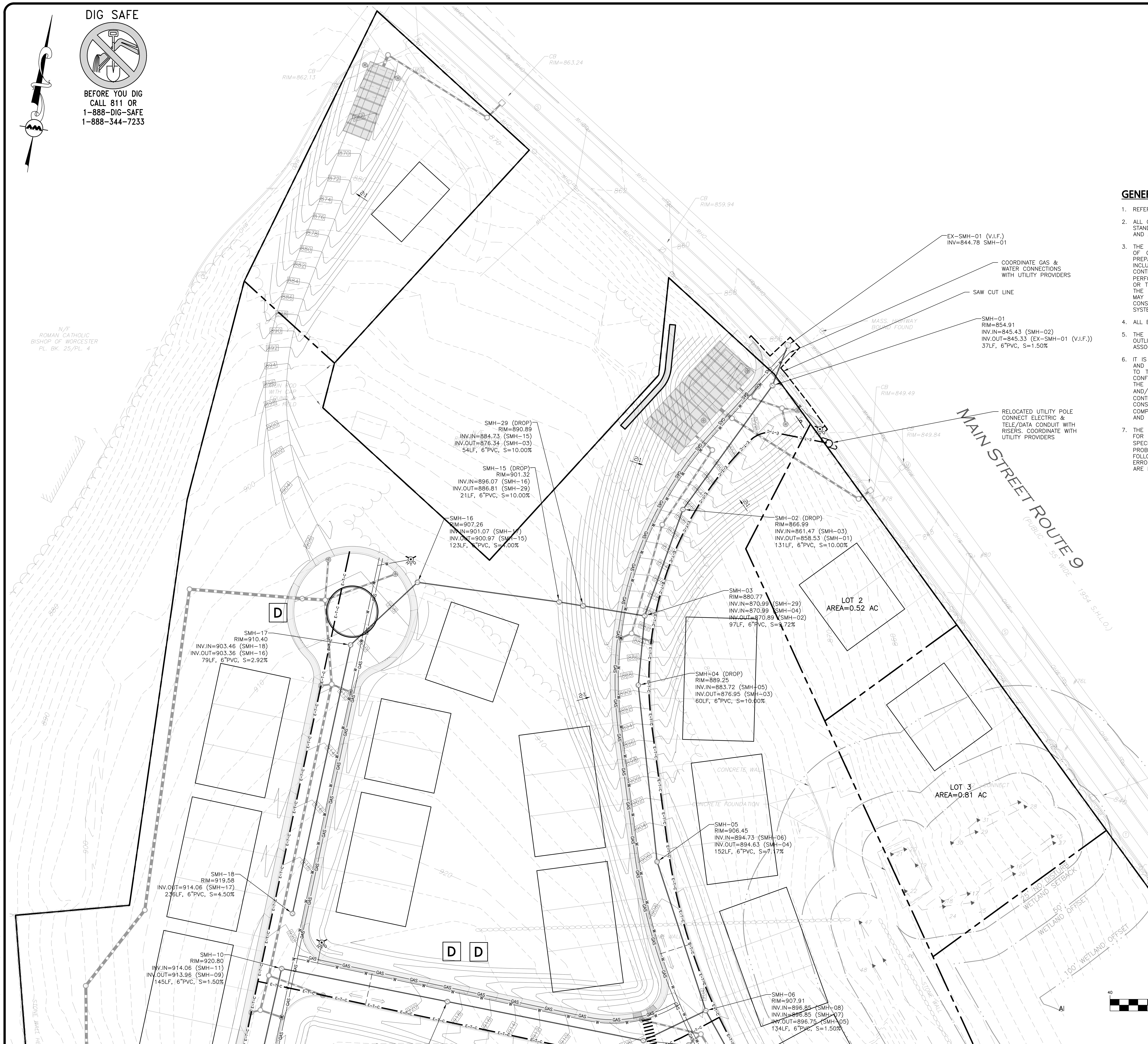
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG.:	C-2889-01_Utilities
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ♦ land surveying
environmental consulting ♦ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ♦ LAKEVILLE, MA ♦ MANCHESTER, NH

DRAWING TITLE:	SHEET No.
UTILITY PLAN	C-103B
	13 OF 22



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LEGEND

SEWER MANHOLE	
SEWER LINE	
WATER LINE	W
ELEC/TELE/CABLE CONDUIT	E-T-C
GAS LINE	GAS
HYDRANT	HYD
UTILILTY POLE	

GENERAL PLAN NOTES:

1. REFER TO SHEET C-103 FOR ADDITIONAL COMPLIANCE INFORMATION.
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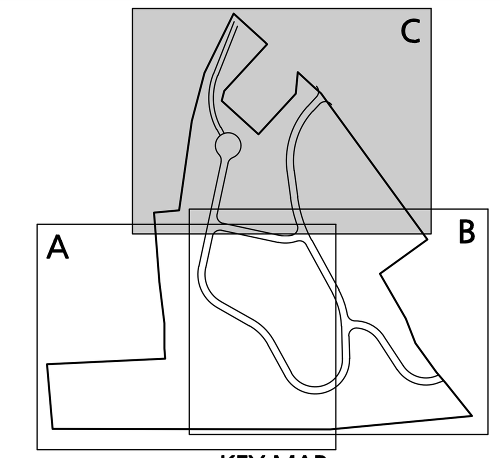

KEY MAP
NOT TO SCALE

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________________

LEICESTER PLANNING BOARD

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TOWN CLERK – TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

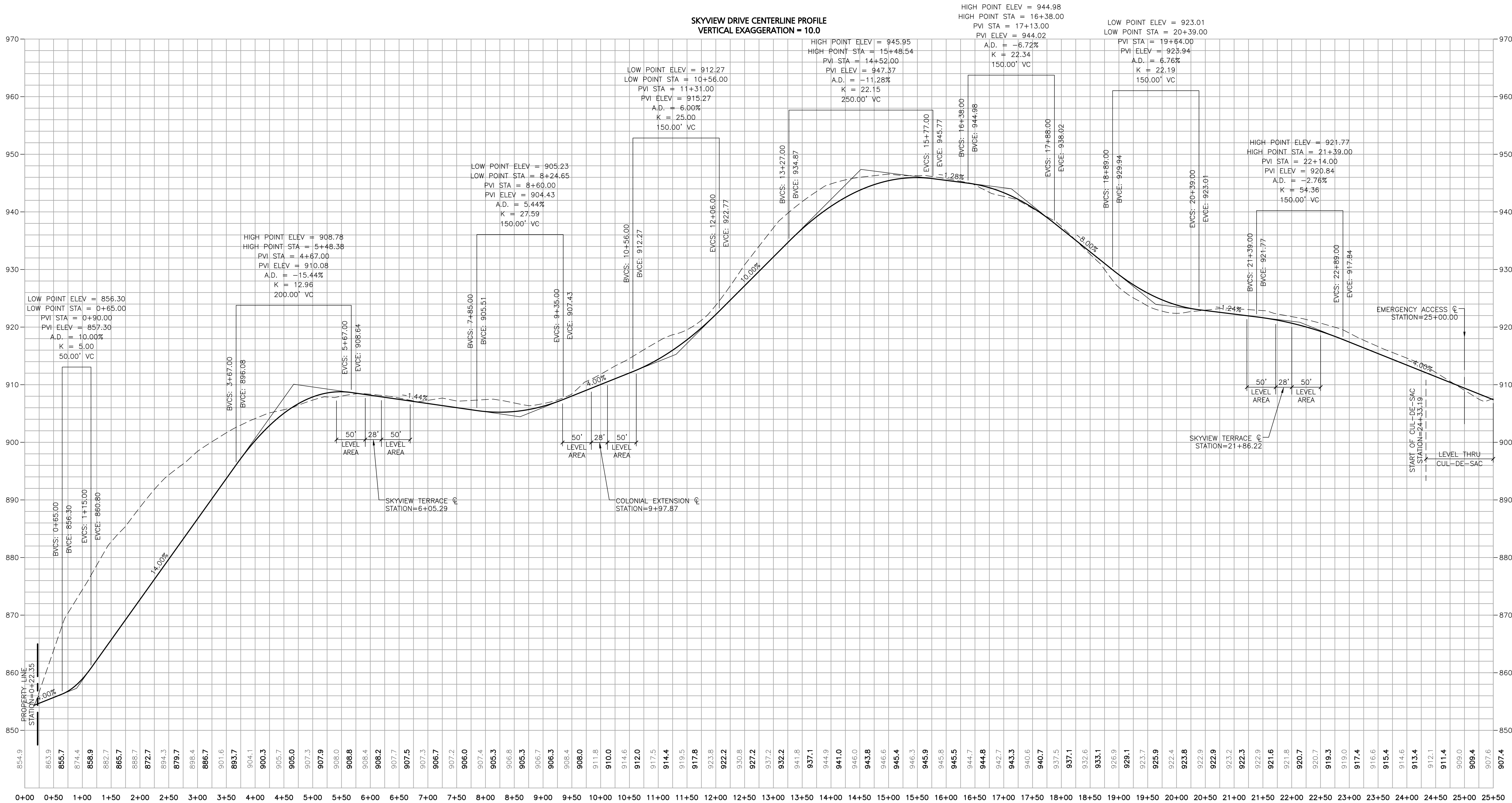
PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 40'	DWG.:	C-2889-01_Utilities
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: UTILITY PLAN

SHEET No. C-103C



GENERAL NOTES

1. REFER TO SHEET C-102 FOR ADDITIONAL INFORMATION
2. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF LEICESTER, MDOT, MADEP, MUTCD, AND AASHTO.
3. ANY DAMAGE TO PRIVATE OR PUBLIC PROPERTIES DUE TO THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AND RESTORED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
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5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED , WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
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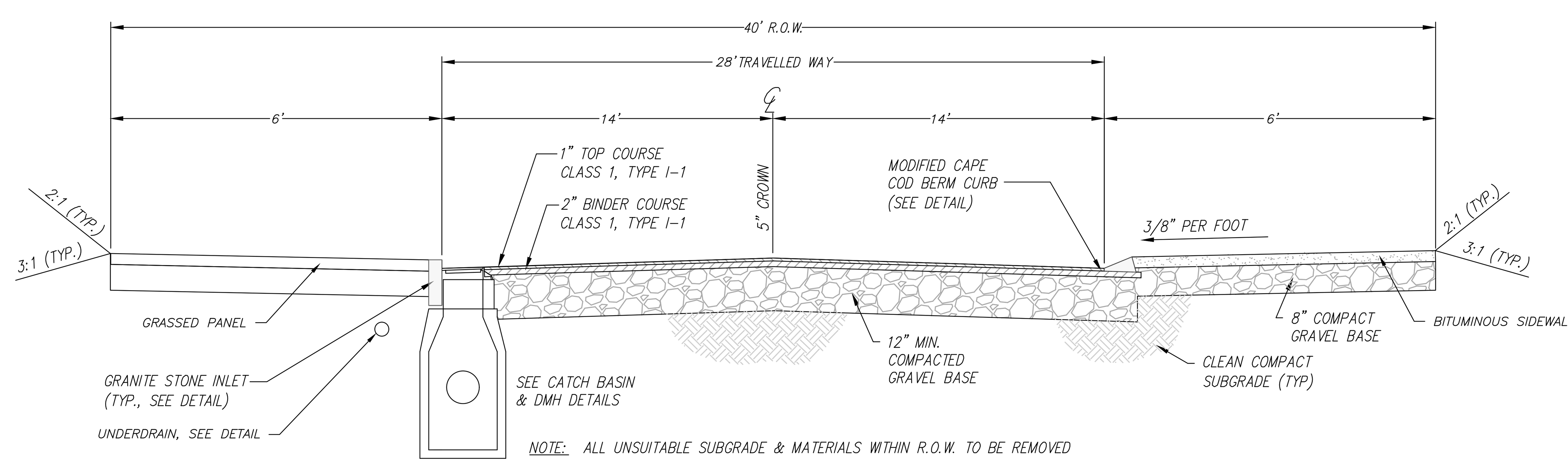
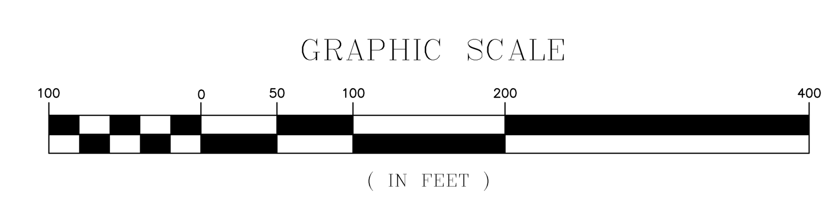


STANDARD ROADWAY CROSS - SECTION (1)
NOT TO SCALE



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APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 100'	DWG.:	C-2889-01_Grading & Drainage
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
ROADWAY PROFILE
SKYVIEW DRIVE

SHEET No.
C-201

GENERAL NOTES

1. REFER TO SHEET C-102 FOR ADDITIONAL INFORMATION
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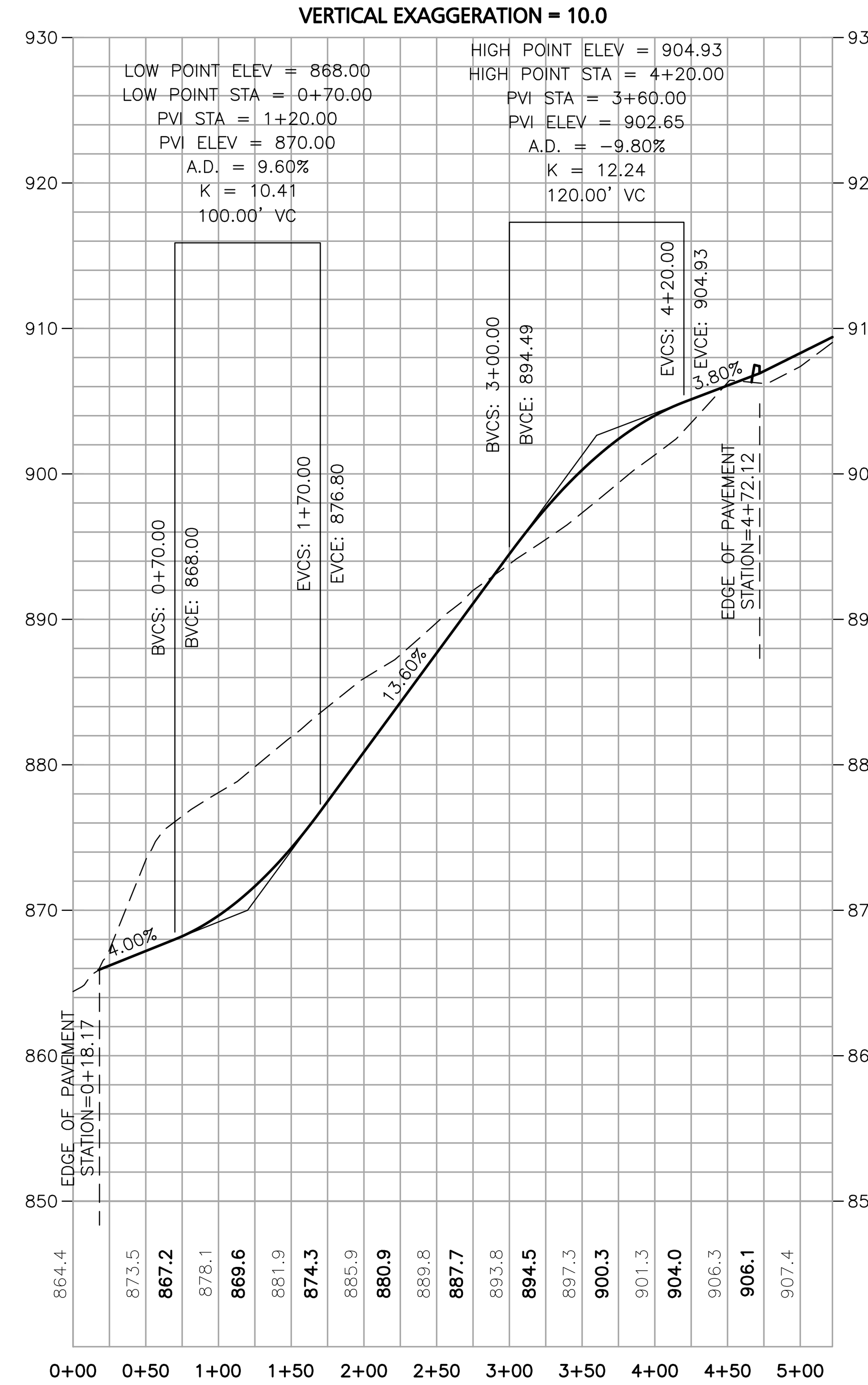
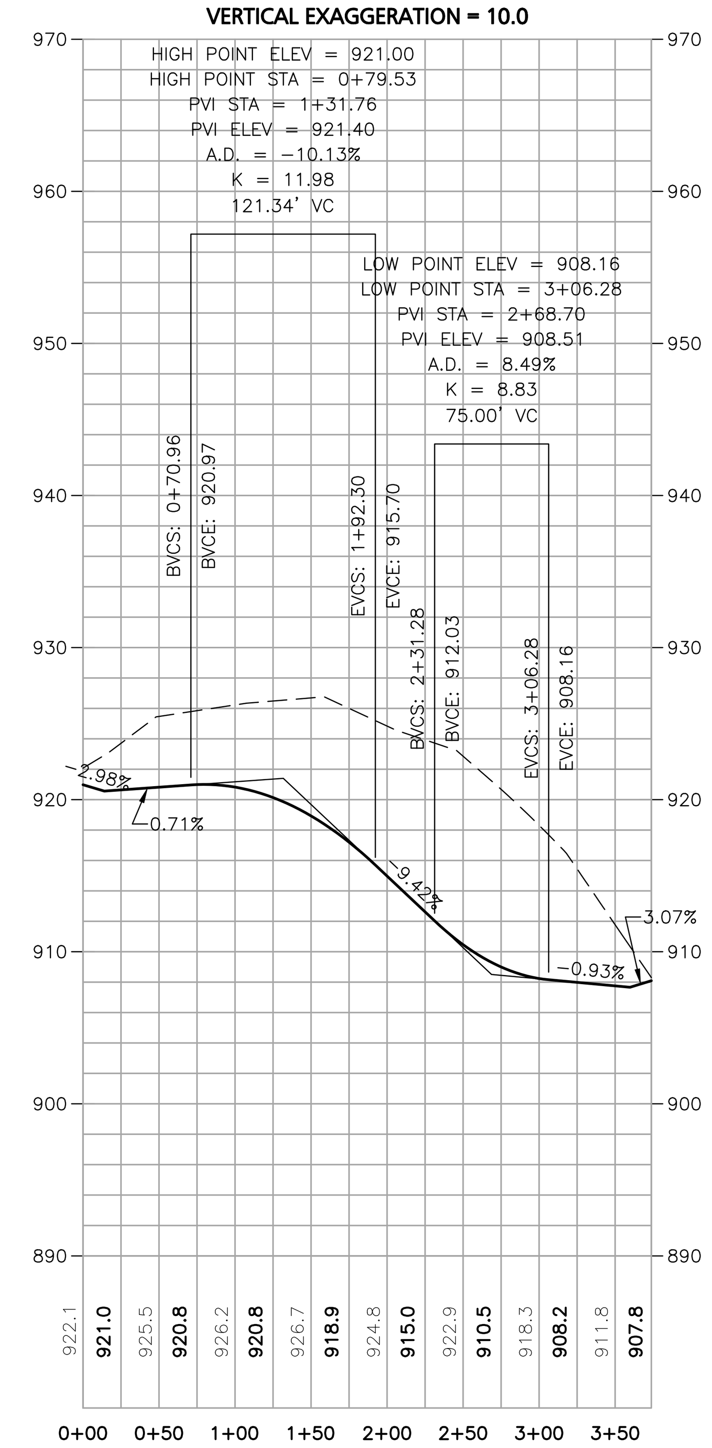
5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED , WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS OF THE SITE. THESE PLANS PREPARED BY ALLEN & MAJOR ASSOCIATES, INC., DO NOT EXTEND TO, NOR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THE EMPLOYEES, AGENTS OF REPRESENTATIVES IN PERFORMANCE OF THE WORK. THE SEAL OF THE ARCHITECT OR ENGINEER HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OF OBTAIN THE APPROPRIATE SAFETY SYSTEMS THAT MAY BE REQUIRED BY THE US OCCUPATIONAL SAFETY AND HEATH ADMINISTRATION (OSHA) AND/OR LOCAL REGULATIONS.
7. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE START OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DRAWINGS, SPECIFICATIONS, OR RELATIVE CODES, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT PRIOR TO START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE ENGINEER AND/OR ARCHITECT SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AND/OR DESIGN INTENT OF THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
8. THE DESIGN ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF THE DESIGN ENGINEER WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES, OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.

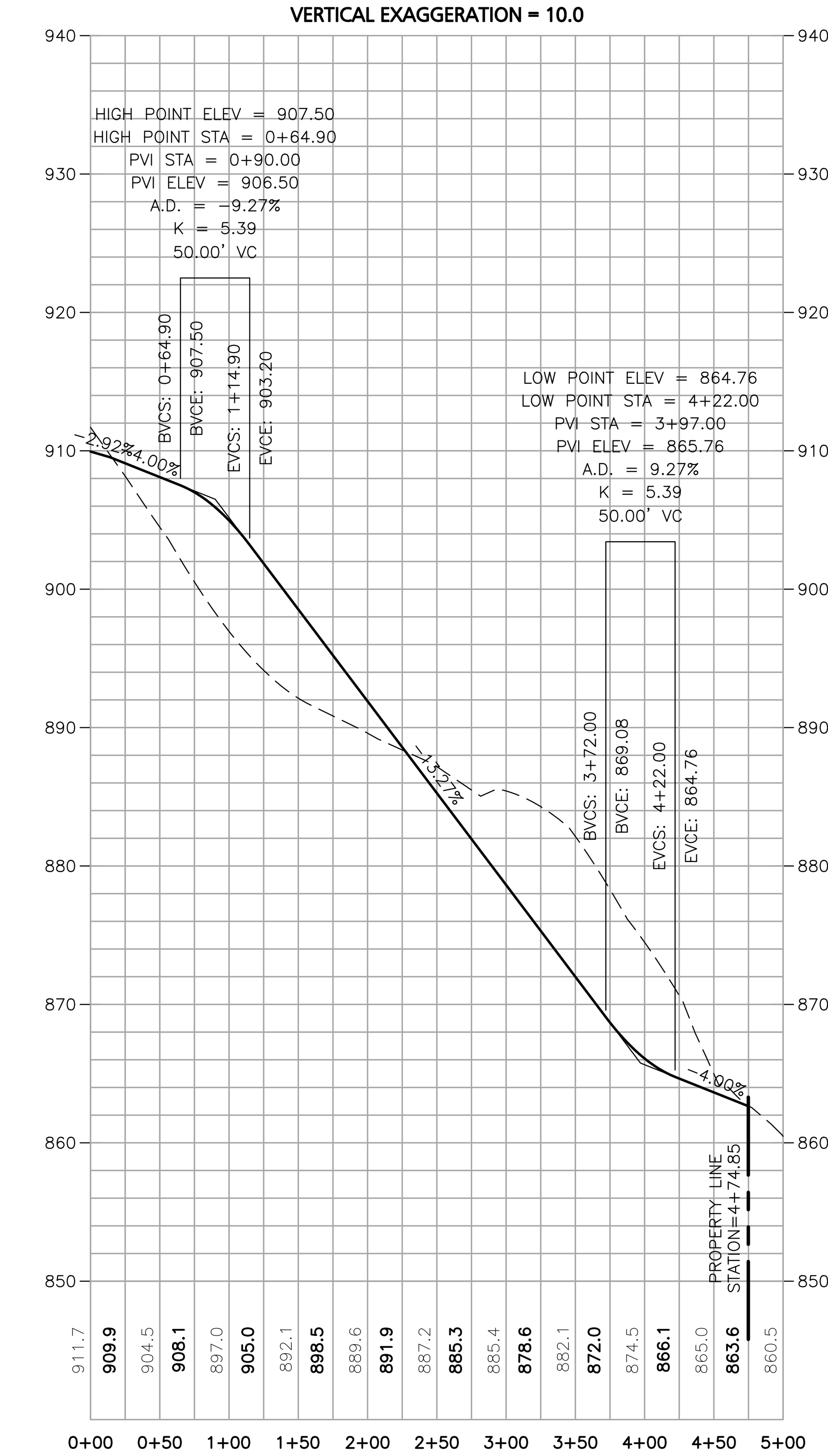
EMERGENCY ACCESS CENTERLINE PROFILE
VERTICAL EXAGGERATION = 10.0



SKYVIEW TERRACE CENTERLINE PROFILE
VERTICAL EXAGGERATION = 10.0



COLONIAL EXTENSION CENTERLINE PROFILE
VERTICAL EXAGGERATION = 10.0



GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

DIG SAFE
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CALL 811 OR
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1-888-344-7233

R:\PROJECTS\2889-01\CIVIL\DRAWINGS\CURRENT\C-2889-01_GRADING & DRAINAGE.DWG

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

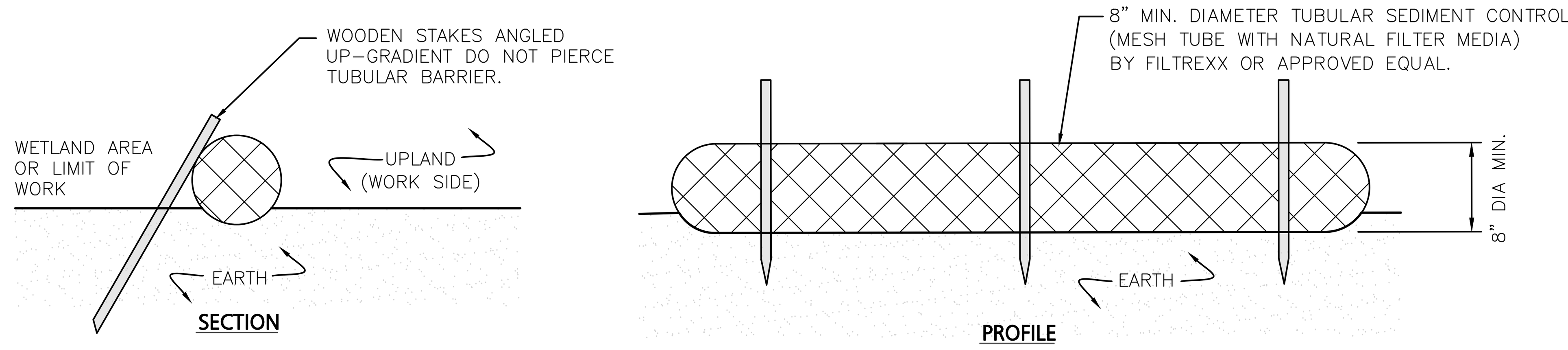
PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	1" = 100'	DWG.:	C-2889-01_Grading & Drainage
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
ROADWAY PROFILES
SKYVIEW TERRACE, EMERGENCY ACCESS, & COLONIAL EXTENSION

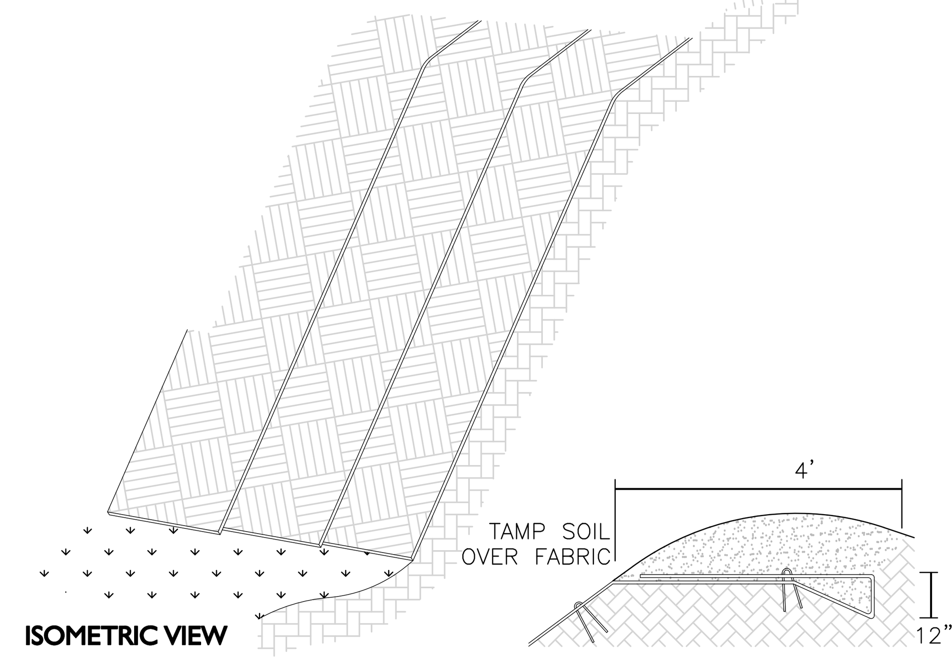
SHEET No.
C-202



NOTES:

1. TUBULAR SEDIMENT CONTROL SHALL BE 8" MIN. DIAMETER MESH TUBE WITH NATURAL FILTER MEDIA BY FILTREXX OR APPROVED EQUAL.
2. ALL MATERIALS TO MEET MANUFACTURERS SPECIFICATIONS.
3. INSTALL WOODEN STAKES ANGLED UP-GRADIENT EVERY 8' ON CENTER
4. OVERLAP TUBULAR BARRIER SEGMENTS A MINIMUM OF 12".
5. THE CONTRACTOR SHALL MAINTAIN THE TUBULAR BARRIERS IN A FUNCTIONAL CONDITION AT ALL TIMES. THE CONTROLS SHALL BE ROUTINELY INSPECTED BY THE CONTRACTOR.
6. WHERE THE TUBULAR BARRIERS REQUIRE REPAIR OR SEDIMENT REMOVAL, IT WILL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST.
7. AT A MINIMUM, THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE WHEN THEY REACH 1/3 THE EXPOSED HEIGHT OF THE BARRIER.

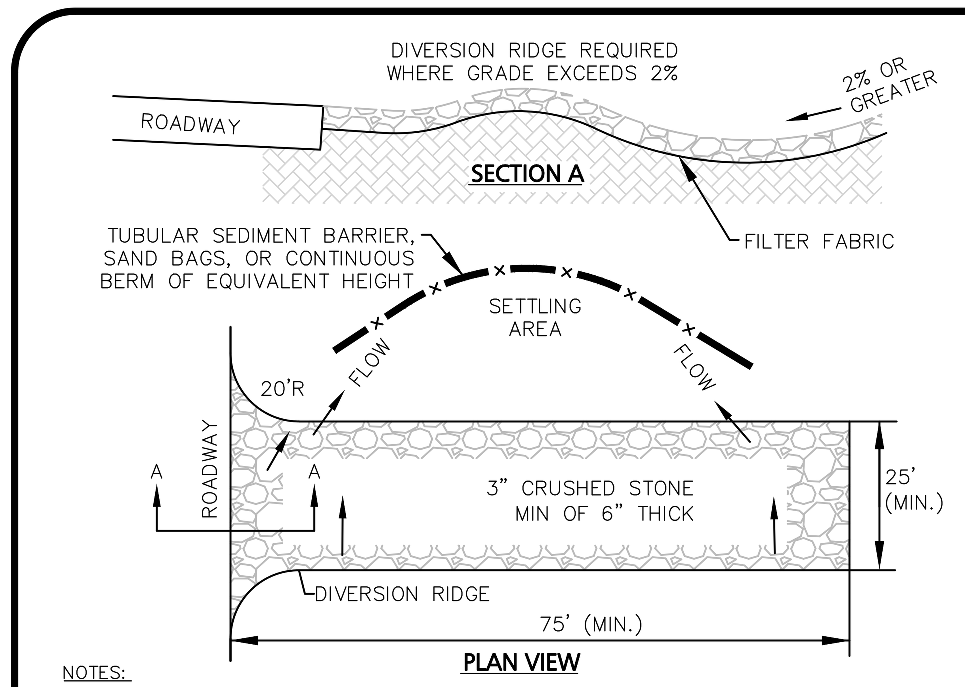
TUBULAR SEDIMENT BARRIER (1)
NOT TO SCALE



NOTE:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS.
2. APPLY PERMANENT SEEDING BEFORE PLACING FABRIC.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

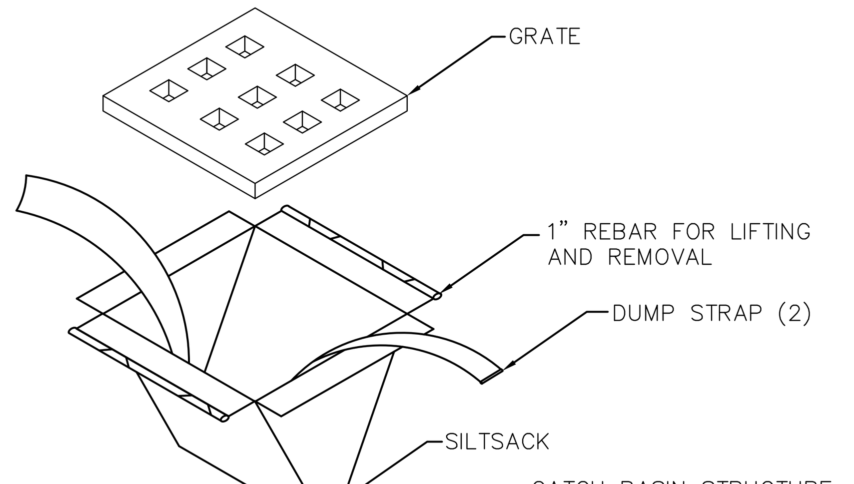
EROSION CONTROL FABRIC (2)
NOT TO SCALE



NOTES:

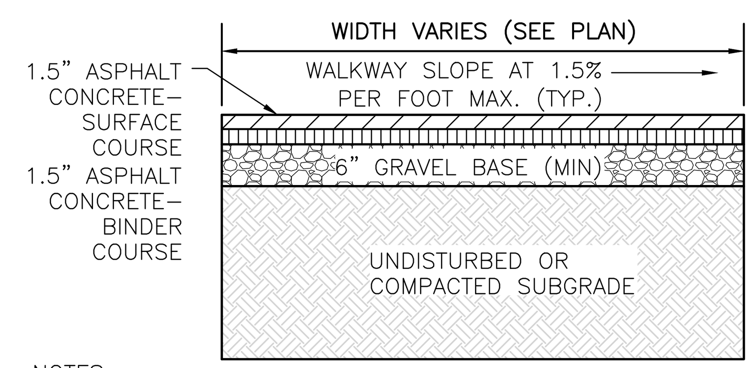
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTERING THE PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

STABILIZED CONSTRUCTION ENTRANCE (3)
NOT TO SCALE



NOTE:
1. INSTALL SILTSACK PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EMPTY OR REMOVE SEDIMENT FROM SILTSACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE. CLEAN, RINSE, AND REPLACE AS NEEDED.
2. SILT SACKS TO BE INSTALLED DURING CONSTRUCTION OPERATIONS WHEN THE POTENTIAL FOR SEDIMENT TO ENTER EXISTING & PROPOSED BASINS EXISTS.

CATCH BASIN INLET PROTECTION (4)
NOT TO SCALE

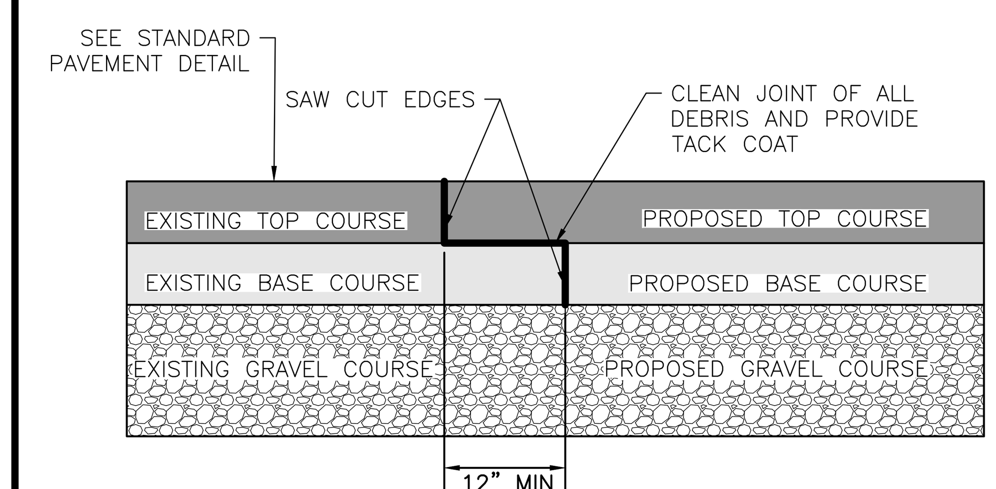


NOTES:

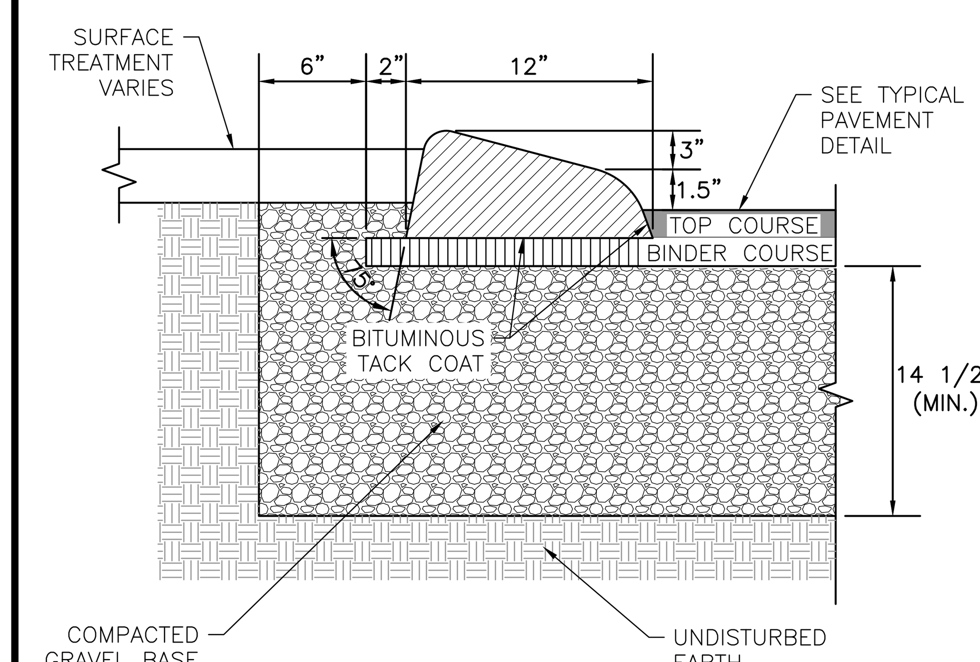
1. REFERENCE PLANS FOR ELEVATIONS.
2. COMPACT SOIL SUBGRADE UNIFORMLY TO AT LEAST 95% OF ASTM D 1557 LABORATORY DENSITY.
3. PROOF-ROLL PREPARED SUBGRADE TO IDENTIFY SOFT POCKETS AND AREAS OF EXCESS YIELDING. EXCAVATE SOFT SPOTS, UNSATISFACTORY SOILS, AND AREAS OF EXCESSIVE PUMPING OR RUTTING, AS DETERMINED BY GEOTECHNICAL ENGINEER AND REPLACE WITH COMPACTED BACKFILL OR FILL AS DIRECTED.
4. CONTRACTOR SHALL COORDINATE SURFACE, BINDER, AND BASE COURSES WITH GEOTECHNICAL OR SOILS REPORT. REFER TO REPORT FOR RECOMMENDATIONS FOR LOCAL SOILS OR DRAINAGE CONDITIONS AND/OR METHODS.
5. BASE COURSE SHALL EXTEND 6 INCHES BEYOND WALKWAY EDGE WHERE WALKWAY DOES NOT ABUT DEEP CURB, WALL, STEPS, OR FIXED OBJECT.
6. WALKWAY EDGES SHALL BE TAMPED WHERE WALKWAY DOES NOT ABUT DEEP CURB, WALL, STEPS, OR FIXED OBJECT.

BITUMINOUS WALKWAY (5)
NOT TO SCALE

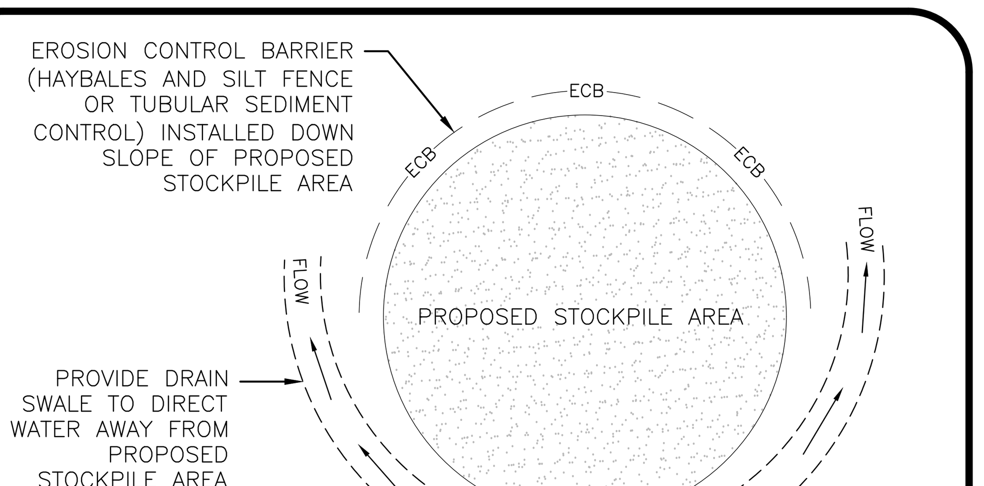
NOTE:
TACK COAT - PROVIDE EMULSIFIED ASPHALT WHICH CONFORMS TO THE REQUIREMENTS OF THE STATE SPECIFICATIONS, DILUTED WITH ONE PART WATER TO ONE ONE PART ASPHALT FOLLOWING AASHTO M140/ASTM D997, OR AASHTO M208/ASTM D2397, SS-1H, CSS-1, OR CSS-1H.



PAVEMENT KEY CUT (6)
NOT TO SCALE



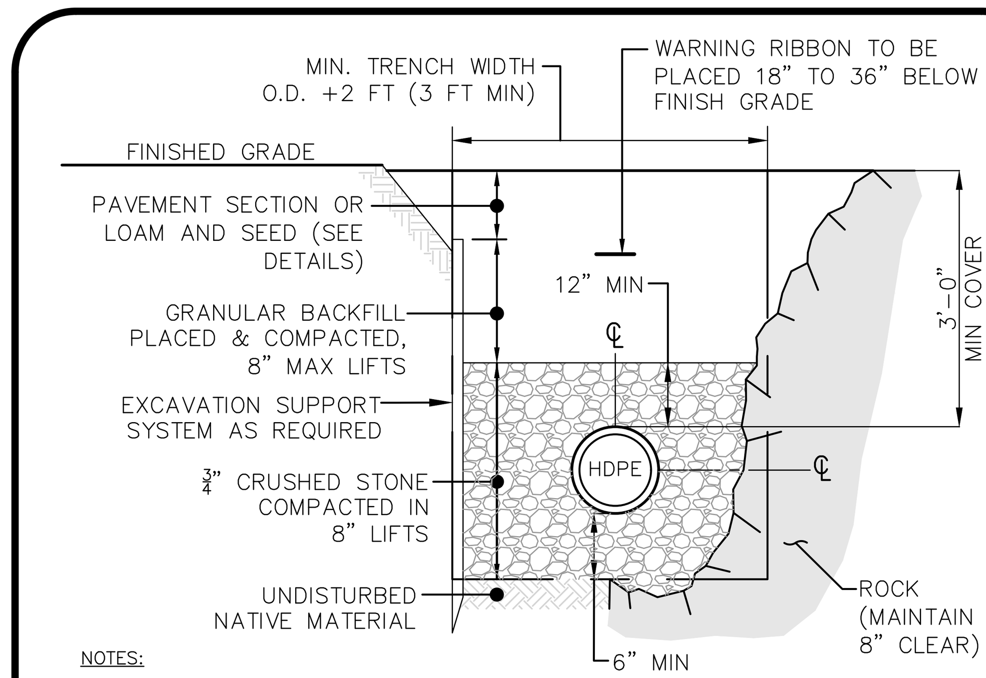
CAPE COD BERM (7)
NOT TO SCALE



NOTES:

1. SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR LESS THAN 90 DAYS SHALL BE COVERED WITH HAY AND MULCH (AT 100LBS/1,000 SF), OR WITH AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.
2. SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR 90 DAYS OR MORE SHALL BE SEEDED WITH WINTER RYE (FOR FALL SEEDING AT 3LB/1,000 SF) OR OATS (FOR SUMMER SEEDING AT 2LB/1,000 SF) AND THEN COVERED WITH HAY MULCH (AT 100LB/1,000 SF) OR AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.

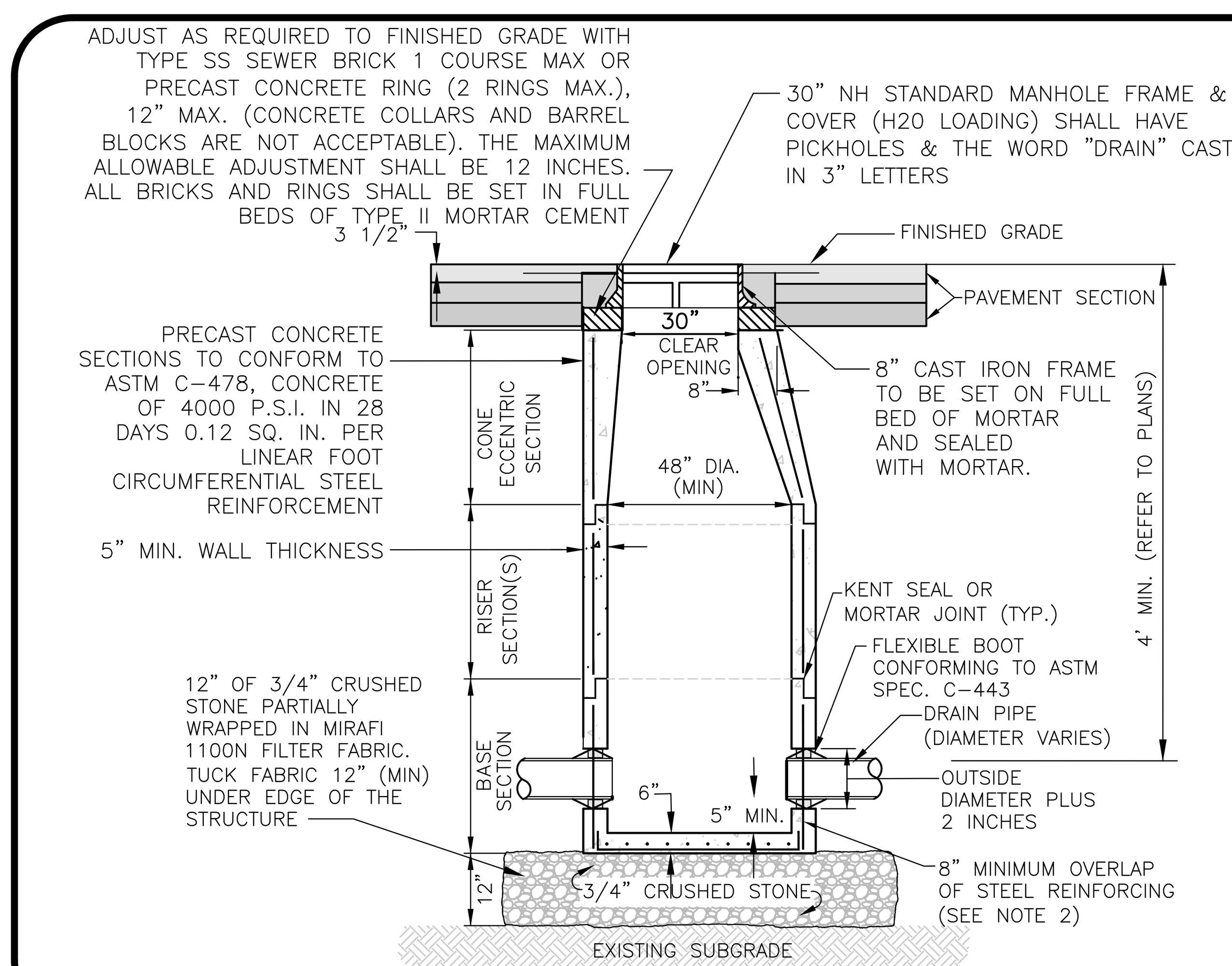
STOCKPILE PROTECTION (8)
NOT TO SCALE



NOTES:

1. WHERE BACKFILL IS DESIGNATED AS COMPACTED, THIS MEANS 90 TO 95% STANDARD PROCTOR. AASHTO T-99. ALL FILL PLACED BELOW PIPES AND STRUCTURES MUST MEET THIS REQUIREMENT.
2. FOR ALL TRENCHES WITH A GRADE GREATER THAN 4% AND/OR WHERE GROUNDWATER IS APPARENT, INSTALL CLAY DAMS AROUND THE PIPE AT 100' INTERVALS.
3. CRUSHED STONE SHALL BE CLEAN, HARD, FREE FROM COATINGS AND THOROUGHLY WASHED WITH A GRADATION BY WEIGHT OF 100% PASSING A 1" SQUARE OPENING, AND 0 TO 5% PASSING A ¼" SQUARE OPENING.

DRAIN TRENCH DETAIL (9)
NOT TO SCALE



NOTES:

1. MANHOLE TO BE CAPABLE OF AASHTO H-20 LOADING WITHOUT FAILURE.
2. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN. FT. (BOTH WAYS).
3. BASE SECTION SHALL BE MONOLITHIC
4. ANY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW CUTTING AND/OR CORING. THE USE OF JACKHAMMERS, HAMMERS, AND CHISELS WILL NOT BE ALLOWED.

DRAIN MANHOLE (10)
NOT TO SCALE

R:\PROJECTS\2889-01\CIVIL\DRAWINGS\CURRENT\C-2889-01_DETAILS.DWG

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ____________

LEICESTER PLANNING BOARD

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TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	AS SHOWN	DWG.:	C-2889-01_Details
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

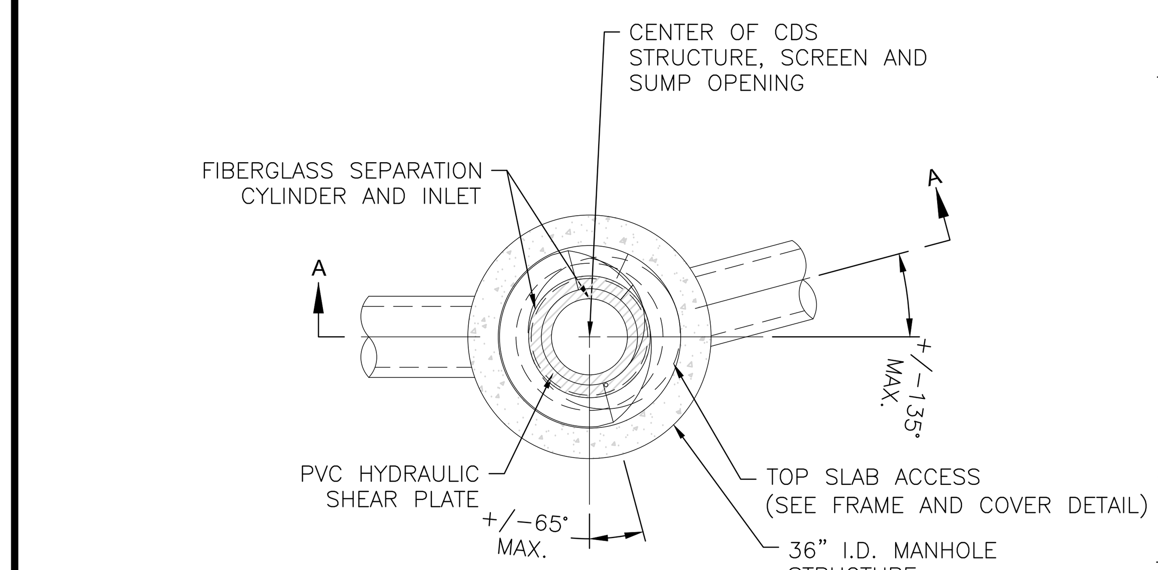
DRAWING TITLE: DETAILS

SHEET No. C-501

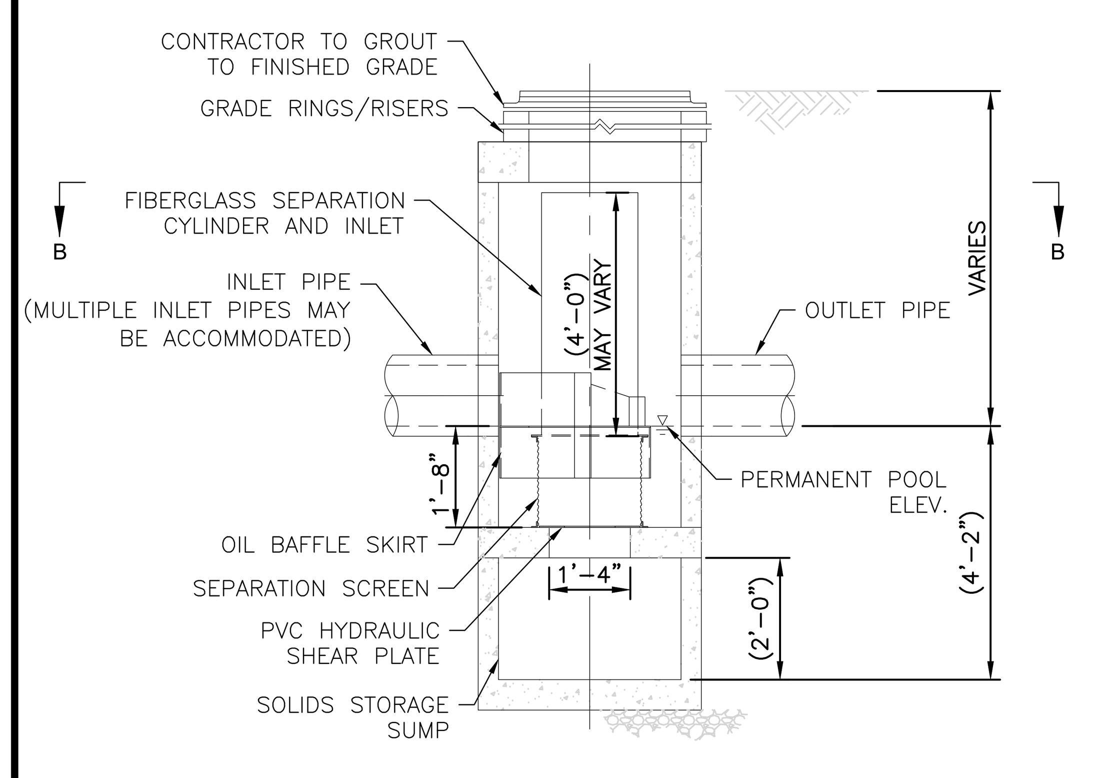
CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN.



PLAN VIEW B-B
N.T.S.



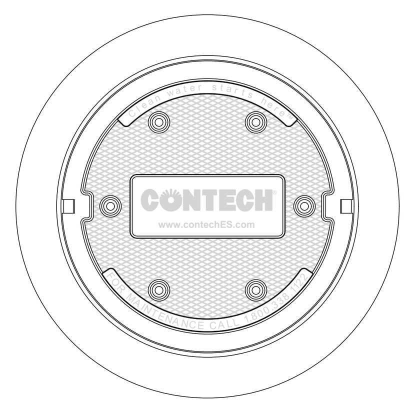
ELEVATION A-A
N.T.S.

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



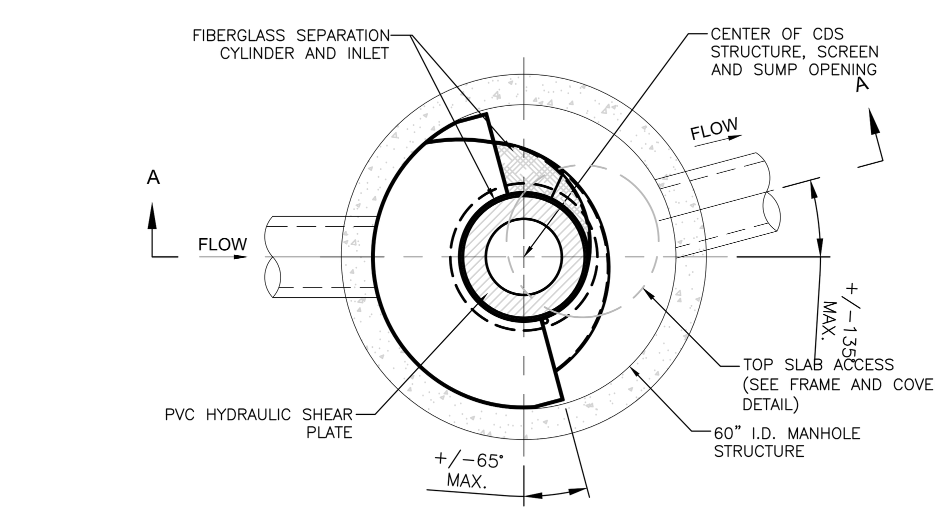
FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS1515-3-C STANDARD DETAIL (1)
NOT TO SCALE

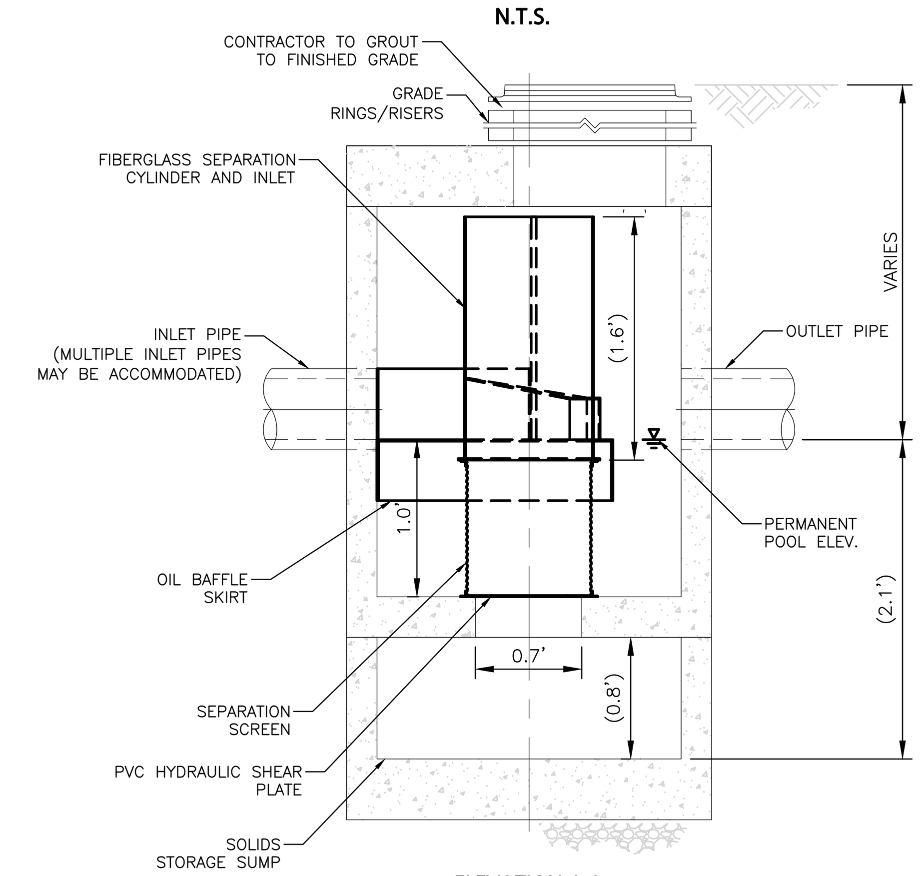
CDS2020-5-C DESIGN NOTES

CDS2020-5-C RATED TREATMENT CAPACITY IS 2.2 CFS, OR PER LOCAL REGULATIONS. THE STANDARD CDS2020-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

GENERAL NOTES

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2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
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INSTALLATION NOTES

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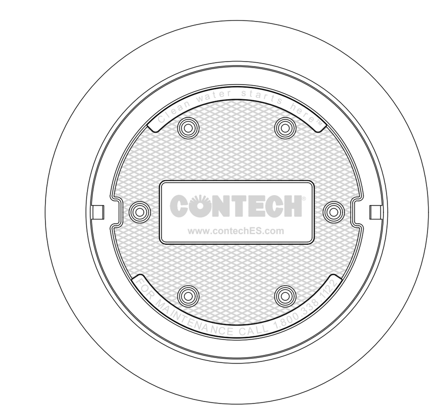
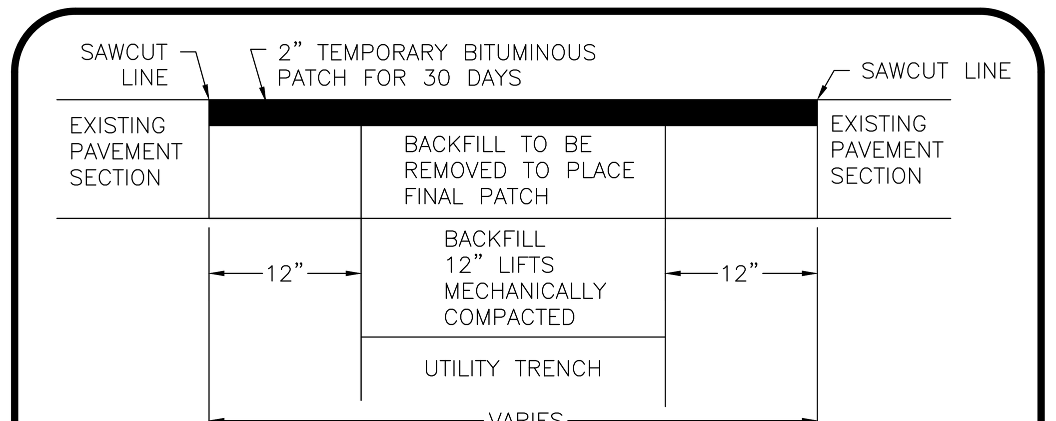
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

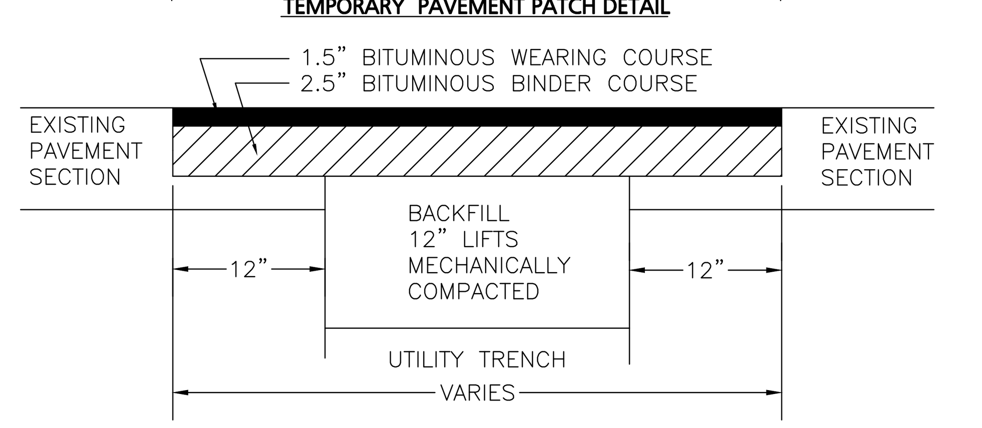


FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS2020-5-C STANDARD DETAIL (2)
NOT TO SCALE

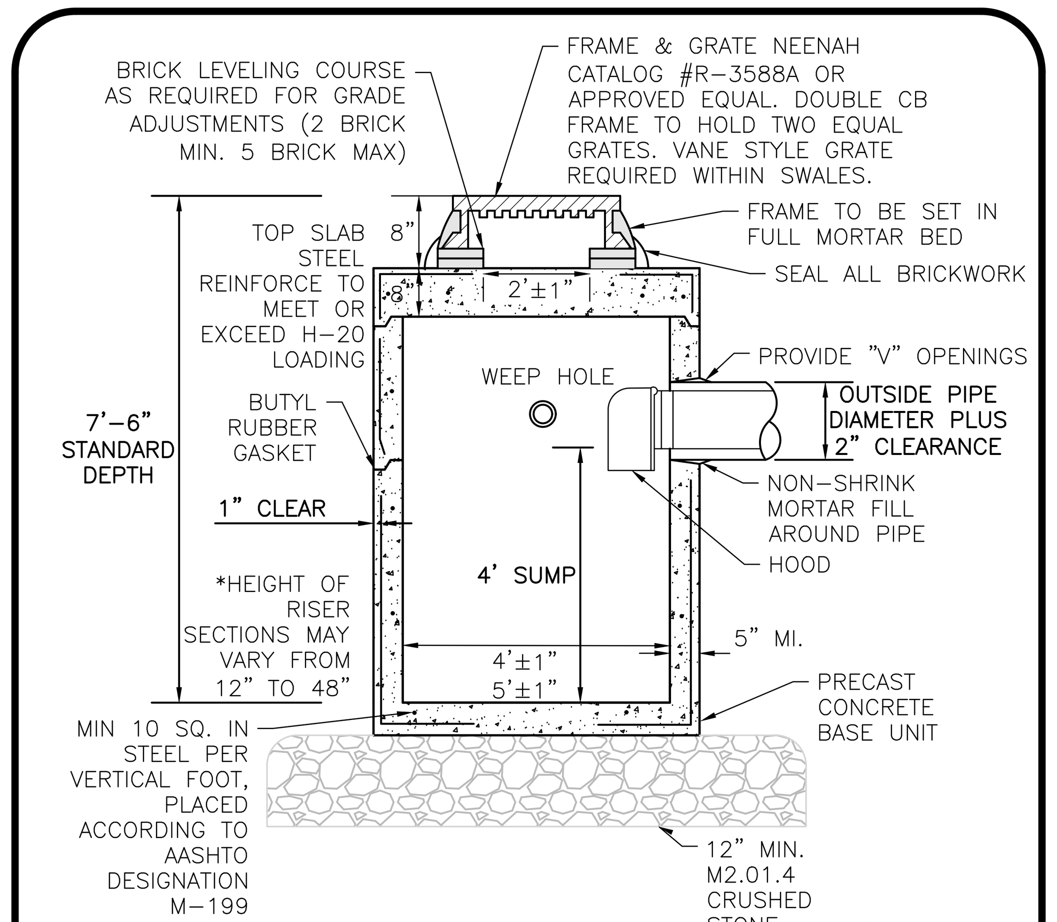


TEMPORARY PAVEMENT PATCH DETAIL

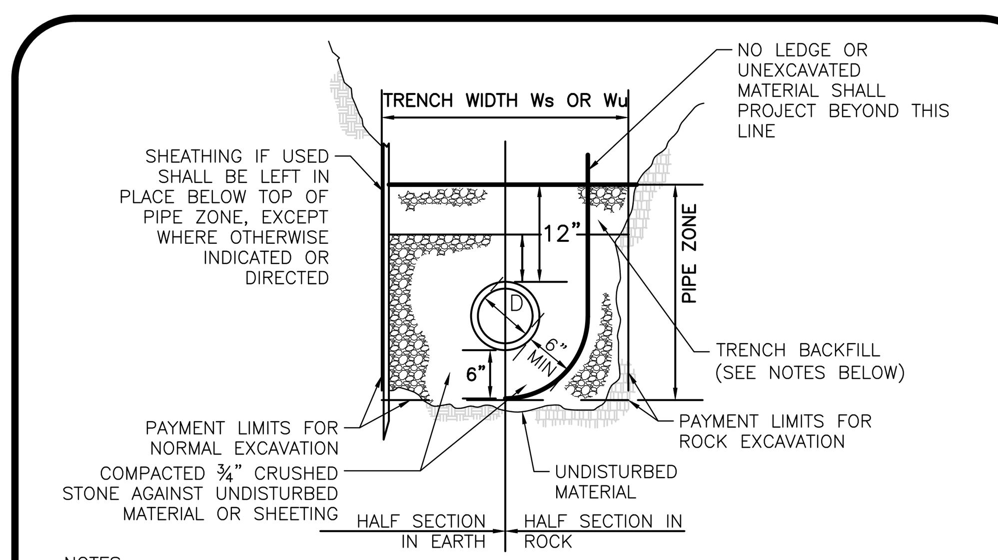


FINAL PAVEMENT PATCH DETAIL

PAVEMENT TRENCH PATCH DETAIL (3)
NOT TO SCALE



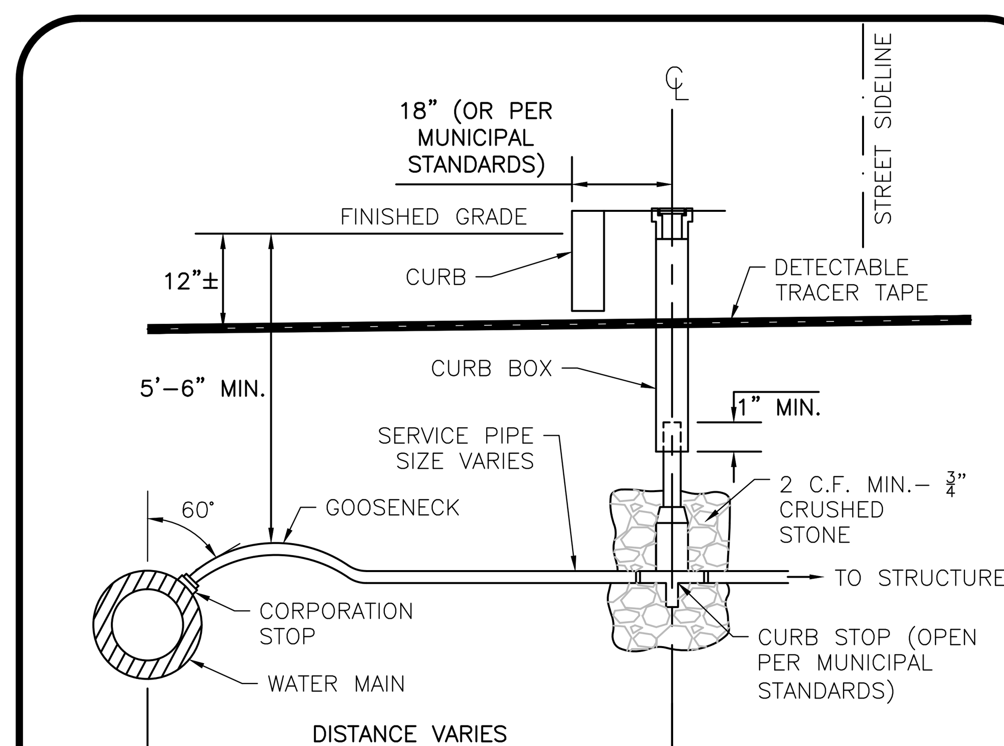
CATCH BASIN (4)
NOT TO SCALE



NOTES:

1. TRENCH BACKFILL TO BE USED WITHIN THE RIGHT-OF-WAY SHALL CONSIST OF EITHER GRAVEL BORROW MEETING MHD SPECIFICATION M1.03.0, TYPE "B" OR PROCESSED GRAVEL BORROW FOR SUBBASE MEETING MHD SPECIFICATION M1.03.1.
2. WHERE THE REMOVAL OF 100 SQUARE FEET OR LESS OF ASPHALT IS REQUIRED WITHIN THE RIGHT OF WAY, THEN THE TRENCH BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL MEETING MHD SPECIFICATION M4.08.0, TYPE "1E" OR "2E".
3. TRENCH BACKFILL MATERIAL TO BE USED OF THE RIGHT-OF-WAY MAY CONSIST OF MATERIAL GENERATED DURING EXCAVATIONS PROVIDED ALL STONES GREATER THAN 4" ARE REMOVED PRIOR TO PLACEMENT AND COMPACTION.
4. GRANULAR TRENCH BACKFILL MATERIAL USED WITHIN THE RIGHT-OF-WAY SHALL BE PLACED IN MAXIMUM 6" LIFTS AND MECHANICALLY COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AND TO 90% ELSEWHERE AS DETERMINED BY ASTM D 1557.

SEWER TRENCH (5)
NOT TO SCALE



NOTES:

1. WATER SERVICES LARGER THAN 1" ARE TO BE RESTRAINED TO WATER MAIN WITH APPROVED SADDLE.

TYPICAL WATER SERVICE CONNECTION (6)
NOT TO SCALE

R:\PROJECTS\2889-01\CIVIL\DRAWINGS\CURRENT\C-2889-01_DETAILS.DWG

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE: ______

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	AS SHOWN	DWG.:	C-2889-01_Details
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: DETAILS

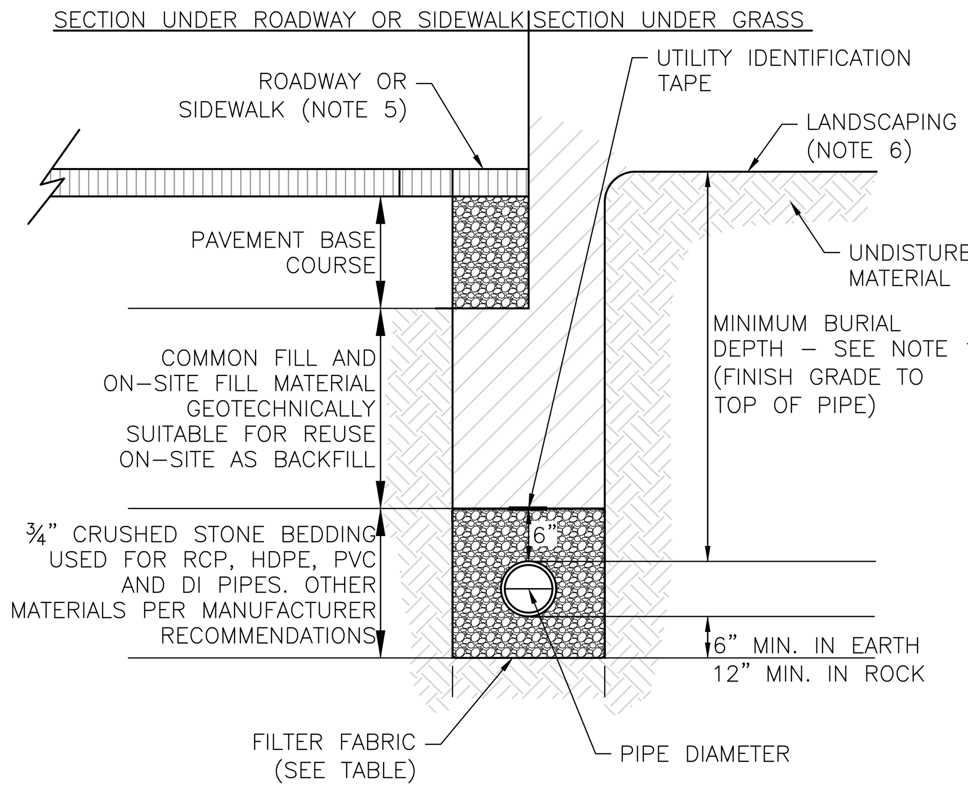
SHEET No. C-502

NOTES:

1. MINIMUM BURIAL DEPTH (FINISH GRADE TO TOP OF PIPE)
   GRAVITY PIPE (SEWER & DRAIN) – SEE PLAN OR PROFILE
   PRESSURE PIPE UNDER PAVING – 4'
   PRESSURE PIPE BENEATH UNPAVED – 3'
   WATER PIPE – 5'
2. WHERE BACKFILL IS DESIGNATED AS COMPACTED, THIS MEANS 90 TO 95% STANDARD PROCTOR, AASHTO T-99. ALL FILL PLACED BELOW PIPES AND STRUCTURES MUST MEET THIS REQUIREMENT.
3. TRENCHES WITHIN PUBLIC RIGHT OF WAY MAY REQUIRE FLOWABLE FILL. VERIFY WITH MUNICIPAL ENGINEER.
4. WHERE WASTE FILLS ARE ENCOUNTERED AT SUBGRADE LEVEL FOR NEW UTILITIES, THE FILL SHOULD BE OVER-EXCAVATED, THE SUBGRADE SHOULD BE RE-COMPACTED, AND BACKFILL CONSISTING OF PIPE BEDDING MATERIAL, CRUSHED STONE OR OTHER SUITABLE GRANULAR FILL SHOULD BE PLACED TO A SUFFICIENT DEPTH TO CREATE A FIRM AND STABLE SUBGRADE (TYPICALLY 12 TO 18 INCHES OVER-EXCAVATION).
5. REFER TO PAVING, CURBS, WALKS AND DRIVEWAY DETAILS.
6. REFER TO LANDSCAPING DETAILS.

FILTER FABRIC USE

	SOIL TYPE	
	SILT OR CLAY	GRANULAR SOIL
ABOVE GROUND WATER	FILTER FABRIC NOT REQUIRED	FILTER FABRIC NOT REQUIRED
BELOW GROUND WATER	FILTER FABRIC REQUIRED	FILTER FABRIC NOT REQUIRED

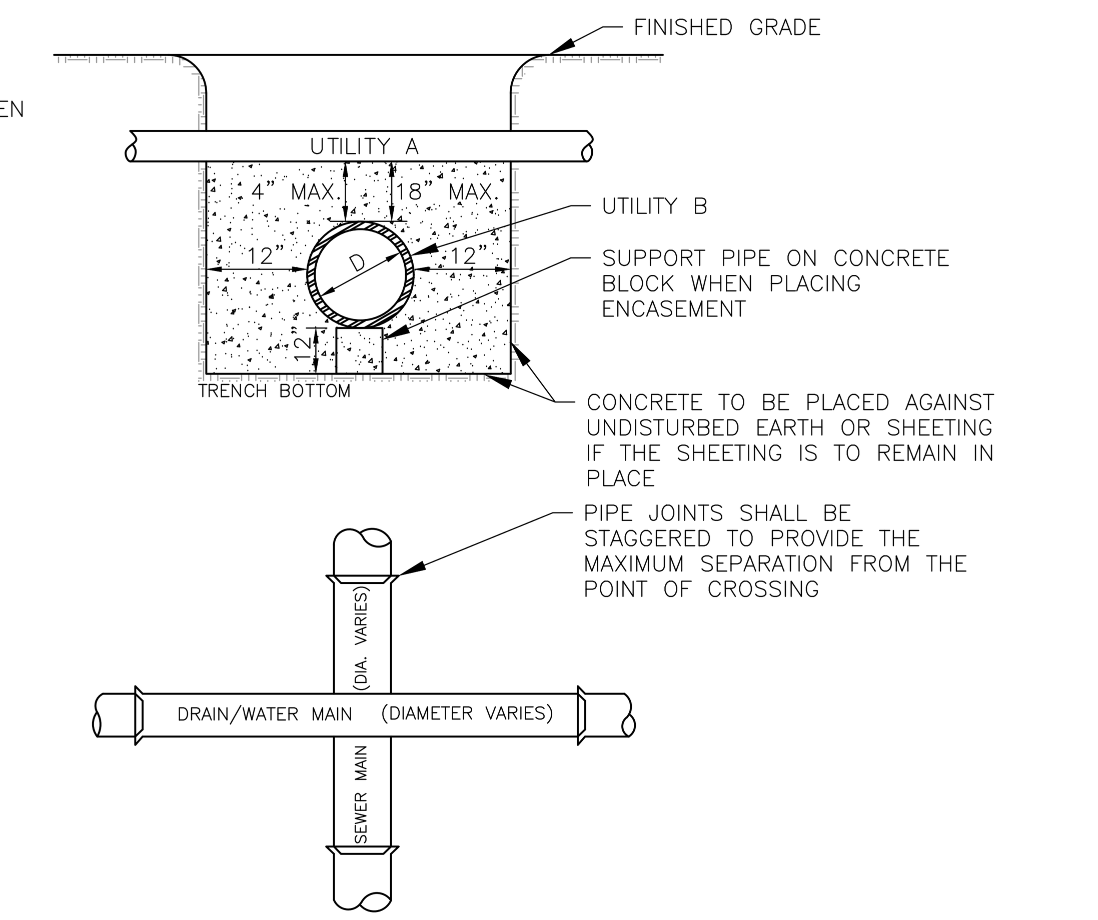


UTILITY TRENCH
NOT TO SCALE
1

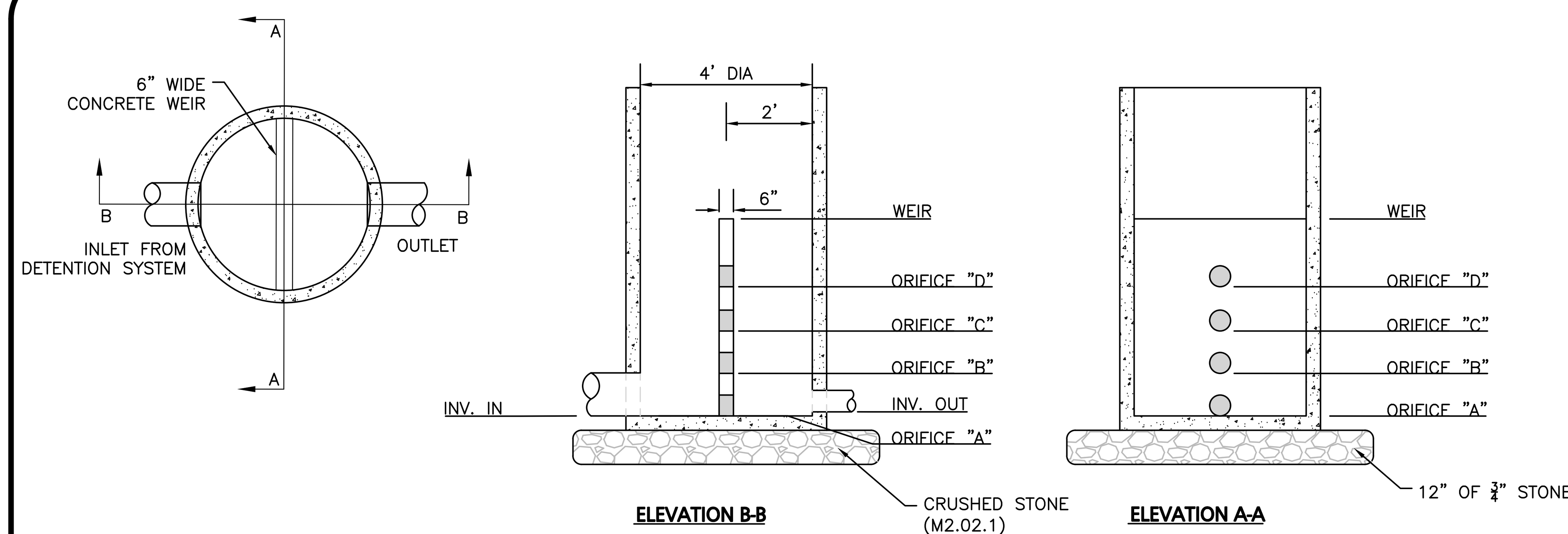
NOTES:

WHENEVER CONDITIONS PREVENT A LATERAL SEPARATION OF 10 FEET BETWEEN A SEWER MAIN AND A WATER/DRAIN MAIN:

1. THE WATER/DRAIN MAIN SHALL BE LAID IN A SEPARATE TRENCH AND THE DIFFERENCE IN ELEVATION BETWEEN THE WATER/DRAIN MAIN AND THE SEWER MAIN SHALL BE AT LEAST 18 INCHES.
2. THE PIPE CROSSING SHALL OCCUR AS CLOSE TO 90° AS PRACTICABLE.
3. THE PIPE JOINTS SHALL BE STAGGERED TO PROVIDE THE MAXIMUM SEPARATION FROM THE POINT OF CROSSING.
4. THE CROSSING SHALL BE ENCASED IN CONCRETE FOR THE ENTIRE WIDTH OF THE TRENCH AND FOR A DISTANCE OF 10 LINEAR FEET CENTERED ON THE CROSSING.
5. UTILITIES A AND B CAN BE EITHER NEW OR EXISTING.
6. WHEN ONE UTILITY IS A SANITARY SEWER, IT IS PREFERABLE TO BE POSITIONED AS SHOWN FOR UTILITY B.
7. ENCASEMENT EXTENDS 10'-0" ON EACH SIDE OF THE CENTERLINE OF UTILITY A.
8. PIPE MUST BE BRACED VERTICALLY AND HORIZONTALLY TO PREVENT FLOATATION DURING PLACEMENT OF CONCRETE.



SEWER WATER/DRAIN CROSSING
NOT TO SCALE
2

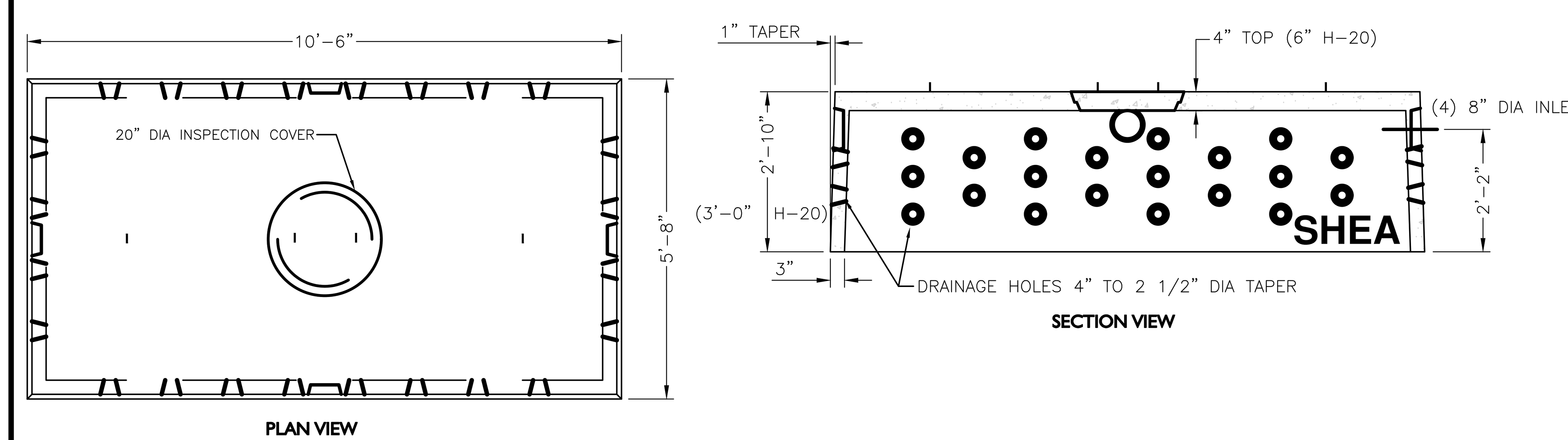


OUTLET CONTROL STRUCTURE TABLE

STRUCTURE	ORIFICE IDENTIFIER	ORIFICE DIAMETER	ORIFICE ELEV.	INLET DIAMETER	INLET INVERT ELEV.	OUTLET DIAMETER	OUTLET INVERT ELEV.
OCS-1 (DS-1A)	A	3"	847.90	24"	848.00	15"	847.90
	B	8"	849.00				
	C	8"	850.15				
	D	7"	851.15				
	WEIR	N/A	852.80				
OCS-2 (DS-2A)	A	5"	892.00	24"	892.00	18"	891.90
	B	10"	895.40				
	C	11"	897.90				
	D	10"	899.90				
	WEIR	N/A	901.45				
OCS-3 (DS-2B)	A	8"	859.2	24"	859.00	12"	858.90
	WEIR	N/A	862.55				
OCS-05 (DS-1B)	A	4"	859.20	24"	859.20	12"	859.10
	WEIR	N/A	862.50				

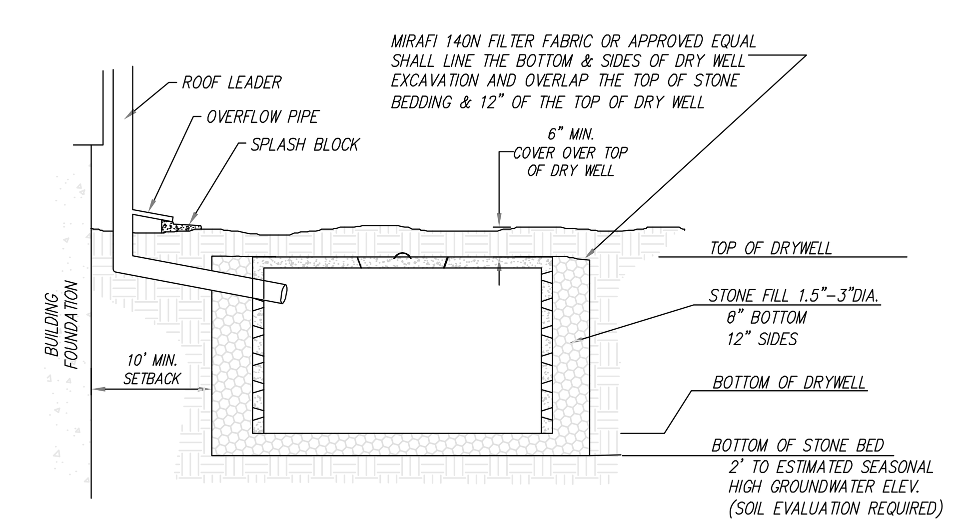
NOTE:
1. MANHOLE TO MATCH LOCAL DPW STANDARDS

OUTLET CONTROL STRUCTURE
NOT TO SCALE
3



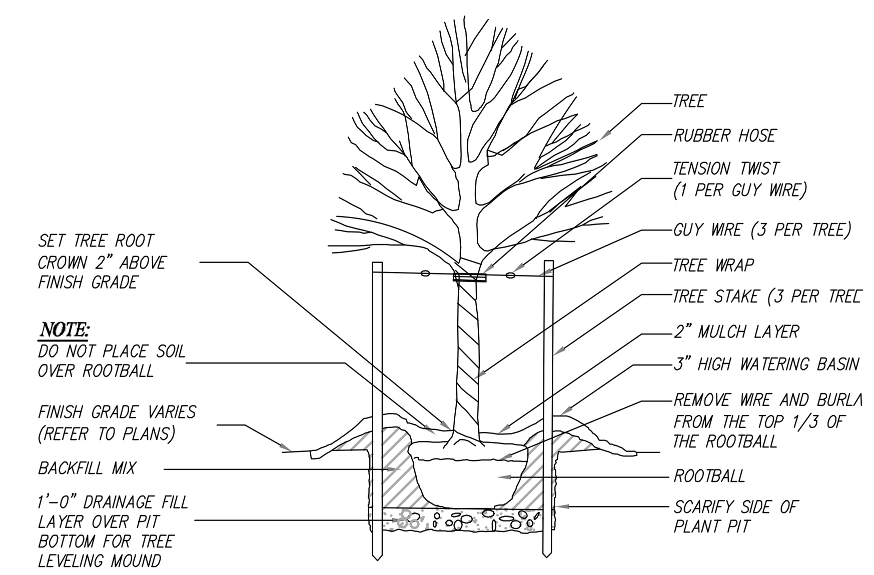
NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. ALSO AVAILABLE IN AASHTO HS-20 LOADING.

1,000 GALLON JUMBO DRY WELL
NOT TO SCALE
4



NOTES:
1. DRYWELLS SHALL BE INSTALLED IN STONE BED AS DEPICTED HEREON FOR EACH INDIVIDUAL STRUCTURE FOR STORMWATER RECHARGE, IN A LOCATION WHERE FIELD CONDITIONS MAKE IT POSSIBLE. EACH LOCATION SHALL BE EVALUATED BASED ON SITE SOIL EVALUATION OF THE ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION AT THE TIME OF LOT CONSTRUCTION.
2. THE DRYWELLS SHALL BE SHEA CONCRETE PRODUCTS 1000 GALLON SHALLOW RECTANGULAR OR APPROVED EQUAL.
3. THE DRYWELLS SHALL BE RATED FOR H20 LOADING.

ROOF DRAIN & DRYWELL CONNECTION DETAIL
NOT TO SCALE
5



TREE PLANTING DETAIL
NOT TO SCALE
6

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

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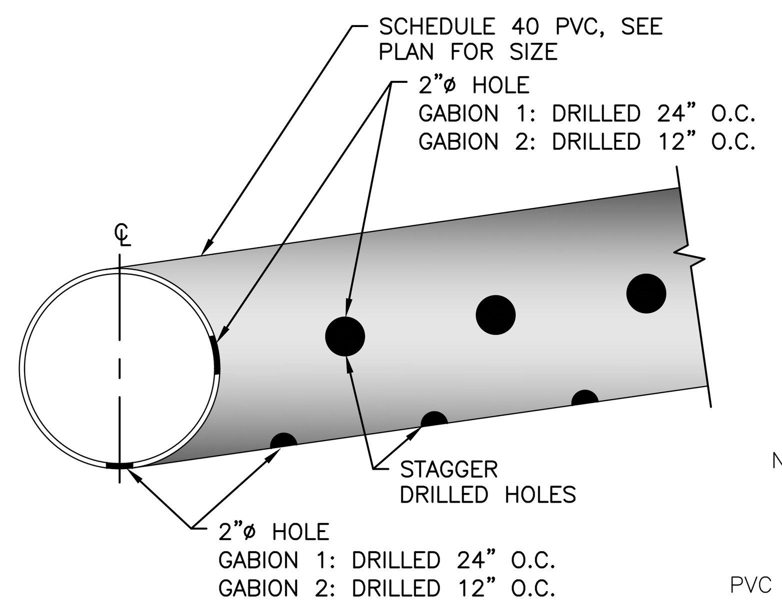
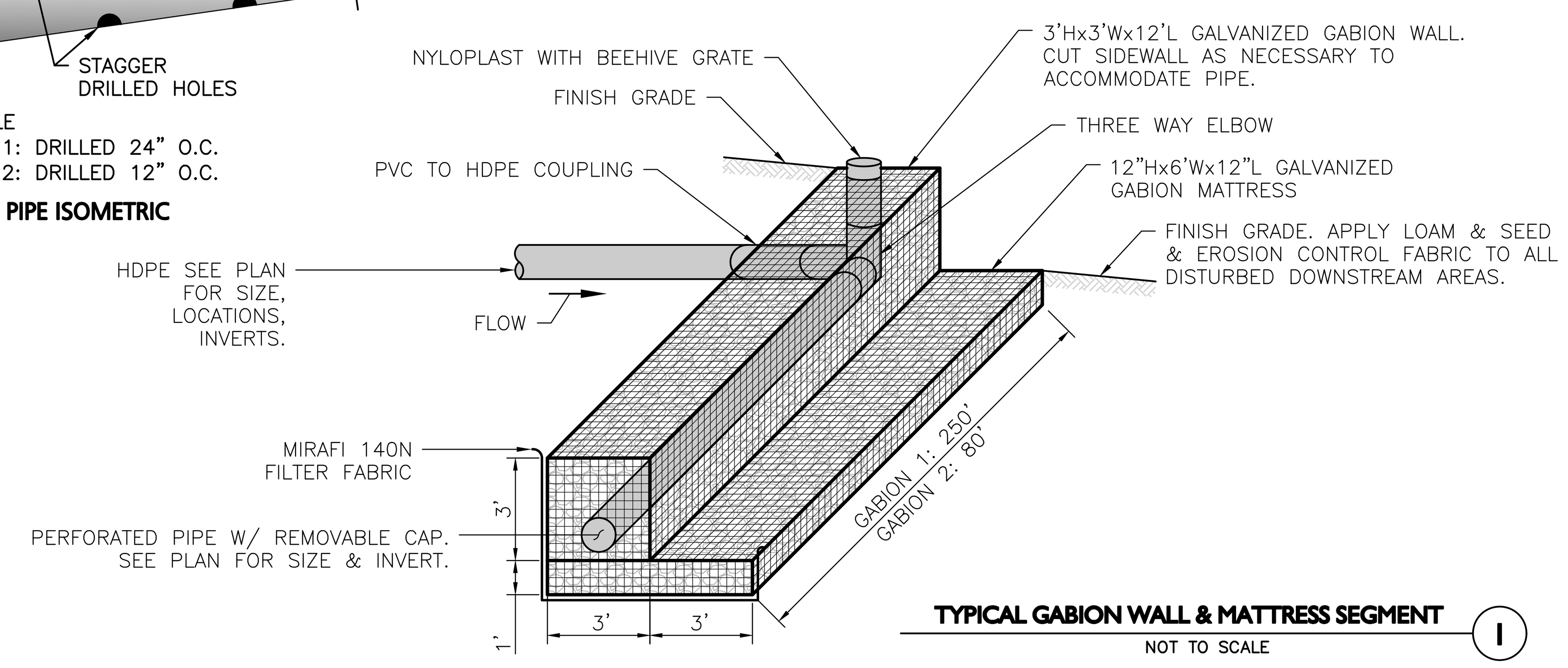
DRAWING TITLE:
DETAILS

SHEET No.
C-503

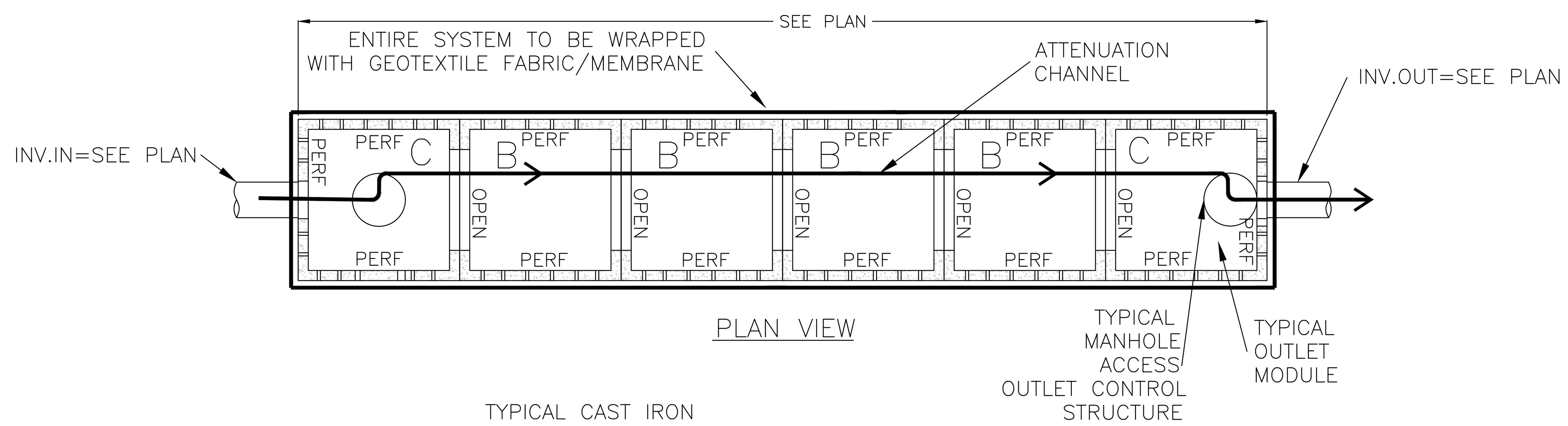


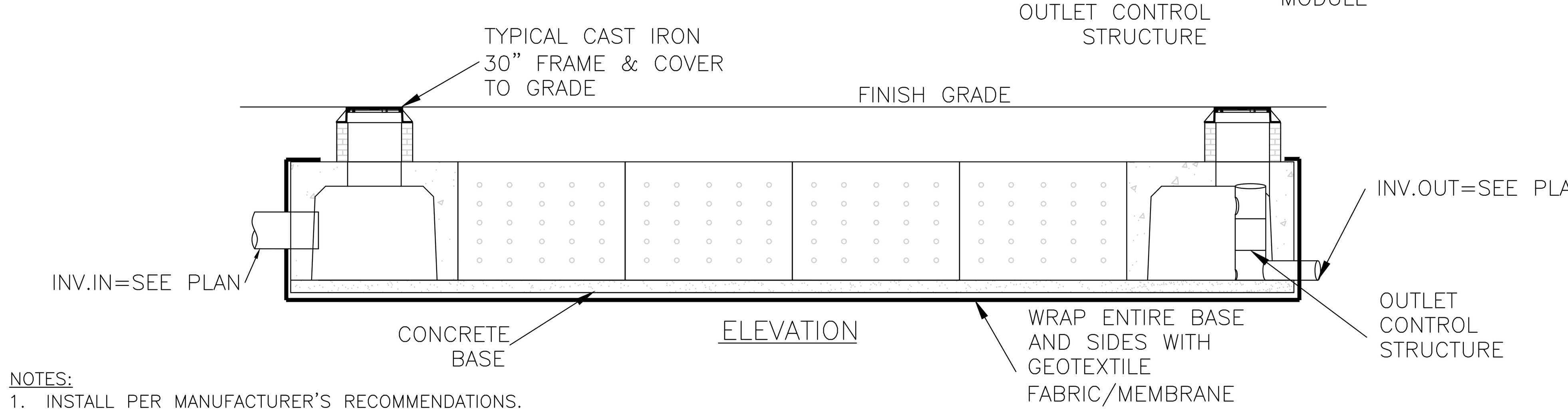
PIPE ISOMETRIC

NOTES:
1. ASSEMBLE GABION WALL AND MATTRESS PER MANUFACTURER'S RECOMMENDATIONS.
2. STONE FOR GABION FILL SHALL BE STONE FILL FOR GABION SHALL BE BETWEEN 4"-7" AND COORDINATED WITH LANDSCAPE ARCHITECT FOR COLOR AND TEXTURE.



TYPICAL GABION WALL & MATTRESS SEGMENT (1)
NOT TO SCALE

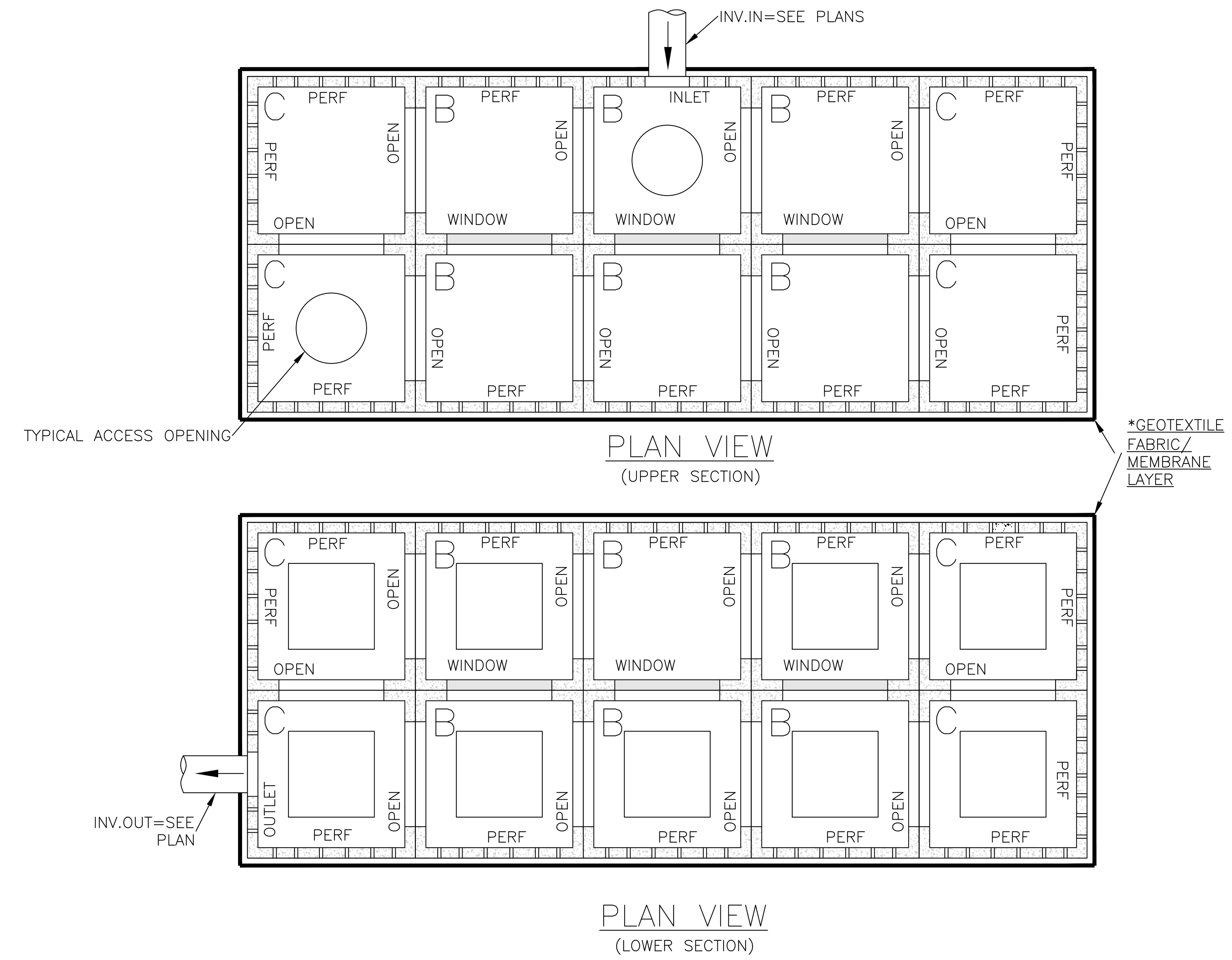


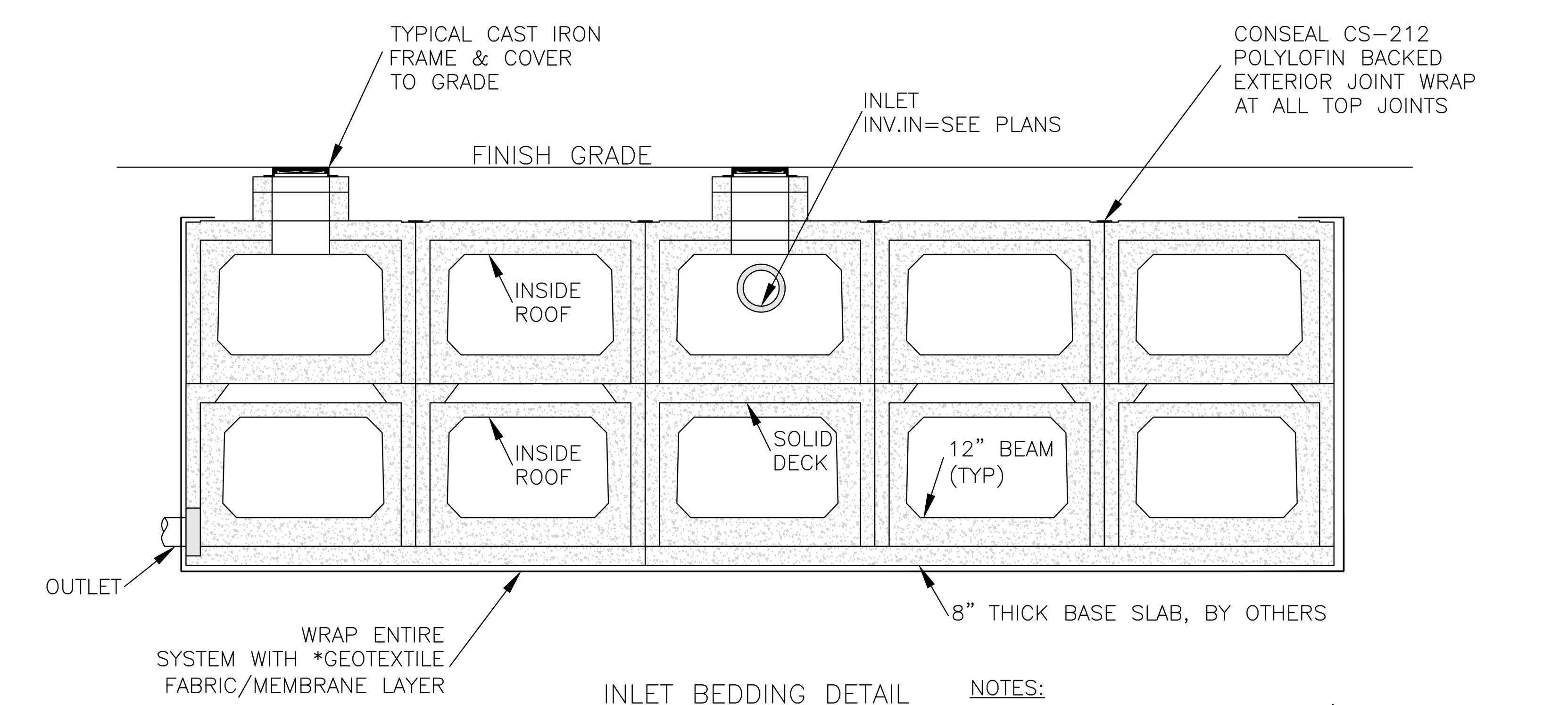


NOTES:
1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. RETAIN-IT DETAILS ARE PROTOTYPICAL.
2. TREATMENT OF TSS TO BE PROVIDED BY ADVANCED SEDIMENTATION WITHIN RETAIN-IT MODULES.
3. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL.

TYPICAL DETENTION /RETENTION

RETAIN-IT STORMWATER DETENTION SYSTEM (2)
NOT TO SCALE

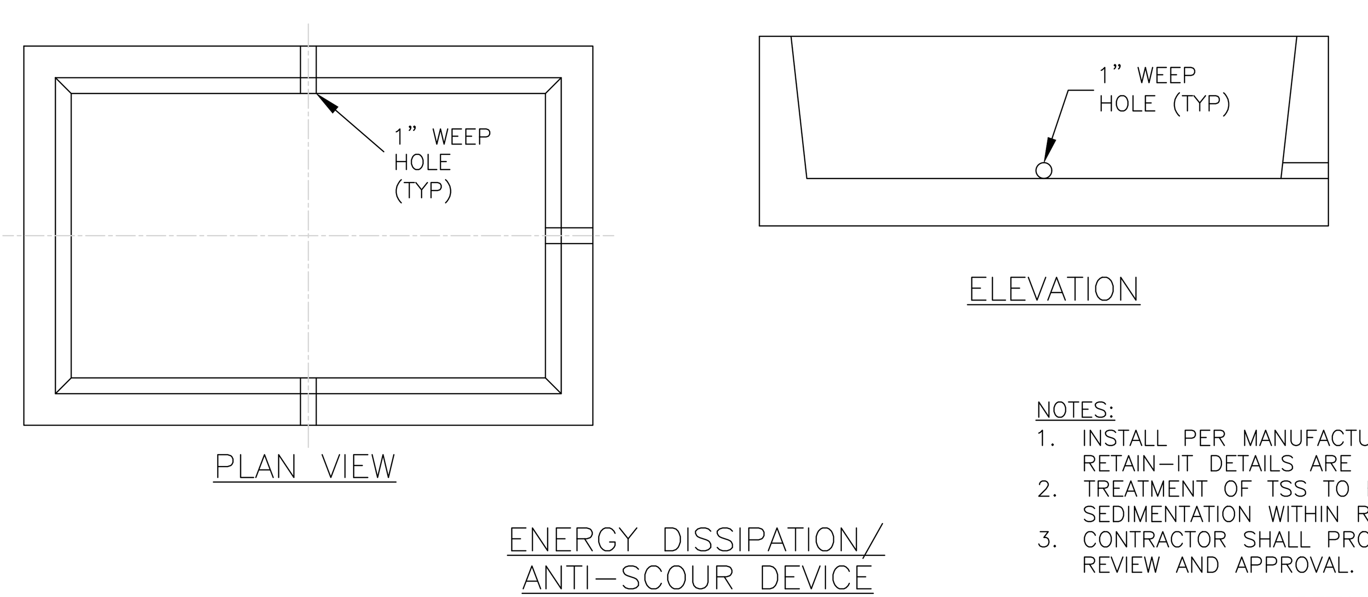




INLET BEDDING DETAIL
NTS

NOTES:
1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. RETAIN-IT DETAILS ARE PROTOTYPICAL.
2. TREATMENT OF TSS TO BE PROVIDED BY ADVANCED SEDIMENTATION WITHIN RETAIN-IT MODULES.
3. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL.

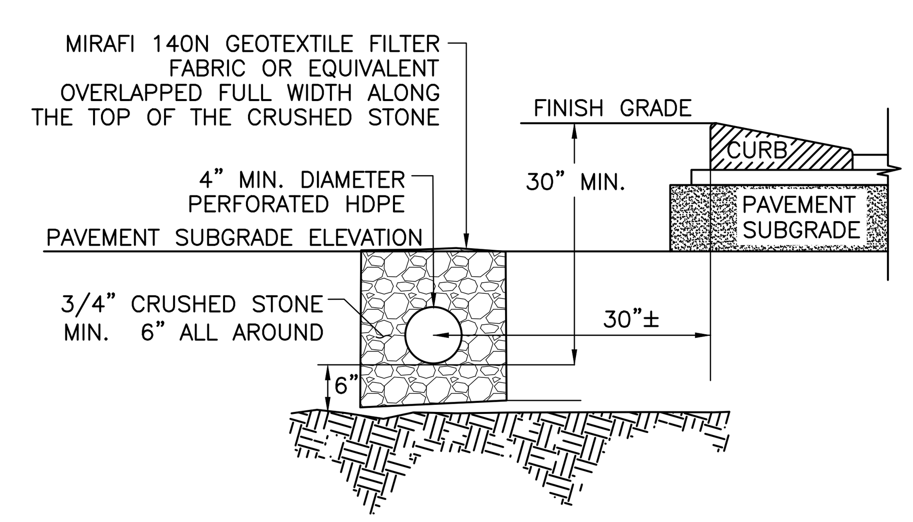
RETAIN-IT STACKED STORMWATER DETENTION SYSTEM (3)
NOT TO SCALE



ENERGY DISSIPATION/ ANTI-SCOUR DEVICE

NOTES:
1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. RETAIN-IT DETAILS ARE PROTOTYPICAL.
2. TREATMENT OF TSS TO BE PROVIDED BY ADVANCED SEDIMENTATION WITHIN RETAIN-IT MODULES.
3. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL.

RETAIN-IT ANTI-SCOUR DEVICE (4)
NOT TO SCALE



NOTES:
1. UNDERDRAIN TO BE PLACED IN LOCATIONS OF CUT AND WHERE GRAVEL ROAD BASE WILL BE BELOW EXISTING GRADE.
2. THE UNDERDRAIN SHALL CONSIST OF A 4 INCH DIAMETER PERFORATED HDPE PIPE SURROUNDED WITH AT LEAST 6 INCHES OF 3/4" STONE ALONG THE SIDES AND BOTTOM OF THE PIPE. CRUSHED STONE OVER THE TOP OF PIPE SHALL EXTEND UP TO THE PROPOSED PAVEMENT SUBGRADE ELEVATION.
3. THE CRUSHED STONE SHALL BE WRAPPED IN FILTER FABRIC (MIRAFI 140N OR APPROVED EQUAL) AND OVERLAPPED FULL WIDTH ON THE TOP.
4. THE PIPE SHALL BE LAID FLAT AND SHALL CONNECT TO A SOLID PIPE BEFORE GOING UNDER ANY PAVEMENT AREAS.
5. THE BOTTOM OF THE PIPE SHALL BE AT LEAST 30 INCHES BELOW THE PROPOSED FINISH GRADE.

ROADWAY UNDERDRAIN (5)
NOT TO SCALE

R:\PROJECTS\2889-01\CIVIL\DRAWINGS\CURRENT\C-2889-01_DETAILS.DWG

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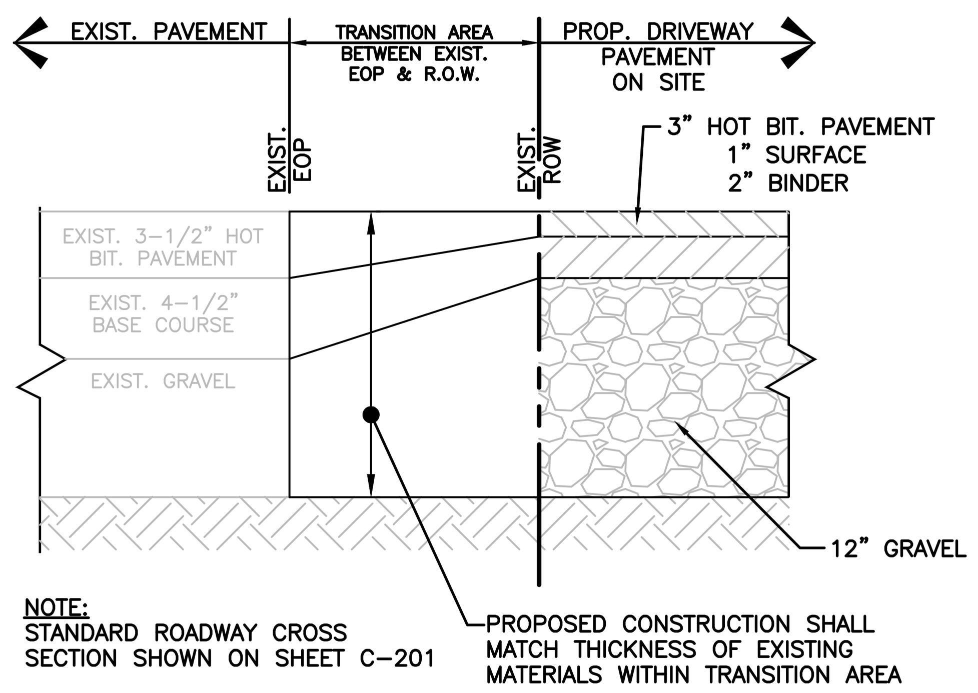
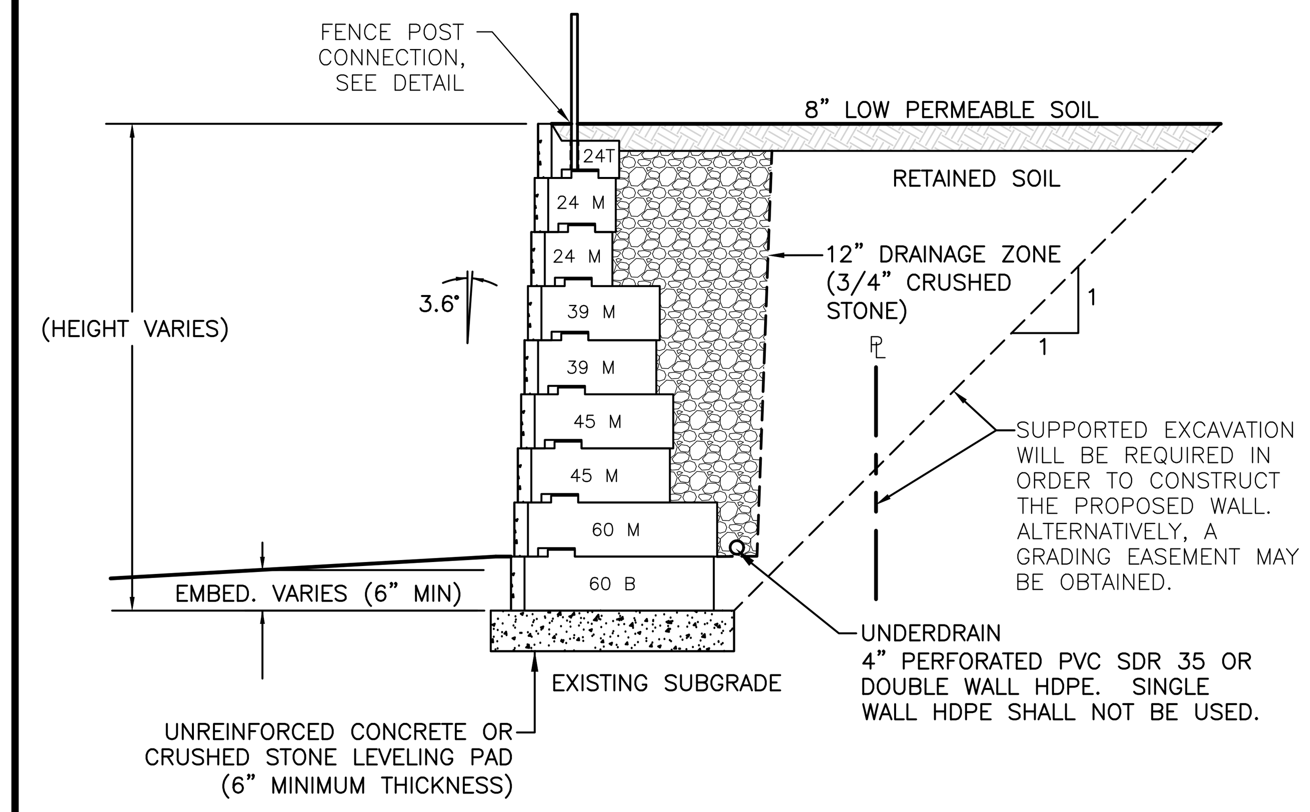
DRAWING TITLE: DETAILS

SHEET No. C-504



NOTE:
STANDARD ROADWAY CROSS SECTION SHOWN ON SHEET C-201

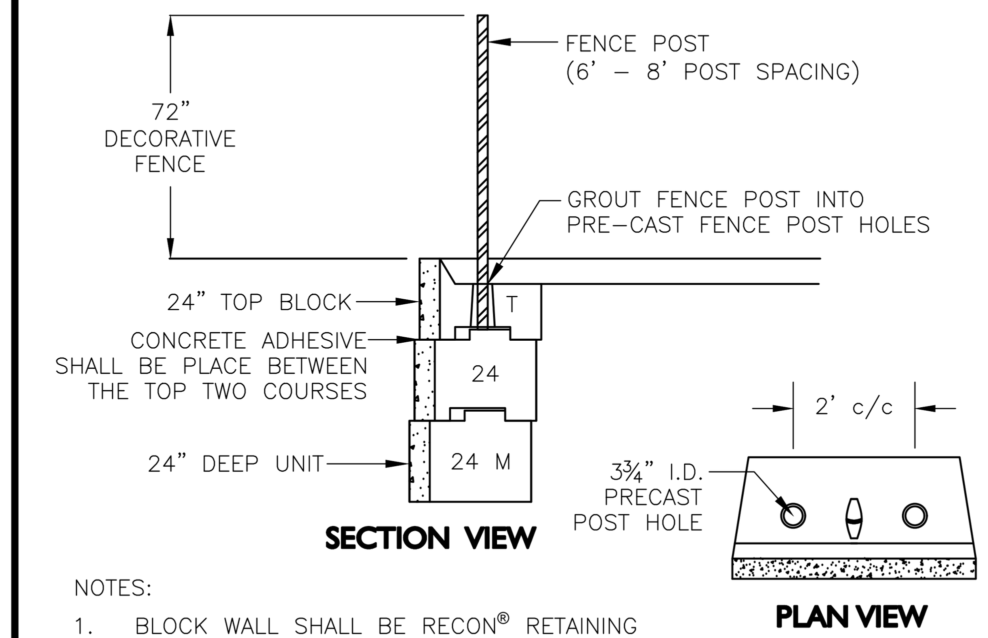
PAVEMENT TRANSITION (1)
NOT TO SCALE



NOTES:

1. BLOCK WALL SHALL BE RECON® RETAINING WALL SYSTEMS OR APPROVED EQUAL.
2. VENDOR INFORMATION:
   SHEA WALL SYSTEM INC.
   87 HAVERHILL STREET
   AMESBURY, MA 01913
   PHONE: 800-696-7432
   www.sheaconcrete.com
3. RECON BLOCK STYLE SHALL BE "NORTH SHORE GRANITE".
4. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND WALL CALCULATIONS, PREPARED AND ENDORSED BY A MA REGISTERED PROFESSIONAL ENGINEER, TO THE ENGINEER-OF-RECORD FOR APPROVAL AND TO THE TOWN FOR THEIR FILES.
5. SEE GRADING PLANS FOR WALL LAYOUT AND HEIGHTS.
6. SHORING, IF USED, WOULD REQUIRE A FORMAL SUBMITTAL, STAMPED BY A GEOTECHNICAL ENGINEER.
7. CONTRACTOR SHALL STABILIZE AND OTHERWISE PROTECT ABUTTING PROPERTIES FROM SUBSIDENCE, OR OTHER PROPERTY DAMAGE RESULTING FROM EXCAVATION, RETAINING WALL CONSTRUCTION, OR OTHER CONTRACTOR OPERATIONS.

BLOCK RETAINING WALL SECTION (2)
NOT TO SCALE



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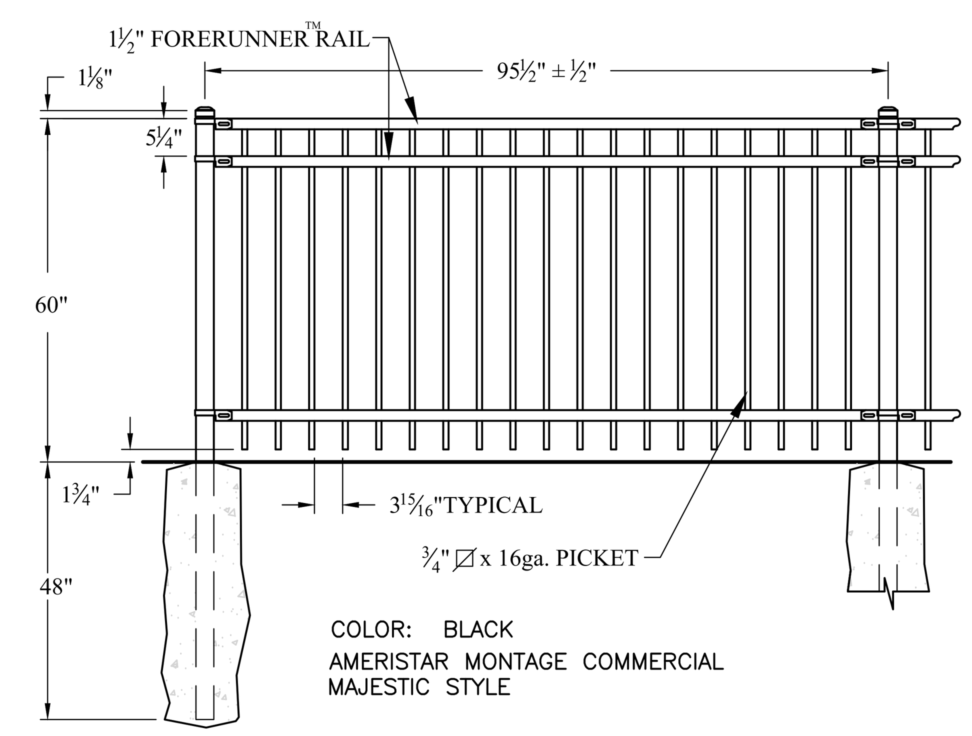
   PHONE: 800-696-7432
   www.sheaconcrete.com

FENCE CONNECTION TO TOP OF WALL (3)
NOT TO SCALE



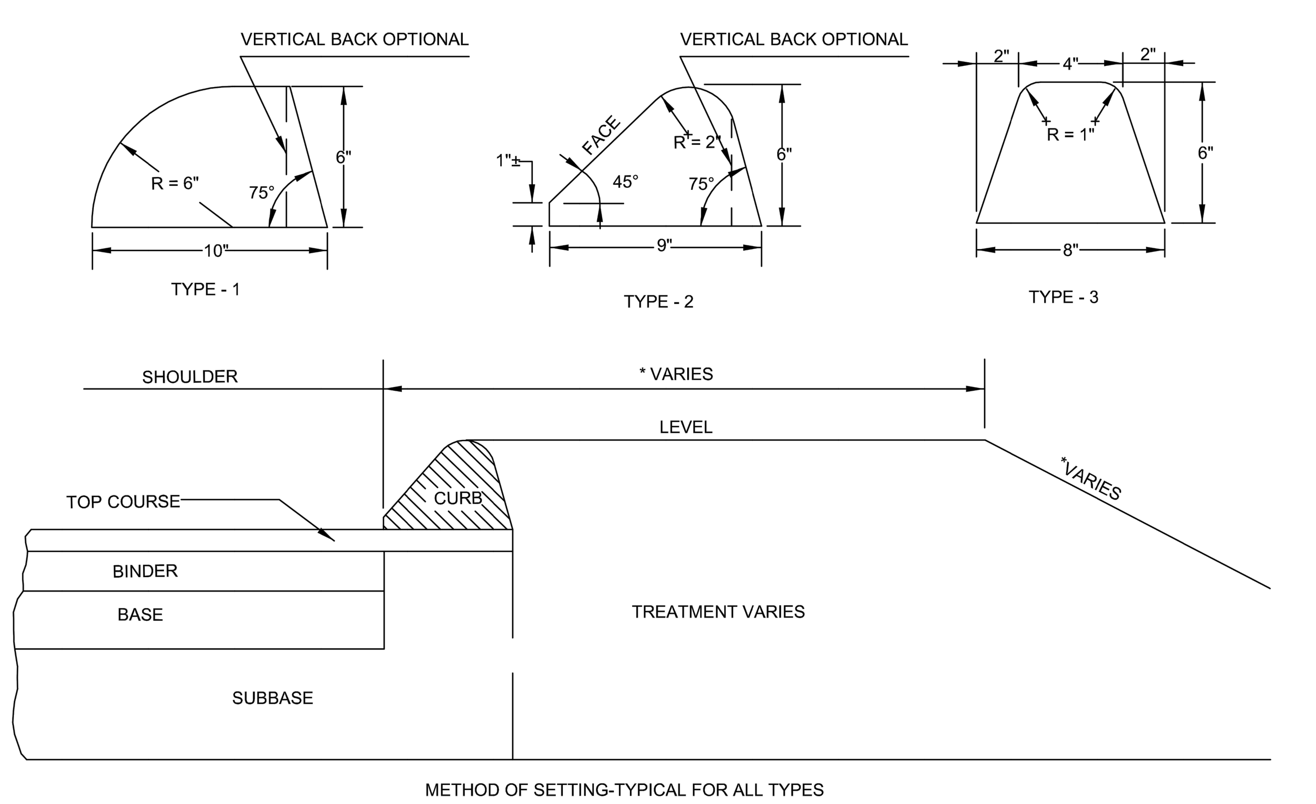
COLOR: BLACK
AMERISTAR MONTAGE COMMERCIAL
MAJESTIC STYLE

AMERISTAR®
1555 N. Mingo
Tulsa, OK 74116
1-888-333-3422

DECORATIVE STEEL FENCE (4)
NOT TO SCALE

massDOT CONSTRUCTION STANDARDS

HOT MIX ASPHALT CURBS



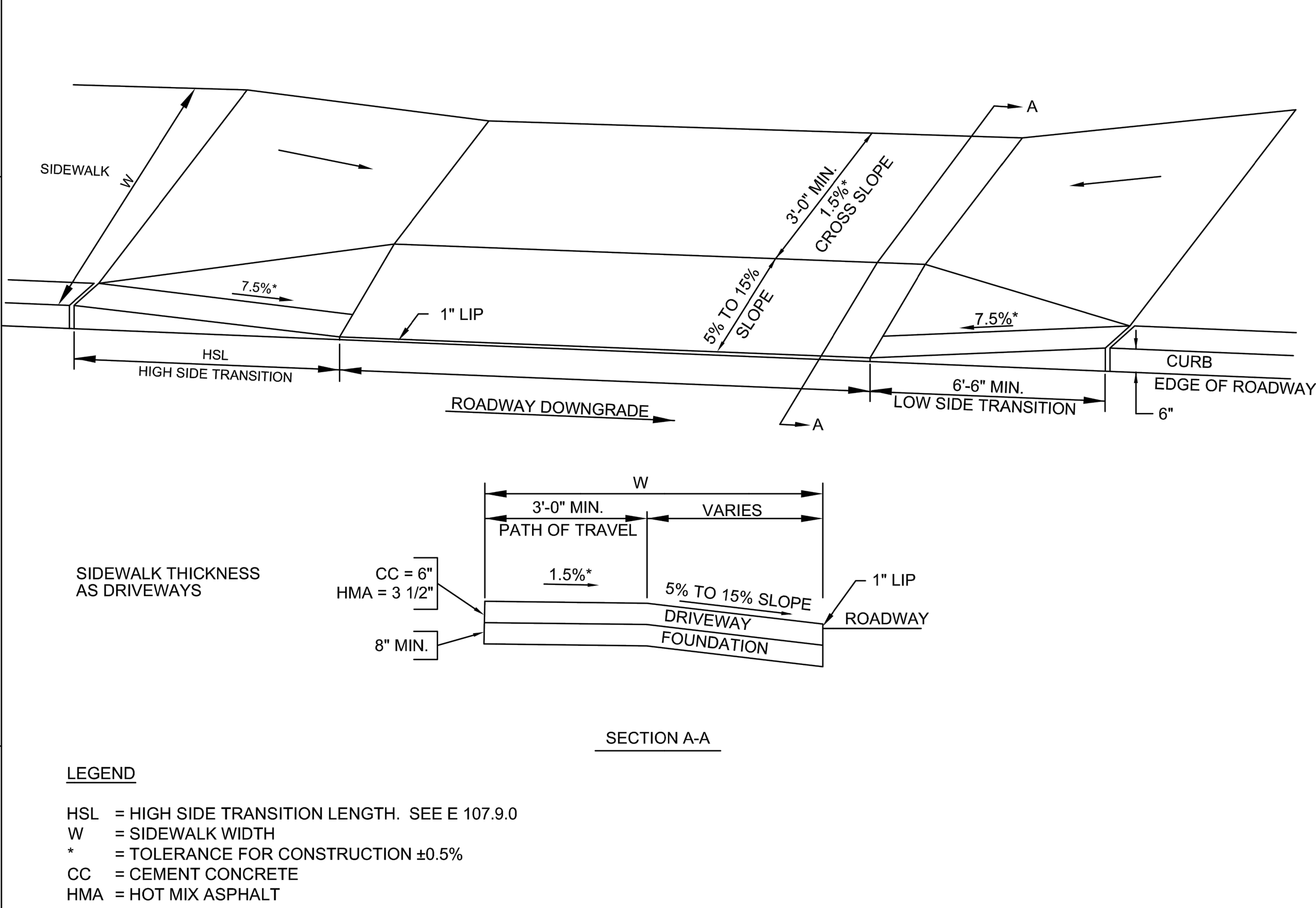
METHOD OF SETTING-TYPICAL FOR ALL TYPES

* SEE TYPICAL SECTIONS FOR PROJECT.

DATE OF ISSUE: OCTOBER 2017
DRAWING NUMBER: E 106.2.0

massDOT CONSTRUCTION STANDARDS

SIDEWALK THROUGH DRIVEWAYS WITHOUT CURB RETURNS



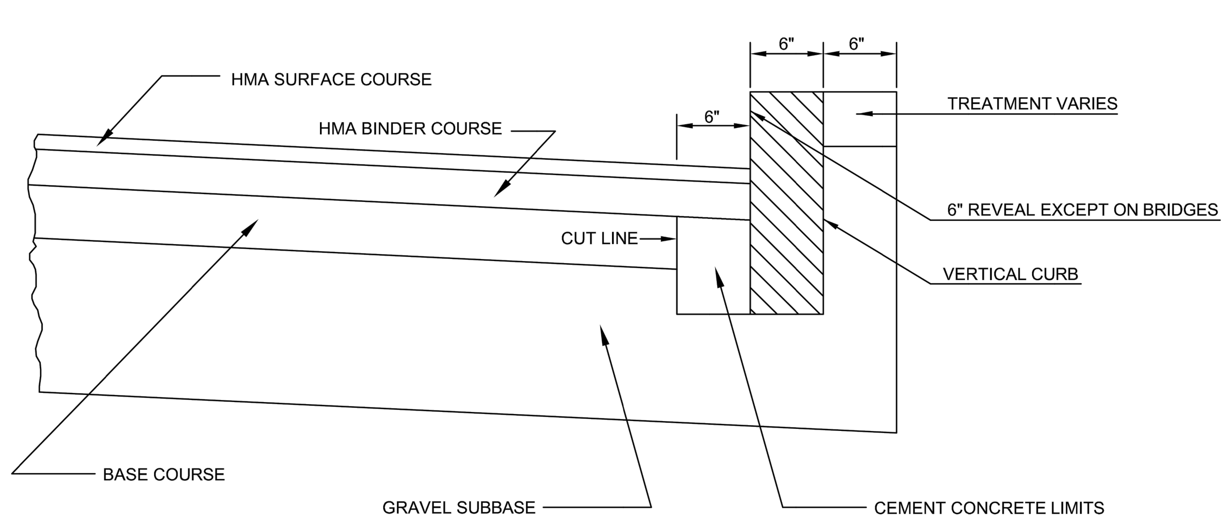
LEGEND

HSL = HIGH SIDE TRANSITION LENGTH. SEE E 107.9.0
W = SIDEWALK WIDTH
* = TOLERANCE FOR CONSTRUCTION ±0.5%
CC = CEMENT CONCRETE
HMA = HOT MIX ASPHALT

DATE OF ISSUE: OCTOBER 2017
DRAWING NUMBER: E 107.7.0

massDOT CONSTRUCTION STANDARDS

METHOD OF SETTING VERTICAL CURB



NOTES:

1. THIS PROCEDURE IS APPLICABLE ONLY IF CURB IS TO BE SET AFTER BASE COURSE IS IN PLACE PRIOR TO BINDER AND TOP PLACEMENT.
2. CUT NEAT LINE 6" FROM CURB LINE AND REMOVE BASE AND GRAVEL. REPLACE WITH CEMENT CONCRETE.
3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED; ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT TO BE USED AS A SUBSTITUTE.

DATE OF ISSUE: OCTOBER 2017
DRAWING NUMBER: E 106.3.0

massDOT CONSTRUCTION STANDARDS

CURB TRANSITION LENGTH FOR WHEELCHAIR RAMPS

ROADWAY PROFILE GRADE	* HIGH SIDE TRANSITION LENGTH
%	ENGLISH UNITS
=0%	6'-6"
>0% TO 1%	7'-8"
>1% TO 2%	9'-0"
>2% TO 3%	11'-0"
>3% TO 4%	14'-0"
>4% TO 5%	15'-0" Max

NOTE:

* BASED ON A DESIGN SLOPE OF 7.5% AND A REVEAL OF 6".

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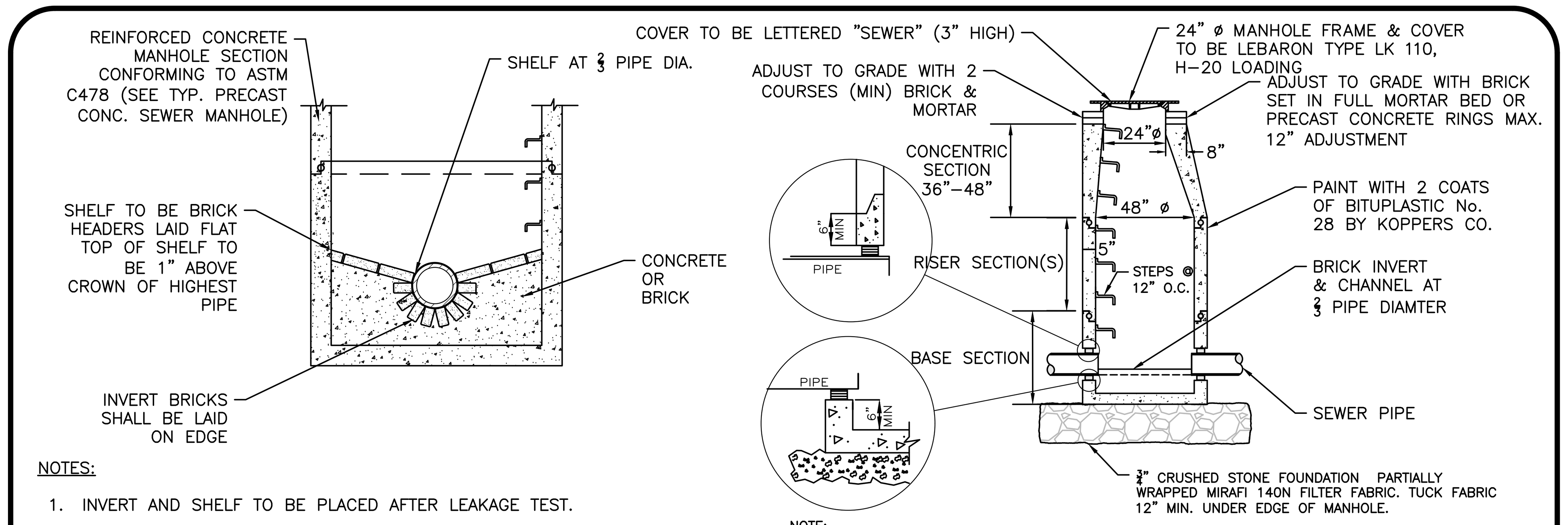
DRAWING TITLE: DETAILS

SHEET No. C-505

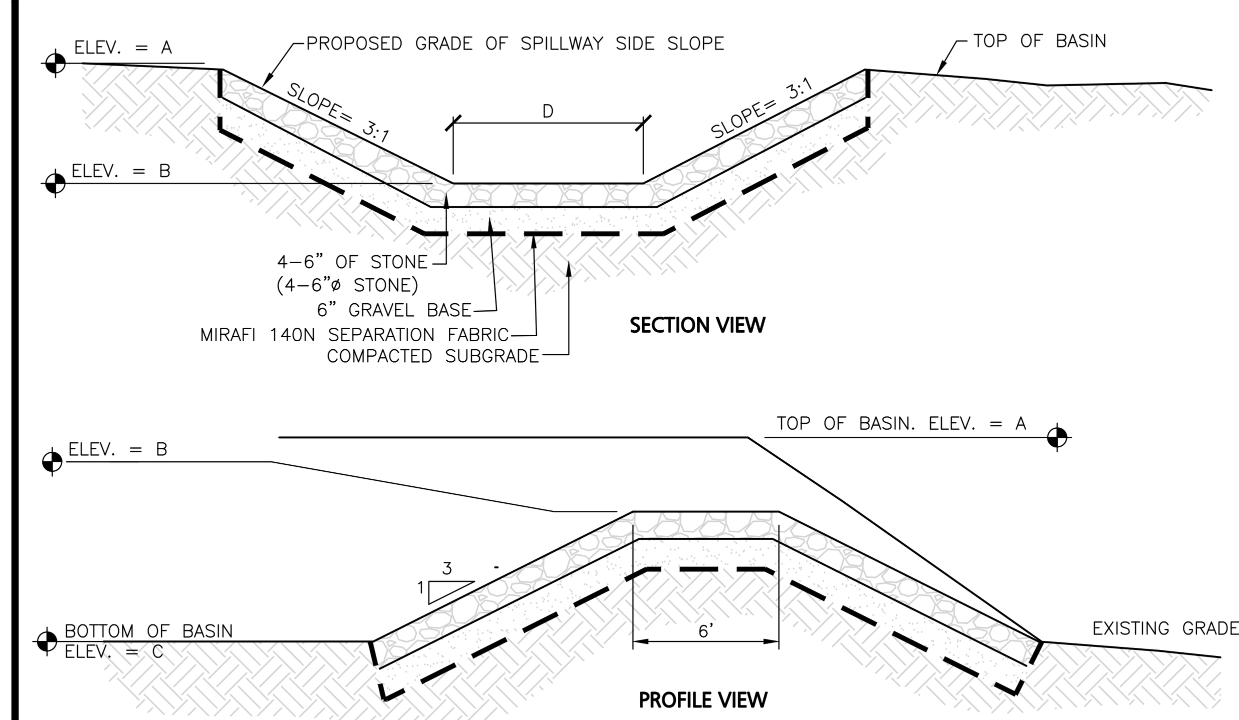


NOTES:

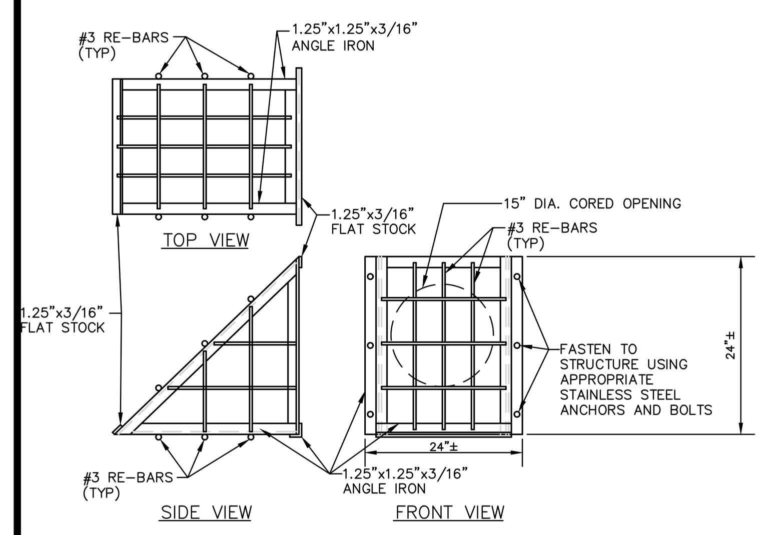
1. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST.
2. MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW. AT CHANGES IN DIRECTION, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE HIGHEST PIPE CROWN AND SLOPE TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF CEMENT CONCRETE OR BRICK IN MORTAR.

NOTE:
THE MANHOLE, INCLUDING ALL COMPONENT PARTS, SHALL HAVE ADEQUATE SPACE, STRENGTH AND LEAK PROOF QUALITIES CONSIDERED NECESSARY FOR THE INTENDED SERVICE SPACE REQUIREMENT AND CONFIGURATIONS SHALL BE AS SHOWN ON THE DRAWING. MANHOLES MAY BE AN ASSEMBLY OR PRECAST SECTIONS, WITH OR WITHOUT STEEL REINFORCEMENT, WITH ADEQUATE JOINTING OR CONCRETE CAST MONOLITHICALLY IN PLACE WITH OR WITHOUT REINFORCEMENT. IN ANY APPROVED MANHOLE, THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND LOADS OF 8 TONS (H-20 LOADING) WITHOUT FAILURE AND PREVENT LEAKAGE IN EXCESS OF ONE GALLON PER DAY PER VERTICAL FOOT OF MANHOLE.

PRECAST CONCRETE SEWER MANHOLE (1)
NOT TO SCALE

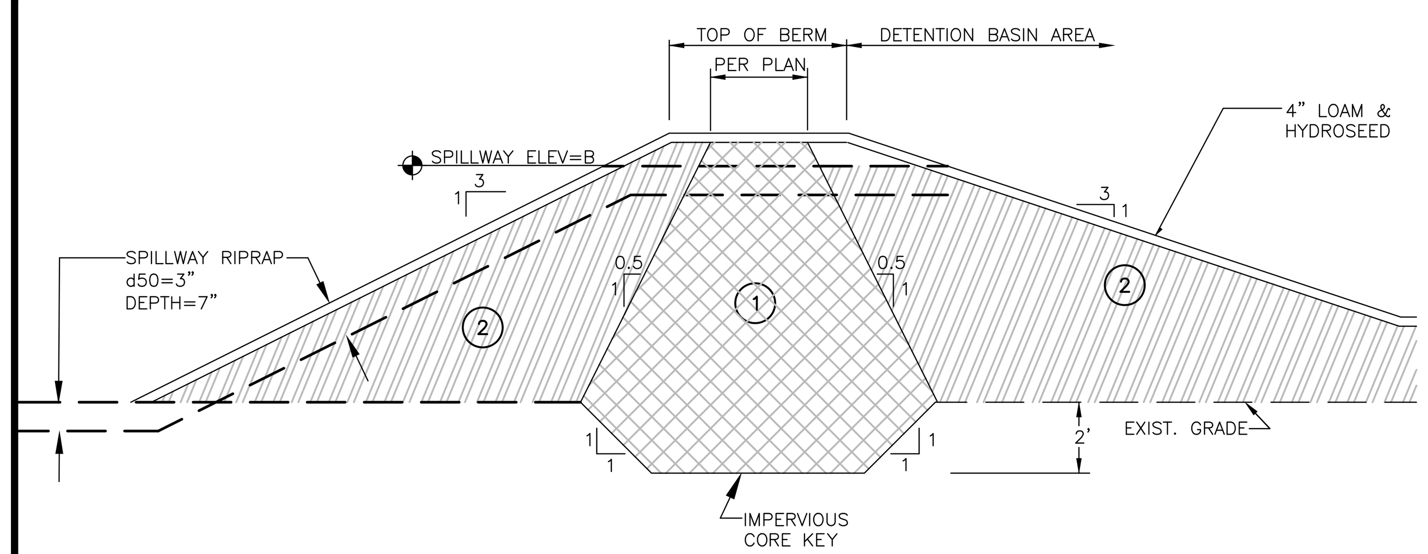


TYPICAL SECTION & PROFILE OF EMERGENCY SPILLWAY (2)
NOT TO SCALE



NOTES
1) SPACE BETWEEN RE-BARS SHOULD NOT BE GREATER THAN 3.5 INCHES.
2) TRASH RACK TO BE FASTENED TO THE CONCRETE OULET STRUCTURE WITH A MINIMUM OF FOUR BOLTS AND ANCHORS.
3) ANGLE IRON MAY BE BOLTED TOGETHER.
4) RE-BARS SHALL BE WELDED TO THE ANGLE IRON.
5) UPON COMPLETE FABRICATION OF STRUCTURE, ENTIRE UNIT SHALL BE GALVANIZED.

TRASH RACK (3)
NOT TO SCALE



BERM MATERIALS

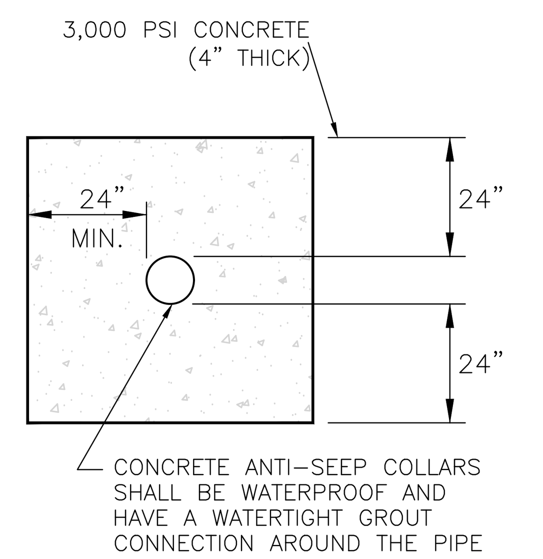
(1) IMPERVIOUS CORE(CLAY, SILT, & SAND) SHALL CONFORM TO AASHTO T27 AND ROLLED TO 6" LAYERS(95% COMPACTION) CORE MATERIAL TO HAVE A PERMEABILITY OF 1X10^-6 CM/SEC AND THE FOLLOWING GRADATION.

PERCENT FINER	SIEVE SIZE
100	#4
30 TO 85	#40
20 TO 50	#200

(2) FILTER LAYER F2 EMBANKMENT MATERIAL SHALL CONFORM TO ASSHTO M57 AND MEET THE FOLLOWING GRADATION:

PERCENT FINER	SIEVE SIZE
100	3 IN.
95-100	2 IN.
55-85	1 IN.
27-52	NO. 4
50 MAX.	NO. 40
25 MAX.	NO. 200

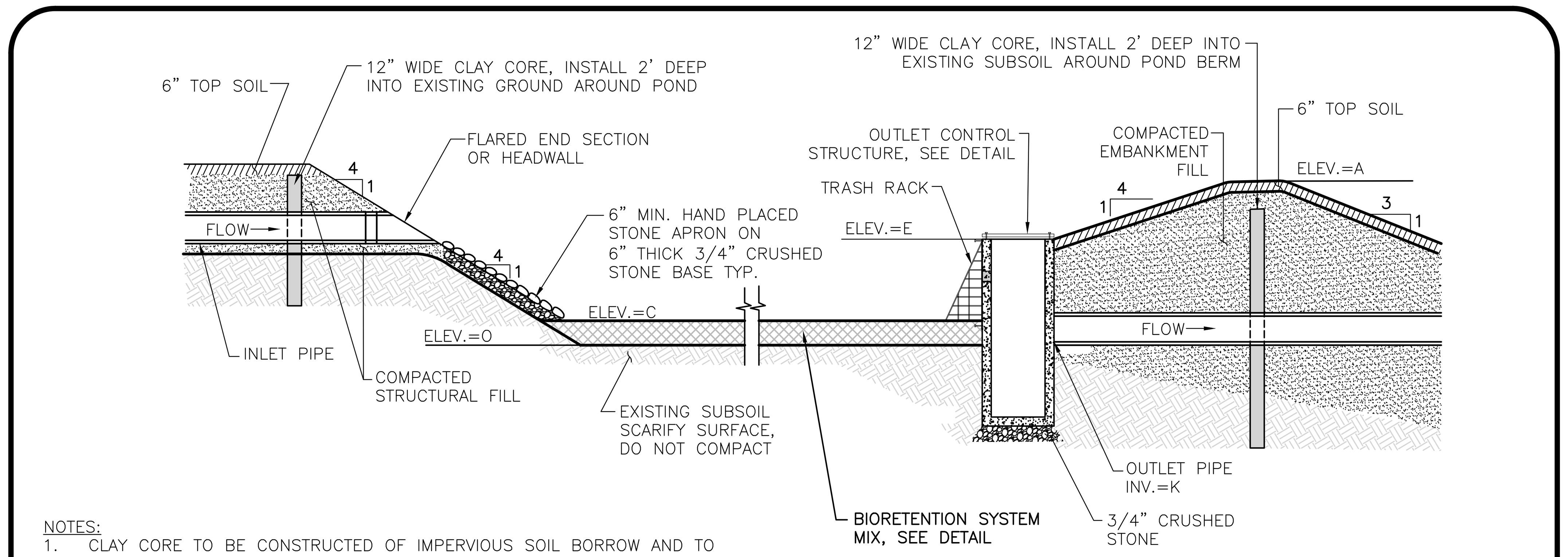
TYPICAL BASIN EMBANKMENT CROSS SECTION (4)
NOT TO SCALE



NOTE:

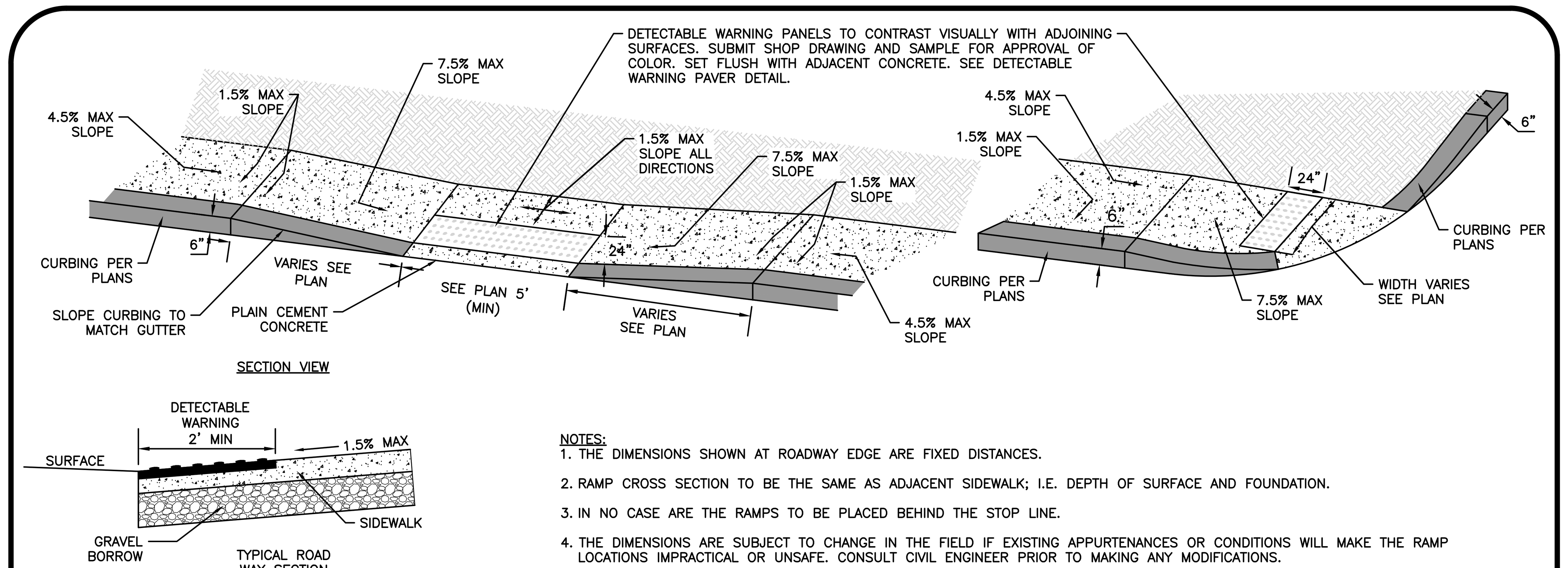
1. TO BE INSTALLED EQUIDISTANT FROM ENDS OF PIPE AND SPACED 20 FEET APART.

ANTI-SEEP COLLAR FOR BASIN OUTLET (5)
NOT TO SCALE



NOTES:
1. CLAY CORE TO BE CONSTRUCTED OF IMPERVIOUS SOIL BORROW AND TO BE COMPACTED TO 90% OF MAXIMUM DRY DENSITY WITH 6" OF TOPSOIL. BERM TO BE SEEDED. IMPERVIOUS CLAY CORE TO BE FREE OF PEAT STUMPS, BRUSH, ORGANIC SOILS AND OTHER DELETERIOUS MATERIALS. CORE MATERIAL TO HAVE MAXIMUM PERMEABILITY OF 1 x10^-4 CM/SEC
1. SIDE SLOPES TO BE SEEDED WITH NEW ENGLAND EROSION CONTROL.
2. PROJECT CIVIL ENGINEER SHALL PERFORM AN INSPECTION PRIOR TO THE PLACEMENT OF THE SEED MIX.

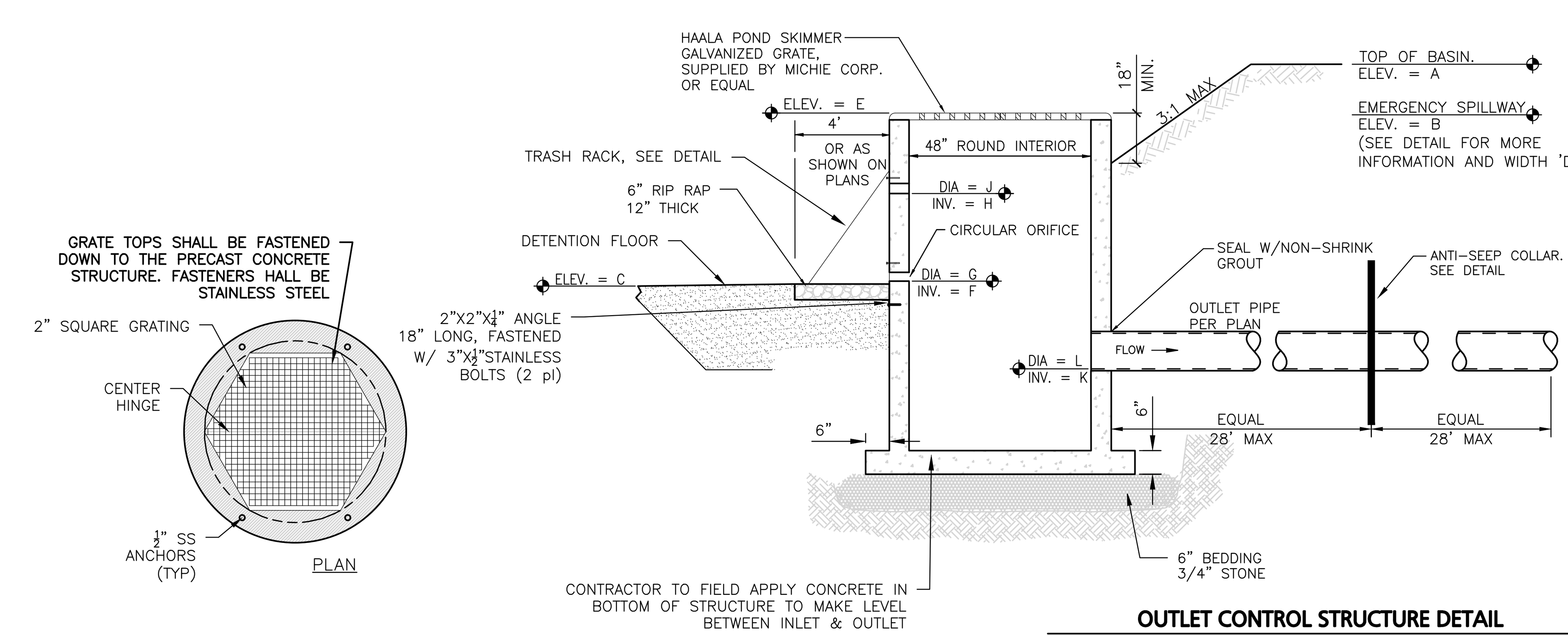
VEGETATED STORMWATER BASIN (6)
NOT TO SCALE



NOTES:
1. THE DIMENSIONS SHOWN AT ROADWAY EDGE ARE FIXED DISTANCES.
2. RAMP CROSS SECTION TO BE THE SAME AS ADJACENT SIDEWALK; I.E. DEPTH OF SURFACE AND FOUNDATION.
3. IN NO CASE ARE THE RAMPS TO BE PLACED BEHIND THE STOP LINE.
4. THE DIMENSIONS ARE SUBJECT TO CHANGE IN THE FIELD IF EXISTING APPURTENANCES OR CONDITIONS MAY BE MADE RAMP LOCATIONS IMPRACTICAL OR UNSAFE. CONSULT CIVIL ENGINEER PRIOR TO MAKING ANY MODIFICATIONS.

ADA ACCESSIBLE CURB CUT AND TRANSITION (7)
NOT TO SCALE

	A	B	C	D	E	F	G	H	J	K	L
	(Elev.)	(Elev.)	(Elev.)	(feet)	(Elev.)	(Elev.)	(Dia)	(Elev.)	(Dia)	(Elev.)	(Dia)
DB1	816.00	814.40	811.00	8.0	813.20	811.00	8" x2	811.90	12" x2	811.00	18"



OUTLET CONTROL STRUCTURE DETAIL (8)
NOT TO SCALE

R:\PROJECTS\2889-01\CIVIL\DRAWINGS\CURRENT\C-2889-01_DETAILS.DWG

APPROVAL UNDER SUBDIVISION CONTROL REQUIRED. SUBJECT TO A COVENANT TO BE RECORDED HEREWITH.

DATE:

LEICESTER PLANNING BOARD

I CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY (20) RECORDING DAYS NEXT AFTER RECEIPT AND OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THIS PLAN

TOWN CLERK - TOWN OF LEICESTER

DEFINITIVE
ISSUED FOR REVIEW
OCTOBER 5, 2021

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	10-05-21	MISC. REVISIONS PER TOWN COMMENTS

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	09-17-21
SCALE:	AS SHOWN	DWG.:	C-2889-01_Details
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
w w w . a l l e n m a j o r . c o m
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

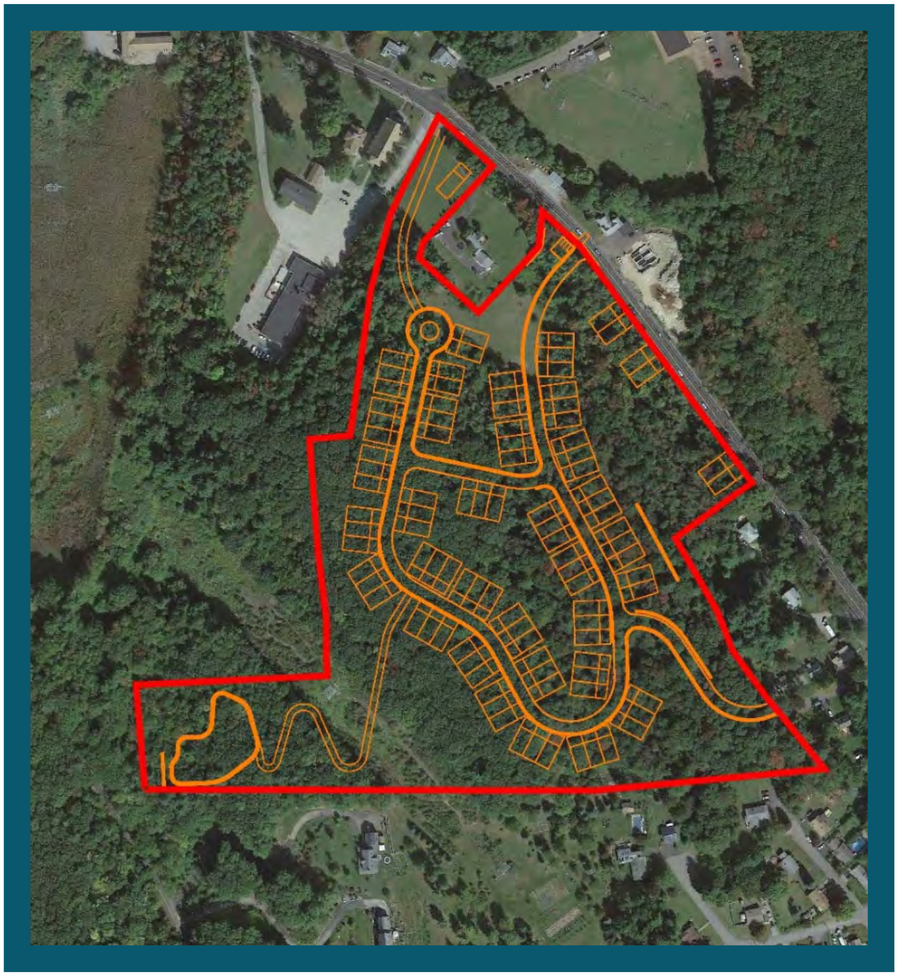
DRAWING TITLE: DETAILS

SHEET No. C-506

ALLEN & MAJOR ASSOCIATES, INC.

DRAINAGE REPORT

Skyview Estates
Leicester, MA



APPLICANT:
MKEP 770 LLC
265 Sunrise Highway, Suite 1368
Rockville Center, NY 11570

PREPARED BY:
Allen & Major Associates, Inc.
100 Commerce Way, Suite 5
Woburn, Massachusetts 01801

DRAINAGE REPORT

Skyview Estates
Leicester, Massachusetts

APPLICANT:
MKEP 770 LCC
265 Sunrise Highway, Suite 1368
Rockville Center, NY 11570

COMMONWEALTH OF MASSACHUSETTS
MICHAEL A.
MALYNOWSKI
CIVIL
No. 47269
REGISTERED
PROFESSIONAL ENGINEER

Digitally signed by Michael Malynowski
Date: 2021.10.05 12:01:34 -04'00'

PREPARED BY:
Allen & Major Associates, Inc.
100 Commerce Way, Suite 5
Woburn, Massachusetts 01801

REVISED:
10-05-2021

ISSUED:
07-16-2021

A&M PROJECT NO.:
2889-01

TABLE OF CONTENTS

SECTION 1.0 -
DRAINAGE REPORT

Introduction

The purpose of this drainage report is to provide an overview of the proposed stormwater management system (SMS) for the Skyview Estates subdivision located at 651 Main Street in Leicester. The report will show by means of narrative, calculations and exhibits that the proposed stormwater management system will meet or exceed the Massachusetts Department of Environmental Protection (MassDEP) stormwater standards, and the Town of Leicester Stormwater Management Regulations.

The proposed site improvements include the construction of a neighborhood style residential development. The development will consist of a combination of two and three family town homes situated along a curvilinear roadway network. The entire development will remain private under the control of an established home owner association.

The proposed SMS incorporates structural and non-structural Best Management Practices (BMPs) to provide stormwater peak flow mitigation, quality treatment, and conveyance. The SMS includes catch basins, drain manholes, proprietary separators, subsurface detention systems, and gabion wall systems.

Site Categorization for Stormwater Regulations

The proposed site improvements at 651 Main Street are considered a new development under the DEP Stormwater Management Standards due to the net increase in impervious area. A new development project is required to meet the all of Stormwater Management Standards listed within the MA DEP Stormwater Handbook.

Site Location and Access

The site is a single lot (21-B5.1) that is proposed to be subdivided into 5 lots. Each of the proposed lots which front Main Street contains the minimum 100 feet of frontage. The remaining lot will be further developed into a residential development. The parcel is located along Main Street (Route 9) approximately 0.2 miles south of Waite Pond.

The parcel is abutted by the Residential 1 zone to the southeast and Suburban-Agricultural zone to the southwest. St. Josephs Church and Leicester Early Learning Center abut the parcel to the west while residential homes abut the parcel to the east and south.

The site is accessed to the southeast by an existing curb cut for Colonial Drive as well as to the north by a proposed curb cut on Main Street. The proposed private roadway network will be connected by these curb cuts to provide adequate traffic flow and safe travel throughout the site.

Existing Site Conditions

The site currently includes unused land that is occupied by trees and various wetland pockets. There is an existing electrical tower and 250’ easement that is located through the southwest portion of the site. Various stone walls, concrete walls, and a concrete foundation were also found by an on the ground survey performed by A&M. The site topography ranges from elevation 815 in the southwest corner of the parcel to 948 in the southern-central portion of the site.

The surface drainage flows were analyzed at five Study Points. Study Point #1 summarizes off-site flows generated from the northeast portion of the parcel. This area flows to existing drainage infrastructure located within Main Street and discharges to the municipal drainage system. Study Point #2 summarizes off-site flows generated from southeast portion of the site. This area flows to an existing wetland/swale formed along an existing stone wall. Study Point #3 summarizes off-site flows generated from the southwest portion of the parcel. This area flows to an existing wetland that is enclosed by the parcel to the west and Henshaw Street to the east. Study Point #4 summarizes off-site flows generated from the northwest portion of the parcel. Study Point #5 summarizes off-site flows generated from the northern-central portion of the parcel.

Existing Soil Conditions

The on-site soils were identified using the USDA Natural Resources Conservation Services (NRCS) Soil Survey for Worcester County. The site contains a range of soil types including: Ridgebury, Whitman, Paxton, Woodbridge, Charlton, Canton, and Udorthents. The majority of the site is made up of Paxton fine sandy loam. A copy of the NRCS Custom Soil Resource Report is included in the appendix of this report.

Based upon the NRCS soil report the project site is classified as multiple types of fine sandy loam. The NRCS soil survey classified the onsite soil as the following:

Symbol	Soil Taxonomic Name	Hydrologic Soil Group
70B	Ridgebury, 3-8% slopes	D
71B	Ridgebury (stony), 3-8% slopes	D
73A	Whitman, 0-3% slopes	D
305B	Paxton, 3-8% slopes	C
305C	Paxton, 8-15% slopes	C
305D	Paxton, 15-25% slopes	C
312B	Woodbridge, 0-8% slopes	C/D
407C	Charlton, 8-15% slopes	A
420B	Canton, 3-8% slopes	B
651	Udorthents, smoothed	A

Paxton fine sandy loam has a Hydrologic Soil Group "C" designation which has been used throughout the design. An Infiltration rate for the Paxton fine sandy loam was used for the design being 4.06 micrometers per second, converted to 0.575 inches per hour.

FEMA Floodplain/Environmental Due Diligence

There are no portions of the site located within the FEMA Zone "AE" Special Flood Hazard Area Subject to Inundation by the 1% Annual Chance Flood (100-year floodplain). The official Flood Insurance Rate Map (FIRM) effective date July 4, 2011, map #25027C0782E, panel 782 of 1075. See section 3 of this report for a copy of the FEMA FIRM.

Environmentally Sensitive Zones

The Commonwealth of Massachusetts asserts control over numerous protected and regulated areas including: Areas of Critical Environmental Concern (ACEC); Outstanding Resource Waters (ORWs); Priority and Protected Habitat for rare and endangered species, and areas protected under the Wetlands Protection Act. The subject property is not located within any of these regulated areas.

Drainage Analysis Methodology

A peak rate of runoff will be determined using techniques and data found in the following:

1. Urban Hydrology for Small Watersheds – Technical Release 55 by the United States Department of Agriculture Soils Conservation Service, June 1986. Runoff curve numbers and 24-hour precipitation values were obtained from this reference.
2. HydroCAD © Stormwater Modeling System by HydroCAD Software Solutions LLC, version 10.1-5a. The HydroCAD program was used to generate the runoff hydrographs for the watershed areas, to determine discharge/ stage/storage characteristics for the stormwater BMPs, to perform drainage routing and to combine the results of the runoff hydrographs. HydroCAD uses the TR-20 methodology of the SCS Unit Hydrograph procedure (SCS-UH).

Proposed Conditions – Peak Rate of Runoff

The stormwater runoff analysis of the existing and proposed conditions includes an estimate of the peak rate of runoff from various rainfall events. Peak runoff rates were developed using TR55 Urban Hydrology for Small Watersheds, developed by the U.S. Department of Commerce, Engineering Division and the HydroCAD computer program. Further, the analysis has been prepared in accordance with the MassDEP and the town requirements and standard engineering practices. The peak rate of runoff has been estimated for each watershed during the 2, 10, 25, and 100-year storm events.

The proposed stormwater management system for the site consists of deep sump catch basins, pipe detention systems, a detention basin, outlet control structures, and gabion walls (level spreaders). These systems have been designed in accordance with the MA DEP

Stormwater Management Policy to recharge groundwater and reduce rate of runoff from the parcel.

Detention system 1A and detention system 1B will overflow and discharges through an outlet control structure to an existing catch basin within Main Street (Study Point 1).

Detention system 2A overflows to gabion wall 2, which discharges into an existing wetland/swale at the eastern portion of the site that conveys stormwater to a proposed catch basin that is connected to the existing municipal system (SP-2) within Colonial Drive. Detention system 2B overflows through an outlet control structure that discharges to existing catch basin within the municipal system (SP-2).

Detention system 3 consisting of an extended dry detention basin overflows to gabion wall 2, which discharges to an existing wetland to the west of the site along Henshaw Street (SP-3). Stormwater runoff along the south-western border of the parcel will flow to the proposed Detention Basin which overflows to the existing wetland (SP- 3).

There are no proposed stormwater management systems used for on-site flows directed to Study Points 4 & 5. However, the rate of runoff to these points has been mitigated from the existing to proposed conditions.

The stormwater runoff model indicates that the proposed site development reduces the rate of runoff during all storm events at the identified points of analysis. The following tables provide a summary of the estimated peak rate, in Cubic Feet per Second (CFS) and total runoff volume, in cubic-feet (CF) at each of the five (5) Study Points for each of the design storm events. The HydroCAD worksheets are included in Section 4 and 5 of this report.

STUDY POINT #1 (Existing Catch Basin 1)				
	2-Year	10-Year	25-Year	100-Year
Existing Flow (CFS)	3.95	10.15	15.72	28.02
Proposed Flow (CFS)	3.93	10.01	15.69	27.01
Change (CFS)	**-0.02**	**-0.14**	**-0.03**	**-1.01**
Existing Volume (AF)	0.439	1.014	1.537	2.714
Proposed Volume (AF)	0.659	1.335	1.918	3.183
Change (AF)	**0.220**	**0.321**	**0.381**	**0.469**

STUDY POINT #2 (Existing Catch Basin 2)				
	2-Year	10-Year	25-Year	100-Year
Existing Flow (CFS)	2.81	8.34	13.67	25.99
Proposed Flow (CFS)	2.76	7.74	13.12	25.98
Change (CFS)	**-0.05**	**-0.60**	**-0.55**	**-0.01**
Existing Volume (AF)	0.738	1.682	2.534	4.447
Proposed Volume (AF)	1.215	2.325	3.259	5.259
Change (AF)	**0.477**	**0.643**	**0.725**	**0.812**

STUDY POINT #3 (Existing Wetland East)				
	2-Year	10-Year	25-Year	100-Year
Existing Flow (CFS)	3.94	10.91	17.41	32.17
Proposed Flow (CFS)	3.20	10.44	13.75	26.97
Change (CFS)	**-0.74**	**-0.47**	**-3.66**	**-5.20**
Existing Volume (AF)	0.644	1.482	2.243	3.954
Proposed Volume (AF)	1.223	2.451	3.506	5.795
Change (AF)	**0.579**	**0.969**	**1.263**	**1.841**

STUDY POINT #4 (Existing Wetland West)				
	2-Year	10-Year	25-Year	100-Year
Existing Flow (CFS)	1.57	3.91	5.98	10.55
Proposed Flow (CFS)	0.93	2.01	2.93	4.90
Change (CFS)	**-0.64**	**-1.90**	**-3.05**	**-5.65**
Existing Volume (AF)	0.144	0.329	0.495	0.869
Proposed Volume (AF)	0.070	0.146	0.213	0.358
Change (AF)	**-0.074**	**-0.183**	**-0.282**	**-0.511**

STUDY POINT #5 (Off-Site)				
	2-Year	10-Year	25-Year	100-Year
Existing Flow (CFS)	0.46	1.12	1.70	2.98
Proposed Flow (CFS)	0.28	0.60	0.86	1.42
Change (CFS)	**-0.18**	**-0.52**	**-0.84**	**-1.56**
Existing Volume (AF)	0.050	0.112	0.168	0.292
Proposed Volume (AF)	0.021	0.043	0.062	0.104
Change (AF)	**-0.029**	**-0.069**	**-0.106**	**-0.188**

TOTAL				
	2-Year	10-Year	25-Year	100-Year
Existing Flow (CFS)	7.22	19.61	31.09	56.99
Proposed Flow (CFS)	6.97	18.35	29.67	54.41
Change (CFS)	**-0.25**	**-1.26**	**-1.42**	**-2.58**
Existing Volume (AF)	1.227	2.808	4.239	7.453
Proposed Volume (AF)	1.895	3.703	5.239	8.546
Change (AF)	**0.668**	**0.895**	**1.000**	**1.093**

MASSDEP Stormwater Performance Standards

The MA DEP Stormwater Management Policy was developed to improve water quality by implementing performance standards for stormwater management. The intent is to implement the stormwater management standards through the review of Notice of Intent filings by the issuing authority (Conservation Commission or DEP). The following section outlines how the proposed Stormwater Management System meets the standards set forth by the Policy.

BMP's implemented in the design include:

- Deep Sump Catch Basins
- Proprietary Separators (CDS units)
- Detention Systems (Precast Concrete Chambers & Basin)
- Level Spreaders (Gabion Wall)
- Outlet Control Structures

Stormwater Best Management Practices (BMP's) have been incorporated into the design of the project to mitigate the anticipated pollutant loading. An Operations and Maintenance Plan has been developed for the project, which addresses the long-term maintenance requirements of the proposed system.

Temporary erosion and sedimentation controls will be incorporated into the construction phase of the project. These temporary controls may include straw bale and/or silt fence barriers, inlet sediment traps, slope stabilization, and stabilized construction entrances.

The Massachusetts Department of Environmental Protection has established ten (10) Stormwater Management Standards. A project that meets or exceeds the standards is presumed to satisfy the regulatory requirements regarding stormwater management. The Standards are enumerated below as well as descriptions and supporting calculations as to how the Project will comply with the Standards:

1. *No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The proposed development will not introduce any new outfalls with direct discharge to a wetland area or waters of the Commonwealth of Massachusetts. The rate of discharges to existing wetlands will not be increased in comparison to the existing conditions (See Proposed Conditions Tables).

2. *Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

   The proposed development has been designed so that the post-development peak discharge rates do not exceed the predevelopment peak discharge rates. A summary of the existing and proposed discharge rates is included within this document (See Proposed Conditions Tables).

3. *Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.*

   The existing annual recharge for the site has been approximated in the proposed condition. There are proposed dry wells that are designed to meet this requirement. The proposed Recharge Volume is based on the Static Method per the MA DEP Stormwater Management Standards, Volume 3, Chapter 1.

   See the appendix located at section 6 of this report for stormwater recharge calculations.

4. *Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:*
   - *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*
   - *Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*

- *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

Standard #4 is met when structural stormwater best management practices are sized to capture and treat the required water quality volume and pretreatment is provided in accordance with the Massachusetts Stormwater Handbook. Standard #4 also requires that suitable source control measures are identified in the Long-term Pollution Prevention Plan. The water quality volume for the proposed development is captured and treated using street sweeping, deep sump catch basins, and proprietary separators (CDS units).

The implemented BMPs have been designed to treat the contributing water quality volume. These water quality calculations can be seen within the appendix of this report.

The proposed stormwater management system has been designed to remove 80% of the average annual post-construction load for each treatment train. The TSS removal calculations can be seen within the appendix of this report.

5. *For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

   The site is considered a source of higher potential pollutant loads because it has a proposed roadway, driveways, and vehicle travel daily. Pretreatment and Source reduction is provided to the maximum extent practicable. The drainage system will be designed to treat 1" water quality volume utilizing BMPs listed in Table LUHPPL, within the Massachusetts Stormwater Handbook, Volume 1: Overview of the Massachusetts Stormwater Standards, Chapter 1, Page 14. This requirement only applies to stormwater discharges that come into contract with the actual area or activity on the site that may generate the higher potential pollutant load.

6. *Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

   The project site does not discharge stormwater within a Zone II or Interim Wellhead Protection Area or near a critical area. Critical Areas are Outstanding Resource Waters as designated in 314 CMR 4.00, Special Resource Waters as designated in 314 CMR 4.00, recharge areas for public water supplies as defined in 310 CMR 22.02, bathing beaches as defined in 105 CMR 445.000, cold-water fisheries as defined in 314 CMR 9.02 and 310 CMR 10.04, and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04.

7. *A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

   The proposed project is not considered a re-development project under the Stormwater Management Handbook guidelines as there is an increase in the amount of impervious area.

8. *A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.*

A plan to control construction-related impacts, including erosion, sedimentation and other pollutant sources during construction has been developed. A detailed Erosion and Sedimentation Control Plan is included in the Permit Drawings. The proponent will prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) prior to commencement of construction activities that will result in the disturbance of one acre of land or more.

9. *A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

   A Long-Term Operation & Maintenance (O&M) Plan has been developed for the proposed stormwater management system and is included within this document. See Section 2.0 of this report.

10. *All illicit discharges to the stormwater management system are prohibited.*

    There are no expected illicit discharges to the stormwater management system. The applicant will submit the Illicit Discharge Compliance Statement prior to the discharge of stormwater runoff to the post-construction stormwater best management practices and prior to the issuance of a Certificate of Compliance.

See the next page for the MassDEP Stormwater Checklist.

MASSDEP Stormwater Checklist

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

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[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.

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.

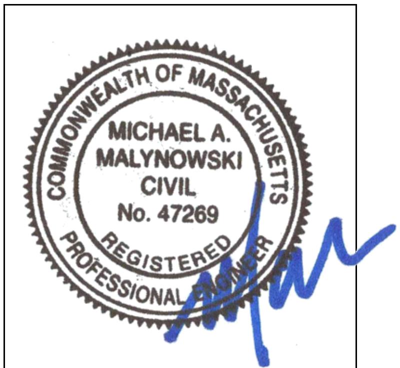
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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



10-05-2021

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

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.

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.

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.

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.

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.

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.

SECTION 2.0 - OPERATION & MAINTENANCE PLAN

Introduction

In accordance with the standards set forth by the Stormwater Management Policy issued by the Massachusetts Department of Environmental Protection (MassDEP), Allen & Major Associates, Inc. has prepared the following Operations & Maintenance (O&M) Plan for the existing development at 651 Main Street, Leicester, MA.

The plan is broken down into three major sections. The first section describes construction-related erosion and sedimentation controls (Demolition & Construction Maintenance Plan). The second section describes the long-term pollution prevention measures (Long Term Pollution Prevention Plan). The third section is a post-construction operation and maintenance plan designed to address the long-term maintenance needs of the stormwater management system (Long-Term Maintenance Plan – Facilities Description).

Notification Procedures for Change of Responsibility for O&M

The Stormwater Management System (SMS) for this project is owned by MKEP 770 LLC (owner). The owner shall be legally responsible for the long-term operation and maintenance of this SMS as outlined in this Operation and Maintenance Plan.

The owner shall submit an annual summary report and the completed Operation & Maintenance Schedule & Checklist to the Conservation Commission (via email or print copy), highlighting inspection and maintenance activities including performances of BMPs. Should ownership of the SMS change, the owner will continue to be responsible until the succeeding owner shall notify the Commission that the succeeding owner has assumed such responsibility. Upon subsequent transfers, the responsibility shall continue to be that of transferring owner until the transferee owner notifies the Commission of its assumption of responsibility.

In the event the SMS will serve multiple lots/owners, such as the subdivision of the existing parcel or creation of lease areas, the owner(s) shall establish an association on other legally enforceable arrangements under which the association or a single party shall have legal responsibility for the operation and maintenance of the entire SMS. The legal instrument creating such responsibility shall be recorded with the Registry of Deeds and promptly following its recording, a copy thereof shall be furnished to the Commission.

Contact Information

Stormwater Management System Owner:	MKEP 770 LLC 265 Sunrise Highway, Suite 1368 Leicester, MA Phone: (646) 483-2517

Emergency Contact Information:

MKEP 770 LLC (Owner/Operator)	Phone: (646) 483-2517
Allen & Major Associates, Inc. (Site Civil Engineer)	Phone: (781) 935-6889
Leicester Development & Inspectional Services	Phone: (508) 892-7007
Leicester Fire Department (non-emergency line)	Phone: (508) 892-7022
MassDEP Emergency Response	Phone: (888) 304-1133
Clean Harbors Inc (24-Hour Line)	Phone: (800) 645-8265

Demolition & Construction Maintenance Plan

1. Call Digsafe: 1-888-344-7233
2. Contact the Town of Leicester at least three (3) days prior to start of demolition and/or construction activities.
3. Install Erosion Control measures as shown on the Plans prepared by A&M. The Town shall review the installation of straw bales and silt fencing prior to the start of any site demolition work. Install Construction fencing if determined to be necessary at the commencement of construction.
4. Install construction entrances, straw bales, and silt fence at the locations shown on the Erosion Control Plan prepared by A&M.
5. Site access shall be achieved only from the designated construction entrances.
6. Cut and clear trees in construction areas only (within the limit of work; see plans).
7. Stockpiles of materials subject to erosion shall be stabilized with erosion control matting or temporary seeding whenever practicable, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.
8. Install silt sacks and straw bales around each drain inlet prior to any demolition and or construction activities.

9. All erosion control measures shall be inspected weekly and after every rainfall event. Records of these inspections shall be kept on-site for review.
10. All erosion control measures shall be maintained, repaired, or replaced as required or at the direction of the owner's engineer or the Town.
11. Sediment accumulation up-gradient of the straw bales, silt fence, and stone check dams greater than 6" in depth shall be removed and disposed of in accordance with all applicable regulations.
12. If it appears that sediment is exiting the site, silt sacks shall be installed in all catch basins adjacent to the site. Sediment accumulation on all adjacent catch basin inlets shall be removed and the silt sack replaced if torn or damaged.
13. Install stone check dams on-site during construction as needed. Refer to the erosion control details. Temporary sediment basins combined with stone check damns shall be installed on-site during construction to control and collect runoff from upland areas of this site during demolition and construction activities.
14. The contractor shall comply with the Sedimentation and Erosion Control Notes as shown on the Site Development Plans and Specifications.
15. The stabilized construction entrances shall be inspected weekly and records of inspections kept. The entrances shall be maintained by adding additional clean, angular, durable stone to remove the soil from the construction vehicle's tires when exiting the site. If soil is still leaving the site via the construction vehicle tires, adjacent roadways shall be kept clean by street sweeping.
16. Dust pollution shall be controlled using on-site water trucks and/or an approved soil stabilization product.
17. During demolition and construction activities, Status Reports on compliance with this O&M Document shall be submitted weekly. The report shall document any deficiencies and corrective actions taken by the applicant.

Long-Term Pollution Prevention Plan

Standard #4 from the MassDEP Stormwater Management Handbook requires that a Long-Term Pollution Prevention Plan (LTPPP) be prepared and incorporated as part of the Operation and Maintenance Plan of the Stormwater Management System. The purpose of the LTPPP is to identify potential sources of pollution that may affect the quality of stormwater discharges, and to describe the implementation of practices to reduce the pollutants in stormwater discharges. The following items describe the source control and proper procedures of the LTPPP.

- Housekeeping
  The existing development has been designed to maintain a high level of water quality treatment for all stormwater discharge to the wetland areas. An Operation and Maintenance (O&M) plan has been prepared and is included in this section of the report. The owner (or its designee) is responsible for adherence to the O&M plan in a strict and complete manner.

- Storing of Materials & Water Products
  The trash and waste program for the site includes exterior dumpsters. There is a trash contractor used to pick up the waste material in the dumpsters. The stormwater drainage system has water quality inlets designed to capture trash and debris.

- Vehicle Washing
  Outdoor vehicle washing has the potential to result in high loads of nutrients, metals, and hydrocarbons during dry weather conditions, as the detergent-rich water used to wash the grime off the vehicle enters the stormwater drainage system. The existing development does not include any designated vehicle washing areas, nor is it expected that any vehicle washing will take place on-site.

- Spill Prevention & Response
  Sources of potential spill hazards include vehicle fluids, liquid fuels, pesticides, paints, solvents, and liquid cleaning products. The majority of the spill hazards would likely occur within the buildings and would not enter the stormwater drainage system. However, there are spill hazards from vehicle fluids or liquid fuels located outside of the buildings. These exterior spill hazards have the potential to enter the stormwater drainage system and are to be addressed as follows:
  1. Spill hazards of pesticides, paints, and solvents shall be remediated using the Manufacturers' recommended spill cleanup protocol.
  2. Vehicle fluids and liquid fuel spill shall be remediated according to the local and state regulations governing fuel spills.
  3. The owner shall have the following equipment and materials on hand to address a spill clean-up: brooms, dust pans, mops, rags, gloves, absorptive material, sand, sawdust, plastic and metal trash containers.
  4. All spills shall be cleaned up immediately after discovery.
  5. Spills of toxic or hazardous material shall be reported, regardless of size, to the Massachusetts Department of Environmental Protection at (888) 304-1333.

6. Should a spill occur, the pollution prevention plan will be adjusted to include measures to prevent another spill of a similar nature. A description of the spill, along with the causes and cleanup measures will be included in the updated pollution prevention plan.

- Maintenance of Lawns, Gardens, and Other Landscaped Areas
  It should be recognized that this is a general guideline towards achieving high quality and well-groomed landscaped areas. The grounds staff/landscape contractor must recognize the shortcomings of a general maintenance plan such as this, and modify and/or augment it based on weekly, monthly, and yearly observations. In order to assure the highest quality conditions, the staff must also recognize and appreciate the need to be aware of the constantly changing conditions of the landscaping and be able to respond to them on a proactive basis. No trees shall be planted over the drain lines or recharge area, and that only shallow rooted plants and shrubs will be allowed.

  - Fertilizer
    Maintenance practices should be aimed at reducing environmental, mechanical and pest stresses to promote healthy and vigorous growth. When necessary, pest outbreaks should be treated with the most sensitive control measure available. Synthetic chemical controls should be used only as a last resort to organic and biological control methods. Fertilizer, synthetic chemical controls and pest management applications (when necessary) shall be performed only by licensed applicators in accordance with the manufacturer's label instructions when environmental conditions are conducive to controlled product application.

    Only slow-release organic fertilizers should be used in the planting and mulch areas to limit the amount of nutrients that could enter downstream resource areas. Fertilization of the planting and mulch areas will be performed within manufacturers labeling instructions and shall not exceed an NPK ration of 1:1:1 (i.e. Triple 10 fertilizer mix), considered a low nitrogen mixture. Fertilizers approved for the use under this O&M Plan are as follows:

    Type: LESCO® 28-0-12 (Lawn Fertilizer)
    MERIT® 0.2 Plus Turf Fertilizer
    MOMENTUM™ Force Weed & Feed

  - Suggested Aeration Program
    In-season aeration of lawn areas is good cultural practice, and is recommended whenever feasible. It should be accomplished with a solid thin tine aeration method to reduce disruption to the use of the area. The

depth of solid tine aeration is similar to core type, but should be performed when the soil is somewhat drier for a greater overall effect.

Depending on the intensity of use, it can be expected that all landscaped lawn areas will need aeration to reduce compaction at least once per year. The first operation should occur in late May following the spring season. Methods of reducing compaction will vary based on the nature of the compaction. Compaction on newly established landscaped areas is generally limited to the top 2-3" and can be alleviated using hollow core or thin tine aeration methods.

The spring aeration should consist of two passes at opposite directions with 1/4" hollow core tines penetrating 3-5" into the soil profile. Aeration should occur when the soil is moist but not saturated. The soil cores should be shattered in place and dragged or swept back into the turf to control thatch. If desired the cores may also be removed and the area top-dressed with sand or sandy loam. If the area drains on average too slowly, the topdressing should contain a higher percentage of sand. If it is draining on average too quickly, the top dressing should contain a higher percentage of soil and organic matter.

- <u>Landscape Maintenance Program Practices:</u>
  - <u>Lawn</u>
    1. Mow a minimum of once a week in spring, to a height of 2″ to 2 1/2″ high. Mowing should be frequent enough so that no more than 1/3 of grass blade is removed at each mowing. The top growth supports the roots; the shorter the grass is cute, the less the roots will grow. Short cutting also dries out the soil and encourages weeds to germinate.
    2. Mow approximately once every two weeks from July 1st to August 15th depending on lawn growth.
    3. Mow on a ten-day cycle in fall, when growth is stimulated by cooler nights and increased moisture.
    4. Do not remove grass clippings after mowing.
    5. Keep mower blades sharp to prevent ragged cuts on grass leaves, which cause a brownish appearance and increase the chance for disease to enter a leaf.
  - <u>Shrubs</u>
    1. Mulch not more than 3″ depth with shredded pine or fir bark.

2. Hand prune annually, immediately after blooming, to remove 1/3 of the above-ground biomass (older stems). Stem removals are to occur within 6″ of the ground to open up shrub and maintain two-year wood (the blooming wood).
3. Hand-prune evergreen shrubs only as needed to remove dead and damaged wood and to maintain the naturalistic form of the shrub. Never mechanically shear evergreen shrubs.

- Trees
  1. Provide aftercare of new tree plantings for the first three years.
  2. Do not fertilize trees, it artificially stimulates them (unless tree health warrants).
  3. Water once a week for the first year; twice a month for the second; once a month for the third year.
  4. Prune trees on a four-year cycle.
- Invasive Species
  1. Inform the Conservation Commission Agent prior to the removal of invasive species proposed either through hand work or through chemical removal.

- Storage and Use of Herbicides and Pesticides

  Integrated Pest Management is the combination of all methods (of pest control) which may prevent, reduce, suppress, eliminate, or repel an insect population. The main requirements necessary to support any pest population are food, shelter and water, and any upset of the balance of these will assist in controlling a pest population. Scientific pest management is the knowledgeable use of all pest control methods (sanitation, mechanical, chemical) to benefit mankind's health, welfare, comfort, property and food. A Pest Management Professional (PMP) should be retained who is licensed with the Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs, Department of Agricultural Resources.

  The site manager will be provided with approved bulletin before entering into or renewing an agreement to apply pesticides for the control of indoor household or structural pests, refer to 333 CMR 13.08.

  Before beginning each application, the applicator must post a Department approved notice on all of the entrances to the treated room or area. The applicator must leave such notices posted after the application. The notice will be posted at conspicuous point(s) of access to the area treated. The location and number of signs will be determined by the configuration of the area to be treated based on the applicator's best judgment. It is intended to give sufficient notice so that no one comes into an area being treated unaware that the applicator is working and pesticides are being applied. However, if the contracting entity does not want the signs posted, he/she may sign a Department approved waiver indicating this.

The applicator or employer will provide to any person upon their request the following information on previously conducted applications:

1. Name and phone number of pest control company;
2. Date and time of the application;
3. Name and license number of the applicator;
4. Target pests; and
5. Name and EPA Registration Number of pesticide products applied.

- Pet Waste Management
  The owner's landscape crew (or designee) shall remove any obvious pet waste that has been left behind by pet owners within the development. The pet waste shall be disposed of in accordance with local and state regulations.
- Operations and Management of Septic Systems
  There are no proposed septic systems within the limits of the project.
- Management of Deicing Chemicals and Snow
  Snow will be stockpiled on site until the accumulated snow becomes a hazard to the daily operations of the site. It will be the responsibility of the snow removal contractor to properly dispose of transported snow according to MassDEP, Bureau of Resource Protection – Snow Disposal Guideline #BRPG01-01, governing the proper disposal of snow. It will be the responsibility of the snow removal contractor to follow these guidelines and all applicable laws and regulations

  The owner's maintenance staff (or its designee) will be responsible for the clearing of the sidewalk and building entrances. The owner may be required to use a de-icing agent such as potassium chloride to maintain a safe walking surface. If used, the de-icing agent for the walkways and building entrances will be kept within the storage rooms located within the building. If used, de-icing agents will not be stored outside. The owner's maintenance staff will limit the application of sand.

Long-Term Maintenance Plan – Facilities Description

A maintenance log will be kept (i.e. report) summarizing inspections, maintenance, and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. The log will be made accessible to department staff and a copy provided to the department upon request.

The following is a description of the Stormwater Management System for the project site.

Stormwater Collection System – On-Site:

The stormwater collection system is a series of inlets located at low points within the limits of the paved area. All of the proposed on-site catch basins incorporate a deep sump and hooded outlet. The catch basins are connected by a closed gravity pipe network that pass through proprietary separators prior to entering the pipe detention systems or gabion walls.

Structural Pretreatment BMPs: Regular maintenance of these BMPs is especially critical because they typically receive the highest concentration of suspended solids during the first flush of a storm event.

- Deep Sump Catch Basin:
  Deep sump catch basins, also known as oil and grease or hooded catch basins, are underground retention systems designed to remove trash, debris, and coarse sediment from stormwater runoff, and serve as temporary spill containment devices for floatables such as oils and greases.

Treatment BMPs:

- Proprietary Separator:
  A proprietary separator is a flow-through structure with a settling or separation unit to remove sediments and other pollutants. They typically use the power of swirling or flowing water to separate floatables and coarser sediments, are typically designed and manufactured by private businesses, and come in different sizes to accommodate different design storms and flow conditions.

Infiltration BMPs:

- Dry Well:
  Dry wells are small excavated pits, backfilled with aggregate, and used to infiltrate uncontaminated runoff from non-metal roofs or metal roofs located outside the Zone II or Interim Wellhead Protection Area of a public water supply and outside an industrial site. Do not use dry wells to infiltrate any runoff that could be significantly contaminated with sediment and other pollutants. Never use dry wells to infiltrate runoff from land uses with higher potential pollutant loads, including parking lot runoff.

Other BMPs:

- Dry Detention Basin
  A dry detention basin is an impoundment or excavated basin for the short-term detention of stormwater runoff from a completed development that allows controlled release from the structure at downstream, pre-development flow rates. Conventional dry detention basins typically control peak runoff for 2-year and 10-year 24-hour storms. They are not specifically designed to provide extended dewatering times, wet pools, or groundwater recharge. Sometimes flows can be controlled using an outlet pipe of the appropriate size but this approach typically cannot control multiple design storms.

BMP Accessories:

- Level Spreader (Gabion Wall):
  A level spreader receives concentrated flow from channels, outlet structures, or other conveyance structures, and converts it to sheet flow where it can disperse uniformly across a stable slope. A level spreader is not a pollutant reduction device. It improves the efficiency of other BMPs, such as vegetated swales, filter strips, or infiltration systems that depend on sheet flow to operate properly.

Other Maintenance Activity:

- Street Sweeping - Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.

Inspection and Maintenance Frequency and Corrective Measures
In accordance with MA DEP Stormwater Handbook: Volume 2, Chapter 2; the previously described BMPs will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments, trash, and debris. In any and all cases, operations, inspections, and maintenance activities shall utilize best practical measures to avoid and minimize impacts to wetland resource areas outside the footprint of the SMS.

Supplemental Information

- Long-Term Operation & Maintenance (O&M) Plan
- MASSDEP Snow Disposal Regulations
- CDS Maintenance Procedures
- Retain-It Owners Maintenance Manual

OPERATION AND MAINTENANCE PLAN SCHEDULE **Date: 10-05-2021**

ALLEN & MAJOR ASSOCIATES, INC.

Project: 2889-01
Project Address: Skyview Estates, Main Street, Leicester, MA

Responsible for O&M Plan: MKEP 770 LLC
Address: 265 Sunrise Highway, Suite 1368, Rockville Center, NY 11570
Phone: (646) 483-2517

All information within table is derived from Massachussetts Stormwater Handbook: Volume 2, Chapter 2

BMP CATEGORY	BMP OR MAINTENANCE ACTIVITY	SCHEDULE/ FREQUENCY	NOTES	INSPECTION PERFORMED	
				DATE:	BY:
STRUCTURAL PRETREATMENT BMPs	DEEP SUMP CATCH BASIN	Four times per year (quarterly).	Inspect and clean catch basin units whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.		
	PROPRIETARY SEPARATORS	In accordance with manufacturers requirements, but no less than twice a year following installation and once a year thereafter.	Remove sediment and other trapped pollutants at frequency or level specified by manufacturer.		
INFILTRATION BMPs	DRY WELL	Inspect after every major storm in the first few months following construction. Thereafter, inspect annually.	Inspect dry wells. Measure the water depth in the observation well at 24- and 48-hour intervals after a storm. Calculate clearance rates by dividing the drop in water level (inches) by the time elapsed (hr.).		

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				DATE:	BY:
OTHER BMPs	DRY DETENTION	Inspect basin operation at least once a year and after large storms to determine if the basin is meeting the expected detention times	Inspect detention pipes to ensure they are operating as designed. Check the outlet structures for accumulated sediment, trash, and debris and remove it. Remove sediment from the basin as needed.		
BMP ACCESSORIES	LEVEL SPREADERS	Inspect regularly, especially after large rainfall events.	Inspect level spreaders regularly, especially after large rainfall events. Note and repair any erosion or low spots in the spreader.		
	OUTLET STRUCTURES	Periodic cleaning of Outlet Control Structures as needed.	Clear trash and debris as necessary.		

OPERATION AND MAINTENANCE PLAN SCHEDULE

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BMP CATEGORY	BMP OR MAINTENANCE ACTIVITY	SCHEDULE/ FREQUENCY	NOTES	INSPECTION PERFORMED	
				DATE:	BY:
OTHER MAINTENANCE ACTIVITIES	SNOW STORAGE	Clear and remove snow to approved storage locations as necessary to ensure systems are working properly and are protected from meltwater pollutants.	Carefully select snow disposal sites before winter. Avoid dumping removed snow over catch basins, or in detention ponds, sediment forebays, rivers, wetlands, and flood plains. It is also prohibited to dump snow in the bioretention basins or gravel swales.		
	STREET SWEEPING	Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring.	Sweep, power broom or vacuum paved areas. Submit information that confirms that all street sweepings have been completed in accordance with state and local requirements		

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

Massachusetts Department of Environmental Protection
Bureau of Water Resources
Snow Disposal Guidance

Effective Date: December 11, 2020

Applicability: Applies to all federal, state, regional and local agencies, as well as to private businesses.

Supersedes: Bureau of Resource Protection (BRP) Snow Disposal Guideline No. BRPG97-1 issued December 12, 1997 and BRPG01-01 issued March 8, 2001; Bureau of Water Resources (BWR) snow disposal guidance issued December 21, 2015 and December 12, 2018.

Approved by: Kathleen Baskin, Assistant Commissioner, Bureau of Water Resources

PURPOSE: To provide guidelines to all government agencies and private businesses regarding snow disposal site selection, site preparation and maintenance, and emergency snow disposal options that are protective of wetlands, drinking water, and water bodies, and are acceptable to the Massachusetts Department of Environmental Protection (MassDEP), Bureau of Water Resources.

APPLICABILITY: These Guidelines are issued by MassDEP's Bureau of Water Resources on behalf of all Bureau Programs (including Drinking Water Supply, Wetlands and Waterways, Wastewater Management, and Watershed Planning and Permitting). They apply to all federal agencies, state agencies, state authorities, municipal agencies and private businesses disposing of snow in the Commonwealth of Massachusetts.

INTRODUCTION

Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. While MassDEP is aware of the threats to public safety caused by snow, collected snow that is contaminated with road salt, sand, litter, and automotive pollutants such as oil also threatens public health and the environment.

As snow melts, road salt, sand, litter, and other pollutants are transported into surface water or through the soil where they may eventually reach the groundwater. Road salt and other pollutants can contaminate water supplies and are toxic to aquatic life at certain levels. Sand washed into waterbodies can create sand bars or fill in wetlands and ponds, impacting aquatic life, causing flooding, and affecting our use of these resources.

There are several steps that communities can take to minimize the impacts of snow disposal on public health and the environment. These steps will help communities avoid the costs of a contaminated water supply, degraded waterbodies, and flooding. Everything that occurs on the land has the potential to impact the Commonwealth's water resources. Given the authority of local government over the use of the land, municipal officials and staff have a critically important role to play in protecting our water resources.

The purpose of these guidelines is to help federal agencies, state agencies, state authorities, municipalities and businesses select, prepare, and maintain appropriate snow disposal sites before the snow begins to accumulate through the winter. Following these guidelines and obtaining the necessary approvals may also help municipalities in cases when seeking reimbursement for snow disposal costs from the Federal Emergency Management Agency is possible.

RECOMMENDED GUIDELINES

These snow disposal guidelines address: (1) site selection; (2) site preparation and maintenance; and (3) emergency snow disposal.

1. SITE SELECTION

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas or upland locations on impervious surfaces away from water resources and drinking water wells. At these locations, the snow meltwater can filter into the soil, leaving behind sand and debris which can be removed in the spring. The following conditions should be followed:

- Within water supply Zone A and Zone II, avoid storage or disposal of snow and ice containing deicing chemicals that has been collected from streets located outside these zones. Municipalities may have a water supply protection land use control that prohibits the disposal of snow and ice containing deicing chemicals from outside the Zone A and Zone II, subject to the Massachusetts Drinking Water Regulations at 310 CMR 22.20C and 310 CMR 22.21(2).
- Avoid storage or disposal of snow or ice in Interim Wellhead Protection Areas (IWPA) of public water supply wells, and within 75 feet of a private well, where road salt may contaminate water supplies.
- Avoid dumping snow into any waterbody, including rivers, the ocean, reservoirs, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid dumping snow on MassDEP-designated high and medium-yield aquifers where it may contaminate groundwater.
- Avoid dumping snow in sanitary landfills and gravel pits. Snow meltwater will create more contaminated leachate in landfills posing a greater risk to groundwater, and in gravel pits, there is little opportunity for pollutants to be filtered out of the meltwater because groundwater is close to the land surface.

- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage systems including detention basins, swales or ditches. Snow combined with sand and debris may block a stormwater drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

Recommended Site Selection Procedures

It is important that the municipal Department of Public Works or Highway Department, Conservation Commission, and Board of Health work together to select appropriate snow disposal sites. The following steps should be taken:

- Estimate how much snow disposal capacity may be needed for the season so that an adequate number of disposal sites can be selected and prepared.
- Identify sites that could potentially be used for snow disposal, such as municipal open space (e.g., parking lots or parks).
- Select sites located in upland locations that are not likely to impact sensitive environmental resources first.
- If more storage space is still needed, prioritize the sites with the least environmental impact (using the site selection criteria, and local or MassGIS maps as a guide).

Snow Disposal Mapping Assistance

MassDEP has an online mapping tool to assist in identifying possible locations to potentially dispose of snow. MassDEP encourages municipalities to use this tool to identify possible snow disposal options. The tool identifies wetland resource areas, public drinking water supplies and other sensitive locations where snow should not be disposed. The tool may be accessed through the Internet at the following web address:
https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/.

2. SITE PREPARATION AND MAINTENANCE

In addition to carefully selecting disposal sites before the winter begins, it is important to prepare and maintain these sites to maximize their effectiveness. The following maintenance measures should be undertaken for all snow disposal sites:

- A silt fence or equivalent barrier should be placed securely on the downgradient side of the snow disposal site.
- Wherever possible maintain a 50-foot vegetated buffer between the disposal site and adjacent waterbodies to filter pollutants from the meltwater.
- Clear debris from the site prior to using the site for snow disposal.
- Clear debris from the site and properly dispose of it at the end of the snow season, and no later than May 15.

3. SNOW DISPOSAL APPROVALS

Proper snow disposal may be undertaken through one of the following approval procedures:

- Routine snow disposal – Minimal, if any, administrative review is required in these cases when upland and pervious snow disposal locations or upland locations on impervious surfaces that have functioning and maintained stormwater management systems have been identified, mapped, and used for snow disposal following ordinary snowfalls. Use of upland and pervious snow disposal sites avoids wetland resource areas and allows snow meltwater to recharge groundwater and will help filter pollutants, sand, and other debris. This process will address the majority of snow removal efforts until an entity exhausts all available upland snow disposal sites. The location and mapping of snow disposal sites will help facilitate each entity's routine snow management efforts.
- Emergency Certifications – If an entity demonstrates that there is no remaining capacity at upland snow disposal locations, local conservation commissions may issue an Emergency Certification under the Massachusetts Wetlands Protection regulations to authorize snow disposal in buffer zones to wetlands, certain open water areas, and certain wetland resource areas (i.e. within flood plains). Emergency Certifications can only be issued at the request of a public agency or by order of a public agency for the protection of the health or safety of citizens, and are limited to those activities necessary to abate the emergency. See 310 CMR 10.06(1)-(4). Use the following guidelines in these emergency situations:
    - Dispose of snow in open water with adequate flow and mixing to prevent ice dams from forming.
    - Do not dispose of snow in salt marshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or IWPAs of public water supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern.
    - Do not dispose of snow where trucks may cause shoreline damage or erosion.
    - Consult with the municipal Conservation Commission to ensure that snow disposal in open water complies with local ordinances and bylaws.

- Severe Weather Emergency Declarations – In the event of a large-scale severe weather event, MassDEP may issue a broader Emergency Declaration under the Wetlands Protection Act which allows federal agencies, state agencies, state authorities, municipalities, and businesses greater flexibility in snow disposal practices. Emergency Declarations typically authorize greater snow disposal options while protecting especially sensitive resources such as public drinking water supplies, vernal pools, land containing shellfish, FEMA designated floodways, coastal dunes, and salt marsh. In the event of severe winter storm emergencies, the snow disposal site maps created by municipalities will enable MassDEP and the Massachusetts Emergency Management Agency (MEMA) in helping communities identify appropriate snow disposal locations.

  If upland disposal sites have been exhausted, the Emergency Declaration issued by MassDEP allows for snow disposal near water bodies. In these situations, a buffer of at least 50 feet, preferably vegetated, should still be maintained between the site and the waterbody. Furthermore, it is essential that the other guidelines for preparing and maintaining snow disposal sites be followed to minimize the threat to adjacent waterbodies.

Under extraordinary conditions, when all land-based snow disposal options are exhausted, the Emergency Declaration issued by MassDEP may allow disposal of snow in certain waterbodies under certain conditions. ***A federal agency, state agency, state authority, municipality or business seeking to dispose of snow in a waterbody should take the following steps***:

- Call the emergency contact phone number [(888) 304-1133)] and notify the MEMA of the municipality's intent.
- MEMA will ask for some information about where the requested disposal will take place.
- MEMA will confirm that the disposal is consistent with MassDEP's Severe Weather Emergency Declaration and these guidelines and is therefore approved.

During declared statewide snow emergency events, MassDEP's website will also highlight the emergency contact phone number [(888) 304-1133)] for authorizations and inquiries. For further non-emergency information about this Guidance you may contact your MassDEP Regional Office Service Center:

Northeast Regional Office, Wilmington, 978-694-3246
Southeast Regional Office, Lakeville, 508-946-2714
Central Regional Office, Worcester, 508-792-7650
Western Regional Office, Springfield, 413-755-2114

CONTECH
ENGINEERED SOLUTIONS

CDS Guide
Operation, Design, Performance and Maintenance

CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

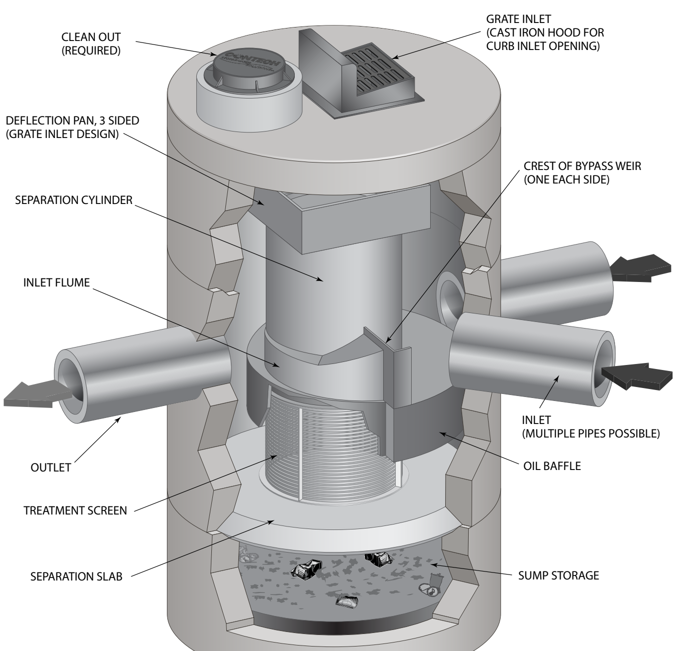
Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.



Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns (μm). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns (μm) or 50 microns (μm).

Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

Performance

Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 μm) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 μm) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

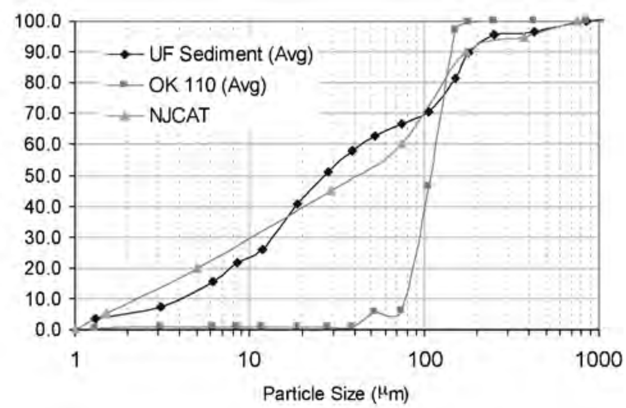


Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

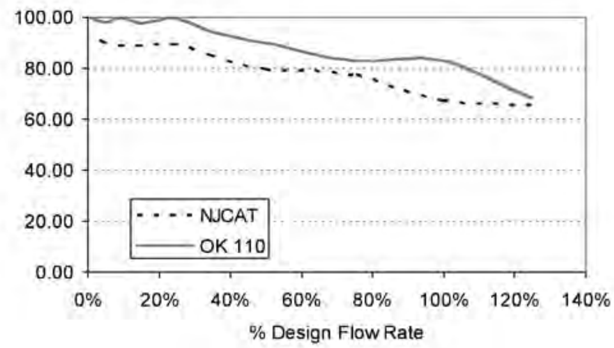


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 μm).

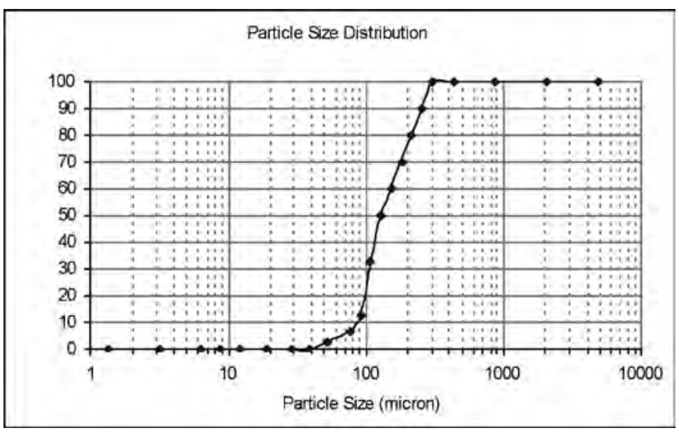


Figure 3. WASDOE PSD

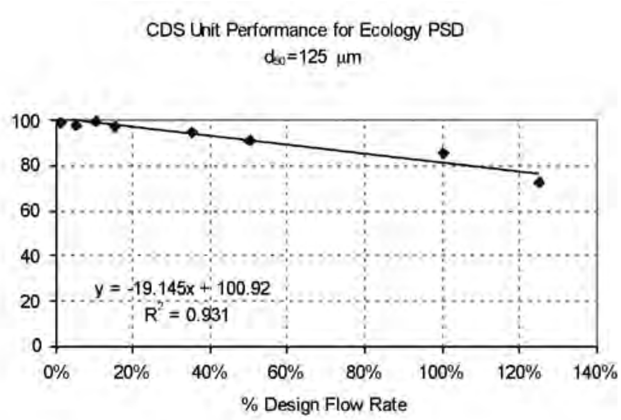


Figure 4. Modeled performance for WASDOE PSD.

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified

during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

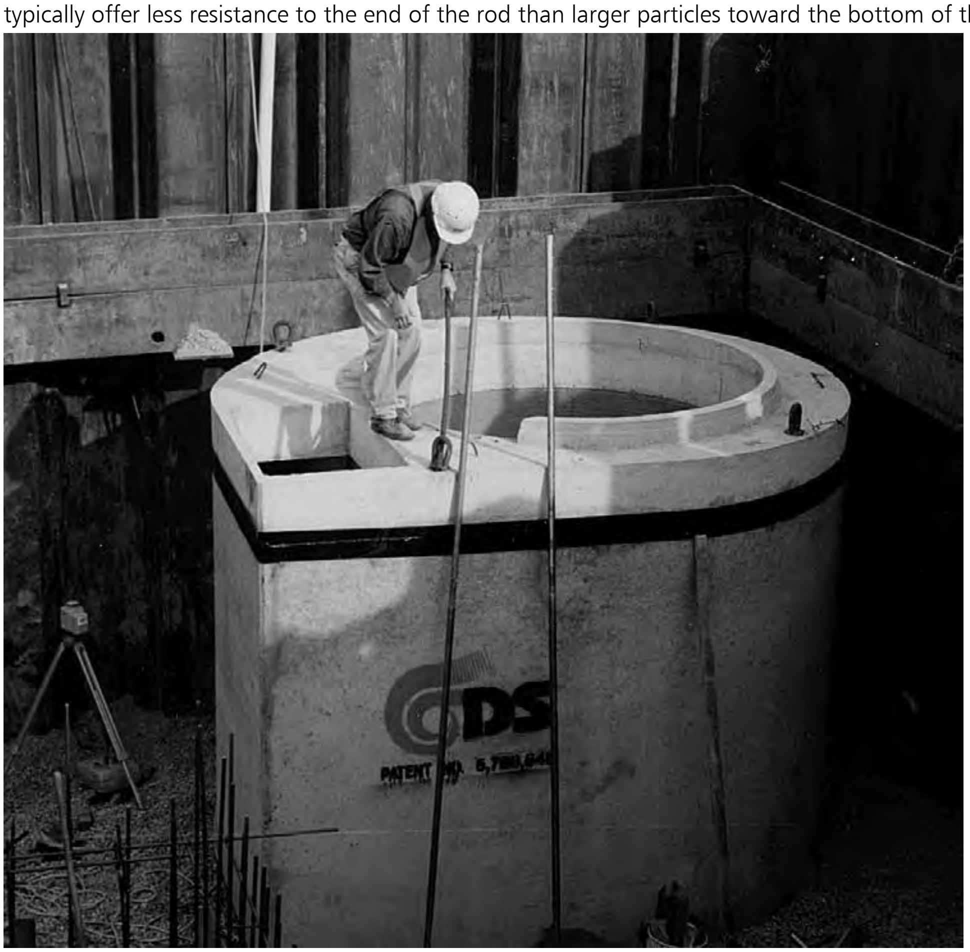
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be cleaned to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



CDS Inspection & Maintenance Log

CDS Model: ______________________ Location: ______________________

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile**.

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

cds_manual 3/17 PDF

retain-it®

Stormwater Management Systems

OWNERS MAINTENANCE MANUAL

retain-it, LLC
560 Salmon Brook Street
Granby, CT 06035
(860) 413-3050

retain-it ®

Owners Maintenance Manual

Table of Contents

Description

retain-it ® is a subsurface Storm Water Management system constructed of precast concrete structures. They are installed in a side by side configuration creating a continuous internal flow channel integrated throughout the system. Systems are constructed with designated inlet and outlet modules, some with multiple inlets and outlets depending on the site storm water system layout. Infiltration systems typically have an inlet and sidewalls/ base constructed on a stone infiltration blanket with geofabric installed at the native soil interface. Other systems incorporate outlet flow control devices. Detention systems are typically lined with a watertight membrane and have inlet and outlet control devices.

The retain-it ® system can consist of multiple varying layouts, with no two the same. Given this, it should be noted that the operation and maintenance requirements are very similar regardless of the intended layout. It is important that the end user know the specific elements of each system so as to understand how best to optimize it's operation.

Installation per Design: Operation is simple to follow where the installation was performed in accordance with the design specifications, drawings and calculations. Specifics shall be identified in the design drawings. As-built drawings will benefit the locating of specific design modules where the system has been buried below a parking lot area. Optional access manholes or removable grates may be installed above every inlet/outlet pipe and at critical design elements designated by the design.

Daily Operation and Long Term Maintenance: In general, daily usage of the system is self sufficient and will operate without requiring any outside assistance, except for periodic inspection to verify optimal performance and maintenance for removal of collected pollutants. A longer term maintenance program should incorporate a more thorough inspection of the all elements of the system to verify proper operating condition. This is more important with the infiltration type of systems where the soil infiltration surface may become restricted due to fine particle build up. Long term maintenance should include provisions for cleaning and removal of collected solids, oils and debris from the system.

System Operation: The system operational function is initiated according to rainfall runoff flows entering the structure. Internally, the runoff flows in a set pattern or sequence throughout the module layout in accordance with the hydraulic design conditions. The flows primarily operate on system head derived from the changes in elevation from the internal water surface and the outlet invert elevation. Some designs incorporate internal flow controls to satisfy hydraulic conditions that enhance water quality treatment or other intended purposes. Modified systems may incorporate a pump, but in general there are no mechanical apparatus required.

End user operations primarily consist of inspection and maintenance of the system over time.

Periodic Inspection: Important note - All storm water management systems react differently depending on the conditions that are characteristic to the contributing water shed. Variables such as storm intensity, runoff flow rates, site geology, surface stabilization and pollution load will affect the system operation. As does the inspection and maintenance frequency to ensure optimum effectiveness.

Inspections should be done periodically, with a greater number scheduled during the system start up and less frequently as the operator becomes familiar with the system performance characteristics. It is recommended that the end user keep records of the performance using the inspection log record sheet found in the back of this manual. These records shall identify the cycle of maintenance “system calibration” required for the specific applications based on the contributing water shed variables operating under “normal” conditions.

Please note that immediate maintenance may be required during “non-normal” events such as during adverse weather conditions or emergency fuel spills. See information on emergency spills in this manual.

Visual inspection of all assessable components shall be performed throughout the lifetime of the system. Access has been supplied at critical points to monitor hydraulic performance and removed pollutants buildup.

Standard Maintenance:

After construction has been completed and all disturbed surfaces have been stabilized by means of vegetation, asphalt or concrete surfaces, and all drainage system components have been constructed and are free of construction debris and sediments; then the storm water management system can be considered in an operational status.

Periodic visual inspections will help to identify issues of concern.The usual indicators are signs of slow flows, backed up water, visible oil, trash and debris or an excessive amount of sediment in the storage area.

Normal operational flows can be observed to flow freely at the predicted design elevations, from the inlet to the outlet module, following a serpintine path thru the storage and attenuation modules. Note that some modules are designed to permanently retain water where others may hold water and slowly release it over a typical 24 hour period. During a storm water event, the flows and water surface elevations will fluctuate from a low flow to a high flow/ storage status. The storage modules should fill during the event and drain down within a 24 hour period after the event has stopped. All pipes, orifices, weirs and standpipes should pass flows freely and at optimum capacity.

Standard maintenance is performed using a vacuum truck to suction the accumulated sediments, oils and greases and trash and debris from the system. Whereas an on-site maintenance staff can remove these items by hand, it is preferred that the vacuum truck be used as dictated by specific system conditions. When a specialized module designed to have a permanent water level is used, the vacuum truck should pump the liquid level down to inspect the below water elevation structures and sump storage areas.

Oils and greases can be handled by on-site staff by utilizing absorbent products that soak up the oils (and not) converting the oils from a liquid into a manageable solid form. These oil soaked absorbent materials should be disposed of in an approved manner.

Sediments, trash and debris shall be removed and disposed of in an approved manner.

Any indications of hazardous material, determined by visual inspection, testing, smell or abnormality, should be reported and handled per appropriate regulations.

Flow Conditions

System operators should familiarize themselves with proper hydraulic flow condition indicators, acceptable depths of sedimentation, debris and trash build up, and concentrations of oils and greases.

Hydraulic flow conditions are those that are established by the design as either a flow/storage or as a water quality treatment function. Both have performance characteristics that can be visually identified so as to determine the effective and efficient operation of the system.

The engineering design drawings should note the various expected water surface level elevations that are achieved during different design storms within the various modules. Since it is difficult for a visual inspection to coincide with the exact time given water elevations are predicted, the following guidelines are given for evaluation.

Visual Inspection Guide:

<u>Internal Flow Evaluation</u>

Low flow: water should flow freely from the inlet to the outlet, travelling the intended attenuation path thru the system with the water surface elevation below the structure beam height (12” deep), the system should drain completely 24 hours after a storm event,

Medium flow: the system should hold and maintain a water level during the 24 hour storm event and yet continually fill as the storm increases or drain downward as the event recedes. Flow within the system should occur freely from inlet to outlet only being restricted when a flow control structure has been integrally designed in place. Flow control devices may result in a water level backing up either temporarily or permanently; noting devices such as water quality modules may require a permanent water level to operate properly (see water quality treatment). Other system applications should drain completely 24 hours after a storm event.

High flow: the system should fill to the maximum design storm water level elevation (hydraulic grade line) per design. In most cases, that is the highest storage elevation available in the system, at the underside of the module top slab, or the invert of the overflow pipe. As the storm event recedes, the water level should begin to drain down via flow thru the system and discharge. The system should drain completely within 24 hours after a storm event.

Pollutant Storage Capacities

Oil and Grease

Oil and Grease Collection (with optional Oil water separator module specified) - Oil and grease accumulation is generally a function related to vehicle parking lot and drive areas, oil generating land uses or emergency spill conditions. It is important to maintain the system from accumulating excessive volumes of oils in that they may wash over into other sections of the system potentially clogging and reducing the infiltration capacity, blocking control devices and contaminating the overall system. The following standards apply.

Oil should not accumulate more than a visible sheen on the water surface in the oil water separation module only. A sheen is described as a fine, thin oil layer on the water surface identified by the glossy rainbow colors. A dipstick (dry wooden stick) can be used as a probe to determine the thickness of oil on the surface.

Accumulated oils could be associated with insufficient maintenance or a potential large volume oil resource. Any accumulation of oil should be promptly maintained by an experienced waste handler. Emergency spills such as those generated by an accidental spill shall be contained and removed immediately before the next storm event. Spills shall be handled in accordance with local environmental regulations. See spill and accumulated oil maintenance procedures.

Sediments

Sediments (with optional primary grit module or sedimentation modules specified) - Sediments shall be periodically removed from the system as they accumulate within the designated storage modules. The inlet modules are generally equipped with a sediment storage sump located in the base of the inlet structure. Inspection should be performed after major storm events or a minimum of annually, unless a different inspection cycle has been determined to be sufficient. Inspection shall consist of using a probe to determine the presence of and depth of the accumulated solids. Access is via the 24" manhole.

Note that excessive volumes of sediments will reduce the performance and efficiency of the system. Regional accumulations of solids such as those associated with ice and snow, may result in large springtime volumes of sand and gravels used for traction and ice control.

Trash and Debris

Trash and Debris (with optional trash and debris module specified) - Trash and debris accumulates in the inlet module in three forms; floating debris, neutrally buoyant, and heavy material. The floating debris is visible from the access manhole floating on the water surface in the form of but not limited to wood, paper, plastic, foam, bottles and cans. The neutrally buoyant material resides below the surface and combines with the natural flow regime of the system. It is hard to detect and can only be recognized when at a high concentration appears as a thickening of the water viscosity. Heavier material will simply settle to the sump base and combine with the sediments.

Note that trash and debris typically cause the most problems when they become lodged in a flow control device such as an outlet elbow, riser pipe, and orifice or weir structure. This can be detected visibly when the system is pumped down during maintenance. It can also be evaluated as a condition when flow is impeded and the water level backs up higher than the design elevations.

Emergency Spill Conditions (with optional emergency spill control module specified):

Emergency spill conditions are defined as an excessive accumulation of hydrocarbons such as oil, gasoline, diesel fuel, transmission oil or antifreeze usually resulting from an accidental discharge. Excessive accumulation is described as any amount larger than a thin "sheen" visible on the water surface.

Care should be given in handling these types of fluids. The incident should be reported to the appropriate authorities and should be mitigated by a hazardous waste consultant approved for such matters.

retain-it ®

Maintenance Log

Storm Water Management System

Location: ID #:

Date	Inspection Notes	Inspector

Note the following conditions:

Inlet Module

Outlet Module

Water Quality Module

Oil Elbow

Oil Accumulation

Sedimentation Accumulation

Trash and Debris Quantity

Flow Conditions

Flow Control Outlet Structure

Overflow Pipe

SECTION 3.0 - EXHIBITS

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WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

PROJECT:

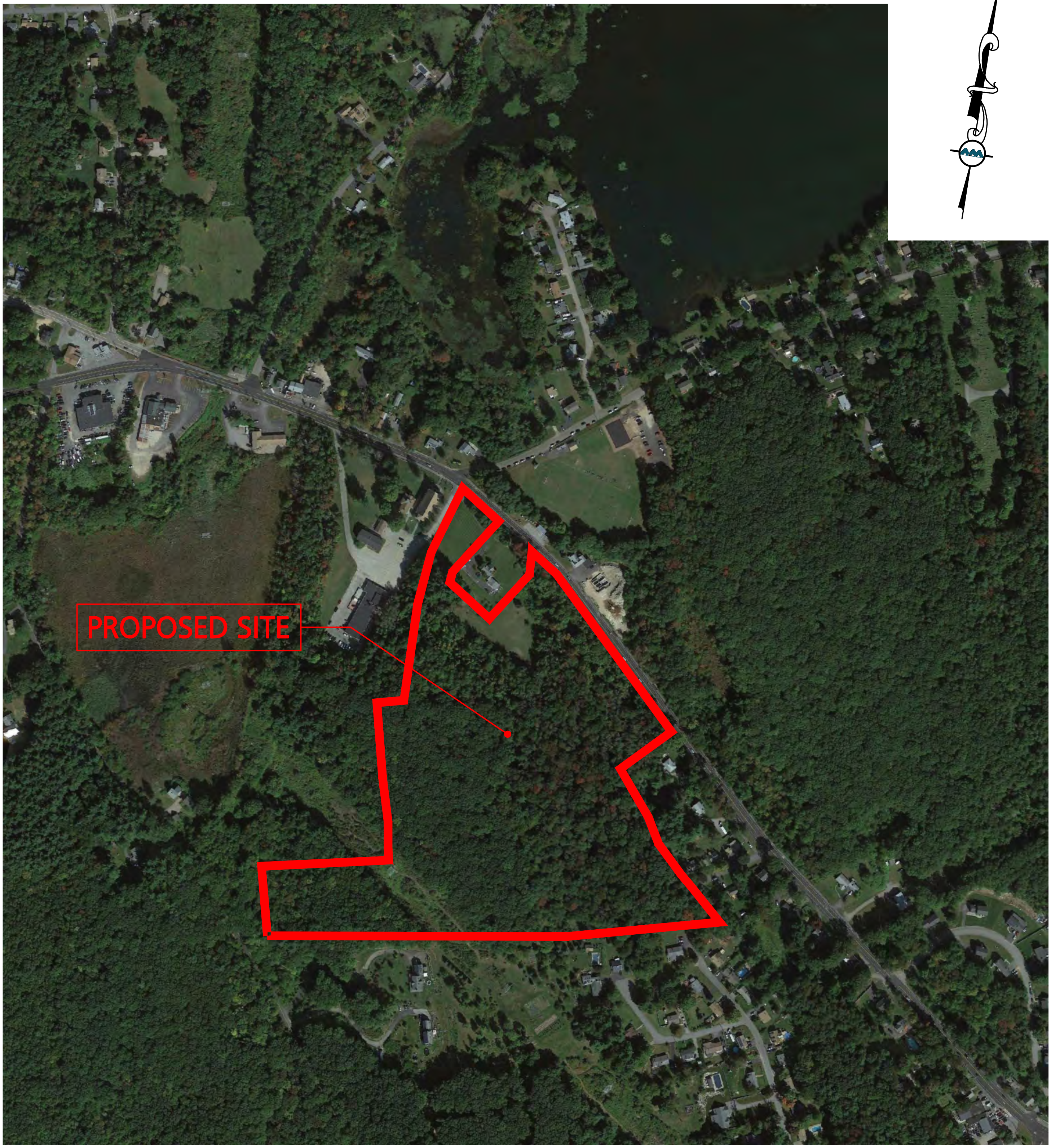
SKYVIEW ESTATES
MAIN STREET
LEICESTER, MA

USGS SITE LOCUS MAP

PROJECT NO.	2889-01	DATE:	07-16-2021
SCALE:	1"=500'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JG	CHECKED BY:	MAM

SHEET No.

EX-1



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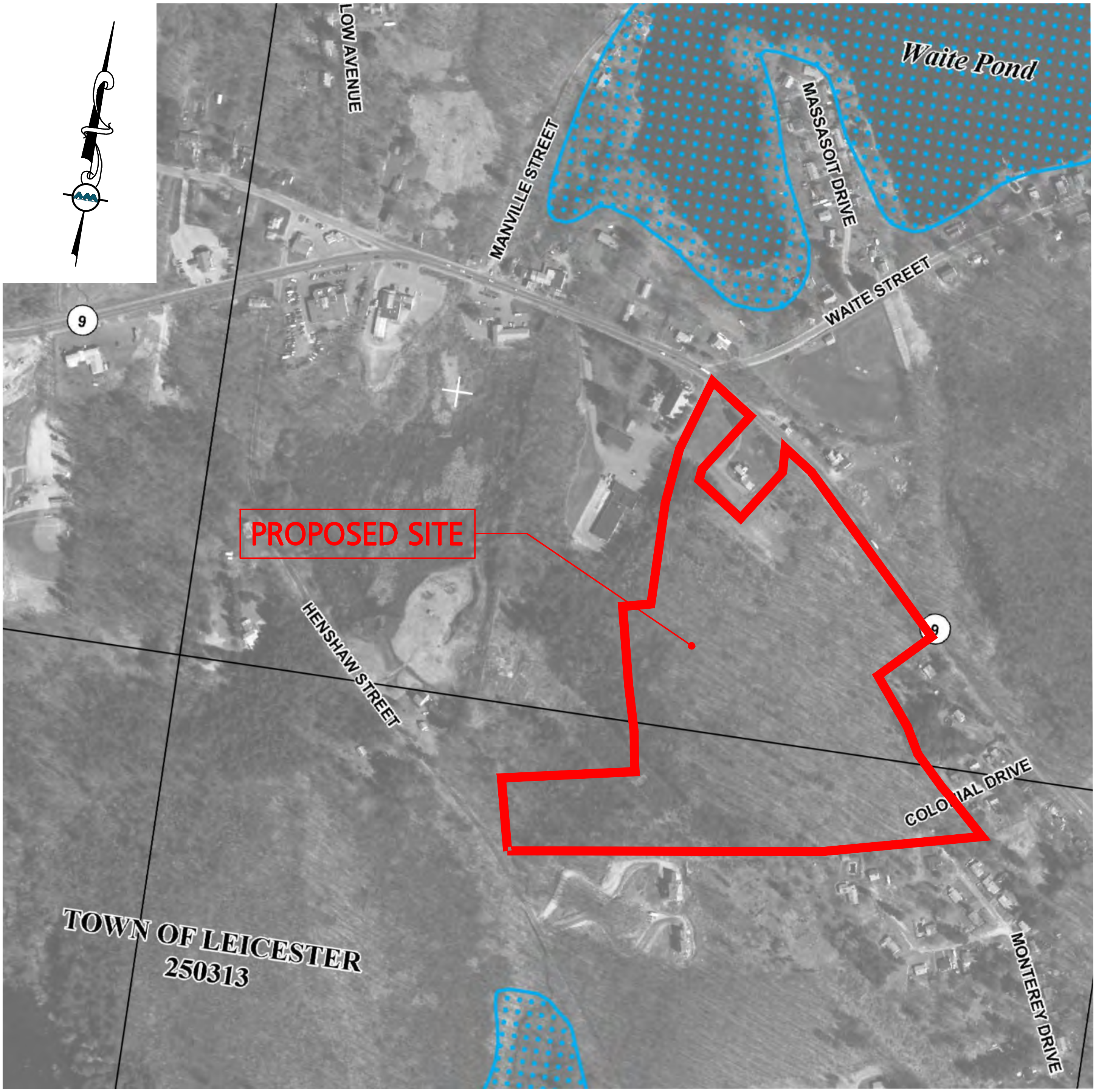
PROJECT:

SKYVIEW ESTATES
MAIN STREET
LEICESTER, MA

AERIAL PHOTO

PROJECT NO.	2889-01	DATE:	07-16-2021
SCALE:	1" = 500'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JG	CHECKED BY:	MAM

SHEET No.
EX-2



NOTES:

1. THE SITE IS LOCATED WITHIN ZONE X – AREAS DETERMINED TO BE OUTSIDE OF THE 0.2 % ANNUAL CHANCE FLOODPLAIN.

2. FEMA FIRM MAP WORCESTER COUNTY, MASSACHUSETTS #25027C0782E, PANEL 782 OF 1075

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FEMA FIRM MAP

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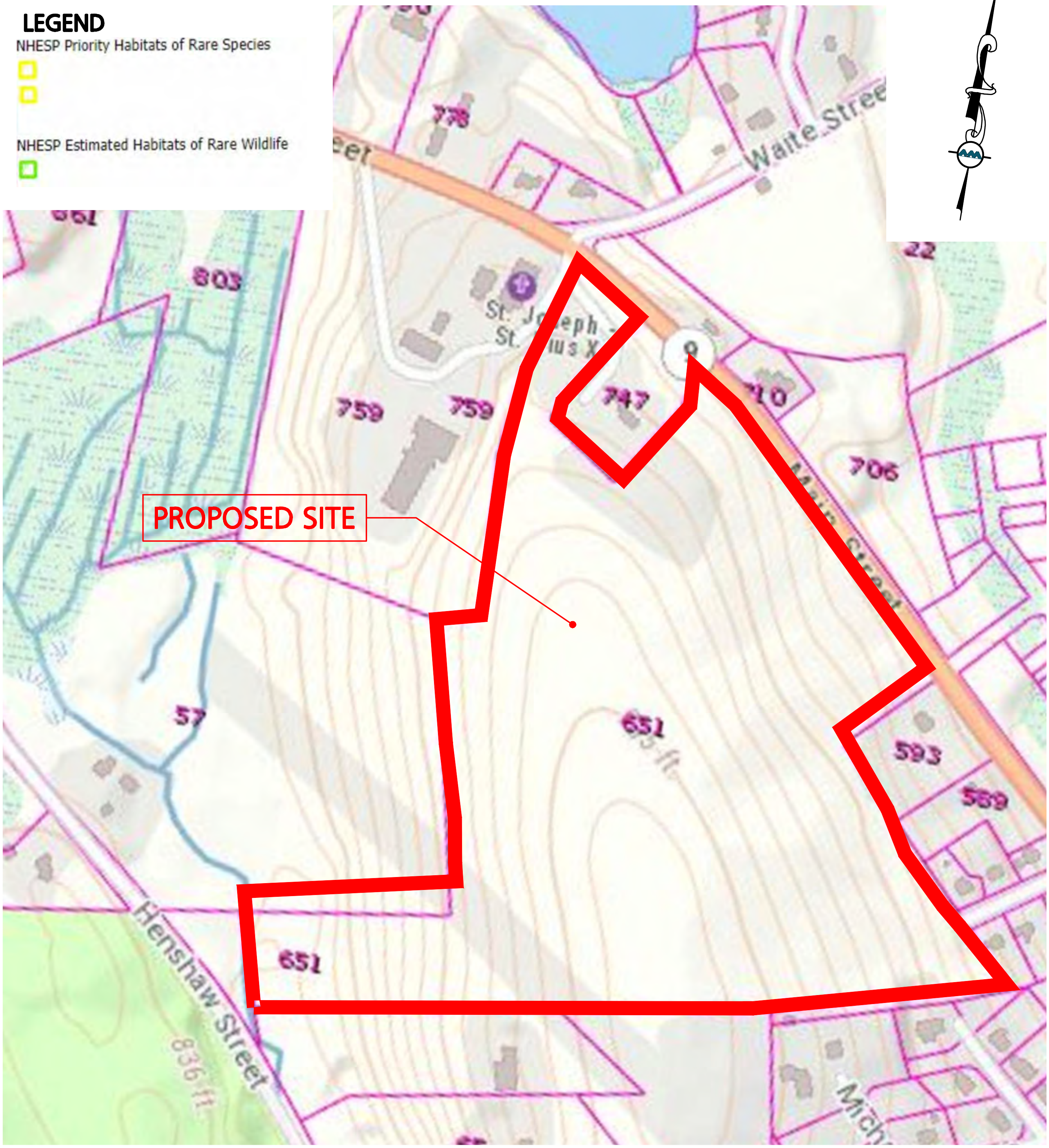
DESIGNED BY:	JG	CHECKED BY:	MAM

SHEET No.

EX-3



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PRIORITY & ESTIMATED HABITATS

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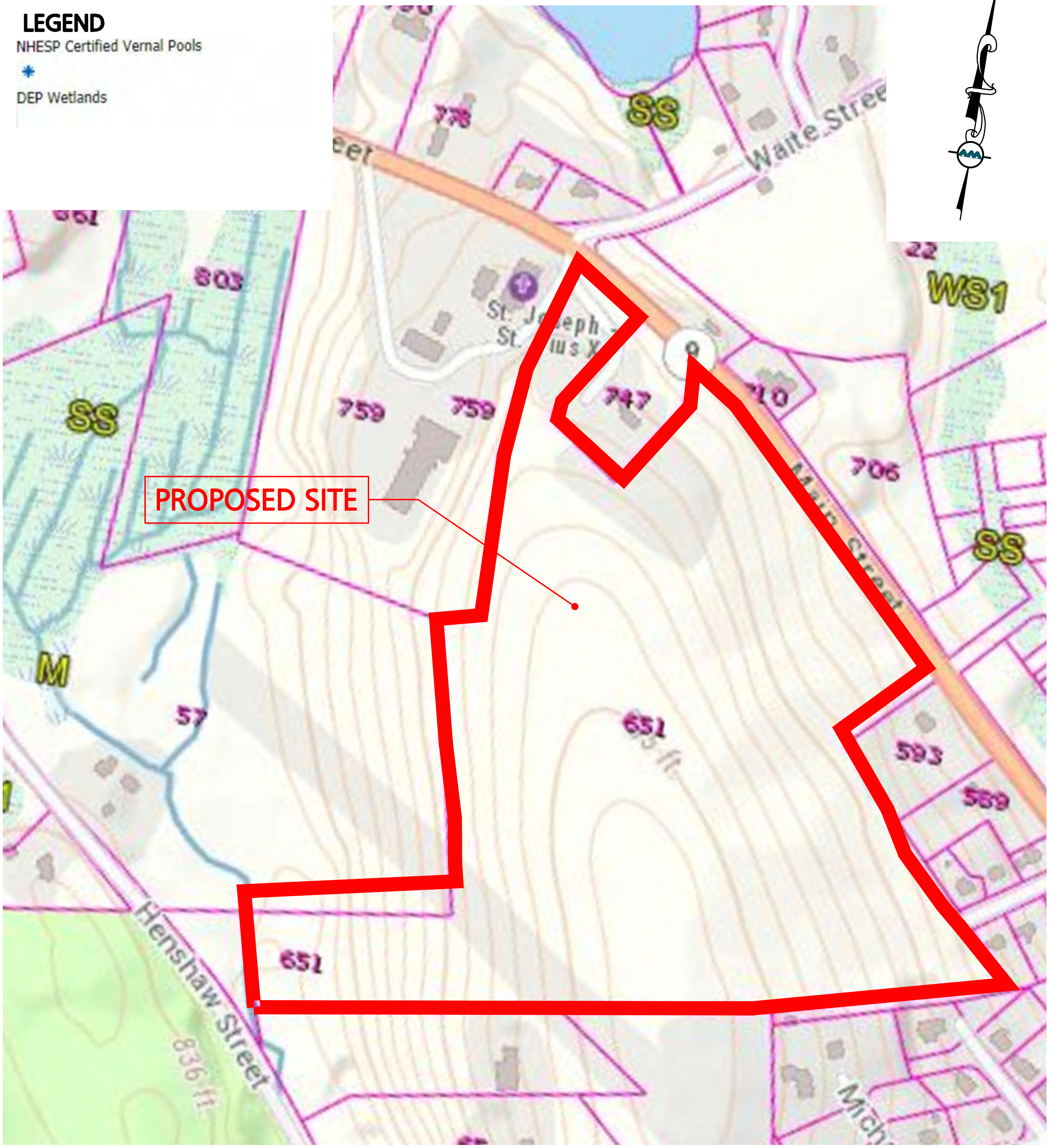
SCALE:	1"=300'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JG	CHECKED BY:	MAM

SHEET No.

EX-4



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PROJECT:

SKYVIEW ESTATES
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LEICESTER, MA

MA GIS WETLANDS MAP

PROJECT NO.	2889-01	DATE:	07-16-2021
SCALE:	1"=300'	DWG. NAME:	EXHIBITS
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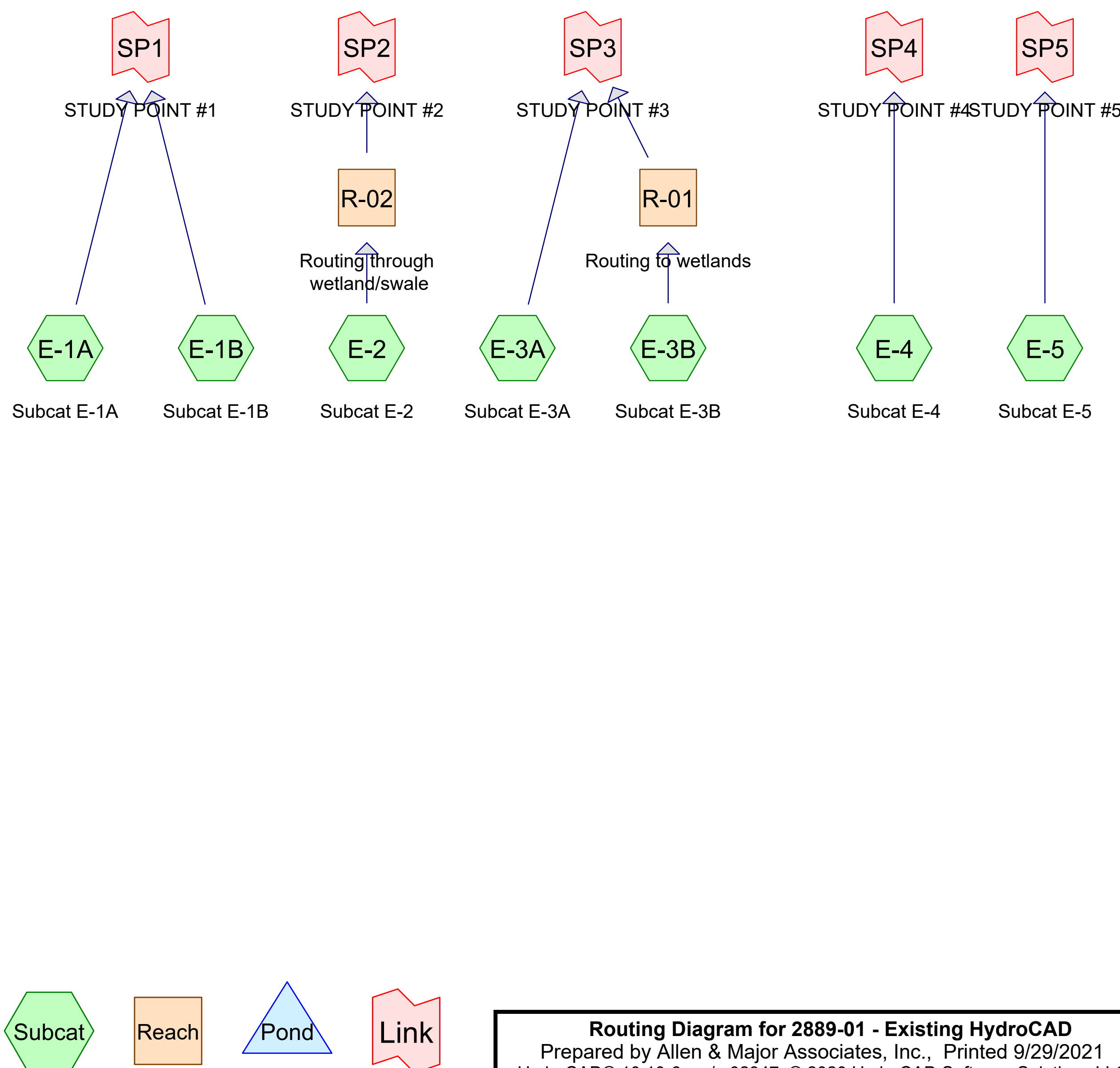
SHEET No.

EX-5

SECTION 4.0 -

EXISTING DRAINAGE ANALYSIS



Routing Diagram for 2889-01 - Existing HydroCAD
Prepared by Allen & Major Associates, Inc., Printed 9/29/2021
HydroCAD® 10.10-6a s/n 02947 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.23	2
2	10-year	Type III 24-hr		Default	24.00	1	4.85	2
3	25-year	Type III 24-hr		Default	24.00	1	6.12	2
4	50-year	Type III 24-hr		Default	24.00	1	7.30	2
5	100-year	Type III 24-hr		Default	24.00	1	8.72	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.210	61	>75% Grass cover, Good, HSG B (E-1B, E-4)
1.474	74	>75% Grass cover, Good, HSG C (E-1A, E-1B, E-2, E-4, E-5)
2.164	65	Brush, Good, HSG C (E-2, E-3A, E-3B)
0.067	98	Paved parking, HSG B (E-1B, E-4)
0.002	98	Paved parking, HSG C (E-1B)
0.749	55	Woods, Good, HSG B (E-1A, E-1B)
24.519	70	Woods, Good, HSG C (E-1A, E-1B, E-2, E-3A, E-3B, E-4, E-5)
29.185	**69**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.026	HSG B	E-1A, E-1B, E-4
28.159	HSG C	E-1A, E-1B, E-2, E-3A, E-3B, E-4, E-5
0.000	HSG D	
0.000	Other	
29.185		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.210	1.474	0.000	0.000	1.684	>75% Grass cover, Good	E-1A, E-1B, E-2, E-4, E-5
0.000	0.000	2.164	0.000	0.000	2.164	Brush, Good	E-2, E-3A, E-3B
0.000	0.067	0.002	0.000	0.000	0.069	Paved parking	E-1B, E-4
0.000	0.749	24.519	0.000	0.000	25.268	Woods, Good	E-1A, E-1B, E-2, E-3A, E-3B, E-4, E-5
0.000	**1.026**	**28.159**	**0.000**	**0.000**	**29.185**	**TOTAL AREA**	

Summary for Subcatchment E-1A: Subcat E-1A

Runoff = 3.62 cfs @ 12.25 hrs, Volume= 0.399 af, Depth= 0.80"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
32,115	55	Woods, Good, HSG B
33,840	74	>75% Grass cover, Good, HSG C
196,179	70	Woods, Good, HSG C
262,134	69	Weighted Average
262,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0680	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.0	431	0.0570	1.19		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	126	0.1350	2.57		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.4	192	0.2000	2.24		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
15.7	799	Total			

Summary for Subcatchment E-1B: Subcat E-1B

Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.040 af, Depth= 0.95"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
90	98	Paved parking, HSG C
2,609	98	Paved parking, HSG B
7,321	61	>75% Grass cover, Good, HSG B
506	55	Woods, Good, HSG B
0	70	Woods, Good, HSG C
11,330	74	>75% Grass cover, Good, HSG C
21,857	72	Weighted Average
19,157		87.65% Pervious Area
2,699		12.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 5.58 cfs @ 12.42 hrs, Volume= 0.739 af, Depth= 0.85"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
18,004	65	Brush, Good, HSG C
1,039	74	>75% Grass cover, Good, HSG C
437,960	70	Woods, Good, HSG C
457,003	70	Weighted Average
457,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.2	50	0.0050	0.04		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.1	562	0.1370	1.85		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.3	612	Total			

Summary for Subcatchment E-3A: Subcat E-3A

Runoff = 3.00 cfs @ 12.31 hrs, Volume= 0.357 af, Depth= 0.80"
Routed to Link SP3 : STUDY POINT #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
3.800	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
5.378	69	Weighted Average
5.378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	545	0.1700	2.06		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
19.2	890	Total			

Summary for Subcatchment E-3B: Subcat E-3B

Runoff = 2.70 cfs @ 12.23 hrs, Volume= 0.287 af, Depth= 0.85"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.172	65	Brush, Good, HSG C
3.902	70	Woods, Good, HSG C
4.074	70	Weighted Average
4.074		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	50	0.0380	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.4	517	0.1000	1.58		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	567	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 1.57 cfs @ 12.16 hrs, Volume= 0.144 af, Depth= 0.85"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.042	61	>75% Grass cover, Good, HSG B
0.007	98	Paved parking, HSG B
0.255	74	>75% Grass cover, Good, HSG C
1.744	70	Woods, Good, HSG C
2.049	70	Weighted Average
2.042		99.65% Pervious Area
0.007		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0670	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.5	208	0.0770	1.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.0	258	Total			

Summary for Subcatchment E-5: Subcat E-5

Runoff = 0.46 cfs @ 12.26 hrs, Volume= 0.050 af, Depth= 0.90"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
6,877	74	>75% Grass cover, Good, HSG C
22,427	70	Woods, Good, HSG C
29,304	71	Weighted Average
29,304		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.8	456	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.5	62	0.0760	1.93		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
16.5	568	Total			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

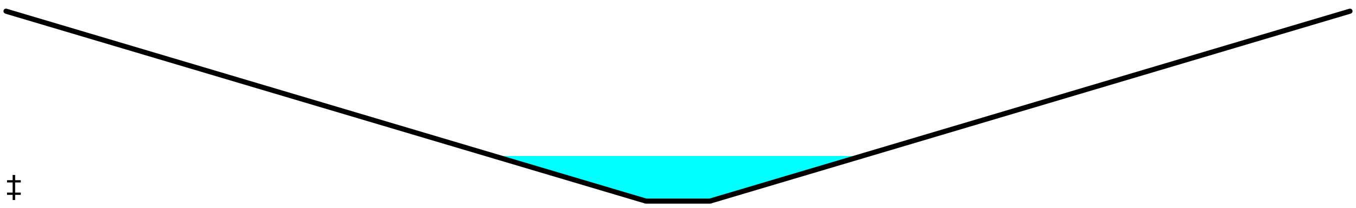
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 4.074 ac, 0.00% Impervious, Inflow Depth = 0.85" for 2-year event
Inflow = 2.70 cfs @ 12.23 hrs, Volume= 0.287 af
Outflow = 1.32 cfs @ 12.59 hrs, Volume= 0.287 af, Atten= 51%, Lag= 21.7 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.33 fps, Min. Travel Time= 36.6 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 89.0 min

Peak Storage= 2,890 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 28.73'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

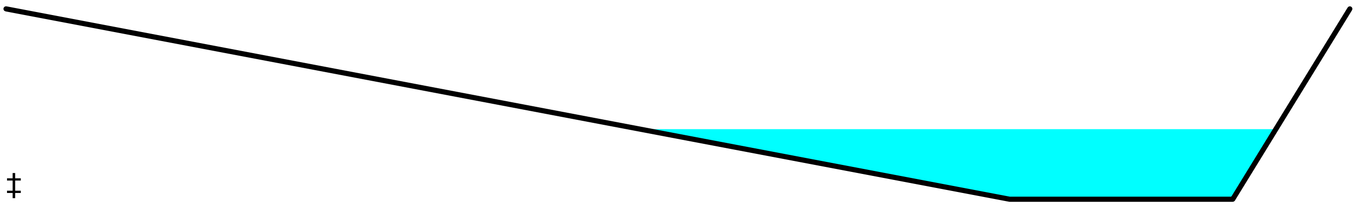
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth = 0.85" for 2-year event
Inflow = 5.58 cfs @ 12.42 hrs, Volume= 0.739 af
Outflow = 2.81 cfs @ 12.84 hrs, Volume= 0.738 af, Atten= 50%, Lag= 25.5 min
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.26 fps, Min. Travel Time= 46.3 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 114.6 min

Peak Storage= 7,825 cf @ 12.84 hrs
Average Depth at Peak Storage= 0.55' , Surface Width= 28.52'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 24.55 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 735.0' Slope= 0.0189 '/'
Inlet Invert= 877.70', Outlet Invert= 863.80'



Summary for Link SP1: STUDY POINT #1

Inflow Area =	6.520 ac,	0.95% Impervious, Inflow Depth = 0.81"	for 2-year event	
Inflow =	3.95 cfs @	12.24 hrs, Volume=	0.439 af	
Primary =	3.95 cfs @	12.24 hrs, Volume=	0.439 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area =	10.491 ac,	0.00% Impervious, Inflow Depth > 0.84"	for 2-year event	
Inflow =	2.81 cfs @	12.84 hrs, Volume=	0.738 af	
Primary =	2.81 cfs @	12.84 hrs, Volume=	0.738 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area =	9.452 ac,	0.00% Impervious, Inflow Depth > 0.82"	for 2-year event	
Inflow =	3.94 cfs @	12.35 hrs, Volume=	0.644 af	
Primary =	3.94 cfs @	12.35 hrs, Volume=	0.644 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area =	2.049 ac,	0.35% Impervious, Inflow Depth = 0.85"	for 2-year event	
Inflow =	1.57 cfs @	12.16 hrs, Volume=	0.144 af	
Primary =	1.57 cfs @	12.16 hrs, Volume=	0.144 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area =	0.673 ac,	0.00% Impervious, Inflow Depth = 0.90"	for 2-year event	
Inflow =	0.46 cfs @	12.26 hrs, Volume=	0.050 af	
Primary =	0.46 cfs @	12.26 hrs, Volume=	0.050 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Subcatchment E-1A: Subcat E-1A

Runoff = 9.32 cfs @ 12.23 hrs, Volume= 0.927 af, Depth= 1.85"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
32,115	55	Woods, Good, HSG B
33,840	74	>75% Grass cover, Good, HSG C
196,179	70	Woods, Good, HSG C
262,134	69	Weighted Average
262,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0680	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.0	431	0.0570	1.19		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	126	0.1350	2.57		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.4	192	0.2000	2.24		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
15.7	799	Total			

Summary for Subcatchment E-1B: Subcat E-1B

Runoff = 1.10 cfs @ 12.12 hrs, Volume= 0.087 af, Depth= 2.08"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
90	98	Paved parking, HSG C
2,609	98	Paved parking, HSG B
7,321	61	>75% Grass cover, Good, HSG B
506	55	Woods, Good, HSG B
0	70	Woods, Good, HSG C
11,330	74	>75% Grass cover, Good, HSG C
21,857	72	Weighted Average
19,157		87.65% Pervious Area
2,699		12.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 13.83 cfs @ 12.39 hrs, Volume= 1.684 af, Depth= 1.93"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
18,004	65	Brush, Good, HSG C
1,039	74	>75% Grass cover, Good, HSG C
437,960	70	Woods, Good, HSG C
457,003	70	Weighted Average
457,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.2	50	0.0050	0.04		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.1	562	0.1370	1.85		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.3	612	Total			

Summary for Subcatchment E-3A: Subcat E-3A

Runoff = 7.71 cfs @ 12.28 hrs, Volume= 0.829 af, Depth= 1.85"
Routed to Link SP3 : STUDY POINT #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
3.800	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
5.378	69	Weighted Average
5.378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	545	0.1700	2.06		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
19.2	890	Total			

Summary for Subcatchment E-3B: Subcat E-3B

Runoff = 6.79 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 1.93"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.172	65	Brush, Good, HSG C
3.902	70	Woods, Good, HSG C
4.074	70	Weighted Average
4.074		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	50	0.0380	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.4	517	0.1000	1.58		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	567	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 3.91 cfs @ 12.15 hrs, Volume= 0.329 af, Depth= 1.93"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.042	61	>75% Grass cover, Good, HSG B
0.007	98	Paved parking, HSG B
0.255	74	>75% Grass cover, Good, HSG C
1.744	70	Woods, Good, HSG C
2.049	70	Weighted Average
2.042		99.65% Pervious Area
0.007		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0670	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.5	208	0.0770	1.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.0	258	Total			

Summary for Subcatchment E-5: Subcat E-5

Runoff = 1.12 cfs @ 12.24 hrs, Volume= 0.112 af, Depth= 2.00"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
6,877	74	>75% Grass cover, Good, HSG C
22,427	70	Woods, Good, HSG C
29,304	71	Weighted Average
29,304		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.8	456	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.5	62	0.0760	1.93		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
16.5	568	Total			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

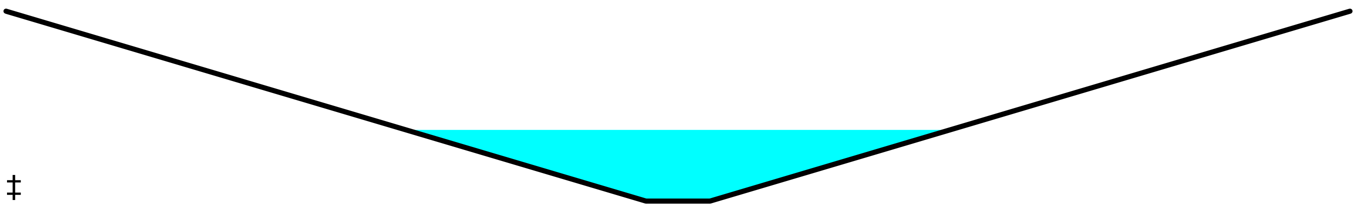
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 4.074 ac, 0.00% Impervious, Inflow Depth = 1.93" for 10-year event
Inflow = 6.79 cfs @ 12.22 hrs, Volume= 0.654 af
Outflow = 3.84 cfs @ 12.49 hrs, Volume= 0.654 af, Atten= 43%, Lag= 16.6 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.43 fps, Min. Travel Time= 27.9 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 76.2 min

Peak Storage= 6,423 cf @ 12.49 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 42.47'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

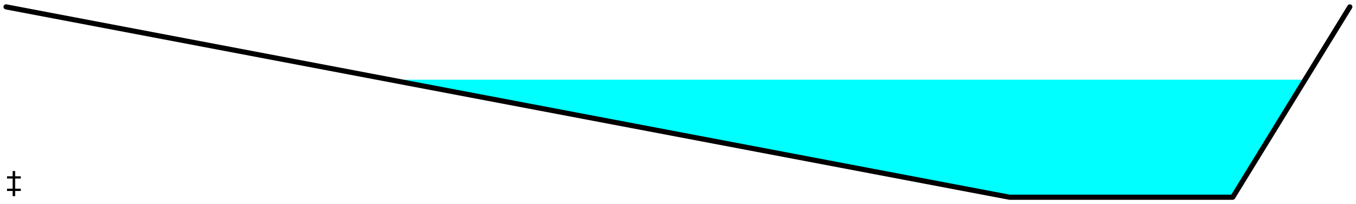
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth = 1.93" for 10-year event
Inflow = 13.83 cfs @ 12.39 hrs, Volume= 1.684 af
Outflow = 8.34 cfs @ 12.72 hrs, Volume= 1.682 af, Atten= 40%, Lag= 19.8 min
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.35 fps, Min. Travel Time= 34.7 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 96.0 min

Peak Storage= 17,368 cf @ 12.72 hrs
Average Depth at Peak Storage= 0.93' , Surface Width= 41.03'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 24.55 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 735.0' Slope= 0.0189 '/'
Inlet Invert= 877.70', Outlet Invert= 863.80'



Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.520 ac, 0.95% Impervious, Inflow Depth = 1.87" for 10-year event
Inflow = 10.15 cfs @ 12.22 hrs, Volume= 1.014 af
Primary = 10.15 cfs @ 12.22 hrs, Volume= 1.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth > 1.92" for 10-year event
Inflow = 8.34 cfs @ 12.72 hrs, Volume= 1.682 af
Primary = 8.34 cfs @ 12.72 hrs, Volume= 1.682 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 9.452 ac, 0.00% Impervious, Inflow Depth = 1.88" for 10-year event
Inflow = 10.91 cfs @ 12.32 hrs, Volume= 1.482 af
Primary = 10.91 cfs @ 12.32 hrs, Volume= 1.482 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 2.049 ac, 0.35% Impervious, Inflow Depth = 1.93" for 10-year event
Inflow = 3.91 cfs @ 12.15 hrs, Volume= 0.329 af
Primary = 3.91 cfs @ 12.15 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.673 ac, 0.00% Impervious, Inflow Depth = 2.00" for 10-year event
Inflow = 1.12 cfs @ 12.24 hrs, Volume= 0.112 af
Primary = 1.12 cfs @ 12.24 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Subcatchment E-1A: Subcat E-1A

Runoff = 14.52 cfs @ 12.22 hrs, Volume= 1.407 af, Depth= 2.81"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
32,115	55	Woods, Good, HSG B
33,840	74	>75% Grass cover, Good, HSG C
196,179	70	Woods, Good, HSG C
262,134	69	Weighted Average
262,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0680	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.0	431	0.0570	1.19		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	126	0.1350	2.57		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.4	192	0.2000	2.24		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
15.7	799	Total			

Summary for Subcatchment E-1B: Subcat E-1B

Runoff = 1.66 cfs @ 12.12 hrs, Volume= 0.129 af, Depth= 3.09"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
90	98	Paved parking, HSG C
2,609	98	Paved parking, HSG B
7,321	61	>75% Grass cover, Good, HSG B
506	55	Woods, Good, HSG B
0	70	Woods, Good, HSG C
11,330	74	>75% Grass cover, Good, HSG C
21,857	72	Weighted Average
19,157		87.65% Pervious Area
2,699		12.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 21.23 cfs @ 12.37 hrs, Volume= 2.536 af, Depth= 2.90"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
18,004	65	Brush, Good, HSG C
1,039	74	>75% Grass cover, Good, HSG C
437,960	70	Woods, Good, HSG C
457,003	70	Weighted Average
457,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.2	50	0.0050	0.04		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.1	562	0.1370	1.85		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.3	612	Total			

Summary for Subcatchment E-3A: Subcat E-3A

Runoff = 11.99 cfs @ 12.27 hrs, Volume= 1.258 af, Depth= 2.81"
Routed to Link SP3 : STUDY POINT #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
3.800	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
5.378	69	Weighted Average
5.378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	545	0.1700	2.06		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
19.2	890	Total			

Summary for Subcatchment E-3B: Subcat E-3B

Runoff = 10.42 cfs @ 12.21 hrs, Volume= 0.985 af, Depth= 2.90"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.172	65	Brush, Good, HSG C
3.902	70	Woods, Good, HSG C
4.074	70	Weighted Average
4.074		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	50	0.0380	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.4	517	0.1000	1.58		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	567	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 5.98 cfs @ 12.15 hrs, Volume= 0.495 af, Depth= 2.90"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.042	61	>75% Grass cover, Good, HSG B
0.007	98	Paved parking, HSG B
0.255	74	>75% Grass cover, Good, HSG C
1.744	70	Woods, Good, HSG C
2.049	70	Weighted Average
2.042		99.65% Pervious Area
0.007		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0670	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.5	208	0.0770	1.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.0	258	Total			

Summary for Subcatchment E-5: Subcat E-5

Runoff = 1.70 cfs @ 12.23 hrs, Volume= 0.168 af, Depth= 3.00"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
6,877	74	>75% Grass cover, Good, HSG C
22,427	70	Woods, Good, HSG C
29,304	71	Weighted Average
29,304		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.8	456	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.5	62	0.0760	1.93		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
16.5	568	Total			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

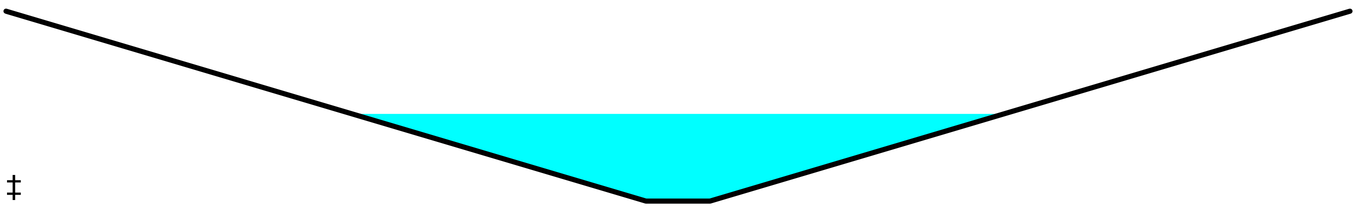
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 4.074 ac, 0.00% Impervious, Inflow Depth = 2.90" for 25-year event
Inflow = 10.42 cfs @ 12.21 hrs, Volume= 0.985 af
Outflow = 6.28 cfs @ 12.45 hrs, Volume= 0.985 af, Atten= 40%, Lag= 14.4 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.49 fps, Min. Travel Time= 24.6 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 70.1 min

Peak Storage= 9,269 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.46' , Surface Width= 50.92'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

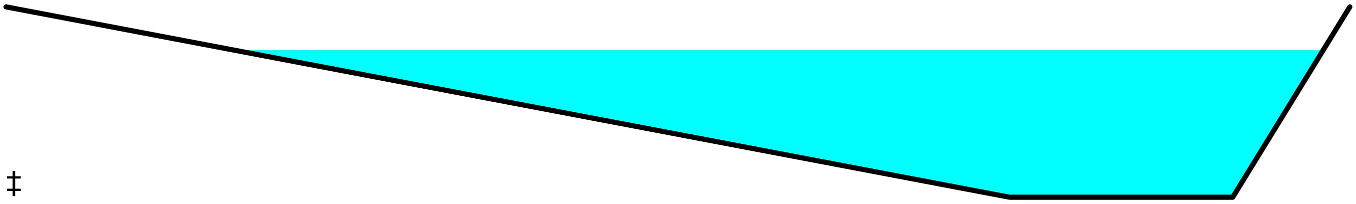
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth = 2.90" for 25-year event
Inflow = 21.23 cfs @ 12.37 hrs, Volume= 2.536 af
Outflow = 13.67 cfs @ 12.67 hrs, Volume= 2.534 af, Atten= 36%, Lag= 17.8 min
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.40 fps, Min. Travel Time= 30.6 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 87.5 min

Peak Storage= 25,053 cf @ 12.67 hrs
Average Depth at Peak Storage= 1.16' , Surface Width= 48.82'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 24.55 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 735.0' Slope= 0.0189 '/'
Inlet Invert= 877.70', Outlet Invert= 863.80'



Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.520 ac, 0.95% Impervious, Inflow Depth = 2.83" for 25-year event
Inflow = 15.72 cfs @ 12.22 hrs, Volume= 1.537 af
Primary = 15.72 cfs @ 12.22 hrs, Volume= 1.537 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth > 2.90" for 25-year event
Inflow = 13.67 cfs @ 12.67 hrs, Volume= 2.534 af
Primary = 13.67 cfs @ 12.67 hrs, Volume= 2.534 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 9.452 ac, 0.00% Impervious, Inflow Depth = 2.85" for 25-year event
Inflow = 17.41 cfs @ 12.31 hrs, Volume= 2.243 af
Primary = 17.41 cfs @ 12.31 hrs, Volume= 2.243 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 2.049 ac, 0.35% Impervious, Inflow Depth = 2.90" for 25-year event
Inflow = 5.98 cfs @ 12.15 hrs, Volume= 0.495 af
Primary = 5.98 cfs @ 12.15 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.673 ac, 0.00% Impervious, Inflow Depth = 3.00" for 25-year event
Inflow = 1.70 cfs @ 12.23 hrs, Volume= 0.168 af
Primary = 1.70 cfs @ 12.23 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Subcatchment E-1A: Subcat E-1A

Runoff = 19.62 cfs @ 12.22 hrs, Volume= 1.886 af, Depth= 3.76"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
32,115	55	Woods, Good, HSG B
33,840	74	>75% Grass cover, Good, HSG C
196,179	70	Woods, Good, HSG C
262,134	69	Weighted Average
262,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0680	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.0	431	0.0570	1.19		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	126	0.1350	2.57		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.4	192	0.2000	2.24		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
15.7	799	Total			

Summary for Subcatchment E-1B: Subcat E-1B

Runoff = 2.20 cfs @ 12.12 hrs, Volume= 0.171 af, Depth= 4.09"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
90	98	Paved parking, HSG C
2,609	98	Paved parking, HSG B
7,321	61	>75% Grass cover, Good, HSG B
506	55	Woods, Good, HSG B
0	70	Woods, Good, HSG C
11,330	74	>75% Grass cover, Good, HSG C
21,857	72	Weighted Average
19,157		87.65% Pervious Area
2,699		12.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 28.49 cfs @ 12.37 hrs, Volume= 3.383 af, Depth= 3.87"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
18,004	65	Brush, Good, HSG C
1,039	74	>75% Grass cover, Good, HSG C
437,960	70	Woods, Good, HSG C
457,003	70	Weighted Average
457,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.2	50	0.0050	0.04		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.1	562	0.1370	1.85		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.3	612	Total			

Summary for Subcatchment E-3A: Subcat E-3A

Runoff = 16.19 cfs @ 12.27 hrs, Volume= 1.686 af, Depth= 3.76"
Routed to Link SP3 : STUDY POINT #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
3.800	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
5.378	69	Weighted Average
5.378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	545	0.1700	2.06		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
19.2	890	Total			

Summary for Subcatchment E-3B: Subcat E-3B

Runoff = 13.99 cfs @ 12.21 hrs, Volume= 1.314 af, Depth= 3.87"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.172	65	Brush, Good, HSG C
3.902	70	Woods, Good, HSG C
4.074	70	Weighted Average
4.074		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	50	0.0380	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.4	517	0.1000	1.58		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	567	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 8.02 cfs @ 12.15 hrs, Volume= 0.661 af, Depth= 3.87"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.042	61	>75% Grass cover, Good, HSG B
0.007	98	Paved parking, HSG B
0.255	74	>75% Grass cover, Good, HSG C
1.744	70	Woods, Good, HSG C
2.049	70	Weighted Average
2.042		99.65% Pervious Area
0.007		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0670	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.5	208	0.0770	1.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.0	258	Total			

Summary for Subcatchment E-5: Subcat E-5

Runoff = 2.27 cfs @ 12.23 hrs, Volume= 0.223 af, Depth= 3.98"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
6,877	74	>75% Grass cover, Good, HSG C
22,427	70	Woods, Good, HSG C
29,304	71	Weighted Average
29,304		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.8	456	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.5	62	0.0760	1.93		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
16.5	568	Total			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

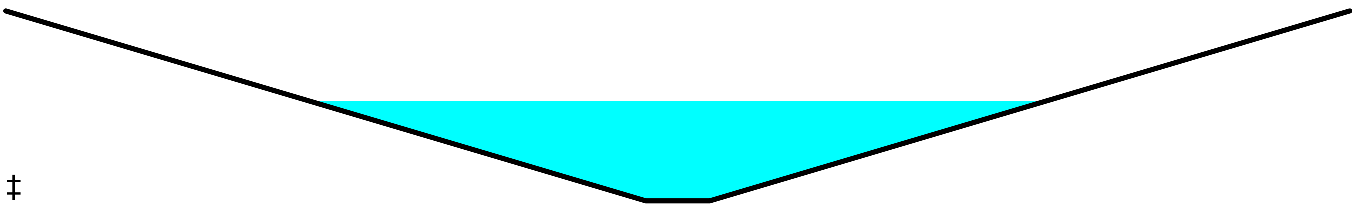
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 4.074 ac, 0.00% Impervious, Inflow Depth = 3.87" for 50-year event
Inflow = 13.99 cfs @ 12.21 hrs, Volume= 1.314 af
Outflow = 8.76 cfs @ 12.42 hrs, Volume= 1.314 af, Atten= 37%, Lag= 13.0 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.53 fps, Min. Travel Time= 22.7 min
Avg. Velocity = 0.18 fps, Avg. Travel Time= 66.0 min

Peak Storage= 11,895 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.53' , Surface Width= 57.62'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

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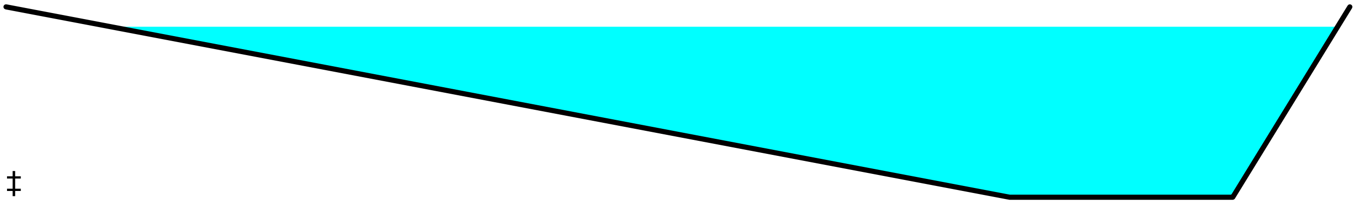
[55] Hint: Peak inflow is 116% of Manning's capacity

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth = 3.87" for 50-year event
Inflow = 28.49 cfs @ 12.37 hrs, Volume= 3.383 af
Outflow = 19.08 cfs @ 12.65 hrs, Volume= 3.381 af, Atten= 33%, Lag= 16.6 min
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.44 fps, Min. Travel Time= 28.0 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 82.0 min

Peak Storage= 32,102 cf @ 12.65 hrs
Average Depth at Peak Storage= 1.34' , Surface Width= 55.01'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 24.55 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 735.0' Slope= 0.0189 '/'
Inlet Invert= 877.70', Outlet Invert= 863.80'



Summary for Link SP1: STUDY POINT #1

Inflow Area =	6.520 ac,	0.95% Impervious,	Inflow Depth = 3.79"	for 50-year event
Inflow =	21.20 cfs @	12.21 hrs, Volume=	2.057 af	
Primary =	21.20 cfs @	12.21 hrs, Volume=	2.057 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area =	10.491 ac,	0.00% Impervious,	Inflow Depth > 3.87"	for 50-year event
Inflow =	19.08 cfs @	12.65 hrs, Volume=	3.381 af	
Primary =	19.08 cfs @	12.65 hrs, Volume=	3.381 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area =	9.452 ac,	0.00% Impervious,	Inflow Depth = 3.81"	for 50-year event
Inflow =	23.93 cfs @	12.30 hrs, Volume=	2.999 af	
Primary =	23.93 cfs @	12.30 hrs, Volume=	2.999 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area =	2.049 ac,	0.35% Impervious,	Inflow Depth = 3.87"	for 50-year event
Inflow =	8.02 cfs @	12.15 hrs, Volume=	0.661 af	
Primary =	8.02 cfs @	12.15 hrs, Volume=	0.661 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area =	0.673 ac,	0.00% Impervious,	Inflow Depth = 3.98"	for 50-year event
Inflow =	2.27 cfs @	12.23 hrs, Volume=	0.223 af	
Primary =	2.27 cfs @	12.23 hrs, Volume=	0.223 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Subcatchment E-1A: Subcat E-1A

Runoff = 25.97 cfs @ 12.22 hrs, Volume= 2.491 af, Depth= 4.97"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
32,115	55	Woods, Good, HSG B
33,840	74	>75% Grass cover, Good, HSG C
196,179	70	Woods, Good, HSG C
262,134	69	Weighted Average
262,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0680	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.0	431	0.0570	1.19		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	126	0.1350	2.57		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.4	192	0.2000	2.24		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
15.7	799	Total			

Summary for Subcatchment E-1B: Subcat E-1B

Runoff = 2.86 cfs @ 12.12 hrs, Volume= 0.223 af, Depth= 5.33"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
90	98	Paved parking, HSG C
2,609	98	Paved parking, HSG B
7,321	61	>75% Grass cover, Good, HSG B
506	55	Woods, Good, HSG B
0	70	Woods, Good, HSG C
11,330	74	>75% Grass cover, Good, HSG C
21,857	72	Weighted Average
19,157		87.65% Pervious Area
2,699		12.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 37.51 cfs @ 12.36 hrs, Volume= 4.449 af, Depth= 5.09"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
18,004	65	Brush, Good, HSG C
1,039	74	>75% Grass cover, Good, HSG C
437,960	70	Woods, Good, HSG C
457,003	70	Weighted Average
457,003		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.2	50	0.0050	0.04		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.1	562	0.1370	1.85		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.3	612	Total			

Summary for Subcatchment E-3A: Subcat E-3A

Runoff = 21.44 cfs @ 12.27 hrs, Volume= 2.226 af, Depth= 4.97"
Routed to Link SP3 : STUDY POINT #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
3.800	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
5.378	69	Weighted Average
5.378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	545	0.1700	2.06		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
19.2	890	Total			

Summary for Subcatchment E-3B: Subcat E-3B

Runoff = 18.41 cfs @ 12.21 hrs, Volume= 1.728 af, Depth= 5.09"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.172	65	Brush, Good, HSG C
3.902	70	Woods, Good, HSG C
4.074	70	Weighted Average
4.074		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	50	0.0380	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
5.4	517	0.1000	1.58		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	567	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 10.55 cfs @ 12.14 hrs, Volume= 0.869 af, Depth= 5.09"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.042	61	>75% Grass cover, Good, HSG B
0.007	98	Paved parking, HSG B
0.255	74	>75% Grass cover, Good, HSG C
1.744	70	Woods, Good, HSG C
2.049	70	Weighted Average
2.042		99.65% Pervious Area
0.007		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0670	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.5	208	0.0770	1.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.0	258	Total			

Summary for Subcatchment E-5: Subcat E-5

Runoff = 2.98 cfs @ 12.23 hrs, Volume= 0.292 af, Depth= 5.21"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
6,877	74	>75% Grass cover, Good, HSG C
22,427	70	Woods, Good, HSG C
29,304	71	Weighted Average
29,304		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
6.8	456	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.5	62	0.0760	1.93		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
16.5	568	Total			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

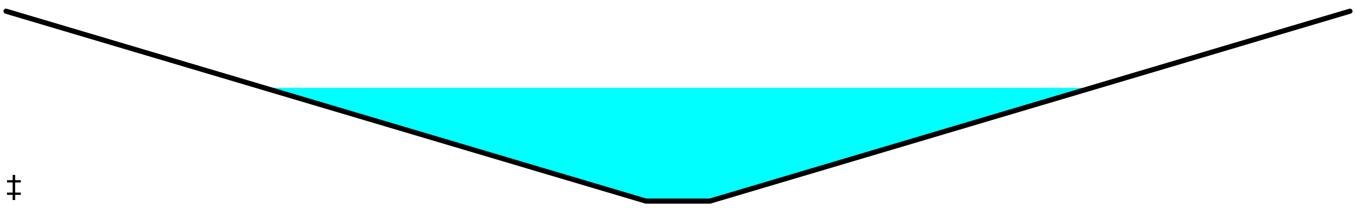
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 4.074 ac, 0.00% Impervious, Inflow Depth = 5.09" for 100-year event
Inflow = 18.41 cfs @ 12.21 hrs, Volume= 1.728 af
Outflow = 11.93 cfs @ 12.41 hrs, Volume= 1.728 af, Atten= 35%, Lag= 12.0 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.57 fps, Min. Travel Time= 20.9 min
Avg. Velocity = 0.19 fps, Avg. Travel Time= 62.3 min

Peak Storage= 14,989 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.60' , Surface Width= 64.63'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

---

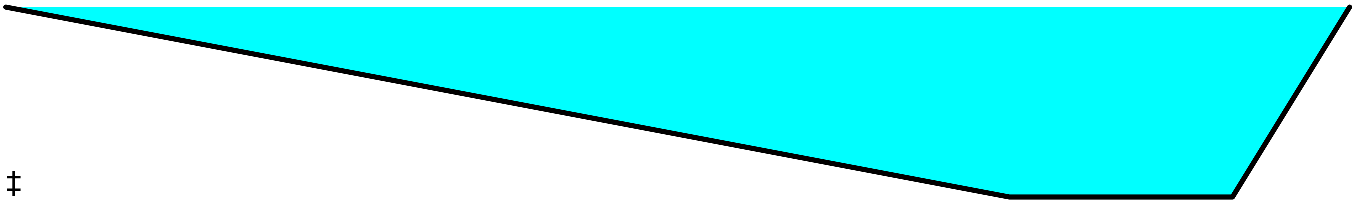
[91] Warning: Storage range exceeded by 0.04'
[55] Hint: Peak inflow is 153% of Manning's capacity

Inflow Area = 10.491 ac, 0.00% Impervious, Inflow Depth = 5.09" for 100-year event
Inflow = 37.51 cfs @ 12.36 hrs, Volume= 4.449 af
Outflow = 25.99 cfs @ 12.62 hrs, Volume= 4.447 af, Atten= 31%, Lag= 15.4 min
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.47 fps, Min. Travel Time= 25.9 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 77.0 min

Peak Storage= 40,416 cf @ 12.62 hrs
Average Depth at Peak Storage= 1.54' , Surface Width= 61.53'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 24.55 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 735.0' Slope= 0.0189 '/'
Inlet Invert= 877.70', Outlet Invert= 863.80'



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Summary for Link SP1: STUDY POINT #1

Inflow Area =	6.520 ac,	0.95% Impervious, Inflow Depth = 5.00"	for 100-year event
Inflow =	28.02 cfs @	12.21 hrs, Volume=	2.714 af
Primary =	28.02 cfs @	12.21 hrs, Volume=	2.714 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area =	10.491 ac,	0.00% Impervious, Inflow Depth > 5.09"	for 100-year event
Inflow =	25.99 cfs @	12.62 hrs, Volume=	4.447 af
Primary =	25.99 cfs @	12.62 hrs, Volume=	4.447 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area =	9.452 ac,	0.00% Impervious, Inflow Depth = 5.02"	for 100-year event
Inflow =	32.17 cfs @	12.30 hrs, Volume=	3.954 af
Primary =	32.17 cfs @	12.30 hrs, Volume=	3.954 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area =	2.049 ac,	0.35% Impervious, Inflow Depth = 5.09"	for 100-year event
Inflow =	10.55 cfs @	12.14 hrs, Volume=	0.869 af
Primary =	10.55 cfs @	12.14 hrs, Volume=	0.869 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area =	0.673 ac,	0.00% Impervious, Inflow Depth = 5.21"	for 100-year event
Inflow =	2.98 cfs @	12.23 hrs, Volume=	0.292 af
Primary =	2.98 cfs @	12.23 hrs, Volume=	0.292 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

REV	DATE	DESCRIPTION

APPLICANT:
MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:
SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	10-05-21
SCALE:	1" = 80'	DWG.:	C-2889-01_Watershed-Existing
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
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environmental consulting ◆ landscape architecture
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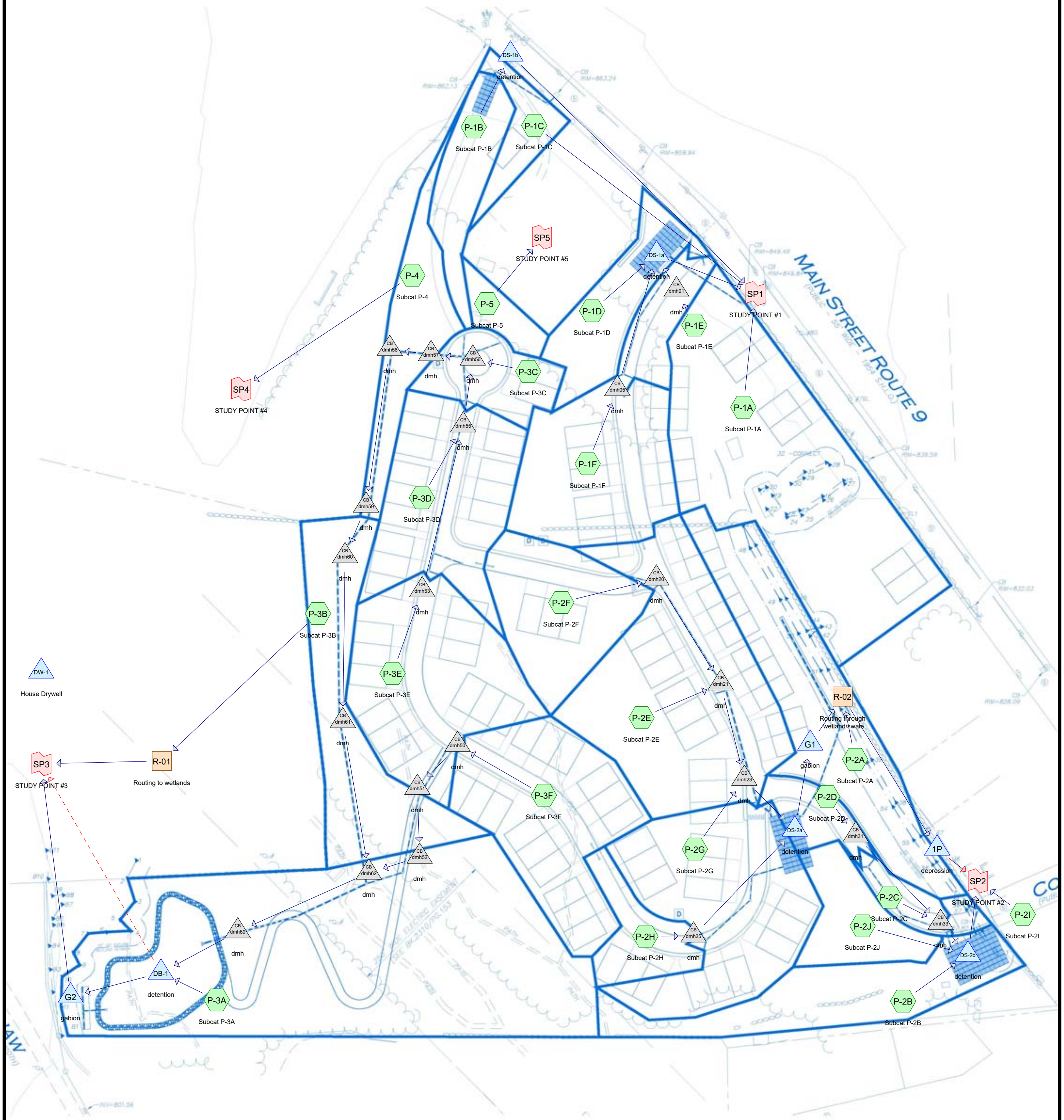
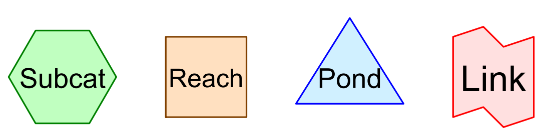
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:	SHEET No.
EXISTING WATERSHED PLAN	WS-1

SECTION 5.0 -
PROPOSED DRAINAGE ANALYSIS





Routing Diagram for 2889-01 - Proposed HydroCAD

Prepared by Allen & Major Associates, Inc., Printed 10/5/2021

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.23	2
2	10-year	Type III 24-hr		Default	24.00	1	4.85	2
3	25-year	Type III 24-hr		Default	24.00	1	6.12	2
4	50-year	Type III 24-hr		Default	24.00	1	7.30	2
5	100-year	Type III 24-hr		Default	24.00	1	8.72	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.343	70	1/2 acre lots, 25% imp, HSG B (P-1A, P-1B, P-1C, P-1D)
14.753	80	1/2 acre lots, 25% imp, HSG C (P-1A, P-1B, P-1C, P-1D, P-1E, P-1F, P-2A, P-2B, P-2C, P-2D, P-2E, P-2F, P-2G, P-2H, P-2I, P-2J, P-3A, P-3B, P-3C, P-3D, P-3E, P-3F, P-4, P-5)
0.337	61	>75% Grass cover, Good, HSG B (P-1A, P-1B, P-1C, P-1D, P-1E, P-4)
4.475	74	>75% Grass cover, Good, HSG C (P-1A, P-1B, P-1C, P-1D, P-1E, P-1F, P-2B, P-2C, P-2D, P-2G, P-2J, P-3A, P-4, P-5)
2.065	65	Brush, Good, HSG C (P-2B, P-3A, P-3B)
0.158	98	Paved parking, HSG B (P-1B, P-1C, P-1D, P-1E)
2.761	98	Paved parking, HSG C (P-1C, P-1D, P-1E, P-1F, P-2B, P-2C, P-2D, P-2E, P-2F, P-2G, P-2H, P-2I, P-2J, P-3C, P-3D, P-3E, P-3F)
0.188	55	Woods, Good, HSG B (P-1A)
4.105	70	Woods, Good, HSG C (P-1A, P-1B, P-2A, P-2B, P-2I, P-2J, P-3A, P-3B, P-4, P-5)
29.185	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.026	HSG B	P-1A, P-1B, P-1C, P-1D, P-1E, P-4
28.159	HSG C	P-1A, P-1B, P-1C, P-1D, P-1E, P-1F, P-2A, P-2B, P-2C, P-2D, P-2E, P-2F, P-2G, P-2H, P-2I, P-2J, P-3A, P-3B, P-3C, P-3D, P-3E, P-3F, P-4, P-5
0.000	HSG D	
0.000	Other	
29.185		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.343	14.753	0.000	0.000	15.096	1/2 acre lots, 25% imp	P-1A, P-1B, P-1C, P-1D, P-1E, P-1F, P-2A, P-2B, P-2C, P-2D, P-2E, P-2F, P-2G, P-2H, P-2I, P-2J, P-3A, P-3B, P-3C, P-3D, P-3E, P-3F, P-4, P-5
0.000	0.337	4.475	0.000	0.000	4.812	>75% Grass cover, Good	P-1A, P-1B, P-1C, P-1D, P-1E, P-1F, P-2B, P-2C, P-2D, P-2G, P-2J, P-3A, P-4, P-5
0.000	0.000	2.065	0.000	0.000	2.065	Brush, Good	P-2B, P-3A, P-3B
0.000	0.158	2.761	0.000	0.000	2.919	Paved parking	P-1B, P-1C, P-1D, P-1E, P-1F, P-2B, P-2C, P-2D, P-2E, P-2F, P-2G, P-2H, P-2I, P-2J, P-3C, P-3D, P-3E, P-3F
0.000	0.188	4.105	0.000	0.000	4.293	Woods, Good	P-1A, P-1B, P-2A, P-2B, P-2I, P-2J, P-3A, P-3B, P-4, P-5
0.000	**1.026**	**28.159**	**0.000**	**0.000**	**29.185**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	859.00	858.73	27.0	0.0100	0.013	0.0	24.0	0.0
2	DB-1	811.00	810.30	32.0	0.0219	0.013	0.0	18.0	0.0
3	dmh01	849.34	849.22	12.0	0.0100	0.013	0.0	12.0	0.0
4	dmh05	868.52	865.12	97.0	0.0351	0.013	0.0	12.0	0.0
5	dmh20	902.74	900.30	205.0	0.0119	0.013	0.0	15.0	0.0
6	dmh21	899.55	897.65	190.0	0.0100	0.013	0.0	24.0	0.0
7	dmh23	897.55	897.20	27.0	0.0130	0.013	0.0	24.0	0.0
8	dmh25	922.60	915.84	97.0	0.0697	0.013	0.0	12.0	0.0
9	dmh31	875.76	868.05	96.0	0.0803	0.013	0.0	12.0	0.0
10	dmh33	859.71	859.36	27.0	0.0130	0.013	0.0	15.0	0.0
11	dmh50	927.65	919.50	102.0	0.0799	0.013	0.0	15.0	0.0
12	dmh51	919.40	909.50	127.0	0.0780	0.013	0.0	15.0	0.0
13	dmh52	892.52	887.55	62.0	0.0802	0.013	0.0	15.0	0.0
14	dmh53	916.46	916.16	31.0	0.0097	0.013	0.0	18.0	0.0
15	dmh55	905.32	903.80	72.0	0.0211	0.013	0.0	18.0	0.0
16	dmh56	901.21	901.02	20.0	0.0095	0.013	0.0	24.0	0.0
17	dmh57	900.92	896.30	97.0	0.0476	0.013	0.0	24.0	0.0
18	dmh58	896.20	893.43	278.0	0.0100	0.013	0.0	24.0	0.0
19	dmh59	893.33	892.50	82.0	0.0101	0.013	0.0	24.0	0.0
20	dmh60	892.40	889.43	258.0	0.0115	0.013	0.0	24.0	0.0
21	dmh61	889.33	886.55	278.0	0.0100	0.013	0.0	24.0	0.0
22	dmh62	886.45	884.91	62.0	0.0248	0.013	0.0	24.0	0.0
23	dmh69	812.48	811.50	29.0	0.0338	0.013	0.0	24.0	0.0
24	DS-1a	847.90	846.36	129.0	0.0119	0.013	0.0	15.0	0.0
25	DS-1b	859.20	858.10	100.0	0.0110	0.013	0.0	12.0	0.0
26	DS-2a	892.00	890.52	46.0	0.0322	0.013	0.0	24.0	0.0
27	DS-2b	858.90	858.44	30.0	0.0153	0.013	0.0	12.0	0.0

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1A: Subcat P-1A Runoff Area=3.097 ac 14.03% Impervious Runoff Depth=1.06"
Tc=10.0 min CN=74 Runoff=3.14 cfs 0.273 af

Subcatchment P-1B: Subcat P-1B Runoff Area=25,318 sf 6.21% Impervious Runoff Depth=1.00"
Flow Length=315' Tc=8.2 min CN=73 Runoff=0.58 cfs 0.049 af

Subcatchment P-1C: Subcat P-1C Runoff Area=0.337 ac 34.38% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=78 Runoff=0.49 cfs 0.036 af

Subcatchment P-1D: Subcat P-1D Runoff Area=31,222 sf 15.07% Impervious Runoff Depth=1.17"
Tc=6.0 min CN=76 Runoff=0.94 cfs 0.070 af

Subcatchment P-1E: Subcat P-1E Runoff Area=0.382 ac 45.62% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=83 Runoff=0.72 cfs 0.052 af

Subcatchment P-1F: Subcat P-1F Runoff Area=1.377 ac 35.23% Impervious Runoff Depth=1.56"
Tc=6.0 min CN=82 Runoff=2.47 cfs 0.179 af

Subcatchment P-2A: Subcat P-2A Runoff Area=1.764 ac 18.64% Impervious Runoff Depth=1.23"
Tc=6.0 min CN=77 Runoff=2.44 cfs 0.181 af

Subcatchment P-2B: Subcat P-2B Runoff Area=1.164 ac 1.79% Impervious Runoff Depth=0.85"
Tc=6.0 min CN=70 Runoff=1.02 cfs 0.082 af

Subcatchment P-2C: Subcat P-2C Runoff Area=0.216 ac 77.47% Impervious Runoff Depth=2.47"
Tc=6.0 min CN=93 Runoff=0.59 cfs 0.044 af

Subcatchment P-2D: Subcat P-2D Runoff Area=0.315 ac 55.97% Impervious Runoff Depth=1.94"
Tc=6.0 min CN=87 Runoff=0.70 cfs 0.051 af

Subcatchment P-2E: Subcat P-2E Runoff Area=2.441 ac 36.97% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=83 Runoff=4.58 cfs 0.332 af

Subcatchment P-2F: Subcat P-2F Runoff Area=1.075 ac 38.90% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=83 Runoff=2.02 cfs 0.146 af

Subcatchment P-2G: Subcat P-2G Runoff Area=1.864 ac 32.70% Impervious Runoff Depth=1.56"
Tc=6.0 min CN=82 Runoff=3.34 cfs 0.243 af

Subcatchment P-2H: Subcat P-2H Runoff Area=0.470 ac 53.38% Impervious Runoff Depth=1.94"
Tc=6.0 min CN=87 Runoff=1.05 cfs 0.076 af

Subcatchment P-2I: Subcat P-2I Runoff Area=0.081 ac 70.48% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=91 Runoff=0.21 cfs 0.015 af

Subcatchment P-2J: Subcat P-2J Runoff Area=0.584 ac 3.54% Impervious Runoff Depth=1.06"
Tc=6.0 min CN=74 Runoff=0.68 cfs 0.051 af

Subcatchment P-3A: Subcat P-3A Runoff Area=5.064 ac 1.31% Impervious Runoff Depth=0.90"
Flow Length=644' Tc=16.1 min CN=71 Runoff=3.52 cfs 0.378 af

Subcatchment P-3B: Subcat P-3B Runoff Area=1.393 ac 9.09% Impervious Runoff Depth=1.00"
Tc=6.0 min CN=73 Runoff=1.51 cfs 0.116 af

Subcatchment P-3C: Subcat P-3C Runoff Area=0.542 ac 58.67% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=88 Runoff=1.25 cfs 0.091 af

Subcatchment P-3D: Subcat P-3D Runoff Area=1.446 ac 41.28% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=84 Runoff=2.84 cfs 0.206 af

Subcatchment P-3E: Subcat P-3E Runoff Area=1.691 ac 35.87% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=83 Runoff=3.17 cfs 0.230 af

Subcatchment P-3F: Subcat P-3F
Runoff Area=1.617 ac 36.01% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=83 Runoff=3.03 cfs 0.220 af

Subcatchment P-4: Subcat P-4
Runoff Area=32,853 sf 8.68% Impervious Runoff Depth=1.11"
Tc=6.0 min CN=75 Runoff=0.93 cfs 0.070 af

Subcatchment P-5: Subcat P-5
Runoff Area=9,362 sf 12.25% Impervious Runoff Depth=1.17"
Tc=6.0 min CN=76 Runoff=0.28 cfs 0.021 af

Reach R-01: Routing to wetlands
Avg. Flow Depth=0.15' Max Vel=0.26 fps Inflow=1.51 cfs 0.116 af
n=0.400 L=722.0' S=0.1087 '/' Capacity=43.77 cfs Outflow=0.50 cfs 0.116 af

Reach R-02: Routing through wetland/swale
Avg. Flow Depth=0.43' Max Vel=0.25 fps Inflow=3.32 cfs 0.976 af
n=0.400 L=525.0' S=0.0223 '/' Capacity=26.65 cfs Outflow=1.82 cfs 0.974 af

Pond 1P: depression
Peak Elev=862.20' Storage=70 cf Inflow=1.82 cfs 0.974 af
Primary=1.82 cfs 0.974 af Secondary=0.00 cfs 0.000 af Outflow=1.82 cfs 0.974 af

Pond DB-1: detention
Peak Elev=812.09' Storage=18,022 cf Inflow=12.35 cfs 1.126 af
Primary=3.24 cfs 1.107 af Secondary=0.00 cfs 0.000 af Outflow=3.24 cfs 1.107 af

Pond dmh01: dmh
Peak Elev=849.82' Inflow=0.72 cfs 0.052 af
12.0" Round Culvert n=0.013 L=12.0' S=0.0100 '/' Outflow=0.72 cfs 0.052 af

Pond dmh05: dmh
Peak Elev=869.44' Inflow=2.47 cfs 0.179 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0351 '/' Outflow=2.47 cfs 0.179 af

Pond dmh20: dmh
Peak Elev=903.44' Inflow=2.02 cfs 0.146 af
15.0" Round Culvert n=0.013 L=205.0' S=0.0119 '/' Outflow=2.02 cfs 0.146 af

Pond dmh21: dmh
Peak Elev=900.70' Inflow=6.60 cfs 0.479 af
24.0" Round Culvert n=0.013 L=190.0' S=0.0100 '/' Outflow=6.60 cfs 0.479 af

Pond dmh23: dmh
Peak Elev=899.12' Inflow=9.93 cfs 0.721 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=9.93 cfs 0.721 af

Pond dmh25: dmh
Peak Elev=923.13' Inflow=1.05 cfs 0.076 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0697 '/' Outflow=1.05 cfs 0.076 af

Pond dmh31: dmh
Peak Elev=876.18' Inflow=0.70 cfs 0.051 af
12.0" Round Culvert n=0.013 L=96.0' S=0.0803 '/' Outflow=0.70 cfs 0.051 af

Pond dmh33: dmh
Peak Elev=860.27' Inflow=1.29 cfs 0.095 af
15.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=1.29 cfs 0.095 af

Pond dmh50: dmh
Peak Elev=928.55' Inflow=3.03 cfs 0.220 af
15.0" Round Culvert n=0.013 L=102.0' S=0.0799 '/' Outflow=3.03 cfs 0.220 af

Pond dmh51: dmh
Peak Elev=920.30' Inflow=3.03 cfs 0.220 af
15.0" Round Culvert n=0.013 L=127.0' S=0.0780 '/' Outflow=3.03 cfs 0.220 af

Pond dmh52: dmh
Peak Elev=893.42' Inflow=3.03 cfs 0.220 af
15.0" Round Culvert n=0.013 L=62.0' S=0.0802 '/' Outflow=3.03 cfs 0.220 af

Pond dmh53: dmh
Peak Elev=917.38' Inflow=3.17 cfs 0.230 af
18.0" Round Culvert n=0.013 L=31.0' S=0.0097 '/' Outflow=3.17 cfs 0.230 af

Pond dmh55: dmh
Peak Elev=906.57' Inflow=6.01 cfs 0.436 af
18.0" Round Culvert n=0.013 L=72.0' S=0.0211 '/' Outflow=6.01 cfs 0.436 af

Pond dmh56: dmh
Peak Elev=902.58' Inflow=7.27 cfs 0.527 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0095 '/' Outflow=7.27 cfs 0.527 af

Pond dmh57: dmh
Peak Elev=902.11' Inflow=7.27 cfs 0.527 af
24.0" Round Culvert n=0.013 L=97.0' S=0.0476 '/' Outflow=7.27 cfs 0.527 af

Pond dmh58: dmh Peak Elev=897.39' Inflow=7.27 cfs 0.527 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=7.27 cfs 0.527 af

Pond dmh59: dmh Peak Elev=894.56' Inflow=7.27 cfs 0.527 af
24.0" Round Culvert n=0.013 L=82.0' S=0.0101 '/' Outflow=7.27 cfs 0.527 af

Pond dmh60: dmh Peak Elev=893.59' Inflow=7.27 cfs 0.527 af
24.0" Round Culvert n=0.013 L=258.0' S=0.0115 '/' Outflow=7.27 cfs 0.527 af

Pond dmh61: dmh Peak Elev=890.52' Inflow=7.27 cfs 0.527 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=7.27 cfs 0.527 af

Pond dmh62: dmh Peak Elev=887.93' Inflow=10.30 cfs 0.748 af
24.0" Round Culvert n=0.013 L=62.0' S=0.0248 '/' Outflow=10.30 cfs 0.748 af

Pond dmh69: dmh Peak Elev=813.96' Inflow=10.30 cfs 0.748 af
24.0" Round Culvert n=0.013 L=29.0' S=0.0338 '/' Outflow=10.30 cfs 0.748 af

Pond DS-1a: detention Peak Elev=849.50' Storage=5,122 cf Inflow=4.12 cfs 0.301 af
Outflow=0.95 cfs 0.301 af

Pond DS-1b: detention Peak Elev=859.62' Storage=567 cf Inflow=0.58 cfs 0.049 af
Outflow=0.21 cfs 0.048 af

Pond DS-2a: detention Peak Elev=895.67' Storage=15,099 cf Inflow=10.98 cfs 0.797 af
Outflow=1.48 cfs 0.794 af

Pond DS-2b: detention Peak Elev=859.84' Storage=3,199 cf Inflow=2.98 cfs 0.229 af
Outflow=0.94 cfs 0.226 af

Pond DW-1: House Drywell Peak Elev=0.00' Storage=0.000 af

Pond G1: gabion Peak Elev=877.54' Storage=3 cf Inflow=1.48 cfs 0.794 af
Outflow=1.48 cfs 0.794 af

Pond G2: gabion Peak Elev=810.45' Storage=7 cf Inflow=3.24 cfs 1.107 af
Outflow=3.24 cfs 1.107 af

Link SP1: STUDY POINT #1 Inflow=3.93 cfs 0.659 af
Primary=3.93 cfs 0.659 af

Link SP2: STUDY POINT #2 Inflow=2.76 cfs 1.215 af
Primary=2.76 cfs 1.215 af

Link SP3: STUDY POINT #3 Inflow=3.72 cfs 1.223 af
Primary=3.72 cfs 1.223 af

Link SP4: STUDY POINT #4 Inflow=0.93 cfs 0.070 af
Primary=0.93 cfs 0.070 af

Link SP5: STUDY POINT #5 Inflow=0.28 cfs 0.021 af
Primary=0.28 cfs 0.021 af

Total Runoff Area = 29.185 ac Runoff Volume = 3.215 af Average Runoff Depth = 1.32"
77.07% Pervious = 22.491 ac 22.93% Impervious = 6.693 ac

Summary for Subcatchment P-1A: Subcat P-1A

Runoff = 3.14 cfs @ 12.15 hrs, Volume= 0.273 af, Depth= 1.06"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.021	74	>75% Grass cover, Good, HSG C
0.017	61	>75% Grass cover, Good, HSG B
0.188	55	Woods, Good, HSG B
0.290	70	1/2 acre lots, 25% imp, HSG B
1.448	80	1/2 acre lots, 25% imp, HSG C
1.132	70	Woods, Good, HSG C
3.097	74	Weighted Average
2.662		85.97% Pervious Area
0.434		14.03% Impervious Area

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

Summary for Subcatchment P-1B: Subcat P-1B

Runoff = 0.58 cfs @ 12.13 hrs, Volume= 0.049 af, Depth= 1.00"
Routed to Pond DS-1b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
43	98	Paved parking, HSG B
3,925	61	>75% Grass cover, Good, HSG B
760	70	1/2 acre lots, 25% imp, HSG B
5,357	80	1/2 acre lots, 25% imp, HSG C
3,003	70	Woods, Good, HSG C
12,230	74	>75% Grass cover, Good, HSG C
25,318	73	Weighted Average
23,746		93.79% Pervious Area
1,572		6.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment P-1C: Subcat P-1C

Runoff = 0.49 cfs @ 12.10 hrs, Volume= 0.036 af, Depth= 1.30"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.077	61	>75% Grass cover, Good, HSG B
0.002	98	Paved parking, HSG C
0.066	98	Paved parking, HSG B
0.035	70	1/2 acre lots, 25% imp, HSG B
0.156	80	1/2 acre lots, 25% imp, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.337	78	Weighted Average
0.221		65.62% Pervious Area
0.116		34.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-1D: Subcat P-1D

Runoff = 0.94 cfs @ 12.10 hrs, Volume= 0.070 af, Depth= 1.17"
Routed to Pond DS-1a : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
4,573	61	>75% Grass cover, Good, HSG B
2,625	98	Paved parking, HSG B
1	70	1/2 acre lots, 25% imp, HSG B
3,514	80	1/2 acre lots, 25% imp, HSG C
1,200	98	Paved parking, HSG C
19,309	74	>75% Grass cover, Good, HSG C
31,222	76	Weighted Average
26,518		84.93% Pervious Area
4,704		15.07% Impervious Area

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

Summary for Subcatchment P-1E: Subcat P-1E

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.052 af, Depth= 1.63"
Routed to Pond dmh01 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.031	98	Paved parking, HSG B
0.046	61	>75% Grass cover, Good, HSG B
0.118	74	>75% Grass cover, Good, HSG C
0.129	98	Paved parking, HSG C
0.059	80	1/2 acre lots, 25% imp, HSG C
0.382	83	Weighted Average
0.208		54.38% Pervious Area
0.174		45.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-1F: Subcat P-1F

Runoff = 2.47 cfs @ 12.09 hrs, Volume= 0.179 af, Depth= 1.56"
Routed to Pond dmh05 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
1.135	80	1/2 acre lots, 25% imp, HSG C
0.201	98	Paved parking, HSG C
0.041	74	>75% Grass cover, Good, HSG C
1.377	82	Weighted Average
0.892		64.77% Pervious Area
0.485		35.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2A: Subcat P-2A

Runoff = 2.44 cfs @ 12.10 hrs, Volume= 0.181 af, Depth= 1.23"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.449	70	Woods, Good, HSG C
1.315	80	1/2 acre lots, 25% imp, HSG C
1.764	77	Weighted Average
1.435		81.36% Pervious Area
0.329		18.64% Impervious Area

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

Summary for Subcatchment P-2B: Subcat P-2B

Runoff = 1.02 cfs @ 12.10 hrs, Volume= 0.082 af, Depth= 0.85"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.512	70	Woods, Good, HSG C
0.254	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.314	65	Brush, Good, HSG C
0.084	80	1/2 acre lots, 25% imp, HSG C
1.164	70	Weighted Average
1.143		98.21% Pervious Area
0.021		1.79% Impervious Area

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

Summary for Subcatchment P-2C: Subcat P-2C

Runoff = 0.59 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 2.47"
Routed to Pond dmh33 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.151	98	Paved parking, HSG C
0.065	80	1/2 acre lots, 25% imp, HSG C
0.216	93	Weighted Average
0.049		22.53% Pervious Area
0.167		77.47% Impervious Area

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

Summary for Subcatchment P-2D: Subcat P-2D

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 1.94"
Routed to Pond dmh31 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.116	74	>75% Grass cover, Good, HSG C
0.169	98	Paved parking, HSG C
0.030	80	1/2 acre lots, 25% imp, HSG C
0.315	87	Weighted Average
0.138		44.03% Pervious Area
0.176		55.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2E: Subcat P-2E

Runoff = 4.58 cfs @ 12.09 hrs, Volume= 0.332 af, Depth= 1.63"
Routed to Pond dmh21 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
2.051	80	1/2 acre lots, 25% imp, HSG C
0.390	98	Paved parking, HSG C
2.441	83	Weighted Average
1.539		63.03% Pervious Area
0.902		36.97% Impervious Area

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

Summary for Subcatchment P-2F: Subcat P-2F

Runoff = 2.02 cfs @ 12.09 hrs, Volume= 0.146 af, Depth= 1.63"
Routed to Pond dmh20 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.199	98	Paved parking, HSG C
0.875	80	1/2 acre lots, 25% imp, HSG C
1.075	83	Weighted Average
0.657		61.10% Pervious Area
0.418		38.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2G: Subcat P-2G

Runoff = 3.34 cfs @ 12.09 hrs, Volume= 0.243 af, Depth= 1.56"
Routed to Pond dmh23 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.106	74	>75% Grass cover, Good, HSG C
1.531	80	1/2 acre lots, 25% imp, HSG C
0.227	98	Paved parking, HSG C
1.864	82	Weighted Average
1.254		67.30% Pervious Area
0.610		32.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2H: Subcat P-2H

Runoff = 1.05 cfs @ 12.09 hrs, Volume= 0.076 af, Depth= 1.94"
Routed to Pond dmh25 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.178	98	Paved parking, HSG C
0.292	80	1/2 acre lots, 25% imp, HSG C
0.470	87	Weighted Average
0.219		46.62% Pervious Area
0.251		53.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2I: Subcat P-2I

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 2.29"
Routed to Link SP2 : STUDY POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.000	70	Woods, Good, HSG C
0.049	98	Paved parking, HSG C
0.032	80	1/2 acre lots, 25% imp, HSG C
0.081	91	Weighted Average
0.024		29.52% Pervious Area
0.057		70.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2J: Subcat P-2J

Runoff = 0.68 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 1.06"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.069	70	Woods, Good, HSG C
0.432	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.083	80	1/2 acre lots, 25% imp, HSG C
0.584	74	Weighted Average
0.563		96.46% Pervious Area
0.021		3.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3A: Subcat P-3A

Runoff = 3.52 cfs @ 12.25 hrs, Volume= 0.378 af, Depth= 0.90"
Routed to Pond DB-1 : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.264	80	1/2 acre lots, 25% imp, HSG C
0.959	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
2.262	74	>75% Grass cover, Good, HSG C
5.064	71	Weighted Average
4.998		98.69% Pervious Area
0.066		1.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.3	299	0.3000	3.83		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.1	644	Total			

Summary for Subcatchment P-3B: Subcat P-3B

Runoff = 1.51 cfs @ 12.10 hrs, Volume= 0.116 af, Depth= 1.00"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.714	70	Woods, Good, HSG C
0.172	65	Brush, Good, HSG C
0.506	80	1/2 acre lots, 25% imp, HSG C
1.393	73	Weighted Average
1.267		90.91% Pervious Area
0.127		9.09% Impervious Area

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

Summary for Subcatchment P-3C: Subcat P-3C

Runoff = 1.25 cfs @ 12.09 hrs, Volume= 0.091 af, Depth= 2.02"
Routed to Pond dmh56 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG C
0.299	80	1/2 acre lots, 25% imp, HSG C
0.542	88	Weighted Average
0.224		41.33% Pervious Area
0.318		58.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3D: Subcat P-3D

Runoff = 2.84 cfs @ 12.09 hrs, Volume= 0.206 af, Depth= 1.71"
Routed to Pond dmh55 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
1.132	80	1/2 acre lots, 25% imp, HSG C
0.314	98	Paved parking, HSG C
1.446	84	Weighted Average
0.849		58.72% Pervious Area
0.597		41.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr-55 min**

Summary for Subcatchment P-3E: Subcat P-3E

Runoff = 3.17 cfs @ 12.09 hrs, Volume= 0.230 af, Depth= 1.63"
Routed to Pond dmh53 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
1.446	80	1/2 acre lots, 25% imp, HSG C
0.245	98	Paved parking, HSG C
1.691	83	Weighted Average
1.085		64.13% Pervious Area
0.607		35.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-3F: Subcat P-3F

Runoff = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af, Depth= 1.63"
Routed to Pond dmh50 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (ac)	CN	Description
1.379	80	1/2 acre lots, 25% imp, HSG C
0.237	98	Paved parking, HSG C
1.617	83	Weighted Average
1.035		63.99% Pervious Area
0.582		36.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat P-4

Runoff = 0.93 cfs @ 12.10 hrs, Volume= 0.070 af, Depth= 1.11"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
56	61	>75% Grass cover, Good, HSG B
11,411	80	1/2 acre lots, 25% imp, HSG C
6,253	70	Woods, Good, HSG C
15,134	74	>75% Grass cover, Good, HSG C
32,853	75	Weighted Average
30,001		91.32% Pervious Area
2,853		8.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-5: Subcat P-5

Runoff = 0.28 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 1.17"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.23"

Area (sf)	CN	Description
2,452	70	Woods, Good, HSG C
2,321	74	>75% Grass cover, Good, HSG C
4,589	80	1/2 acre lots, 25% imp, HSG C
9,362	76	Weighted Average
8,215		87.75% Pervious Area
1,147		12.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TR-55 Min.**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

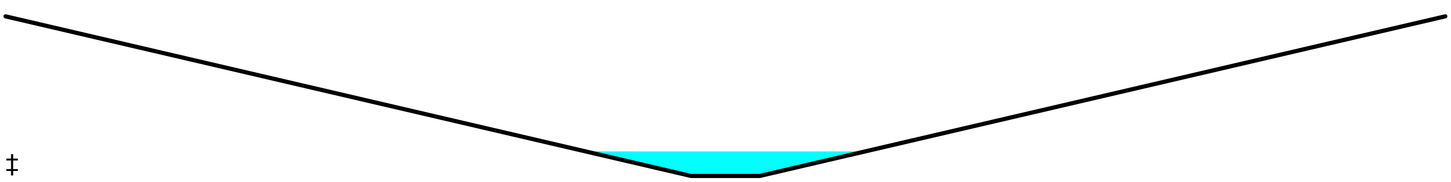
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 1.393 ac, 9.09% Impervious, Inflow Depth = 1.00" for 2-year event
Inflow = 1.51 cfs @ 12.10 hrs, Volume= 0.116 af
Outflow = 0.50 cfs @ 12.47 hrs, Volume= 0.116 af, Atten= 67%, Lag= 22.1 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.26 fps, Min. Travel Time= 46.9 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 111.2 min

Peak Storage= 1,410 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 20.38'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

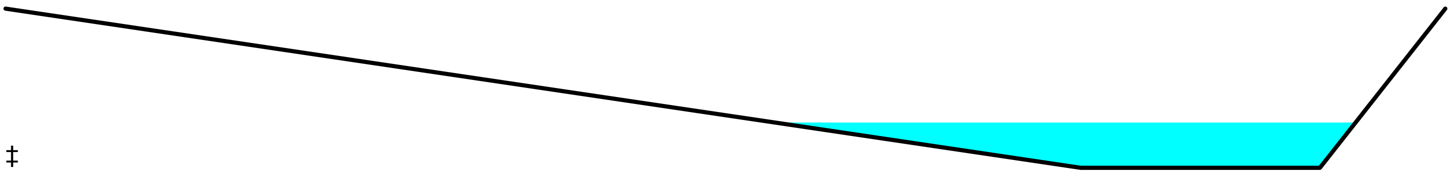
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 1.54" for 2-year event
Inflow = 3.32 cfs @ 12.10 hrs, Volume= 0.976 af
Outflow = 1.82 cfs @ 12.80 hrs, Volume= 0.974 af, Atten= 45%, Lag= 41.5 min
Routed to Pond 1P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.25 fps, Min. Travel Time= 35.2 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 71.1 min

Peak Storage= 3,848 cf @ 12.80 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 24.31'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 26.65 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 525.0' Slope= 0.0223 '/'
Inlet Invert= 875.70', Outlet Invert= 864.00'



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Summary for Pond 1P: depression

Inflow Area =	7.613 ac, 32.96% Impervious, Inflow Depth > 1.54" for 2-year event				
Inflow =	1.82 cfs @	12.80 hrs,	Volume=	0.974 af	
Outflow =	1.82 cfs @	12.80 hrs,	Volume=	0.974 af,	Atten= 0%, Lag= 0.4 min
Primary =	1.82 cfs @	12.80 hrs,	Volume=	0.974 af	
Routed to Link SP2 : STUDY POINT #2					
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Routed to Link SP2 : STUDY POINT #2					

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 862.20' @ 12.80 hrs Surf.Area= 374 sf Storage= 70 cf
Flood Elev= 864.00' Surf.Area= 837 sf Storage= 1,133 cf

Plug-Flow detention time= 0.8 min calculated for 0.973 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (1,004.8 - 1,004.0)

Volume	Invert	Avail.Storage	Storage Description
#1	862.00'	1,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
862.00	334	74.0	0	0	334
864.00	837	119.0	1,133	1,133	1,052

Device	Routing	Invert	Outlet Devices
#1	Primary	859.00'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.00' / 858.73' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	862.00'	**24.0" Horiz. beehive** C= 0.600 Limited to weir flow at low heads
#3	Secondary	863.30'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.82 cfs @ 12.80 hrs HW=862.20' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.82 cfs of 22.43 cfs potential flow)
  └─**2=beehive** (Weir Controls 1.82 cfs @ 1.46 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=862.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DB-1: detention

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth = 1.30" for 2-year event
Inflow = 12.35 cfs @ 12.11 hrs, Volume= 1.126 af
Outflow = 3.24 cfs @ 12.62 hrs, Volume= 1.107 af, Atten= 74%, Lag= 31.1 min
Primary = 3.24 cfs @ 12.62 hrs, Volume= 1.107 af
Routed to Pond G2 : gabion
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 812.09' @ 12.62 hrs Surf.Area= 17,466 sf Storage= 18,022 cf
Flood Elev= 816.00' Surf.Area= 24,900 sf Storage= 100,504 cf

Plug-Flow detention time= 123.2 min calculated for 1.106 af (98% of inflow)
Center-of-Mass det. time= 114.6 min (961.3 - 846.7)

Volume	Invert	Avail.Storage	Storage Description
#1	811.00'	100,504 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
811.00	15,556	576.0	0	0	15,556
812.00	17,303	594.0	16,422	16,422	17,331
813.00	19,115	613.0	18,201	34,623	19,253
814.00	20,984	632.0	20,042	54,665	21,236
815.00	22,910	651.0	21,940	76,605	23,279
816.00	24,900	670.0	23,898	100,504	25,383

Device	Routing	Invert	Outlet Devices
#1	Primary	811.00'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 811.00' / 810.30' S= 0.0219 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	811.00'	**8.0" Vert. (2) 8" Orifice (2yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	811.90'	**12.0" Vert. (2) 12" Orifice (10yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	813.20'	**24.0" x 24.0" Horiz. 24" Top of Structure** C= 0.600 Limited to weir flow at low heads
#5	Secondary	814.40'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=3.24 cfs @ 12.62 hrs HW=812.09' TW=810.45' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.24 cfs of 4.90 cfs potential flow)
├─**2=(2) 8" Orifice (2yr)** (Orifice Controls 2.93 cfs @ 4.19 fps)
├─**3=(2) 12" Orifice (10yr)** (Orifice Controls 0.31 cfs @ 1.49 fps)
└─**4=24" Top of Structure** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=811.00' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond dmh01: dmh

Inflow Area = 0.382 ac, 45.62% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 0.72 cfs @ 12.09 hrs, Volume= 0.052 af
Outflow = 0.72 cfs @ 12.09 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min
Primary = 0.72 cfs @ 12.09 hrs, Volume= 0.052 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 849.82' @ 12.09 hrs
Flood Elev= 855.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	849.34'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 849.34' / 849.22' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.09 hrs HW=849.82' TW=848.83' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.71 cfs @ 2.77 fps)

Summary for Pond dmh05: dmh

Inflow Area = 1.377 ac, 35.23% Impervious, Inflow Depth = 1.56" for 2-year event
Inflow = 2.47 cfs @ 12.09 hrs, Volume= 0.179 af
Outflow = 2.47 cfs @ 12.09 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min
Primary = 2.47 cfs @ 12.09 hrs, Volume= 0.179 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 869.44' @ 12.09 hrs
Flood Elev= 883.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.52'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 868.52' / 865.12' S= 0.0351 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.43 cfs @ 12.09 hrs HW=869.43' TW=848.83' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.43 cfs @ 3.25 fps)

Summary for Pond dmh20: dmh

Inflow Area = 1.075 ac, 38.90% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 2.02 cfs @ 12.09 hrs, Volume= 0.146 af
Outflow = 2.02 cfs @ 12.09 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min
Primary = 2.02 cfs @ 12.09 hrs, Volume= 0.146 af
Routed to Pond dmh21 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 903.44' @ 12.09 hrs
Flood Elev= 907.61'

Device	Routing	Invert	Outlet Devices
#1	Primary	902.74'	**15.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 902.74' / 900.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.98 cfs @ 12.09 hrs HW=903.43' TW=900.69' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.98 cfs @ 2.84 fps)

Summary for Pond dmh21: dmh

Inflow Area = 3.515 ac, 37.56% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 6.60 cfs @ 12.09 hrs, Volume= 0.479 af
Outflow = 6.60 cfs @ 12.09 hrs, Volume= 0.479 af, Atten= 0%, Lag= 0.0 min
Primary = 6.60 cfs @ 12.09 hrs, Volume= 0.479 af
Routed to Pond dmh23 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 900.70' @ 12.10 hrs
Flood Elev= 905.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	899.55'	**24.0" Round Culvert** L= 190.0' Ke= 0.500 Inlet / Outlet Invert= 899.55' / 897.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.25 cfs @ 12.09 hrs HW=900.69' TW=899.10' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 6.25 cfs @ 4.90 fps)

Summary for Pond dmh23: dmh

Inflow Area = 5.379 ac, 35.88% Impervious, Inflow Depth = 1.61" for 2-year event
Inflow = 9.93 cfs @ 12.09 hrs, Volume= 0.721 af
Outflow = 9.93 cfs @ 12.09 hrs, Volume= 0.721 af, Atten= 0%, Lag= 0.0 min
Primary = 9.93 cfs @ 12.09 hrs, Volume= 0.721 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 899.12' @ 12.09 hrs
Flood Elev= 910.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	897.55'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 897.55' / 897.20' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=9.78 cfs @ 12.09 hrs HW=899.11' TW=893.95' (Dynamic Tailwater)
└—**1=Culvert** (Barrel Controls 9.78 cfs @ 5.14 fps)

Summary for Pond dmh25: dmh

Inflow Area = 0.470 ac, 53.38% Impervious, Inflow Depth = 1.94" for 2-year event
Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.076 af
Outflow = 1.05 cfs @ 12.09 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 12.09 hrs, Volume= 0.076 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 923.13' @ 12.09 hrs
Flood Elev= 930.54'

Device	Routing	Invert	Outlet Devices
#1	Primary	922.60'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 922.60' / 915.84' S= 0.0697 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.03 cfs @ 12.09 hrs HW=923.12' TW=893.93' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 1.03 cfs @ 2.46 fps)

Summary for Pond dmh31: dmh

Inflow Area = 0.315 ac, 55.97% Impervious, Inflow Depth = 1.94" for 2-year event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af
Routed to Pond dmh33 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 876.18' @ 12.09 hrs
Flood Elev= 885.77'

Device	Routing	Invert	Outlet Devices
#1	Primary	875.76'	**12.0" Round Culvert** L= 96.0' Ke= 0.500 Inlet / Outlet Invert= 875.76' / 868.05' S= 0.0803 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.69 cfs @ 12.09 hrs HW=876.18' TW=860.26' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 0.69 cfs @ 2.20 fps)

Summary for Pond dmh33: dmh

Inflow Area = 0.530 ac, 64.72% Impervious, Inflow Depth = 2.16" for 2-year event
Inflow = 1.29 cfs @ 12.09 hrs, Volume= 0.095 af
Outflow = 1.29 cfs @ 12.09 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 12.09 hrs, Volume= 0.095 af
Routed to Pond DS-2b : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 860.27' @ 12.09 hrs
Flood Elev= 864.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	859.71'	**15.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.71' / 859.36' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.26 cfs @ 12.09 hrs HW=860.26' TW=859.60' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.26 cfs @ 3.58 fps)

Summary for Pond dmh50: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af
Outflow = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min
Primary = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af
Routed to Pond dmh51 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 928.55' @ 12.09 hrs
Flood Elev= 933.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	927.65'	**15.0" Round Culvert** L= 102.0' Ke= 0.500 Inlet / Outlet Invert= 927.65' / 919.50' S= 0.0799 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.99 cfs @ 12.09 hrs HW=928.54' TW=920.29' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.99 cfs @ 3.21 fps)

Summary for Pond dmh51: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af
Outflow = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min
Primary = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af
Routed to Pond dmh52 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 920.30' @ 12.09 hrs
Flood Elev= 924.04'

Device	Routing	Invert	Outlet Devices
#1	Primary	919.40'	**15.0" Round Culvert** L= 127.0' Ke= 0.500 Inlet / Outlet Invert= 919.40' / 909.50' S= 0.0780 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.99 cfs @ 12.09 hrs HW=920.29' TW=893.41' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.99 cfs @ 3.21 fps)

Summary for Pond dmh52: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af
Outflow = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min
Primary = 3.03 cfs @ 12.09 hrs, Volume= 0.220 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 893.42' @ 12.09 hrs
Flood Elev= 914.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.52'	**15.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 892.52' / 887.55' S= 0.0802 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.99 cfs @ 12.09 hrs HW=893.41' TW=887.91' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.99 cfs @ 3.21 fps)

Summary for Pond dmh53: dmh

Inflow Area = 1.691 ac, 35.87% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 3.17 cfs @ 12.09 hrs, Volume= 0.230 af
Outflow = 3.17 cfs @ 12.09 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min
Primary = 3.17 cfs @ 12.09 hrs, Volume= 0.230 af
Routed to Pond dmh55 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 917.38' @ 12.09 hrs
Flood Elev= 921.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	916.46'	**18.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 916.46' / 916.16' S= 0.0097 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.12 cfs @ 12.09 hrs HW=917.37' TW=906.56' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 3.12 cfs @ 4.00 fps)

Summary for Pond dmh55: dmh

Inflow Area = 3.137 ac, 38.36% Impervious, Inflow Depth = 1.67" for 2-year event
Inflow = 6.01 cfs @ 12.09 hrs, Volume= 0.436 af
Outflow = 6.01 cfs @ 12.09 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min
Primary = 6.01 cfs @ 12.09 hrs, Volume= 0.436 af
Routed to Pond dmh56 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 906.57' @ 12.09 hrs
Flood Elev= 911.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	905.32'	**18.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 905.32' / 903.80' S= 0.0211 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.92 cfs @ 12.09 hrs HW=906.56' TW=902.57' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.92 cfs @ 3.79 fps)

Summary for Pond dmh56: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Outflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Routed to Pond dmh57 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 902.58' @ 12.10 hrs
Flood Elev= 908.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	901.21'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 901.21' / 901.02' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.73 cfs @ 12.09 hrs HW=902.57' TW=902.10' (Dynamic Tailwater)
1=Culvert (Outlet Controls 6.73 cfs @ 4.17 fps)

Summary for Pond dmh57: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Outflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Routed to Pond dmh58 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 902.11' @ 12.09 hrs
Flood Elev= 908.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	900.92'	**24.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 900.92' / 896.30' S= 0.0476 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.14 cfs @ 12.09 hrs HW=902.10' TW=897.38' (Dynamic Tailwater)
1=Culvert (Inlet Controls 7.14 cfs @ 3.70 fps)

Summary for Pond dmh58: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Outflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Routed to Pond dmh59 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 897.39' @ 12.09 hrs
Flood Elev= 901.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	896.20'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 896.20' / 893.43' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.14 cfs @ 12.09 hrs HW=897.38' TW=894.55' (Dynamic Tailwater)
1=Culvert (Inlet Controls 7.14 cfs @ 3.70 fps)

Summary for Pond dmh59: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Outflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Routed to Pond dmh60 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 894.56' @ 12.10 hrs
Flood Elev= 909.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	893.33'	**24.0" Round Culvert** L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 893.33' / 892.50' S= 0.0101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.84 cfs @ 12.09 hrs HW=894.55' TW=893.58' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 6.84 cfs @ 4.89 fps)

Summary for Pond dmh60: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Outflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Routed to Pond dmh61 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 893.59' @ 12.09 hrs
Flood Elev= 901.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.40'	**24.0" Round Culvert** L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 892.40' / 889.43' S= 0.0115 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.14 cfs @ 12.09 hrs HW=893.58' TW=890.51' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.14 cfs @ 3.70 fps)

Summary for Pond dmh61: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Outflow = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.09 hrs, Volume= 0.527 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 890.52' @ 12.09 hrs
Flood Elev= 898.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	889.33'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 889.33' / 886.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.14 cfs @ 12.09 hrs HW=890.51' TW=887.91' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.14 cfs @ 3.70 fps)

Summary for Pond dmh62: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 1.69" for 2-year event
Inflow = 10.30 cfs @ 12.09 hrs, Volume= 0.748 af
Outflow = 10.30 cfs @ 12.09 hrs, Volume= 0.748 af, Atten= 0%, Lag= 0.0 min
Primary = 10.30 cfs @ 12.09 hrs, Volume= 0.748 af
Routed to Pond dmh69 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 887.93' @ 12.09 hrs
Flood Elev= 902.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.45'	**24.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 886.45' / 884.91' S= 0.0248 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.13 cfs @ 12.09 hrs HW=887.91' TW=813.94' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.13 cfs @ 4.12 fps)

Summary for Pond dmh69: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 1.69" for 2-year event
Inflow = 10.30 cfs @ 12.09 hrs, Volume= 0.748 af
Outflow = 10.30 cfs @ 12.09 hrs, Volume= 0.748 af, Atten= 0%, Lag= 0.0 min
Primary = 10.30 cfs @ 12.09 hrs, Volume= 0.748 af
Routed to Pond DB-1 : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 813.96' @ 12.09 hrs
Flood Elev= 818.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	812.48'	**24.0" Round Culvert** L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 812.48' / 811.50' S= 0.0338 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.13 cfs @ 12.09 hrs HW=813.94' TW=811.58' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.13 cfs @ 4.12 fps)

Summary for Pond DS-1a: detention

Inflow Area = 2.476 ac, 30.99% Impervious, Inflow Depth = 1.46" for 2-year event
Inflow = 4.12 cfs @ 12.10 hrs, Volume= 0.301 af
Outflow = 0.95 cfs @ 12.53 hrs, Volume= 0.301 af, Atten= 77%, Lag= 25.8 min
Primary = 0.95 cfs @ 12.53 hrs, Volume= 0.301 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 849.50' @ 12.53 hrs Surf.Area= 3,840 sf Storage= 5,122 cf
Flood Elev= 853.00' Surf.Area= 3,840 sf Storage= 17,124 cf

Plug-Flow detention time= 164.1 min calculated for 0.301 af (100% of inflow)
Center-of-Mass det. time= 164.2 min (1,003.9 - 839.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	848.00'	0 cf	**96.00'W x 40.00'L x 5.67'H Field A** 21,760 cf Overall - 21,760 cf Embedded = 0 cf x 40.0% Voids
#2A	848.00'	17,124 cf	**retain_it retain_it 5.0'** x 60 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 12 Rows adjusted for 353.3 cf perimeter wall
		17,124 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	847.90'	**15.0" Round Culvert** L= 129.0' Ke= 0.500 Inlet / Outlet Invert= 847.90' / 846.36' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	847.90'	**3.0" Vert. 3" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	849.00'	**8.0" Vert. 8" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	850.15'	**8.0" Vert. 8" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	851.15'	**7.0" Vert. 7" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	852.80'	**4.0' long Overflow Weir** 2 End Contraction(s) 4.0' Crest Height

Primary OutFlow Max=0.95 cfs @ 12.53 hrs HW=849.49' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 0.95 cfs of 5.82 cfs potential flow)
2=3" Orifice (2yr) (Orifice Controls 0.29 cfs @ 5.84 fps)
3=8" Orifice (10yr) (Orifice Controls 0.66 cfs @ 2.39 fps)
4=8" Orifice (25yr) (Controls 0.00 cfs)
5=7" Orifice (50yr) (Controls 0.00 cfs)
6=Overflow Weir (Controls 0.00 cfs)

Summary for Pond DS-1b: detention

Inflow Area = 0.581 ac, 6.21% Impervious, Inflow Depth = 1.00" for 2-year event
Inflow = 0.58 cfs @ 12.13 hrs, Volume= 0.049 af
Outflow = 0.21 cfs @ 12.50 hrs, Volume= 0.048 af, Atten= 63%, Lag= 22.0 min
Primary = 0.21 cfs @ 12.50 hrs, Volume= 0.048 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 859.62' @ 12.50 hrs Surf.Area= 1,536 sf Storage= 567 cf
Flood Elev= 862.70' Surf.Area= 1,536 sf Storage= 4,684 cf

Plug-Flow detention time= 68.4 min calculated for 0.048 af (99% of inflow)
Center-of-Mass det. time= 65.4 min (932.3 - 866.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**64.00'W x 24.00'L x 4.17'H Field A** 6,400 cf Overall - 6,400 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	4,684 cf	**retain_it retain_it 3.5'** x 24 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 8 Rows adjusted for 135.1 cf perimeter wall
		4,684 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	859.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 859.20' / 858.10' S= 0.0110 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**4.0" Vert. 4" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	862.50'	**12.0" Vert. Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 12.50 hrs HW=859.62' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 0.21 cfs of 0.70 cfs potential flow)
2=4" Orifice (Orifice Controls 0.21 cfs @ 2.44 fps)
3=Overflow (Controls 0.00 cfs)

Summary for Pond DS-2a: detention

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth = 1.64" for 2-year event
Inflow = 10.98 cfs @ 12.09 hrs, Volume= 0.797 af
Outflow = 1.48 cfs @ 12.74 hrs, Volume= 0.794 af, Atten= 87%, Lag= 38.5 min
Primary = 1.48 cfs @ 12.74 hrs, Volume= 0.794 af
Routed to Pond G1 : gabion

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 895.67' @ 12.74 hrs Surf.Area= 4,032 sf Storage= 15,099 cf
Flood Elev= 902.66' Storage= 41,196 cf

Plug-Flow detention time= 156.2 min calculated for 0.794 af (100% of inflow)
Center-of-Mass det. time= 154.0 min (986.2 - 832.2)

Volume	Invert	Avail.Storage	Storage Description
#1	892.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
#2	897.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
		41,196 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	892.00'	**24.0" Round Culvert** L= 46.0' Ke= 0.500 Inlet / Outlet Invert= 892.00' / 890.52' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	892.00'	**5.0" Vert. 5" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	895.40'	**10.0" Vert. 10" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	897.90'	**11.0" Vert. 11" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	899.90'	**10.0" Vert. 10" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	901.45'	**4.0' long Sharp-Crested Weir Overflow (100yr)** 2 End Contraction(s)

Primary OutFlow Max=1.48 cfs @ 12.74 hrs HW=895.66' TW=877.54' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.48 cfs of 24.69 cfs potential flow)
  ├─**2=5" Orifice (2yr)** (Orifice Controls 1.22 cfs @ 8.95 fps)
  ├─**3=10" Orifice (10yr)** (Orifice Controls 0.26 cfs @ 1.75 fps)
  ├─**4=11" Orifice (25yr)** (Controls 0.00 cfs)
  ├─**5=10" Orifice (50yr)** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Weir Overflow (100yr)**(Controls 0.00 cfs)

Summary for Pond DS-2b: detention

Inflow Area = 2.278 ac, 16.89% Impervious, Inflow Depth = 1.21" for 2-year event
Inflow = 2.98 cfs @ 12.10 hrs, Volume= 0.229 af
Outflow = 0.94 cfs @ 12.46 hrs, Volume= 0.226 af, Atten= 68%, Lag= 21.9 min
Primary = 0.94 cfs @ 12.46 hrs, Volume= 0.226 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 859.84' @ 12.46 hrs Surf.Area= 5,632 sf Storage= 3,199 cf
Flood Elev= 862.70' Surf.Area= 5,632 sf Storage= 17,435 cf

Plug-Flow detention time= 101.1 min calculated for 0.226 af (99% of inflow)
Center-of-Mass det. time= 93.8 min (937.1 - 843.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**88.00'W x 64.00'L x 4.17'H Field A** 23,467 cf Overall - 23,467 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	17,435 cf	**retain_it retain_it 3.5'** x 88 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 11 Rows adjusted for 233.3 cf perimeter wall
		17,435 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	858.90'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 858.90' / 858.44' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**8.0" Vert. 8" Orifice** C= 0.600 Limited to weir flow at low heads

#3 Device 1 862.55' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.94 cfs @ 12.46 hrs HW=859.84' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.94 cfs of 2.53 cfs potential flow)
  ├─**2=8" Orifice** (Orifice Controls 0.94 cfs @ 2.73 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DW-1: House Drywell

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**7.67'W x 12.50'L x 3.50'H Field A** 0.008 af Overall - 0.004 af Embedded = 0.004 af x 40.0% Voids
#2A	0.67'	0.003 af	**Shea Dry Well 1000gal** Inside #1 Inside= 62.0"W x 30.0"H => 12.86 sf x 10.00'L = 128.6 cf Outside= 68.0"W x 34.0"H => 15.80 sf x 10.50'L = 165.9 cf
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Summary for Pond G1: gabion

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth > 1.63" for 2-year event
Inflow = 1.48 cfs @ 12.74 hrs, Volume= 0.794 af
Outflow = 1.48 cfs @ 12.74 hrs, Volume= 0.794 af, Atten= 0%, Lag= 0.0 min
Primary = 1.48 cfs @ 12.74 hrs, Volume= 0.794 af
Routed to Reach R-02 : Routing through wetland/swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 877.54' @ 12.74 hrs Surf.Area= 115 sf Storage= 3 cf
Flood Elev= 880.00' Surf.Area= 2 sf Storage= 444 cf

Plug-Flow detention time= 0.0 min calculated for 0.793 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (986.2 - 986.2)

Volume	Invert	Avail.Storage	Storage Description
#1	877.50'	442 cf	**18.0" Round Pipe Storage** L= 250.0'
#2	879.00'	2 cf	**1.50'D x 1.00'H Vertical Cone/Cylinder**
		444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	877.50'	**2.0" Horiz. invert orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	878.25'	**2.0" Vert. spring line orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	880.00'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.48 cfs @ 12.74 hrs HW=877.54' TW=876.13' (Dynamic Tailwater)
├─**1=invert orifices** (Weir Controls 1.48 cfs @ 0.62 fps)
├─**2=spring line orifices** (Controls 0.00 cfs)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Pond G2: gabion

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth > 1.28" for 2-year event
Inflow = 3.24 cfs @ 12.62 hrs, Volume= 1.107 af
Outflow = 3.24 cfs @ 12.63 hrs, Volume= 1.107 af, Atten= 0%, Lag= 0.3 min
Primary = 3.24 cfs @ 12.63 hrs, Volume= 1.107 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 810.45' @ 12.63 hrs Surf.Area= 72 sf Storage= 7 cf
Flood Elev= 811.80' Storage= 141 cf

Plug-Flow detention time= 0.0 min calculated for 1.106 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (961.3 - 961.3)

Volume	Invert	Avail.Storage	Storage Description
#1	810.30'	141 cf	**18.0" Round Pipe Storage** L= 80.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.30'	**2.0" Horiz. invert orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	811.05'	**2.0" Vert. spring line orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	811.80'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.24 cfs @ 12.63 hrs HW=810.45' TW=0.00' (Dynamic Tailwater)
├─**1=invert orifices** (Orifice Controls 3.24 cfs @ 1.86 fps)
├─**2=spring line orifices** (Controls 0.00 cfs)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.491 ac, 20.86% Impervious, Inflow Depth = 1.22" for 2-year event
Inflow = 3.93 cfs @ 12.16 hrs, Volume= 0.659 af
Primary = 3.93 cfs @ 12.16 hrs, Volume= 0.659 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 9.972 ac, 29.60% Impervious, Inflow Depth > 1.46" for 2-year event
Inflow = 2.76 cfs @ 12.53 hrs, Volume= 1.215 af
Primary = 2.76 cfs @ 12.53 hrs, Volume= 1.215 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 11.753 ac, 19.54% Impervious, Inflow Depth > 1.25" for 2-year event
Inflow = 3.72 cfs @ 12.60 hrs, Volume= 1.223 af
Primary = 3.72 cfs @ 12.60 hrs, Volume= 1.223 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 0.754 ac, 8.68% Impervious, Inflow Depth = 1.11" for 2-year event
Inflow = 0.93 cfs @ 12.10 hrs, Volume= 0.070 af
Primary = 0.93 cfs @ 12.10 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.215 ac, 12.25% Impervious, Inflow Depth = 1.17" for 2-year event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 0.021 af
Primary = 0.28 cfs @ 12.10 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1A: Subcat P-1A Runoff Area=3.097 ac 14.03% Impervious Runoff Depth=2.25"
Tc=10.0 min CN=74 Runoff=6.99 cfs 0.579 af

Subcatchment P-1B: Subcat P-1B Runoff Area=25,318 sf 6.21% Impervious Runoff Depth=2.16"
Flow Length=315' Tc=8.2 min CN=73 Runoff=1.33 cfs 0.105 af

Subcatchment P-1C: Subcat P-1C Runoff Area=0.337 ac 34.38% Impervious Runoff Depth=2.58"
Tc=6.0 min CN=78 Runoff=1.00 cfs 0.073 af

Subcatchment P-1D: Subcat P-1D Runoff Area=31,222 sf 15.07% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=76 Runoff=1.98 cfs 0.144 af

Subcatchment P-1E: Subcat P-1E Runoff Area=0.382 ac 45.62% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=83 Runoff=1.33 cfs 0.097 af

Subcatchment P-1F: Subcat P-1F Runoff Area=1.377 ac 35.23% Impervious Runoff Depth=2.95"
Tc=6.0 min CN=82 Runoff=4.65 cfs 0.338 af

Subcatchment P-2A: Subcat P-2A Runoff Area=1.764 ac 18.64% Impervious Runoff Depth=2.50"
Tc=6.0 min CN=77 Runoff=5.06 cfs 0.367 af

Subcatchment P-2B: Subcat P-2B Runoff Area=1.164 ac 1.79% Impervious Runoff Depth=1.93"
Tc=6.0 min CN=70 Runoff=2.53 cfs 0.187 af

Subcatchment P-2C: Subcat P-2C Runoff Area=0.216 ac 77.47% Impervious Runoff Depth=4.05"
Tc=6.0 min CN=93 Runoff=0.94 cfs 0.073 af

Subcatchment P-2D: Subcat P-2D Runoff Area=0.315 ac 55.97% Impervious Runoff Depth=3.43"
Tc=6.0 min CN=87 Runoff=1.22 cfs 0.090 af

Subcatchment P-2E: Subcat P-2E Runoff Area=2.441 ac 36.97% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=83 Runoff=8.48 cfs 0.618 af

Subcatchment P-2F: Subcat P-2F Runoff Area=1.075 ac 38.90% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=83 Runoff=3.73 cfs 0.272 af

Subcatchment P-2G: Subcat P-2G Runoff Area=1.864 ac 32.70% Impervious Runoff Depth=2.95"
Tc=6.0 min CN=82 Runoff=6.29 cfs 0.457 af

Subcatchment P-2H: Subcat P-2H Runoff Area=0.470 ac 53.38% Impervious Runoff Depth=3.43"
Tc=6.0 min CN=87 Runoff=1.82 cfs 0.134 af

Subcatchment P-2I: Subcat P-2I Runoff Area=0.081 ac 70.48% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=91 Runoff=0.34 cfs 0.026 af

Subcatchment P-2J: Subcat P-2J Runoff Area=0.584 ac 3.54% Impervious Runoff Depth=2.25"
Tc=6.0 min CN=74 Runoff=1.50 cfs 0.109 af

Subcatchment P-3A: Subcat P-3A Runoff Area=5.064 ac 1.31% Impervious Runoff Depth=2.00"
Flow Length=644' Tc=16.1 min CN=71 Runoff=8.52 cfs 0.846 af

Subcatchment P-3B: Subcat P-3B Runoff Area=1.393 ac 9.09% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=73 Runoff=3.44 cfs 0.251 af

Subcatchment P-3C: Subcat P-3C Runoff Area=0.542 ac 58.67% Impervious Runoff Depth=3.53"
Tc=6.0 min CN=88 Runoff=2.14 cfs 0.159 af

Subcatchment P-3D: Subcat P-3D Runoff Area=1.446 ac 41.28% Impervious Runoff Depth=3.13"
Tc=6.0 min CN=84 Runoff=5.17 cfs 0.378 af

Subcatchment P-3E: Subcat P-3E Runoff Area=1.691 ac 35.87% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=83 Runoff=5.88 cfs 0.428 af

Subcatchment P-3F: Subcat P-3F
Runoff Area=1.617 ac 36.01% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=83 Runoff=5.62 cfs 0.409 af

Subcatchment P-4: Subcat P-4
Runoff Area=32,853 sf 8.68% Impervious Runoff Depth=2.33"
Tc=6.0 min CN=75 Runoff=2.01 cfs 0.146 af

Subcatchment P-5: Subcat P-5
Runoff Area=9,362 sf 12.25% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=76 Runoff=0.60 cfs 0.043 af

Reach R-01: Routing to wetlands
Avg. Flow Depth=0.24' Max Vel=0.33 fps Inflow=3.44 cfs 0.251 af
n=0.400 L=722.0' S=0.1087 '/' Capacity=43.77 cfs Outflow=1.37 cfs 0.251 af

Reach R-02: Routing through wetland/swale
Avg. Flow Depth=0.77' Max Vel=0.34 fps Inflow=8.18 cfs 1.846 af
n=0.400 L=525.0' S=0.0223 '/' Capacity=26.65 cfs Outflow=6.04 cfs 1.844 af

Pond 1P: depression
Peak Elev=862.44' Storage=167 cf Inflow=6.04 cfs 1.844 af
Primary=6.04 cfs 1.844 af Secondary=0.00 cfs 0.000 af Outflow=6.04 cfs 1.844 af

Pond DB-1: detention
Peak Elev=812.90' Storage=32,669 cf Inflow=24.38 cfs 2.220 af
Primary=9.11 cfs 2.200 af Secondary=0.00 cfs 0.000 af Outflow=9.11 cfs 2.200 af

Pond dmh01: dmh
Peak Elev=850.59' Inflow=1.33 cfs 0.097 af
12.0" Round Culvert n=0.013 L=12.0' S=0.0100 '/' Outflow=1.33 cfs 0.097 af

Pond dmh05: dmh
Peak Elev=870.53' Inflow=4.65 cfs 0.338 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0351 '/' Outflow=4.65 cfs 0.338 af

Pond dmh20: dmh
Peak Elev=903.77' Inflow=3.73 cfs 0.272 af
15.0" Round Culvert n=0.013 L=205.0' S=0.0119 '/' Outflow=3.73 cfs 0.272 af

Pond dmh21: dmh
Peak Elev=901.37' Inflow=12.22 cfs 0.890 af
24.0" Round Culvert n=0.013 L=190.0' S=0.0100 '/' Outflow=12.22 cfs 0.890 af

Pond dmh23: dmh
Peak Elev=900.10' Inflow=18.51 cfs 1.348 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=18.51 cfs 1.348 af

Pond dmh25: dmh
Peak Elev=923.34' Inflow=1.82 cfs 0.134 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0697 '/' Outflow=1.82 cfs 0.134 af

Pond dmh31: dmh
Peak Elev=876.34' Inflow=1.22 cfs 0.090 af
12.0" Round Culvert n=0.013 L=96.0' S=0.0803 '/' Outflow=1.22 cfs 0.090 af

Pond dmh33: dmh
Peak Elev=860.56' Inflow=2.16 cfs 0.163 af
15.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=2.16 cfs 0.163 af

Pond dmh50: dmh
Peak Elev=929.18' Inflow=5.62 cfs 0.409 af
15.0" Round Culvert n=0.013 L=102.0' S=0.0799 '/' Outflow=5.62 cfs 0.409 af

Pond dmh51: dmh
Peak Elev=920.93' Inflow=5.62 cfs 0.409 af
15.0" Round Culvert n=0.013 L=127.0' S=0.0780 '/' Outflow=5.62 cfs 0.409 af

Pond dmh52: dmh
Peak Elev=894.05' Inflow=5.62 cfs 0.409 af
15.0" Round Culvert n=0.013 L=62.0' S=0.0802 '/' Outflow=5.62 cfs 0.409 af

Pond dmh53: dmh
Peak Elev=917.82' Inflow=5.88 cfs 0.428 af
18.0" Round Culvert n=0.013 L=31.0' S=0.0097 '/' Outflow=5.88 cfs 0.428 af

Pond dmh55: dmh
Peak Elev=907.75' Inflow=11.05 cfs 0.806 af
18.0" Round Culvert n=0.013 L=72.0' S=0.0211 '/' Outflow=11.05 cfs 0.806 af

Pond dmh56: dmh
Peak Elev=903.31' Inflow=13.19 cfs 0.965 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0095 '/' Outflow=13.19 cfs 0.965 af

Pond dmh57: dmh
Peak Elev=902.68' Inflow=13.19 cfs 0.965 af
24.0" Round Culvert n=0.013 L=97.0' S=0.0476 '/' Outflow=13.19 cfs 0.965 af

Pond dmh58: dmh Peak Elev=897.96' Inflow=13.19 cfs 0.965 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=13.19 cfs 0.965 af

Pond dmh59: dmh Peak Elev=895.18' Inflow=13.19 cfs 0.965 af
24.0" Round Culvert n=0.013 L=82.0' S=0.0101 '/' Outflow=13.19 cfs 0.965 af

Pond dmh60: dmh Peak Elev=894.16' Inflow=13.19 cfs 0.965 af
24.0" Round Culvert n=0.013 L=258.0' S=0.0115 '/' Outflow=13.19 cfs 0.965 af

Pond dmh61: dmh Peak Elev=891.10' Inflow=13.19 cfs 0.965 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=13.19 cfs 0.965 af

Pond dmh62: dmh Peak Elev=888.99' Inflow=18.81 cfs 1.374 af
24.0" Round Culvert n=0.013 L=62.0' S=0.0248 '/' Outflow=18.81 cfs 1.374 af

Pond dmh69: dmh Peak Elev=815.02' Inflow=18.81 cfs 1.374 af
24.0" Round Culvert n=0.013 L=29.0' S=0.0338 '/' Outflow=18.81 cfs 1.374 af

Pond DS-1a: detention Peak Elev=850.58' Storage=8,835 cf Inflow=7.96 cfs 0.579 af
Outflow=2.79 cfs 0.579 af

Pond DS-1b: detention Peak Elev=860.25' Storage=1,412 cf Inflow=1.33 cfs 0.105 af
Outflow=0.40 cfs 0.104 af

Pond DS-2a: detention Peak Elev=898.00' Storage=24,724 cf Inflow=20.33 cfs 1.482 af
Outflow=5.50 cfs 1.479 af

Pond DS-2b: detention Peak Elev=860.55' Storage=6,703 cf Inflow=6.18 cfs 0.459 af
Outflow=1.69 cfs 0.456 af

Pond DW-1: House Drywell Peak Elev=0.00' Storage=0.000 af

Pond G1: gabion Peak Elev=877.68' Storage=29 cf Inflow=5.50 cfs 1.479 af
Outflow=5.50 cfs 1.479 af

Pond G2: gabion Peak Elev=811.16' Storage=84 cf Inflow=9.11 cfs 2.200 af
Outflow=9.14 cfs 2.200 af

Link SP1: STUDY POINT #1 Inflow=10.01 cfs 1.335 af
Primary=10.01 cfs 1.335 af

Link SP2: STUDY POINT #2 Inflow=7.74 cfs 2.325 af
Primary=7.74 cfs 2.325 af

Link SP3: STUDY POINT #3 Inflow=10.44 cfs 2.451 af
Primary=10.44 cfs 2.451 af

Link SP4: STUDY POINT #4 Inflow=2.01 cfs 0.146 af
Primary=2.01 cfs 0.146 af

Link SP5: STUDY POINT #5 Inflow=0.60 cfs 0.043 af
Primary=0.60 cfs 0.043 af

Total Runoff Area = 29.185 ac Runoff Volume = 6.330 af Average Runoff Depth = 2.60"
77.07% Pervious = 22.491 ac 22.93% Impervious = 6.693 ac

Summary for Subcatchment P-1A: Subcat P-1A

Runoff = 6.99 cfs @ 12.15 hrs, Volume= 0.579 af, Depth= 2.25"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.021	74	>75% Grass cover, Good, HSG C
0.017	61	>75% Grass cover, Good, HSG B
0.188	55	Woods, Good, HSG B
0.290	70	1/2 acre lots, 25% imp, HSG B
1.448	80	1/2 acre lots, 25% imp, HSG C
1.132	70	Woods, Good, HSG C
3.097	74	Weighted Average
2.662		85.97% Pervious Area
0.434		14.03% Impervious Area

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

Summary for Subcatchment P-1B: Subcat P-1B

Runoff = 1.33 cfs @ 12.12 hrs, Volume= 0.105 af, Depth= 2.16"
Routed to Pond DS-1b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
43	98	Paved parking, HSG B
3,925	61	>75% Grass cover, Good, HSG B
760	70	1/2 acre lots, 25% imp, HSG B
5,357	80	1/2 acre lots, 25% imp, HSG C
3,003	70	Woods, Good, HSG C
12,230	74	>75% Grass cover, Good, HSG C
25,318	73	Weighted Average
23,746		93.79% Pervious Area
1,572		6.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment P-1C: Subcat P-1C

Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 2.58"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.077	61	>75% Grass cover, Good, HSG B
0.002	98	Paved parking, HSG C
0.066	98	Paved parking, HSG B
0.035	70	1/2 acre lots, 25% imp, HSG B
0.156	80	1/2 acre lots, 25% imp, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.337	78	Weighted Average
0.221		65.62% Pervious Area
0.116		34.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-1D: Subcat P-1D

Runoff = 1.98 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 2.41"
Routed to Pond DS-1a : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
4,573	61	>75% Grass cover, Good, HSG B
2,625	98	Paved parking, HSG B
1	70	1/2 acre lots, 25% imp, HSG B
3,514	80	1/2 acre lots, 25% imp, HSG C
1,200	98	Paved parking, HSG C
19,309	74	>75% Grass cover, Good, HSG C
31,222	76	Weighted Average
26,518		84.93% Pervious Area
4,704		15.07% Impervious Area

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

Summary for Subcatchment P-1E: Subcat P-1E

Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.097 af, Depth= 3.04"
Routed to Pond dmh01 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.031	98	Paved parking, HSG B
0.046	61	>75% Grass cover, Good, HSG B
0.118	74	>75% Grass cover, Good, HSG C
0.129	98	Paved parking, HSG C
0.059	80	1/2 acre lots, 25% imp, HSG C
0.382	83	Weighted Average
0.208		54.38% Pervious Area
0.174		45.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-1F: Subcat P-1F

Runoff = 4.65 cfs @ 12.09 hrs, Volume= 0.338 af, Depth= 2.95"
Routed to Pond dmh05 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
1.135	80	1/2 acre lots, 25% imp, HSG C
0.201	98	Paved parking, HSG C
0.041	74	>75% Grass cover, Good, HSG C
1.377	82	Weighted Average
0.892		64.77% Pervious Area
0.485		35.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2A: Subcat P-2A

Runoff = 5.06 cfs @ 12.09 hrs, Volume= 0.367 af, Depth= 2.50"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.449	70	Woods, Good, HSG C
1.315	80	1/2 acre lots, 25% imp, HSG C
1.764	77	Weighted Average
1.435		81.36% Pervious Area
0.329		18.64% Impervious Area

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

Summary for Subcatchment P-2B: Subcat P-2B

Runoff = 2.53 cfs @ 12.10 hrs, Volume= 0.187 af, Depth= 1.93"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.512	70	Woods, Good, HSG C
0.254	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.314	65	Brush, Good, HSG C
0.084	80	1/2 acre lots, 25% imp, HSG C
1.164	70	Weighted Average
1.143		98.21% Pervious Area
0.021		1.79% Impervious Area

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

Summary for Subcatchment P-2C: Subcat P-2C

Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 4.05"
Routed to Pond dmh33 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.151	98	Paved parking, HSG C
0.065	80	1/2 acre lots, 25% imp, HSG C
0.216	93	Weighted Average
0.049		22.53% Pervious Area
0.167		77.47% Impervious Area

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

Summary for Subcatchment P-2D: Subcat P-2D

Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 3.43"
Routed to Pond dmh31 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.116	74	>75% Grass cover, Good, HSG C
0.169	98	Paved parking, HSG C
0.030	80	1/2 acre lots, 25% imp, HSG C
0.315	87	Weighted Average
0.138		44.03% Pervious Area
0.176		55.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2E: Subcat P-2E

Runoff = 8.48 cfs @ 12.09 hrs, Volume= 0.618 af, Depth= 3.04"
Routed to Pond dmh21 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
2.051	80	1/2 acre lots, 25% imp, HSG C
0.390	98	Paved parking, HSG C
2.441	83	Weighted Average
1.539		63.03% Pervious Area
0.902		36.97% Impervious Area

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

Summary for Subcatchment P-2F: Subcat P-2F

Runoff = 3.73 cfs @ 12.09 hrs, Volume= 0.272 af, Depth= 3.04"
Routed to Pond dmh20 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.199	98	Paved parking, HSG C
0.875	80	1/2 acre lots, 25% imp, HSG C
1.075	83	Weighted Average
0.657		61.10% Pervious Area
0.418		38.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2G: Subcat P-2G

Runoff = 6.29 cfs @ 12.09 hrs, Volume= 0.457 af, Depth= 2.95"
Routed to Pond dmh23 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.106	74	>75% Grass cover, Good, HSG C
1.531	80	1/2 acre lots, 25% imp, HSG C
0.227	98	Paved parking, HSG C
1.864	82	Weighted Average
1.254		67.30% Pervious Area
0.610		32.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2H: Subcat P-2H

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af, Depth= 3.43"
Routed to Pond dmh25 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.178	98	Paved parking, HSG C
0.292	80	1/2 acre lots, 25% imp, HSG C
0.470	87	Weighted Average
0.219		46.62% Pervious Area
0.251		53.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2I: Subcat P-2I

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 3.84"
Routed to Link SP2 : STUDY POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.000	70	Woods, Good, HSG C
0.049	98	Paved parking, HSG C
0.032	80	1/2 acre lots, 25% imp, HSG C
0.081	91	Weighted Average
0.024		29.52% Pervious Area
0.057		70.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2J: Subcat P-2J

Runoff = 1.50 cfs @ 12.10 hrs, Volume= 0.109 af, Depth= 2.25"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.069	70	Woods, Good, HSG C
0.432	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.083	80	1/2 acre lots, 25% imp, HSG C
0.584	74	Weighted Average
0.563		96.46% Pervious Area
0.021		3.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3A: Subcat P-3A

Runoff = 8.52 cfs @ 12.23 hrs, Volume= 0.846 af, Depth= 2.00"
Routed to Pond DB-1 : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.264	80	1/2 acre lots, 25% imp, HSG C
0.959	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
2.262	74	>75% Grass cover, Good, HSG C
5.064	71	Weighted Average
4.998		98.69% Pervious Area
0.066		1.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.3	299	0.3000	3.83		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.1	644	Total			

Summary for Subcatchment P-3B: Subcat P-3B

Runoff = 3.44 cfs @ 12.10 hrs, Volume= 0.251 af, Depth= 2.16"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.714	70	Woods, Good, HSG C
0.172	65	Brush, Good, HSG C
0.506	80	1/2 acre lots, 25% imp, HSG C
1.393	73	Weighted Average
1.267		90.91% Pervious Area
0.127		9.09% Impervious Area

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

Summary for Subcatchment P-3C: Subcat P-3C

Runoff = 2.14 cfs @ 12.09 hrs, Volume= 0.159 af, Depth= 3.53"
Routed to Pond dmh56 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG C
0.299	80	1/2 acre lots, 25% imp, HSG C
0.542	88	Weighted Average
0.224		41.33% Pervious Area
0.318		58.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3D: Subcat P-3D

Runoff = 5.17 cfs @ 12.09 hrs, Volume= 0.378 af, Depth= 3.13"
Routed to Pond dmh55 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
1.132	80	1/2 acre lots, 25% imp, HSG C
0.314	98	Paved parking, HSG C
1.446	84	Weighted Average
0.849		58.72% Pervious Area
0.597		41.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr-55 min**

Summary for Subcatchment P-3E: Subcat P-3E

Runoff = 5.88 cfs @ 12.09 hrs, Volume= 0.428 af, Depth= 3.04"
Routed to Pond dmh53 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
1.446	80	1/2 acre lots, 25% imp, HSG C
0.245	98	Paved parking, HSG C
1.691	83	Weighted Average
1.085		64.13% Pervious Area
0.607		35.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-3F: Subcat P-3F

Runoff = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af, Depth= 3.04"
Routed to Pond dmh50 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (ac)	CN	Description
1.379	80	1/2 acre lots, 25% imp, HSG C
0.237	98	Paved parking, HSG C
1.617	83	Weighted Average
1.035		63.99% Pervious Area
0.582		36.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat P-4

Runoff = 2.01 cfs @ 12.09 hrs, Volume= 0.146 af, Depth= 2.33"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
56	61	>75% Grass cover, Good, HSG B
11,411	80	1/2 acre lots, 25% imp, HSG C
6,253	70	Woods, Good, HSG C
15,134	74	>75% Grass cover, Good, HSG C
32,853	75	Weighted Average
30,001		91.32% Pervious Area
2,853		8.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-5: Subcat P-5

Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af, Depth= 2.41"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.85"

Area (sf)	CN	Description
2,452	70	Woods, Good, HSG C
2,321	74	>75% Grass cover, Good, HSG C
4,589	80	1/2 acre lots, 25% imp, HSG C
9,362	76	Weighted Average
8,215		87.75% Pervious Area
1,147		12.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TR-55 Min.**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

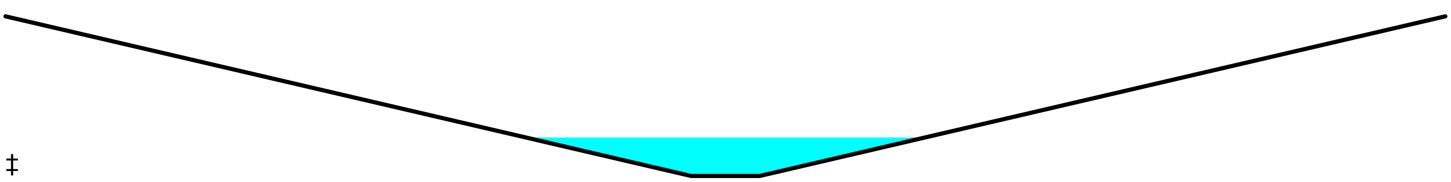
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 1.393 ac, 9.09% Impervious, Inflow Depth = 2.16" for 10-year event
Inflow = 3.44 cfs @ 12.10 hrs, Volume= 0.251 af
Outflow = 1.37 cfs @ 12.37 hrs, Volume= 0.251 af, Atten= 60%, Lag= 16.5 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.33 fps, Min. Travel Time= 36.2 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 96.1 min

Peak Storage= 2,969 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 29.11'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

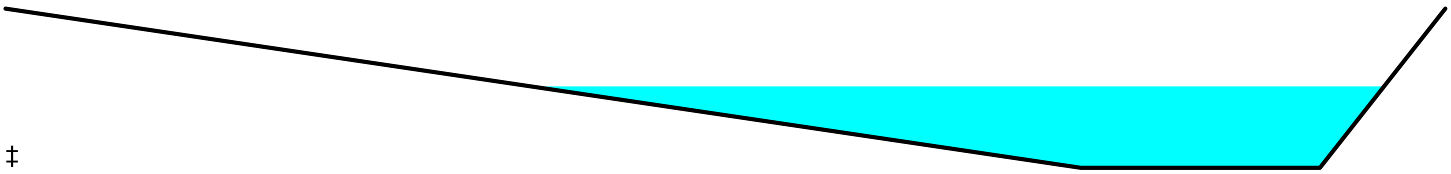
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 2.91" for 10-year event
Inflow = 8.18 cfs @ 12.14 hrs, Volume= 1.846 af
Outflow = 6.04 cfs @ 12.63 hrs, Volume= 1.844 af, Atten= 26%, Lag= 29.2 min
Routed to Pond 1P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.34 fps, Min. Travel Time= 25.4 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 61.5 min

Peak Storage= 9,204 cf @ 12.63 hrs
Average Depth at Peak Storage= 0.77' , Surface Width= 35.70'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 26.65 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 525.0' Slope= 0.0223 '/'
Inlet Invert= 875.70', Outlet Invert= 864.00'



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Summary for Pond 1P: depression

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 2.91" for 10-year event
Inflow = 6.04 cfs @ 12.63 hrs, Volume= 1.844 af
Outflow = 6.04 cfs @ 12.64 hrs, Volume= 1.844 af, Atten= 0%, Lag= 0.4 min
Primary = 6.04 cfs @ 12.64 hrs, Volume= 1.844 af
Routed to Link SP2 : STUDY POINT #2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 862.44' @ 12.64 hrs Surf.Area= 426 sf Storage= 167 cf
Flood Elev= 864.00' Surf.Area= 837 sf Storage= 1,133 cf

Plug-Flow detention time= 0.7 min calculated for 1.841 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (953.3 - 952.6)

Volume	Invert	Avail.Storage	Storage Description
#1	862.00'	1,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
862.00	334	74.0	0	0	334
864.00	837	119.0	1,133	1,133	1,052

Device	Routing	Invert	Outlet Devices
#1	Primary	859.00'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.00' / 858.73' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	862.00'	**24.0" Horiz. beehive** C= 0.600 Limited to weir flow at low heads
#3	Secondary	863.30'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.04 cfs @ 12.64 hrs HW=862.44' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 6.04 cfs of 23.64 cfs potential flow)
↑—**2=beehive** (Weir Controls 6.04 cfs @ 2.17 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=862.00' TW=0.00' (Dynamic Tailwater)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DB-1: detention

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 24.38 cfs @ 12.11 hrs, Volume= 2.220 af
Outflow = 9.11 cfs @ 12.51 hrs, Volume= 2.200 af, Atten= 63%, Lag= 24.3 min
Primary = 9.11 cfs @ 12.51 hrs, Volume= 2.200 af
Routed to Pond G2 : gabion
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 812.90' @ 12.51 hrs Surf.Area= 18,925 sf Storage= 32,669 cf
Flood Elev= 816.00' Surf.Area= 24,900 sf Storage= 100,504 cf

Plug-Flow detention time= 95.4 min calculated for 2.197 af (99% of inflow)
Center-of-Mass det. time= 90.9 min (919.7 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1	811.00'	100,504 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
811.00	15,556	576.0	0	0	15,556
812.00	17,303	594.0	16,422	16,422	17,331
813.00	19,115	613.0	18,201	34,623	19,253
814.00	20,984	632.0	20,042	54,665	21,236
815.00	22,910	651.0	21,940	76,605	23,279
816.00	24,900	670.0	23,898	100,504	25,383

Device	Routing	Invert	Outlet Devices
#1	Primary	811.00'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 811.00' / 810.30' S= 0.0219 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	811.00'	**8.0" Vert. (2) 8" Orifice (2yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	811.90'	**12.0" Vert. (2) 12" Orifice (10yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	813.20'	**24.0" x 24.0" Horiz. 24" Top of Structure** C= 0.600 Limited to weir flow at low heads
#5	Secondary	814.40'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=9.11 cfs @ 12.51 hrs HW=812.90' TW=811.16' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 9.11 cfs @ 5.15 fps)
├─**2=(2) 8" Orifice (2yr)** (Passes < 4.20 cfs potential flow)
├─**3=(2) 12" Orifice (10yr)** (Passes < 5.34 cfs potential flow)
└─**4=24" Top of Structure** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=811.00' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond dmh01: dmh

Inflow Area = 0.382 ac, 45.62% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.097 af
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min
Primary = 1.33 cfs @ 12.09 hrs, Volume= 0.097 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 850.59' @ 12.43 hrs
Flood Elev= 855.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	849.34'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 849.34' / 849.22' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 12.09 hrs HW=850.03' TW=849.84' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.05 cfs @ 2.56 fps)

Summary for Pond dmh05: dmh

Inflow Area = 1.377 ac, 35.23% Impervious, Inflow Depth = 2.95" for 10-year event
Inflow = 4.65 cfs @ 12.09 hrs, Volume= 0.338 af
Outflow = 4.65 cfs @ 12.09 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min
Primary = 4.65 cfs @ 12.09 hrs, Volume= 0.338 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 870.53' @ 12.09 hrs
Flood Elev= 883.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.52'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 868.52' / 865.12' S= 0.0351 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.56 cfs @ 12.09 hrs HW=870.47' TW=849.84' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.56 cfs @ 5.80 fps)

Summary for Pond dmh20: dmh

Inflow Area = 1.075 ac, 38.90% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 3.73 cfs @ 12.09 hrs, Volume= 0.272 af
Outflow = 3.73 cfs @ 12.09 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min
Primary = 3.73 cfs @ 12.09 hrs, Volume= 0.272 af
Routed to Pond dmh21 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 903.77' @ 12.09 hrs
Flood Elev= 907.61'

Device	Routing	Invert	Outlet Devices
#1	Primary	902.74'	**15.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 902.74' / 900.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.66 cfs @ 12.09 hrs HW=903.75' TW=901.32' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.66 cfs @ 3.43 fps)

Summary for Pond dmh21: dmh

Inflow Area = 3.515 ac, 37.56% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 12.22 cfs @ 12.09 hrs, Volume= 0.890 af
Outflow = 12.22 cfs @ 12.09 hrs, Volume= 0.890 af, Atten= 0%, Lag= 0.0 min
Primary = 12.22 cfs @ 12.09 hrs, Volume= 0.890 af
Routed to Pond dmh23 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 901.37' @ 12.11 hrs
Flood Elev= 905.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	899.55'	**24.0" Round Culvert** L= 190.0' Ke= 0.500 Inlet / Outlet Invert= 899.55' / 897.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.79 cfs @ 12.09 hrs HW=901.32' TW=900.05' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 10.79 cfs @ 4.88 fps)

Summary for Pond dmh23: dmh

Inflow Area = 5.379 ac, 35.88% Impervious, Inflow Depth = 3.01" for 10-year event
Inflow = 18.51 cfs @ 12.09 hrs, Volume= 1.348 af
Outflow = 18.51 cfs @ 12.09 hrs, Volume= 1.348 af, Atten= 0%, Lag= 0.0 min
Primary = 18.51 cfs @ 12.09 hrs, Volume= 1.348 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 900.10' @ 12.09 hrs
Flood Elev= 910.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	897.55'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 897.55' / 897.20' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.19 cfs @ 12.09 hrs HW=900.05' TW=896.07' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 18.19 cfs @ 5.95 fps)

Summary for Pond dmh25: dmh

Inflow Area = 0.470 ac, 53.38% Impervious, Inflow Depth = 3.43" for 10-year event
Inflow = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af
Outflow = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 923.34' @ 12.09 hrs
Flood Elev= 930.54'

Device	Routing	Invert	Outlet Devices
#1	Primary	922.60'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 922.60' / 915.84' S= 0.0697 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.77 cfs @ 12.09 hrs HW=923.33' TW=896.04' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.77 cfs @ 2.90 fps)

Summary for Pond dmh31: dmh

Inflow Area = 0.315 ac, 55.97% Impervious, Inflow Depth = 3.43" for 10-year event
Inflow = 1.22 cfs @ 12.09 hrs, Volume= 0.090 af
Outflow = 1.22 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.09 hrs, Volume= 0.090 af
Routed to Pond dmh33 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 876.34' @ 12.09 hrs
Flood Elev= 885.77'

Device	Routing	Invert	Outlet Devices
#1	Primary	875.76'	**12.0" Round Culvert** L= 96.0' Ke= 0.500 Inlet / Outlet Invert= 875.76' / 868.05' S= 0.0803 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.19 cfs @ 12.09 hrs HW=876.33' TW=860.46' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.19 cfs @ 2.57 fps)

Summary for Pond dmh33: dmh

Inflow Area = 0.530 ac, 64.72% Impervious, Inflow Depth = 3.68" for 10-year event
Inflow = 2.16 cfs @ 12.09 hrs, Volume= 0.163 af
Outflow = 2.16 cfs @ 12.09 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.0 min
Primary = 2.16 cfs @ 12.09 hrs, Volume= 0.163 af
Routed to Pond DS-2b : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 860.56' @ 12.49 hrs
Flood Elev= 864.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	859.71'	**15.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.71' / 859.36' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.83 cfs @ 12.09 hrs HW=860.45' TW=860.05' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.83 cfs @ 3.45 fps)

Summary for Pond dmh50: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af
Outflow = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min
Primary = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af
Routed to Pond dmh51 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 929.18' @ 12.09 hrs
Flood Elev= 933.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	927.65'	**15.0" Round Culvert** L= 102.0' Ke= 0.500 Inlet / Outlet Invert= 927.65' / 919.50' S= 0.0799 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.51 cfs @ 12.09 hrs HW=929.14' TW=920.89' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.51 cfs @ 4.49 fps)

Summary for Pond dmh51: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af
Outflow = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min
Primary = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af
Routed to Pond dmh52 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 920.93' @ 12.09 hrs
Flood Elev= 924.04'

Device	Routing	Invert	Outlet Devices
#1	Primary	919.40'	**15.0" Round Culvert** L= 127.0' Ke= 0.500 Inlet / Outlet Invert= 919.40' / 909.50' S= 0.0780 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.51 cfs @ 12.09 hrs HW=920.89' TW=894.01' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.51 cfs @ 4.49 fps)

Summary for Pond dmh52: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af
Outflow = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min
Primary = 5.62 cfs @ 12.09 hrs, Volume= 0.409 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 894.05' @ 12.09 hrs
Flood Elev= 914.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.52'	**15.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 892.52' / 887.55' S= 0.0802 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.51 cfs @ 12.09 hrs HW=894.01' TW=888.93' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.51 cfs @ 4.49 fps)

Summary for Pond dmh53: dmh

Inflow Area = 1.691 ac, 35.87% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 5.88 cfs @ 12.09 hrs, Volume= 0.428 af
Outflow = 5.88 cfs @ 12.09 hrs, Volume= 0.428 af, Atten= 0%, Lag= 0.0 min
Primary = 5.88 cfs @ 12.09 hrs, Volume= 0.428 af
Routed to Pond dmh55 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 917.82' @ 12.09 hrs
Flood Elev= 921.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	916.46'	**18.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 916.46' / 916.16' S= 0.0097 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.76 cfs @ 12.09 hrs HW=917.80' TW=907.69' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 5.76 cfs @ 4.57 fps)

Summary for Pond dmh55: dmh

Inflow Area = 3.137 ac, 38.36% Impervious, Inflow Depth = 3.08" for 10-year event
Inflow = 11.05 cfs @ 12.09 hrs, Volume= 0.806 af
Outflow = 11.05 cfs @ 12.09 hrs, Volume= 0.806 af, Atten= 0%, Lag= 0.0 min
Primary = 11.05 cfs @ 12.09 hrs, Volume= 0.806 af
Routed to Pond dmh56 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 907.75' @ 12.09 hrs
Flood Elev= 911.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	905.32'	**18.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 905.32' / 903.80' S= 0.0211 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.82 cfs @ 12.09 hrs HW=907.69' TW=903.27' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.82 cfs @ 6.12 fps)

Summary for Pond dmh56: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Outflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Routed to Pond dmh57 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 903.31' @ 12.10 hrs
Flood Elev= 908.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	901.21'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 901.21' / 901.02' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=11.91 cfs @ 12.09 hrs HW=903.27' TW=902.65' (Dynamic Tailwater)
1=Culvert (Inlet Controls 11.91 cfs @ 3.79 fps)

Summary for Pond dmh57: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Outflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Routed to Pond dmh58 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 902.68' @ 12.09 hrs
Flood Elev= 908.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	900.92'	**24.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 900.92' / 896.30' S= 0.0476 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.91 cfs @ 12.09 hrs HW=902.65' TW=897.93' (Dynamic Tailwater)
1=Culvert (Inlet Controls 12.91 cfs @ 4.48 fps)

Summary for Pond dmh58: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Outflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Routed to Pond dmh59 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 897.96' @ 12.09 hrs
Flood Elev= 901.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	896.20'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 896.20' / 893.43' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.91 cfs @ 12.09 hrs HW=897.93' TW=895.14' (Dynamic Tailwater)
1=Culvert (Inlet Controls 12.91 cfs @ 4.48 fps)

Summary for Pond dmh59: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Outflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Routed to Pond dmh60 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 895.18' @ 12.10 hrs
Flood Elev= 909.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	893.33'	**24.0" Round Culvert** L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 893.33' / 892.50' S= 0.0101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.08 cfs @ 12.09 hrs HW=895.14' TW=894.13' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 12.08 cfs @ 5.30 fps)

Summary for Pond dmh60: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Outflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Routed to Pond dmh61 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 894.16' @ 12.09 hrs
Flood Elev= 901.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.40'	**24.0" Round Culvert** L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 892.40' / 889.43' S= 0.0115 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.91 cfs @ 12.09 hrs HW=894.13' TW=891.07' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 12.91 cfs @ 4.48 fps)

Summary for Pond dmh61: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 3.15" for 10-year event
Inflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Outflow = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.09 hrs, Volume= 0.965 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 891.10' @ 12.10 hrs
Flood Elev= 898.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	889.33'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 889.33' / 886.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.22 cfs @ 12.09 hrs HW=891.07' TW=888.93' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 12.22 cfs @ 5.62 fps)

Summary for Pond dmh62: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 3.11" for 10-year event
Inflow = 18.81 cfs @ 12.09 hrs, Volume= 1.374 af
Outflow = 18.81 cfs @ 12.09 hrs, Volume= 1.374 af, Atten= 0%, Lag= 0.0 min
Primary = 18.81 cfs @ 12.09 hrs, Volume= 1.374 af
Routed to Pond dmh69 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 888.99' @ 12.09 hrs
Flood Elev= 902.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.45'	**24.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 886.45' / 884.91' S= 0.0248 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.42 cfs @ 12.09 hrs HW=888.93' TW=814.96' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 18.42 cfs @ 5.86 fps)

Summary for Pond dmh69: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 3.11" for 10-year event
Inflow = 18.81 cfs @ 12.09 hrs, Volume= 1.374 af
Outflow = 18.81 cfs @ 12.09 hrs, Volume= 1.374 af, Atten= 0%, Lag= 0.0 min
Primary = 18.81 cfs @ 12.09 hrs, Volume= 1.374 af
Routed to Pond DB-1 : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 815.02' @ 12.09 hrs
Flood Elev= 818.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	812.48'	**24.0" Round Culvert** L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 812.48' / 811.50' S= 0.0338 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.42 cfs @ 12.09 hrs HW=814.96' TW=812.18' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 18.42 cfs @ 5.86 fps)

Summary for Pond DS-1a: detention

Inflow Area = 2.476 ac, 30.99% Impervious, Inflow Depth = 2.81" for 10-year event
Inflow = 7.96 cfs @ 12.09 hrs, Volume= 0.579 af
Outflow = 2.79 cfs @ 12.39 hrs, Volume= 0.579 af, Atten= 65%, Lag= 18.0 min
Primary = 2.79 cfs @ 12.39 hrs, Volume= 0.579 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 850.58' @ 12.39 hrs Surf.Area= 3,840 sf Storage= 8,835 cf
Flood Elev= 853.00' Surf.Area= 3,840 sf Storage= 17,124 cf

Plug-Flow detention time= 124.2 min calculated for 0.578 af (100% of inflow)
Center-of-Mass det. time= 124.5 min (945.7 - 821.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	848.00'	0 cf	**96.00'W x 40.00'L x 5.67'H Field A** 21,760 cf Overall - 21,760 cf Embedded = 0 cf x 40.0% Voids
#2A	848.00'	17,124 cf	**retain_it retain_it 5.0'** x 60 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 12 Rows adjusted for 353.3 cf perimeter wall
		17,124 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	847.90'	**15.0" Round Culvert** L= 129.0' Ke= 0.500 Inlet / Outlet Invert= 847.90' / 846.36' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	847.90'	**3.0" Vert. 3" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	849.00'	**8.0" Vert. 8" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	850.15'	**8.0" Vert. 8" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	851.15'	**7.0" Vert. 7" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	852.80'	**4.0' long Overflow Weir** 2 End Contraction(s) 4.0' Crest Height

Primary OutFlow Max=2.78 cfs @ 12.39 hrs HW=850.58' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.78 cfs of 7.99 cfs potential flow)
  ├─**2=3" Orifice (2yr)** (Orifice Controls 0.38 cfs @ 7.69 fps)
  ├─**3=8" Orifice (10yr)** (Orifice Controls 1.88 cfs @ 5.37 fps)
  ├─**4=8" Orifice (25yr)** (Orifice Controls 0.53 cfs @ 2.23 fps)
  ├─**5=7" Orifice (50yr)** (Controls 0.00 cfs)
  └─**6=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond DS-1b: detention

Inflow Area = 0.581 ac, 6.21% Impervious, Inflow Depth = 2.16" for 10-year event
Inflow = 1.33 cfs @ 12.12 hrs, Volume= 0.105 af
Outflow = 0.40 cfs @ 12.52 hrs, Volume= 0.104 af, Atten= 70%, Lag= 23.8 min
Primary = 0.40 cfs @ 12.52 hrs, Volume= 0.104 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 860.25' @ 12.52 hrs Surf.Area= 1,536 sf Storage= 1,412 cf
Flood Elev= 862.70' Surf.Area= 1,536 sf Storage= 4,684 cf

Plug-Flow detention time= 59.5 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 58.4 min (901.9 - 843.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**64.00'W x 24.00'L x 4.17'H Field A** 6,400 cf Overall - 6,400 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	4,684 cf	**retain_it retain_it 3.5'** x 24 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 8 Rows adjusted for 135.1 cf perimeter wall
		4,684 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	859.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 859.20' / 858.10' S= 0.0110 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**4.0" Vert. 4" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	862.50'	**12.0" Vert. Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.40 cfs @ 12.52 hrs HW=860.25' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.40 cfs of 2.81 cfs potential flow)
  ├─**2=4" Orifice** (Orifice Controls 0.40 cfs @ 4.54 fps)
  └─**3=Overflow** (Controls 0.00 cfs)

Summary for Pond DS-2a: detention

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth = 3.04" for 10-year event
Inflow = 20.33 cfs @ 12.09 hrs, Volume= 1.482 af
Outflow = 5.50 cfs @ 12.46 hrs, Volume= 1.479 af, Atten= 73%, Lag= 22.3 min
Primary = 5.50 cfs @ 12.46 hrs, Volume= 1.479 af
Routed to Pond G1 : gabion

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 898.00' @ 12.46 hrs Surf.Area= 4,032 sf Storage= 24,724 cf
Flood Elev= 902.66' Storage= 41,196 cf

Plug-Flow detention time= 125.2 min calculated for 1.479 af (100% of inflow)
Center-of-Mass det. time= 123.9 min (938.4 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	892.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
#2	897.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
		41,196 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	892.00'	**24.0" Round Culvert** L= 46.0' Ke= 0.500 Inlet / Outlet Invert= 892.00' / 890.52' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	892.00'	**5.0" Vert. 5" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	895.40'	**10.0" Vert. 10" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	897.90'	**11.0" Vert. 11" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	899.90'	**10.0" Vert. 10" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	901.45'	**4.0' long Sharp-Crested Weir Overflow (100yr)** 2 End Contraction(s)

Primary OutFlow Max=5.50 cfs @ 12.46 hrs HW=898.00' TW=877.68' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.50 cfs of 33.81 cfs potential flow)
  ├─**2=5" Orifice (2yr)** (Orifice Controls 1.58 cfs @ 11.58 fps)
  ├─**3=10" Orifice (10yr)** (Orifice Controls 3.88 cfs @ 7.11 fps)
  ├─**4=11" Orifice (25yr)** (Orifice Controls 0.04 cfs @ 1.06 fps)
  ├─**5=10" Orifice (50yr)** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Weir Overflow (100yr)**(Controls 0.00 cfs)

Summary for Pond DS-2b: detention

Inflow Area = 2.278 ac, 16.89% Impervious, Inflow Depth = 2.42" for 10-year event
Inflow = 6.18 cfs @ 12.09 hrs, Volume= 0.459 af
Outflow = 1.69 cfs @ 12.48 hrs, Volume= 0.456 af, Atten= 73%, Lag= 23.0 min
Primary = 1.69 cfs @ 12.48 hrs, Volume= 0.456 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 860.55' @ 12.48 hrs Surf.Area= 5,632 sf Storage= 6,703 cf
Flood Elev= 862.70' Surf.Area= 5,632 sf Storage= 17,435 cf

Plug-Flow detention time= 82.2 min calculated for 0.456 af (99% of inflow)
Center-of-Mass det. time= 78.3 min (904.8 - 826.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**88.00'W x 64.00'L x 4.17'H Field A** 23,467 cf Overall - 23,467 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	17,435 cf	**retain_it retain_it 3.5'** x 88 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 11 Rows adjusted for 233.3 cf perimeter wall
		17,435 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	858.90'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 858.90' / 858.44' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**8.0" Vert. 8" Orifice** C= 0.600 Limited to weir flow at low heads

#3	Device 1	862.55'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.69 cfs @ 12.48 hrs HW=860.54' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.69 cfs of 4.05 cfs potential flow)
  ├─**2=8" Orifice** (Orifice Controls 1.69 cfs @ 4.84 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DW-1: House Drywell

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**7.67'W x 12.50'L x 3.50'H Field A** 0.008 af Overall - 0.004 af Embedded = 0.004 af x 40.0% Voids
#2A	0.67'	0.003 af	**Shea Dry Well 1000gal** Inside #1 Inside= 62.0"W x 30.0"H => 12.86 sf x 10.00'L = 128.6 cf Outside= 68.0"W x 34.0"H => 15.80 sf x 10.50'L = 165.9 cf
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Summary for Pond G1: gabion

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth > 3.03" for 10-year event
Inflow = 5.50 cfs @ 12.46 hrs, Volume= 1.479 af
Outflow = 5.50 cfs @ 12.47 hrs, Volume= 1.479 af, Atten= 0%, Lag= 0.3 min
Primary = 5.50 cfs @ 12.47 hrs, Volume= 1.479 af
Routed to Reach R-02 : Routing through wetland/swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 877.68' @ 12.47 hrs Surf.Area= 241 sf Storage= 29 cf
Flood Elev= 880.00' Surf.Area= 2 sf Storage= 444 cf

Plug-Flow detention time= 0.0 min calculated for 1.479 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (938.4 - 938.4)

Volume	Invert	Avail.Storage	Storage Description
#1	877.50'	442 cf	**18.0" Round Pipe Storage** L= 250.0'
#2	879.00'	2 cf	**1.50'D x 1.00'H Vertical Cone/Cylinder**
		444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	877.50'	**2.0" Horiz. invert orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	878.25'	**2.0" Vert. spring line orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	880.00'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.50 cfs @ 12.47 hrs HW=877.68' TW=876.45' (Dynamic Tailwater)
├─**1=invert orifices** (Orifice Controls 5.50 cfs @ 2.02 fps)
├─**2=spring line orifices** (Controls 0.00 cfs)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Pond G2: gabion

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth > 2.55" for 10-year event
Inflow = 9.11 cfs @ 12.51 hrs, Volume= 2.200 af
Outflow = 9.14 cfs @ 12.51 hrs, Volume= 2.200 af, Atten= 0%, Lag= 0.0 min
Primary = 9.14 cfs @ 12.51 hrs, Volume= 2.200 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 811.16' @ 12.51 hrs Surf.Area= 119 sf Storage= 84 cf
Flood Elev= 811.80' Storage= 141 cf

Plug-Flow detention time= 0.1 min calculated for 2.197 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (919.8 - 919.7)

Volume	Invert	Avail.Storage	Storage Description
#1	810.30'	141 cf	**18.0" Round Pipe Storage** L= 80.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.30'	**2.0" Horiz. invert orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	811.05'	**2.0" Vert. spring line orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	811.80'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.13 cfs @ 12.51 hrs HW=811.16' TW=0.00' (Dynamic Tailwater)
—**1=invert orifices** (Orifice Controls 7.79 cfs @ 4.46 fps)
—**2=spring line orifices** (Orifice Controls 1.34 cfs @ 1.12 fps)
—**3=overflow grates** (Controls 0.00 cfs)

Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.491 ac, 20.86% Impervious, Inflow Depth = 2.47" for 10-year event
Inflow = 10.01 cfs @ 12.15 hrs, Volume= 1.335 af
Primary = 10.01 cfs @ 12.15 hrs, Volume= 1.335 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 9.972 ac, 29.60% Impervious, Inflow Depth > 2.80" for 10-year event
Inflow = 7.74 cfs @ 12.60 hrs, Volume= 2.325 af
Primary = 7.74 cfs @ 12.60 hrs, Volume= 2.325 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 11.753 ac, 19.54% Impervious, Inflow Depth > 2.50" for 10-year event
Inflow = 10.44 cfs @ 12.49 hrs, Volume= 2.451 af
Primary = 10.44 cfs @ 12.49 hrs, Volume= 2.451 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 0.754 ac, 8.68% Impervious, Inflow Depth = 2.33" for 10-year event
Inflow = 2.01 cfs @ 12.09 hrs, Volume= 0.146 af
Primary = 2.01 cfs @ 12.09 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.215 ac, 12.25% Impervious, Inflow Depth = 2.41" for 10-year event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af
Primary = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1A: Subcat P-1A Runoff Area=3.097 ac 14.03% Impervious Runoff Depth=3.29"
Tc=10.0 min CN=74 Runoff=10.30 cfs 0.848 af

Subcatchment P-1B: Subcat P-1B Runoff Area=25,318 sf 6.21% Impervious Runoff Depth=3.19"
Flow Length=315' Tc=8.2 min CN=73 Runoff=1.99 cfs 0.154 af

Subcatchment P-1C: Subcat P-1C Runoff Area=0.337 ac 34.38% Impervious Runoff Depth=3.69"
Tc=6.0 min CN=78 Runoff=1.42 cfs 0.103 af

Subcatchment P-1D: Subcat P-1D Runoff Area=31,222 sf 15.07% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=76 Runoff=2.87 cfs 0.208 af

Subcatchment P-1E: Subcat P-1E Runoff Area=0.382 ac 45.62% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=83 Runoff=1.82 cfs 0.134 af

Subcatchment P-1F: Subcat P-1F Runoff Area=1.377 ac 35.23% Impervious Runoff Depth=4.10"
Tc=6.0 min CN=82 Runoff=6.41 cfs 0.470 af

Subcatchment P-2A: Subcat P-2A Runoff Area=1.764 ac 18.64% Impervious Runoff Depth=3.58"
Tc=6.0 min CN=77 Runoff=7.26 cfs 0.527 af

Subcatchment P-2B: Subcat P-2B Runoff Area=1.164 ac 1.79% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=70 Runoff=3.87 cfs 0.281 af

Subcatchment P-2C: Subcat P-2C Runoff Area=0.216 ac 77.47% Impervious Runoff Depth=5.30"
Tc=6.0 min CN=93 Runoff=1.21 cfs 0.095 af

Subcatchment P-2D: Subcat P-2D Runoff Area=0.315 ac 55.97% Impervious Runoff Depth=4.63"
Tc=6.0 min CN=87 Runoff=1.62 cfs 0.121 af

Subcatchment P-2E: Subcat P-2E Runoff Area=2.441 ac 36.97% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=83 Runoff=11.62 cfs 0.855 af

Subcatchment P-2F: Subcat P-2F Runoff Area=1.075 ac 38.90% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=83 Runoff=5.12 cfs 0.376 af

Subcatchment P-2G: Subcat P-2G Runoff Area=1.864 ac 32.70% Impervious Runoff Depth=4.10"
Tc=6.0 min CN=82 Runoff=8.68 cfs 0.636 af

Subcatchment P-2H: Subcat P-2H Runoff Area=0.470 ac 53.38% Impervious Runoff Depth=4.63"
Tc=6.0 min CN=87 Runoff=2.42 cfs 0.181 af

Subcatchment P-2I: Subcat P-2I Runoff Area=0.081 ac 70.48% Impervious Runoff Depth=5.07"
Tc=6.0 min CN=91 Runoff=0.44 cfs 0.034 af

Subcatchment P-2J: Subcat P-2J Runoff Area=0.584 ac 3.54% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=74 Runoff=2.21 cfs 0.160 af

Subcatchment P-3A: Subcat P-3A Runoff Area=5.064 ac 1.31% Impervious Runoff Depth=3.00"
Flow Length=644' Tc=16.1 min CN=71 Runoff=12.93 cfs 1.264 af

Subcatchment P-3B: Subcat P-3B Runoff Area=1.393 ac 9.09% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=73 Runoff=5.10 cfs 0.370 af

Subcatchment P-3C: Subcat P-3C Runoff Area=0.542 ac 58.67% Impervious Runoff Depth=4.74"
Tc=6.0 min CN=88 Runoff=2.84 cfs 0.214 af

Subcatchment P-3D: Subcat P-3D Runoff Area=1.446 ac 41.28% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=84 Runoff=7.03 cfs 0.519 af

Subcatchment P-3E: Subcat P-3E Runoff Area=1.691 ac 35.87% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=83 Runoff=8.05 cfs 0.592 af

Subcatchment P-3F: Subcat P-3F
Runoff Area=1.617 ac 36.01% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=83 Runoff=7.70 cfs 0.566 af

Subcatchment P-4: Subcat P-4
Runoff Area=32,853 sf 8.68% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=75 Runoff=2.93 cfs 0.213 af

Subcatchment P-5: Subcat P-5
Runoff Area=9,362 sf 12.25% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=76 Runoff=0.86 cfs 0.062 af

Reach R-01: Routing to wetlands
Avg. Flow Depth=0.30' Max Vel=0.37 fps Inflow=5.10 cfs 0.370 af
n=0.400 L=722.0' S=0.1087 '/' Capacity=43.77 cfs Outflow=2.19 cfs 0.370 af

Reach R-02: Routing through wetland/swale
Avg. Flow Depth=1.01' Max Vel=0.40 fps Inflow=13.76 cfs 2.573 af
n=0.400 L=525.0' S=0.0223 '/' Capacity=26.65 cfs Outflow=10.89 cfs 2.570 af

Pond 1P: depression
Peak Elev=862.65' Storage=263 cf Inflow=10.89 cfs 2.570 af
Primary=10.89 cfs 2.570 af Secondary=0.00 cfs 0.000 af Outflow=10.89 cfs 2.570 af

Pond DB-1: detention
Peak Elev=813.63' Storage=46,976 cf Inflow=34.37 cfs 3.156 af
Primary=11.66 cfs 3.136 af Secondary=0.00 cfs 0.000 af Outflow=11.66 cfs 3.136 af

Pond dmh01: dmh
Peak Elev=851.39' Inflow=1.82 cfs 0.134 af
12.0" Round Culvert n=0.013 L=12.0' S=0.0100 '/' Outflow=1.82 cfs 0.134 af

Pond dmh05: dmh
Peak Elev=871.89' Inflow=6.41 cfs 0.470 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0351 '/' Outflow=6.41 cfs 0.470 af

Pond dmh20: dmh
Peak Elev=904.11' Inflow=5.12 cfs 0.376 af
15.0" Round Culvert n=0.013 L=205.0' S=0.0119 '/' Outflow=5.12 cfs 0.376 af

Pond dmh21: dmh
Peak Elev=902.65' Inflow=16.74 cfs 1.231 af
24.0" Round Culvert n=0.013 L=190.0' S=0.0100 '/' Outflow=16.74 cfs 1.231 af

Pond dmh23: dmh
Peak Elev=901.36' Inflow=25.42 cfs 1.868 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=25.42 cfs 1.868 af

Pond dmh25: dmh
Peak Elev=923.50' Inflow=2.42 cfs 0.181 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0697 '/' Outflow=2.42 cfs 0.181 af

Pond dmh31: dmh
Peak Elev=876.45' Inflow=1.62 cfs 0.121 af
12.0" Round Culvert n=0.013 L=96.0' S=0.0803 '/' Outflow=1.62 cfs 0.121 af

Pond dmh33: dmh
Peak Elev=861.21' Inflow=2.83 cfs 0.217 af
15.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=2.83 cfs 0.217 af

Pond dmh50: dmh
Peak Elev=929.97' Inflow=7.70 cfs 0.566 af
15.0" Round Culvert n=0.013 L=102.0' S=0.0799 '/' Outflow=7.70 cfs 0.566 af

Pond dmh51: dmh
Peak Elev=921.72' Inflow=7.70 cfs 0.566 af
15.0" Round Culvert n=0.013 L=127.0' S=0.0780 '/' Outflow=7.70 cfs 0.566 af

Pond dmh52: dmh
Peak Elev=894.84' Inflow=7.70 cfs 0.566 af
15.0" Round Culvert n=0.013 L=62.0' S=0.0802 '/' Outflow=7.70 cfs 0.566 af

Pond dmh53: dmh
Peak Elev=918.20' Inflow=8.05 cfs 0.592 af
18.0" Round Culvert n=0.013 L=31.0' S=0.0097 '/' Outflow=8.05 cfs 0.592 af

Pond dmh55: dmh
Peak Elev=909.20' Inflow=15.08 cfs 1.111 af
18.0" Round Culvert n=0.013 L=72.0' S=0.0211 '/' Outflow=15.08 cfs 1.111 af

Pond dmh56: dmh
Peak Elev=904.51' Inflow=17.92 cfs 1.326 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0095 '/' Outflow=17.92 cfs 1.326 af

Pond dmh57: dmh
Peak Elev=903.32' Inflow=17.92 cfs 1.326 af
24.0" Round Culvert n=0.013 L=97.0' S=0.0476 '/' Outflow=17.92 cfs 1.326 af

Pond dmh58: dmh Peak Elev=898.60' Inflow=17.92 cfs 1.326 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=17.92 cfs 1.326 af

Pond dmh59: dmh Peak Elev=895.96' Inflow=17.92 cfs 1.326 af
24.0" Round Culvert n=0.013 L=82.0' S=0.0101 '/' Outflow=17.92 cfs 1.326 af

Pond dmh60: dmh Peak Elev=894.79' Inflow=17.92 cfs 1.326 af
24.0" Round Culvert n=0.013 L=258.0' S=0.0115 '/' Outflow=17.92 cfs 1.326 af

Pond dmh61: dmh Peak Elev=892.32' Inflow=17.92 cfs 1.326 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=17.92 cfs 1.326 af

Pond dmh62: dmh Peak Elev=890.31' Inflow=25.62 cfs 1.892 af
24.0" Round Culvert n=0.013 L=62.0' S=0.0248 '/' Outflow=25.62 cfs 1.892 af

Pond dmh69: dmh Peak Elev=816.34' Inflow=25.62 cfs 1.892 af
24.0" Round Culvert n=0.013 L=29.0' S=0.0338 '/' Outflow=25.62 cfs 1.892 af

Pond DS-1a: detention Peak Elev=851.36' Storage=11,511 cf Inflow=11.10 cfs 0.812 af
Outflow=4.54 cfs 0.812 af

Pond DS-1b: detention Peak Elev=860.86' Storage=2,223 cf Inflow=1.99 cfs 0.154 af
Outflow=0.51 cfs 0.154 af

Pond DS-2a: detention Peak Elev=899.58' Storage=31,243 cf Inflow=27.84 cfs 2.049 af
Outflow=10.40 cfs 2.046 af

Pond DS-2b: detention Peak Elev=861.20' Storage=9,966 cf Inflow=8.90 cfs 0.658 af
Outflow=2.17 cfs 0.655 af

Pond DW-1: House Drywell Peak Elev=0.00' Storage=0.000 af

Pond G1: gabion Peak Elev=878.13' Storage=175 cf Inflow=10.40 cfs 2.046 af
Outflow=10.39 cfs 2.046 af

Pond G2: gabion Peak Elev=811.29' Storage=99 cf Inflow=11.66 cfs 3.136 af
Outflow=11.72 cfs 3.136 af

Link SP1: STUDY POINT #1 Inflow=15.69 cfs 1.918 af
Primary=15.69 cfs 1.918 af

Link SP2: STUDY POINT #2 Inflow=13.12 cfs 3.259 af
Primary=13.12 cfs 3.259 af

Link SP3: STUDY POINT #3 Inflow=13.75 cfs 3.506 af
Primary=13.75 cfs 3.506 af

Link SP4: STUDY POINT #4 Inflow=2.93 cfs 0.213 af
Primary=2.93 cfs 0.213 af

Link SP5: STUDY POINT #5 Inflow=0.86 cfs 0.062 af
Primary=0.86 cfs 0.062 af

Total Runoff Area = 29.185 ac Runoff Volume = 8.987 af Average Runoff Depth = 3.70"
77.07% Pervious = 22.491 ac 22.93% Impervious = 6.693 ac

Summary for Subcatchment P-1A: Subcat P-1A

Runoff = 10.30 cfs @ 12.15 hrs, Volume= 0.848 af, Depth= 3.29"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.021	74	>75% Grass cover, Good, HSG C
0.017	61	>75% Grass cover, Good, HSG B
0.188	55	Woods, Good, HSG B
0.290	70	1/2 acre lots, 25% imp, HSG B
1.448	80	1/2 acre lots, 25% imp, HSG C
1.132	70	Woods, Good, HSG C
3.097	74	Weighted Average
2.662		85.97% Pervious Area
0.434		14.03% Impervious Area

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

Summary for Subcatchment P-1B: Subcat P-1B

Runoff = 1.99 cfs @ 12.12 hrs, Volume= 0.154 af, Depth= 3.19"
Routed to Pond DS-1b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
43	98	Paved parking, HSG B
3,925	61	>75% Grass cover, Good, HSG B
760	70	1/2 acre lots, 25% imp, HSG B
5,357	80	1/2 acre lots, 25% imp, HSG C
3,003	70	Woods, Good, HSG C
12,230	74	>75% Grass cover, Good, HSG C
25,318	73	Weighted Average
23,746		93.79% Pervious Area
1,572		6.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment P-1C: Subcat P-1C

Runoff = 1.42 cfs @ 12.09 hrs, Volume= 0.103 af, Depth= 3.69"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.077	61	>75% Grass cover, Good, HSG B
0.002	98	Paved parking, HSG C
0.066	98	Paved parking, HSG B
0.035	70	1/2 acre lots, 25% imp, HSG B
0.156	80	1/2 acre lots, 25% imp, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.337	78	Weighted Average
0.221		65.62% Pervious Area
0.116		34.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-1D: Subcat P-1D

Runoff = 2.87 cfs @ 12.09 hrs, Volume= 0.208 af, Depth= 3.48"
Routed to Pond DS-1a : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
4,573	61	>75% Grass cover, Good, HSG B
2,625	98	Paved parking, HSG B
1	70	1/2 acre lots, 25% imp, HSG B
3,514	80	1/2 acre lots, 25% imp, HSG C
1,200	98	Paved parking, HSG C
19,309	74	>75% Grass cover, Good, HSG C
31,222	76	Weighted Average
26,518		84.93% Pervious Area
4,704		15.07% Impervious Area

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

Summary for Subcatchment P-1E: Subcat P-1E

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af, Depth= 4.20"
Routed to Pond dmh01 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.031	98	Paved parking, HSG B
0.046	61	>75% Grass cover, Good, HSG B
0.118	74	>75% Grass cover, Good, HSG C
0.129	98	Paved parking, HSG C
0.059	80	1/2 acre lots, 25% imp, HSG C
0.382	83	Weighted Average
0.208		54.38% Pervious Area
0.174		45.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-1F: Subcat P-1F

Runoff = 6.41 cfs @ 12.09 hrs, Volume= 0.470 af, Depth= 4.10"
Routed to Pond dmh05 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
1.135	80	1/2 acre lots, 25% imp, HSG C
0.201	98	Paved parking, HSG C
0.041	74	>75% Grass cover, Good, HSG C
1.377	82	Weighted Average
0.892		64.77% Pervious Area
0.485		35.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2A: Subcat P-2A

Runoff = 7.26 cfs @ 12.09 hrs, Volume= 0.527 af, Depth= 3.58"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.449	70	Woods, Good, HSG C
1.315	80	1/2 acre lots, 25% imp, HSG C
1.764	77	Weighted Average
1.435		81.36% Pervious Area
0.329		18.64% Impervious Area

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

Summary for Subcatchment P-2B: Subcat P-2B

Runoff = 3.87 cfs @ 12.09 hrs, Volume= 0.281 af, Depth= 2.90"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.512	70	Woods, Good, HSG C
0.254	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.314	65	Brush, Good, HSG C
0.084	80	1/2 acre lots, 25% imp, HSG C
1.164	70	Weighted Average
1.143		98.21% Pervious Area
0.021		1.79% Impervious Area

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

Summary for Subcatchment P-2C: Subcat P-2C

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.095 af, Depth= 5.30"
Routed to Pond dmh33 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.151	98	Paved parking, HSG C
0.065	80	1/2 acre lots, 25% imp, HSG C
0.216	93	Weighted Average
0.049		22.53% Pervious Area
0.167		77.47% Impervious Area

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

Summary for Subcatchment P-2D: Subcat P-2D

Runoff = 1.62 cfs @ 12.09 hrs, Volume= 0.121 af, Depth= 4.63"
Routed to Pond dmh31 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.116	74	>75% Grass cover, Good, HSG C
0.169	98	Paved parking, HSG C
0.030	80	1/2 acre lots, 25% imp, HSG C
0.315	87	Weighted Average
0.138		44.03% Pervious Area
0.176		55.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2E: Subcat P-2E

Runoff = 11.62 cfs @ 12.09 hrs, Volume= 0.855 af, Depth= 4.20"
Routed to Pond dmh21 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
2.051	80	1/2 acre lots, 25% imp, HSG C
0.390	98	Paved parking, HSG C
2.441	83	Weighted Average
1.539		63.03% Pervious Area
0.902		36.97% Impervious Area

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

Summary for Subcatchment P-2F: Subcat P-2F

Runoff = 5.12 cfs @ 12.09 hrs, Volume= 0.376 af, Depth= 4.20"
Routed to Pond dmh20 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.199	98	Paved parking, HSG C
0.875	80	1/2 acre lots, 25% imp, HSG C
1.075	83	Weighted Average
0.657		61.10% Pervious Area
0.418		38.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2G: Subcat P-2G

Runoff = 8.68 cfs @ 12.09 hrs, Volume= 0.636 af, Depth= 4.10"
Routed to Pond dmh23 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.106	74	>75% Grass cover, Good, HSG C
1.531	80	1/2 acre lots, 25% imp, HSG C
0.227	98	Paved parking, HSG C
1.864	82	Weighted Average
1.254		67.30% Pervious Area
0.610		32.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2H: Subcat P-2H

Runoff = 2.42 cfs @ 12.09 hrs, Volume= 0.181 af, Depth= 4.63"
Routed to Pond dmh25 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.178	98	Paved parking, HSG C
0.292	80	1/2 acre lots, 25% imp, HSG C
0.470	87	Weighted Average
0.219		46.62% Pervious Area
0.251		53.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2I: Subcat P-2I

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 5.07"
Routed to Link SP2 : STUDY POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.000	70	Woods, Good, HSG C
0.049	98	Paved parking, HSG C
0.032	80	1/2 acre lots, 25% imp, HSG C
0.081	91	Weighted Average
0.024		29.52% Pervious Area
0.057		70.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2J: Subcat P-2J

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.160 af, Depth= 3.29"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.069	70	Woods, Good, HSG C
0.432	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.083	80	1/2 acre lots, 25% imp, HSG C
0.584	74	Weighted Average
0.563		96.46% Pervious Area
0.021		3.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3A: Subcat P-3A

Runoff = 12.93 cfs @ 12.23 hrs, Volume= 1.264 af, Depth= 3.00"
Routed to Pond DB-1 : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.264	80	1/2 acre lots, 25% imp, HSG C
0.959	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
2.262	74	>75% Grass cover, Good, HSG C
5.064	71	Weighted Average
4.998		98.69% Pervious Area
0.066		1.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.3	299	0.3000	3.83		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.1	644	Total			

Summary for Subcatchment P-3B: Subcat P-3B

Runoff = 5.10 cfs @ 12.09 hrs, Volume= 0.370 af, Depth= 3.19"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.714	70	Woods, Good, HSG C
0.172	65	Brush, Good, HSG C
0.506	80	1/2 acre lots, 25% imp, HSG C
1.393	73	Weighted Average
1.267		90.91% Pervious Area
0.127		9.09% Impervious Area

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

Summary for Subcatchment P-3C: Subcat P-3C

Runoff = 2.84 cfs @ 12.09 hrs, Volume= 0.214 af, Depth= 4.74"
Routed to Pond dmh56 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG C
0.299	80	1/2 acre lots, 25% imp, HSG C
0.542	88	Weighted Average
0.224		41.33% Pervious Area
0.318		58.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3D: Subcat P-3D

Runoff = 7.03 cfs @ 12.09 hrs, Volume= 0.519 af, Depth= 4.31"
Routed to Pond dmh55 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
1.132	80	1/2 acre lots, 25% imp, HSG C
0.314	98	Paved parking, HSG C
1.446	84	Weighted Average
0.849		58.72% Pervious Area
0.597		41.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr-55 min**

Summary for Subcatchment P-3E: Subcat P-3E

Runoff = 8.05 cfs @ 12.09 hrs, Volume= 0.592 af, Depth= 4.20"
Routed to Pond dmh53 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
1.446	80	1/2 acre lots, 25% imp, HSG C
0.245	98	Paved parking, HSG C
1.691	83	Weighted Average
1.085		64.13% Pervious Area
0.607		35.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-3F: Subcat P-3F

Runoff = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af, Depth= 4.20"
Routed to Pond dmh50 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (ac)	CN	Description
1.379	80	1/2 acre lots, 25% imp, HSG C
0.237	98	Paved parking, HSG C
1.617	83	Weighted Average
1.035		63.99% Pervious Area
0.582		36.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat P-4

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.213 af, Depth= 3.38"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
56	61	>75% Grass cover, Good, HSG B
11,411	80	1/2 acre lots, 25% imp, HSG C
6,253	70	Woods, Good, HSG C
15,134	74	>75% Grass cover, Good, HSG C
32,853	75	Weighted Average
30,001		91.32% Pervious Area
2,853		8.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-5: Subcat P-5

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.062 af, Depth= 3.48"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.12"

Area (sf)	CN	Description
2,452	70	Woods, Good, HSG C
2,321	74	>75% Grass cover, Good, HSG C
4,589	80	1/2 acre lots, 25% imp, HSG C
9,362	76	Weighted Average
8,215		87.75% Pervious Area
1,147		12.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TR-55 Min.**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

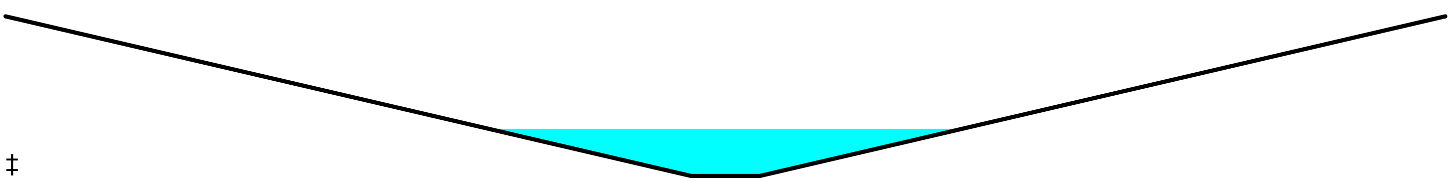
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 1.393 ac, 9.09% Impervious, Inflow Depth = 3.19" for 25-year event
Inflow = 5.10 cfs @ 12.09 hrs, Volume= 0.370 af
Outflow = 2.19 cfs @ 12.32 hrs, Volume= 0.370 af, Atten= 57%, Lag= 13.8 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.37 fps, Min. Travel Time= 32.1 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 88.7 min

Peak Storage= 4,221 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.30' , Surface Width= 34.55'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

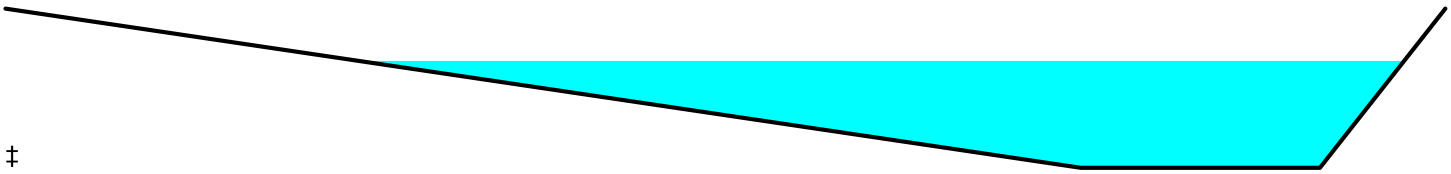
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 4.05" for 25-year event
Inflow = 13.76 cfs @ 12.20 hrs, Volume= 2.573 af
Outflow = 10.89 cfs @ 12.55 hrs, Volume= 2.570 af, Atten= 21%, Lag= 20.9 min
Routed to Pond 1P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.40 fps, Min. Travel Time= 21.8 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 57.0 min

Peak Storage= 14,221 cf @ 12.55 hrs
Average Depth at Peak Storage= 1.01' , Surface Width= 43.76'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 26.65 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 525.0' Slope= 0.0223 '/'
Inlet Invert= 875.70', Outlet Invert= 864.00'



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Summary for Pond 1P: depression

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 4.05" for 25-year event
Inflow = 10.89 cfs @ 12.55 hrs, Volume= 2.570 af
Outflow = 10.89 cfs @ 12.56 hrs, Volume= 2.570 af, Atten= 0%, Lag= 0.3 min
Primary = 10.89 cfs @ 12.56 hrs, Volume= 2.570 af
Routed to Link SP2 : STUDY POINT #2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 862.65' @ 12.56 hrs Surf.Area= 474 sf Storage= 263 cf
Flood Elev= 864.00' Surf.Area= 837 sf Storage= 1,133 cf

Plug-Flow detention time= 0.6 min calculated for 2.570 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (928.8 - 928.2)

Volume	Invert	Avail.Storage	Storage Description
#1	862.00'	1,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
862.00	334	74.0	0	0	334
864.00	837	119.0	1,133	1,133	1,052

Device	Routing	Invert	Outlet Devices
#1	Primary	859.00'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.00' / 858.73' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	862.00'	**24.0" Horiz. beehive** C= 0.600 Limited to weir flow at low heads
#3	Secondary	863.30'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=10.88 cfs @ 12.56 hrs HW=862.65' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 10.88 cfs of 24.64 cfs potential flow)
 └**2=beehive** (Weir Controls 10.88 cfs @ 2.65 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=862.00' TW=0.00' (Dynamic Tailwater)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DB-1: detention

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth = 3.66" for 25-year event
Inflow = 34.37 cfs @ 12.11 hrs, Volume= 3.156 af
Outflow = 11.66 cfs @ 12.54 hrs, Volume= 3.136 af, Atten= 66%, Lag= 25.8 min
Primary = 11.66 cfs @ 12.54 hrs, Volume= 3.136 af
Routed to Pond G2 : gabion
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 813.63' @ 12.54 hrs Surf.Area= 20,277 sf Storage= 46,976 cf
Flood Elev= 816.00' Surf.Area= 24,900 sf Storage= 100,504 cf

Plug-Flow detention time= 87.2 min calculated for 3.132 af (99% of inflow)
Center-of-Mass det. time= 84.1 min (903.7 - 819.6)

Volume	Invert	Avail.Storage	Storage Description
#1	811.00'	100,504 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
811.00	15,556	576.0	0	0	15,556
812.00	17,303	594.0	16,422	16,422	17,331
813.00	19,115	613.0	18,201	34,623	19,253
814.00	20,984	632.0	20,042	54,665	21,236
815.00	22,910	651.0	21,940	76,605	23,279
816.00	24,900	670.0	23,898	100,504	25,383

Device	Routing	Invert	Outlet Devices
#1	Primary	811.00'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 811.00' / 810.30' S= 0.0219 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	811.00'	**8.0" Vert. (2) 8" Orifice (2yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	811.90'	**12.0" Vert. (2) 12" Orifice (10yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	813.20'	**24.0" x 24.0" Horiz. 24" Top of Structure** C= 0.600 Limited to weir flow at low heads
#5	Secondary	814.40'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=11.65 cfs @ 12.54 hrs HW=813.63' TW=811.29' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.65 cfs @ 6.59 fps)
├─**2=(2) 8" Orifice (2yr)** (Passes < 5.09 cfs potential flow)
├─**3=(2) 12" Orifice (10yr)** (Passes < 8.37 cfs potential flow)
└─**4=24" Top of Structure** (Passes < 7.26 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=811.00' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond dmh01: dmh

Inflow Area = 0.382 ac, 45.62% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af
Outflow = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.82 cfs @ 12.09 hrs, Volume= 0.134 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 851.39' @ 12.36 hrs
Flood Elev= 855.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	849.34'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 849.34' / 849.22' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=850.44' TW=850.61' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond dmh05: dmh

Inflow Area = 1.377 ac, 35.23% Impervious, Inflow Depth = 4.10" for 25-year event
Inflow = 6.41 cfs @ 12.09 hrs, Volume= 0.470 af
Outflow = 6.41 cfs @ 12.09 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min
Primary = 6.41 cfs @ 12.09 hrs, Volume= 0.470 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 871.89' @ 12.09 hrs
Flood Elev= 883.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.52'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 868.52' / 865.12' S= 0.0351 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.28 cfs @ 12.09 hrs HW=871.77' TW=850.61' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 6.28 cfs @ 7.99 fps)

Summary for Pond dmh20: dmh

Inflow Area = 1.075 ac, 38.90% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 5.12 cfs @ 12.09 hrs, Volume= 0.376 af
Outflow = 5.12 cfs @ 12.09 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min
Primary = 5.12 cfs @ 12.09 hrs, Volume= 0.376 af
Routed to Pond dmh21 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 904.11' @ 12.10 hrs
Flood Elev= 907.61'

Device	Routing	Invert	Outlet Devices
#1	Primary	902.74'	**15.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 902.74' / 900.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.88 cfs @ 12.09 hrs HW=904.08' TW=902.37' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.88 cfs @ 4.61 fps)

Summary for Pond dmh21: dmh

Inflow Area = 3.515 ac, 37.56% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 16.74 cfs @ 12.09 hrs, Volume= 1.231 af
Outflow = 16.74 cfs @ 12.09 hrs, Volume= 1.231 af, Atten= 0%, Lag= 0.0 min
Primary = 16.74 cfs @ 12.09 hrs, Volume= 1.231 af
Routed to Pond dmh23 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 902.65' @ 12.12 hrs
Flood Elev= 905.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	899.55'	**24.0" Round Culvert** L= 190.0' Ke= 0.500 Inlet / Outlet Invert= 899.55' / 897.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=13.56 cfs @ 12.09 hrs HW=902.37' TW=901.25' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 13.56 cfs @ 4.32 fps)

Summary for Pond dmh23: dmh

Inflow Area = 5.379 ac, 35.88% Impervious, Inflow Depth = 4.17" for 25-year event
Inflow = 25.42 cfs @ 12.09 hrs, Volume= 1.868 af
Outflow = 25.42 cfs @ 12.09 hrs, Volume= 1.868 af, Atten= 0%, Lag= 0.0 min
Primary = 25.42 cfs @ 12.09 hrs, Volume= 1.868 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 901.36' @ 12.09 hrs
Flood Elev= 910.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	897.55'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 897.55' / 897.20' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=24.86 cfs @ 12.09 hrs HW=901.25' TW=897.76' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 24.86 cfs @ 7.91 fps)

Summary for Pond dmh25: dmh

Inflow Area = 0.470 ac, 53.38% Impervious, Inflow Depth = 4.63" for 25-year event
Inflow = 2.42 cfs @ 12.09 hrs, Volume= 0.181 af
Outflow = 2.42 cfs @ 12.09 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min
Primary = 2.42 cfs @ 12.09 hrs, Volume= 0.181 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 923.50' @ 12.09 hrs
Flood Elev= 930.54'

Device	Routing	Invert	Outlet Devices
#1	Primary	922.60'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 922.60' / 915.84' S= 0.0697 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.36 cfs @ 12.09 hrs HW=923.49' TW=897.74' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.36 cfs @ 3.21 fps)

Summary for Pond dmh31: dmh

Inflow Area = 0.315 ac, 55.97% Impervious, Inflow Depth = 4.63" for 25-year event
Inflow = 1.62 cfs @ 12.09 hrs, Volume= 0.121 af
Outflow = 1.62 cfs @ 12.09 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 12.09 hrs, Volume= 0.121 af
Routed to Pond dmh33 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 876.45' @ 12.09 hrs
Flood Elev= 885.77'

Device	Routing	Invert	Outlet Devices
#1	Primary	875.76'	**12.0" Round Culvert** L= 96.0' Ke= 0.500 Inlet / Outlet Invert= 875.76' / 868.05' S= 0.0803 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.58 cfs @ 12.09 hrs HW=876.44' TW=860.67' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.58 cfs @ 2.80 fps)

Summary for Pond dmh33: dmh

Inflow Area = 0.530 ac, 64.72% Impervious, Inflow Depth = 4.90" for 25-year event
Inflow = 2.83 cfs @ 12.09 hrs, Volume= 0.217 af
Outflow = 2.83 cfs @ 12.09 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min
Primary = 2.83 cfs @ 12.09 hrs, Volume= 0.217 af
Routed to Pond DS-2b : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 861.21' @ 12.54 hrs
Flood Elev= 864.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	859.71'	**15.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.71' / 859.36' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.95 cfs @ 12.09 hrs HW=860.67' TW=860.44' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.95 cfs @ 2.67 fps)

Summary for Pond dmh50: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af
Outflow = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af, Atten= 0%, Lag= 0.0 min
Primary = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af
Routed to Pond dmh51 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 929.97' @ 12.09 hrs
Flood Elev= 933.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	927.65'	**15.0" Round Culvert** L= 102.0' Ke= 0.500 Inlet / Outlet Invert= 927.65' / 919.50' S= 0.0799 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.53 cfs @ 12.09 hrs HW=929.90' TW=921.65' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.53 cfs @ 6.13 fps)

Summary for Pond dmh51: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af
Outflow = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af, Atten= 0%, Lag= 0.0 min
Primary = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af
Routed to Pond dmh52 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 921.72' @ 12.09 hrs
Flood Elev= 924.04'

Device	Routing	Invert	Outlet Devices
#1	Primary	919.40'	**15.0" Round Culvert** L= 127.0' Ke= 0.500 Inlet / Outlet Invert= 919.40' / 909.50' S= 0.0780 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.53 cfs @ 12.09 hrs HW=921.65' TW=894.77' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.53 cfs @ 6.13 fps)

Summary for Pond dmh52: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af
Outflow = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af, Atten= 0%, Lag= 0.0 min
Primary = 7.70 cfs @ 12.09 hrs, Volume= 0.566 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 894.84' @ 12.09 hrs
Flood Elev= 914.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.52'	**15.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 892.52' / 887.55' S= 0.0802 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.53 cfs @ 12.09 hrs HW=894.77' TW=890.19' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 7.53 cfs @ 6.13 fps)

Summary for Pond dmh53: dmh

Inflow Area = 1.691 ac, 35.87% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 8.05 cfs @ 12.09 hrs, Volume= 0.592 af
Outflow = 8.05 cfs @ 12.09 hrs, Volume= 0.592 af, Atten= 0%, Lag= 0.0 min
Primary = 8.05 cfs @ 12.09 hrs, Volume= 0.592 af
Routed to Pond dmh55 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 918.20' @ 12.09 hrs
Flood Elev= 921.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	916.46'	**18.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 916.46' / 916.16' S= 0.0097 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=7.88 cfs @ 12.09 hrs HW=918.16' TW=909.08' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 7.88 cfs @ 4.91 fps)

Summary for Pond dmh55: dmh

Inflow Area = 3.137 ac, 38.36% Impervious, Inflow Depth = 4.25" for 25-year event
Inflow = 15.08 cfs @ 12.09 hrs, Volume= 1.111 af
Outflow = 15.08 cfs @ 12.09 hrs, Volume= 1.111 af, Atten= 0%, Lag= 0.0 min
Primary = 15.08 cfs @ 12.09 hrs, Volume= 1.111 af
Routed to Pond dmh56 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 909.20' @ 12.09 hrs
Flood Elev= 911.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	905.32'	**18.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 905.32' / 903.80' S= 0.0211 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=14.75 cfs @ 12.09 hrs HW=909.07' TW=904.31' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 14.75 cfs @ 8.34 fps)

Summary for Pond dmh56: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Outflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af, Atten= 0%, Lag= 0.0 min
Primary = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Routed to Pond dmh57 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 904.51' @ 12.11 hrs
Flood Elev= 908.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	901.21'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 901.21' / 901.02' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=15.43 cfs @ 12.09 hrs HW=904.30' TW=903.26' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 15.43 cfs @ 4.91 fps)

Summary for Pond dmh57: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Outflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af, Atten= 0%, Lag= 0.0 min
Primary = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Routed to Pond dmh58 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 903.32' @ 12.09 hrs
Flood Elev= 908.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	900.92'	**24.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 900.92' / 896.30' S= 0.0476 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.52 cfs @ 12.09 hrs HW=903.26' TW=898.54' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 17.52 cfs @ 5.58 fps)

Summary for Pond dmh58: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Outflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af, Atten= 0%, Lag= 0.0 min
Primary = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Routed to Pond dmh59 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 898.60' @ 12.09 hrs
Flood Elev= 901.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	896.20'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 896.20' / 893.43' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.52 cfs @ 12.09 hrs HW=898.54' TW=895.86' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 17.52 cfs @ 5.58 fps)

Summary for Pond dmh59: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Outflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af, Atten= 0%, Lag= 0.0 min
Primary = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Routed to Pond dmh60 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 895.96' @ 12.11 hrs
Flood Elev= 909.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	893.33'	**24.0" Round Culvert** L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 893.33' / 892.50' S= 0.0101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=15.99 cfs @ 12.09 hrs HW=895.86' TW=894.74' (Dynamic Tailwater)
1=Culvert (Inlet Controls 15.99 cfs @ 5.09 fps)

Summary for Pond dmh60: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Outflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af, Atten= 0%, Lag= 0.0 min
Primary = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Routed to Pond dmh61 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 894.79' @ 12.09 hrs
Flood Elev= 901.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.40'	**24.0" Round Culvert** L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 892.40' / 889.43' S= 0.0115 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.52 cfs @ 12.09 hrs HW=894.74' TW=892.14' (Dynamic Tailwater)
1=Culvert (Inlet Controls 17.52 cfs @ 5.58 fps)

Summary for Pond dmh61: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Outflow = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af, Atten= 0%, Lag= 0.0 min
Primary = 17.92 cfs @ 12.09 hrs, Volume= 1.326 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 892.32' @ 12.11 hrs
Flood Elev= 898.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	889.33'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 889.33' / 886.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=15.80 cfs @ 12.09 hrs HW=892.14' TW=890.19' (Dynamic Tailwater)
1=Culvert (Outlet Controls 15.80 cfs @ 5.03 fps)

Summary for Pond dmh62: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 4.29" for 25-year event
Inflow = 25.62 cfs @ 12.09 hrs, Volume= 1.892 af
Outflow = 25.62 cfs @ 12.09 hrs, Volume= 1.892 af, Atten= 0%, Lag= 0.0 min
Primary = 25.62 cfs @ 12.09 hrs, Volume= 1.892 af
Routed to Pond dmh69 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 890.31' @ 12.09 hrs
Flood Elev= 902.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.45'	**24.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 886.45' / 884.91' S= 0.0248 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=25.05 cfs @ 12.09 hrs HW=890.19' TW=816.22' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 25.05 cfs @ 7.97 fps)

Summary for Pond dmh69: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 4.29" for 25-year event
Inflow = 25.62 cfs @ 12.09 hrs, Volume= 1.892 af
Outflow = 25.62 cfs @ 12.09 hrs, Volume= 1.892 af, Atten= 0%, Lag= 0.0 min
Primary = 25.62 cfs @ 12.09 hrs, Volume= 1.892 af
Routed to Pond DB-1 : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 816.34' @ 12.09 hrs
Flood Elev= 818.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	812.48'	**24.0" Round Culvert** L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 812.48' / 811.50' S= 0.0338 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=25.05 cfs @ 12.09 hrs HW=816.22' TW=812.64' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 25.05 cfs @ 7.97 fps)

Summary for Pond DS-1a: detention

Inflow Area = 2.476 ac, 30.99% Impervious, Inflow Depth = 3.94" for 25-year event
Inflow = 11.10 cfs @ 12.09 hrs, Volume= 0.812 af
Outflow = 4.54 cfs @ 12.32 hrs, Volume= 0.812 af, Atten= 59%, Lag= 14.0 min
Primary = 4.54 cfs @ 12.32 hrs, Volume= 0.812 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 851.36' @ 12.32 hrs Surf.Area= 3,840 sf Storage= 11,511 cf
Flood Elev= 853.00' Surf.Area= 3,840 sf Storage= 17,124 cf

Plug-Flow detention time= 107.7 min calculated for 0.811 af (100% of inflow)
Center-of-Mass det. time= 108.1 min (919.7 - 811.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	848.00'	0 cf	**96.00'W x 40.00'L x 5.67'H Field A** 21,760 cf Overall - 21,760 cf Embedded = 0 cf x 40.0% Voids
#2A	848.00'	17,124 cf	**retain_it retain_it 5.0'** x 60 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 12 Rows adjusted for 353.3 cf perimeter wall
		17,124 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	847.90'	**15.0" Round Culvert** L= 129.0' Ke= 0.500 Inlet / Outlet Invert= 847.90' / 846.36' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	847.90'	**3.0" Vert. 3" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	849.00'	**8.0" Vert. 8" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	850.15'	**8.0" Vert. 8" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	851.15'	**7.0" Vert. 7" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	852.80'	**4.0' long Overflow Weir** 2 End Contraction(s) 4.0' Crest Height

Primary OutFlow Max=4.52 cfs @ 12.32 hrs HW=851.36' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 4.52 cfs of 8.98 cfs potential flow)
  ├─**2=3" Orifice (2yr)** (Orifice Controls 0.43 cfs @ 8.79 fps)
  ├─**3=8" Orifice (10yr)** (Orifice Controls 2.39 cfs @ 6.85 fps)
  ├─**4=8" Orifice (25yr)** (Orifice Controls 1.57 cfs @ 4.50 fps)
  ├─**5=7" Orifice (50yr)** (Orifice Controls 0.13 cfs @ 1.55 fps)
  └─**6=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond DS-1b: detention

Inflow Area = 0.581 ac, 6.21% Impervious, Inflow Depth = 3.19" for 25-year event
Inflow = 1.99 cfs @ 12.12 hrs, Volume= 0.154 af
Outflow = 0.51 cfs @ 12.54 hrs, Volume= 0.154 af, Atten= 74%, Lag= 25.3 min
Primary = 0.51 cfs @ 12.54 hrs, Volume= 0.154 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 860.86' @ 12.54 hrs Surf.Area= 1,536 sf Storage= 2,223 cf
Flood Elev= 862.70' Surf.Area= 1,536 sf Storage= 4,684 cf

Plug-Flow detention time= 61.3 min calculated for 0.154 af (100% of inflow)
Center-of-Mass det. time= 60.7 min (893.0 - 832.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**64.00'W x 24.00'L x 4.17'H Field A** 6,400 cf Overall - 6,400 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	4,684 cf	**retain_it retain_it 3.5'** x 24 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 8 Rows adjusted for 135.1 cf perimeter wall
		4,684 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	859.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 859.20' / 858.10' S= 0.0110 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**4.0" Vert. 4" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	862.50'	**12.0" Vert. Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.51 cfs @ 12.54 hrs HW=860.86' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.51 cfs of 3.88 cfs potential flow)
  ├─**2=4" Orifice** (Orifice Controls 0.51 cfs @ 5.88 fps)
  └─**3=Overflow** (Controls 0.00 cfs)

Summary for Pond DS-2a: detention

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth = 4.20" for 25-year event
Inflow = 27.84 cfs @ 12.09 hrs, Volume= 2.049 af
Outflow = 10.40 cfs @ 12.35 hrs, Volume= 2.046 af, Atten= 63%, Lag= 15.8 min
Primary = 10.40 cfs @ 12.35 hrs, Volume= 2.046 af
Routed to Pond G1 : gabion

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 899.58' @ 12.35 hrs Surf.Area= 4,032 sf Storage= 31,243 cf
Flood Elev= 902.66' Storage= 41,196 cf

Plug-Flow detention time= 110.2 min calculated for 2.043 af (100% of inflow)
Center-of-Mass det. time= 109.8 min (915.1 - 805.3)

Volume	Invert	Avail.Storage	Storage Description
#1	892.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
#2	897.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
		41,196 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	892.00'	**24.0" Round Culvert** L= 46.0' Ke= 0.500 Inlet / Outlet Invert= 892.00' / 890.52' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	892.00'	**5.0" Vert. 5" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	895.40'	**10.0" Vert. 10" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	897.90'	**11.0" Vert. 11" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	899.90'	**10.0" Vert. 10" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	901.45'	**4.0' long Sharp-Crested Weir Overflow (100yr)** 2 End Contraction(s)

Primary OutFlow Max=10.39 cfs @ 12.35 hrs HW=899.58' TW=878.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 10.39 cfs of 38.81 cfs potential flow)
  ├─**2=5" Orifice (2yr)** (Orifice Controls 1.78 cfs @ 13.07 fps)
  ├─**3=10" Orifice (10yr)** (Orifice Controls 5.10 cfs @ 9.34 fps)
  ├─**4=11" Orifice (25yr)** (Orifice Controls 3.52 cfs @ 5.33 fps)
  ├─**5=10" Orifice (50yr)** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Weir Overflow (100yr)**(Controls 0.00 cfs)

Summary for Pond DS-2b: detention

Inflow Area = 2.278 ac, 16.89% Impervious, Inflow Depth = 3.47" for 25-year event
Inflow = 8.90 cfs @ 12.09 hrs, Volume= 0.658 af
Outflow = 2.17 cfs @ 12.50 hrs, Volume= 0.655 af, Atten= 76%, Lag= 24.3 min
Primary = 2.17 cfs @ 12.50 hrs, Volume= 0.655 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 861.20' @ 12.50 hrs Surf.Area= 5,632 sf Storage= 9,966 cf
Flood Elev= 862.70' Surf.Area= 5,632 sf Storage= 17,435 cf

Plug-Flow detention time= 78.5 min calculated for 0.654 af (99% of inflow)
Center-of-Mass det. time= 76.4 min (894.0 - 817.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**88.00'W x 64.00'L x 4.17'H Field A** 23,467 cf Overall - 23,467 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	17,435 cf	**retain_it retain_it 3.5'** x 88 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 11 Rows adjusted for 233.3 cf perimeter wall
		17,435 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	858.90'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 858.90' / 858.44' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**8.0" Vert. 8" Orifice** C= 0.600 Limited to weir flow at low heads

#3	Device 1	862.55'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.17 cfs @ 12.50 hrs HW=861.20' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.17 cfs of 5.07 cfs potential flow)
  ├─**2=8" Orifice** (Orifice Controls 2.17 cfs @ 6.22 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DW-1: House Drywell

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**7.67'W x 12.50'L x 3.50'H Field A** 0.008 af Overall - 0.004 af Embedded = 0.004 af x 40.0% Voids
#2A	0.67'	0.003 af	**Shea Dry Well 1000gal** Inside #1 Inside= 62.0"W x 30.0"H => 12.86 sf x 10.00'L = 128.6 cf Outside= 68.0"W x 34.0"H => 15.80 sf x 10.50'L = 165.9 cf
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Summary for Pond G1: gabion

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth > 4.20" for 25-year event
Inflow = 10.40 cfs @ 12.35 hrs, Volume= 2.046 af
Outflow = 10.39 cfs @ 12.37 hrs, Volume= 2.046 af, Atten= 0%, Lag= 0.7 min
Primary = 10.39 cfs @ 12.37 hrs, Volume= 2.046 af
Routed to Reach R-02 : Routing through wetland/swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 878.13' @ 12.37 hrs Surf.Area= 370 sf Storage= 175 cf
Flood Elev= 880.00' Surf.Area= 2 sf Storage= 444 cf

Plug-Flow detention time= 0.1 min calculated for 2.043 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (915.2 - 915.1)

Volume	Invert	Avail.Storage	Storage Description
#1	877.50'	442 cf	**18.0" Round Pipe Storage** L= 250.0'
#2	879.00'	2 cf	**1.50'D x 1.00'H Vertical Cone/Cylinder**
		444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	877.50'	**2.0" Horiz. invert orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	878.25'	**2.0" Vert. spring line orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	880.00'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.38 cfs @ 12.37 hrs HW=878.12' TW=876.66' (Dynamic Tailwater)
├─**1=invert orifices** (Orifice Controls 10.38 cfs @ 3.81 fps)
├─**2=spring line orifices** (Controls 0.00 cfs)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Pond G2: gabion

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth > 3.63" for 25-year event
Inflow = 11.66 cfs @ 12.54 hrs, Volume= 3.136 af
Outflow = 11.72 cfs @ 12.55 hrs, Volume= 3.136 af, Atten= 0%, Lag= 0.8 min
Primary = 11.72 cfs @ 12.55 hrs, Volume= 3.136 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 811.29' @ 12.55 hrs Surf.Area= 114 sf Storage= 99 cf
Flood Elev= 811.80' Storage= 141 cf

Plug-Flow detention time= 0.1 min calculated for 3.136 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (903.8 - 903.7)

Volume	Invert	Avail.Storage	Storage Description
#1	810.30'	141 cf	**18.0" Round Pipe Storage** L= 80.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.30'	**2.0" Horiz. invert orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	811.05'	**2.0" Vert. spring line orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	811.80'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=11.72 cfs @ 12.55 hrs HW=811.29' TW=0.00' (Dynamic Tailwater)
—**1=invert orifices** (Orifice Controls 8.37 cfs @ 4.80 fps)
—**2=spring line orifices** (Orifice Controls 3.35 cfs @ 1.92 fps)
—**3=overflow grates** (Controls 0.00 cfs)

Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.491 ac, 20.86% Impervious, Inflow Depth = 3.55" for 25-year event
Inflow = 15.69 cfs @ 12.15 hrs, Volume= 1.918 af
Primary = 15.69 cfs @ 12.15 hrs, Volume= 1.918 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 9.972 ac, 29.60% Impervious, Inflow Depth > 3.92" for 25-year event
Inflow = 13.12 cfs @ 12.55 hrs, Volume= 3.259 af
Primary = 13.12 cfs @ 12.55 hrs, Volume= 3.259 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 11.753 ac, 19.54% Impervious, Inflow Depth > 3.58" for 25-year event
Inflow = 13.75 cfs @ 12.46 hrs, Volume= 3.506 af
Primary = 13.75 cfs @ 12.46 hrs, Volume= 3.506 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 0.754 ac, 8.68% Impervious, Inflow Depth = 3.38" for 25-year event
Inflow = 2.93 cfs @ 12.09 hrs, Volume= 0.213 af
Primary = 2.93 cfs @ 12.09 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.215 ac, 12.25% Impervious, Inflow Depth = 3.48" for 25-year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.062 af
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1A: Subcat P-1A Runoff Area=3.097 ac 14.03% Impervious Runoff Depth=4.30"
Tc=10.0 min CN=74 Runoff=13.48 cfs 1.111 af

SubcatchmentP-1B: Subcat P-1B Runoff Area=25,318 sf 6.21% Impervious Runoff Depth=4.20"
Flow Length=315' Tc=8.2 min CN=73 Runoff=2.61 cfs 0.203 af

SubcatchmentP-1C: Subcat P-1C Runoff Area=0.337 ac 34.38% Impervious Runoff Depth=4.75"
Tc=6.0 min CN=78 Runoff=1.82 cfs 0.133 af

SubcatchmentP-1D: Subcat P-1D Runoff Area=31,222 sf 15.07% Impervious Runoff Depth=4.53"
Tc=6.0 min CN=76 Runoff=3.71 cfs 0.270 af

SubcatchmentP-1E: Subcat P-1E Runoff Area=0.382 ac 45.62% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=83 Runoff=2.28 cfs 0.169 af

SubcatchmentP-1F: Subcat P-1F Runoff Area=1.377 ac 35.23% Impervious Runoff Depth=5.20"
Tc=6.0 min CN=82 Runoff=8.06 cfs 0.597 af

SubcatchmentP-2A: Subcat P-2A Runoff Area=1.764 ac 18.64% Impervious Runoff Depth=4.64"
Tc=6.0 min CN=77 Runoff=9.34 cfs 0.682 af

SubcatchmentP-2B: Subcat P-2B Runoff Area=1.164 ac 1.79% Impervious Runoff Depth=3.87"
Tc=6.0 min CN=70 Runoff=5.18 cfs 0.375 af

SubcatchmentP-2C: Subcat P-2C Runoff Area=0.216 ac 77.47% Impervious Runoff Depth=6.47"
Tc=6.0 min CN=93 Runoff=1.46 cfs 0.116 af

SubcatchmentP-2D: Subcat P-2D Runoff Area=0.315 ac 55.97% Impervious Runoff Depth=5.77"
Tc=6.0 min CN=87 Runoff=2.00 cfs 0.151 af

SubcatchmentP-2E: Subcat P-2E Runoff Area=2.441 ac 36.97% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=83 Runoff=14.54 cfs 1.080 af

SubcatchmentP-2F: Subcat P-2F Runoff Area=1.075 ac 38.90% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=83 Runoff=6.40 cfs 0.476 af

SubcatchmentP-2G: Subcat P-2G Runoff Area=1.864 ac 32.70% Impervious Runoff Depth=5.20"
Tc=6.0 min CN=82 Runoff=10.91 cfs 0.807 af

SubcatchmentP-2H: Subcat P-2H Runoff Area=0.470 ac 53.38% Impervious Runoff Depth=5.77"
Tc=6.0 min CN=87 Runoff=2.98 cfs 0.226 af

SubcatchmentP-2I: Subcat P-2I Runoff Area=0.081 ac 70.48% Impervious Runoff Depth=6.23"
Tc=6.0 min CN=91 Runoff=0.54 cfs 0.042 af

SubcatchmentP-2J: Subcat P-2J Runoff Area=0.584 ac 3.54% Impervious Runoff Depth=4.30"
Tc=6.0 min CN=74 Runoff=2.88 cfs 0.209 af

SubcatchmentP-3A: Subcat P-3A Runoff Area=5.064 ac 1.31% Impervious Runoff Depth=3.98"
Flow Length=644' Tc=16.1 min CN=71 Runoff=17.33 cfs 1.678 af

SubcatchmentP-3B: Subcat P-3B Runoff Area=1.393 ac 9.09% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=73 Runoff=6.71 cfs 0.487 af

SubcatchmentP-3C: Subcat P-3C Runoff Area=0.542 ac 58.67% Impervious Runoff Depth=5.89"
Tc=6.0 min CN=88 Runoff=3.49 cfs 0.266 af

SubcatchmentP-3D: Subcat P-3D Runoff Area=1.446 ac 41.28% Impervious Runoff Depth=5.43"
Tc=6.0 min CN=84 Runoff=8.76 cfs 0.654 af

SubcatchmentP-3E: Subcat P-3E Runoff Area=1.691 ac 35.87% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=83 Runoff=10.08 cfs 0.749 af

Subcatchment P-3F: Subcat P-3F Runoff Area=1.617 ac 36.01% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=83 Runoff=9.63 cfs 0.716 af

Subcatchment P-4: Subcat P-4 Runoff Area=32,853 sf 8.68% Impervious Runoff Depth=4.41"
Tc=6.0 min CN=75 Runoff=3.82 cfs 0.277 af

Subcatchment P-5: Subcat P-5 Runoff Area=9,362 sf 12.25% Impervious Runoff Depth=4.53"
Tc=6.0 min CN=76 Runoff=1.11 cfs 0.081 af

Reach R-01: Routing to wetlands Avg. Flow Depth=0.34' Max Vel=0.41 fps Inflow=6.71 cfs 0.487 af
n=0.400 L=722.0' S=0.1087 '/' Capacity=43.77 cfs Outflow=3.03 cfs 0.487 af

Reach R-02: Routing through wetland/swale Avg. Flow Depth=1.19' Max Vel=0.44 fps Inflow=20.26 cfs 3.267 af
n=0.400 L=525.0' S=0.0223 '/' Capacity=26.65 cfs Outflow=15.65 cfs 3.265 af

Pond 1P: depression Peak Elev=863.07' Storage=479 cf Inflow=15.65 cfs 3.265 af
Primary=15.63 cfs 3.265 af Secondary=0.00 cfs 0.000 af Outflow=15.63 cfs 3.265 af

Pond DB-1: detention Peak Elev=814.33' Storage=61,717 cf Inflow=43.86 cfs 4.062 af
Primary=13.67 cfs 4.042 af Secondary=0.00 cfs 0.000 af Outflow=13.67 cfs 4.042 af

Pond dmh01: dmh Peak Elev=852.09' Inflow=2.28 cfs 0.169 af
12.0" Round Culvert n=0.013 L=12.0' S=0.0100 '/' Outflow=2.28 cfs 0.169 af

Pond dmh05: dmh Peak Elev=873.55' Inflow=8.06 cfs 0.597 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0351 '/' Outflow=8.06 cfs 0.597 af

Pond dmh20: dmh Peak Elev=906.56' Inflow=6.40 cfs 0.476 af
15.0" Round Culvert n=0.013 L=205.0' S=0.0119 '/' Outflow=6.40 cfs 0.476 af

Pond dmh21: dmh Peak Elev=905.08' Inflow=20.95 cfs 1.556 af
24.0" Round Culvert n=0.013 L=190.0' S=0.0100 '/' Outflow=20.95 cfs 1.556 af

Pond dmh23: dmh Peak Elev=902.93' Inflow=31.86 cfs 2.363 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=31.86 cfs 2.363 af

Pond dmh25: dmh Peak Elev=923.72' Inflow=2.98 cfs 0.226 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0697 '/' Outflow=2.98 cfs 0.226 af

Pond dmh31: dmh Peak Elev=876.54' Inflow=2.00 cfs 0.151 af
12.0" Round Culvert n=0.013 L=96.0' S=0.0803 '/' Outflow=2.00 cfs 0.151 af

Pond dmh33: dmh Peak Elev=861.87' Inflow=3.46 cfs 0.267 af
15.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=3.46 cfs 0.267 af

Pond dmh50: dmh Peak Elev=930.93' Inflow=9.63 cfs 0.716 af
15.0" Round Culvert n=0.013 L=102.0' S=0.0799 '/' Outflow=9.63 cfs 0.716 af

Pond dmh51: dmh Peak Elev=922.68' Inflow=9.63 cfs 0.716 af
15.0" Round Culvert n=0.013 L=127.0' S=0.0780 '/' Outflow=9.63 cfs 0.716 af

Pond dmh52: dmh Peak Elev=895.80' Inflow=9.63 cfs 0.716 af
15.0" Round Culvert n=0.013 L=62.0' S=0.0802 '/' Outflow=9.63 cfs 0.716 af

Pond dmh53: dmh Peak Elev=918.71' Inflow=10.08 cfs 0.749 af
18.0" Round Culvert n=0.013 L=31.0' S=0.0097 '/' Outflow=10.08 cfs 0.749 af

Pond dmh55: dmh Peak Elev=910.96' Inflow=18.84 cfs 1.402 af
18.0" Round Culvert n=0.013 L=72.0' S=0.0211 '/' Outflow=18.84 cfs 1.402 af

Pond dmh56: dmh Peak Elev=905.94' Inflow=22.32 cfs 1.668 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0095 '/' Outflow=22.32 cfs 1.668 af

Pond dmh57: dmh Peak Elev=904.09' Inflow=22.32 cfs 1.668 af
24.0" Round Culvert n=0.013 L=97.0' S=0.0476 '/' Outflow=22.32 cfs 1.668 af

Pond dmh58: dmh Peak Elev=900.06' Inflow=22.32 cfs 1.668 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=22.32 cfs 1.668 af

Pond dmh59: dmh Peak Elev=898.19' Inflow=22.32 cfs 1.668 af
24.0" Round Culvert n=0.013 L=82.0' S=0.0101 '/' Outflow=22.32 cfs 1.668 af

Pond dmh60: dmh Peak Elev=897.35' Inflow=22.32 cfs 1.668 af
24.0" Round Culvert n=0.013 L=258.0' S=0.0115 '/' Outflow=22.32 cfs 1.668 af

Pond dmh61: dmh Peak Elev=895.15' Inflow=22.32 cfs 1.668 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=22.32 cfs 1.668 af

Pond dmh62: dmh Peak Elev=891.90' Inflow=31.96 cfs 2.384 af
24.0" Round Culvert n=0.013 L=62.0' S=0.0248 '/' Outflow=31.96 cfs 2.384 af

Pond dmh69: dmh Peak Elev=817.93' Inflow=31.96 cfs 2.384 af
24.0" Round Culvert n=0.013 L=29.0' S=0.0338 '/' Outflow=31.96 cfs 2.384 af

Pond DS-1a: detention Peak Elev=852.04' Storage=13,819 cf Inflow=14.05 cfs 1.036 af
Outflow=6.32 cfs 1.036 af

Pond DS-1b: detention Peak Elev=861.48' Storage=3,055 cf Inflow=2.61 cfs 0.203 af
Outflow=0.61 cfs 0.203 af

Pond DS-2a: detention Peak Elev=900.99' Storage=37,021 cf Inflow=34.84 cfs 2.589 af
Outflow=15.22 cfs 2.586 af

Pond DS-2b: detention Peak Elev=861.86' Storage=13,262 cf Inflow=11.52 cfs 0.852 af
Outflow=2.56 cfs 0.849 af

Pond DW-1: House Drywell Peak Elev=0.00' Storage=0.000 af

Pond G1: gabion Peak Elev=878.39' Storage=271 cf Inflow=15.22 cfs 2.586 af
Outflow=15.33 cfs 2.586 af

Pond G2: gabion Peak Elev=811.44' Storage=116 cf Inflow=13.67 cfs 4.042 af
Outflow=13.66 cfs 4.042 af

Link SP1: STUDY POINT #1 Inflow=21.08 cfs 2.483 af
Primary=21.08 cfs 2.483 af

Link SP2: STUDY POINT #2 Inflow=18.31 cfs 4.156 af
Primary=18.31 cfs 4.156 af

Link SP3: STUDY POINT #3 Inflow=16.35 cfs 4.528 af
Primary=16.35 cfs 4.528 af

Link SP4: STUDY POINT #4 Inflow=3.82 cfs 0.277 af
Primary=3.82 cfs 0.277 af

Link SP5: STUDY POINT #5 Inflow=1.11 cfs 0.081 af
Primary=1.11 cfs 0.081 af

Total Runoff Area = 29.185 ac Runoff Volume = 11.556 af Average Runoff Depth = 4.75"
77.07% Pervious = 22.491 ac 22.93% Impervious = 6.693 ac

Summary for Subcatchment P-1A: Subcat P-1A

Runoff = 13.48 cfs @ 12.14 hrs, Volume= 1.111 af, Depth= 4.30"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.021	74	>75% Grass cover, Good, HSG C
0.017	61	>75% Grass cover, Good, HSG B
0.188	55	Woods, Good, HSG B
0.290	70	1/2 acre lots, 25% imp, HSG B
1.448	80	1/2 acre lots, 25% imp, HSG C
1.132	70	Woods, Good, HSG C
3.097	74	Weighted Average
2.662		85.97% Pervious Area
0.434		14.03% Impervious Area

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

Summary for Subcatchment P-1B: Subcat P-1B

Runoff = 2.61 cfs @ 12.12 hrs, Volume= 0.203 af, Depth= 4.20"
Routed to Pond DS-1b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
43	98	Paved parking, HSG B
3,925	61	>75% Grass cover, Good, HSG B
760	70	1/2 acre lots, 25% imp, HSG B
5,357	80	1/2 acre lots, 25% imp, HSG C
3,003	70	Woods, Good, HSG C
12,230	74	>75% Grass cover, Good, HSG C
25,318	73	Weighted Average
23,746		93.79% Pervious Area
1,572		6.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment P-1C: Subcat P-1C

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 0.133 af, Depth= 4.75"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.077	61	>75% Grass cover, Good, HSG B
0.002	98	Paved parking, HSG C
0.066	98	Paved parking, HSG B
0.035	70	1/2 acre lots, 25% imp, HSG B
0.156	80	1/2 acre lots, 25% imp, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.337	78	Weighted Average
0.221		65.62% Pervious Area
0.116		34.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-1D: Subcat P-1D

Runoff = 3.71 cfs @ 12.09 hrs, Volume= 0.270 af, Depth= 4.53"
Routed to Pond DS-1a : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
4,573	61	>75% Grass cover, Good, HSG B
2,625	98	Paved parking, HSG B
1	70	1/2 acre lots, 25% imp, HSG B
3,514	80	1/2 acre lots, 25% imp, HSG C
1,200	98	Paved parking, HSG C
19,309	74	>75% Grass cover, Good, HSG C
31,222	76	Weighted Average
26,518		84.93% Pervious Area
4,704		15.07% Impervious Area

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

Summary for Subcatchment P-1E: Subcat P-1E

Runoff = 2.28 cfs @ 12.09 hrs, Volume= 0.169 af, Depth= 5.31"
Routed to Pond dmh01 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.031	98	Paved parking, HSG B
0.046	61	>75% Grass cover, Good, HSG B
0.118	74	>75% Grass cover, Good, HSG C
0.129	98	Paved parking, HSG C
0.059	80	1/2 acre lots, 25% imp, HSG C
0.382	83	Weighted Average
0.208		54.38% Pervious Area
0.174		45.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-1F: Subcat P-1F

Runoff = 8.06 cfs @ 12.09 hrs, Volume= 0.597 af, Depth= 5.20"
Routed to Pond dmh05 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
1.135	80	1/2 acre lots, 25% imp, HSG C
0.201	98	Paved parking, HSG C
0.041	74	>75% Grass cover, Good, HSG C
1.377	82	Weighted Average
0.892		64.77% Pervious Area
0.485		35.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2A: Subcat P-2A

Runoff = 9.34 cfs @ 12.09 hrs, Volume= 0.682 af, Depth= 4.64"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.449	70	Woods, Good, HSG C
1.315	80	1/2 acre lots, 25% imp, HSG C
1.764	77	Weighted Average
1.435		81.36% Pervious Area
0.329		18.64% Impervious Area

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

Summary for Subcatchment P-2B: Subcat P-2B

Runoff = 5.18 cfs @ 12.09 hrs, Volume= 0.375 af, Depth= 3.87"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.512	70	Woods, Good, HSG C
0.254	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.314	65	Brush, Good, HSG C
0.084	80	1/2 acre lots, 25% imp, HSG C
1.164	70	Weighted Average
1.143		98.21% Pervious Area
0.021		1.79% Impervious Area

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

Summary for Subcatchment P-2C: Subcat P-2C

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 0.116 af, Depth= 6.47"
Routed to Pond dmh33 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.151	98	Paved parking, HSG C
0.065	80	1/2 acre lots, 25% imp, HSG C
0.216	93	Weighted Average
0.049		22.53% Pervious Area
0.167		77.47% Impervious Area

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

Summary for Subcatchment P-2D: Subcat P-2D

Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.151 af, Depth= 5.77"
Routed to Pond dmh31 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.116	74	>75% Grass cover, Good, HSG C
0.169	98	Paved parking, HSG C
0.030	80	1/2 acre lots, 25% imp, HSG C
0.315	87	Weighted Average
0.138		44.03% Pervious Area
0.176		55.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2E: Subcat P-2E

Runoff = 14.54 cfs @ 12.09 hrs, Volume= 1.080 af, Depth= 5.31"
Routed to Pond dmh21 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
2.051	80	1/2 acre lots, 25% imp, HSG C
0.390	98	Paved parking, HSG C
2.441	83	Weighted Average
1.539		63.03% Pervious Area
0.902		36.97% Impervious Area

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

Summary for Subcatchment P-2F: Subcat P-2F

Runoff = 6.40 cfs @ 12.09 hrs, Volume= 0.476 af, Depth= 5.31"
Routed to Pond dmh20 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.199	98	Paved parking, HSG C
0.875	80	1/2 acre lots, 25% imp, HSG C
1.075	83	Weighted Average
0.657		61.10% Pervious Area
0.418		38.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2G: Subcat P-2G

Runoff = 10.91 cfs @ 12.09 hrs, Volume= 0.807 af, Depth= 5.20"
Routed to Pond dmh23 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.106	74	>75% Grass cover, Good, HSG C
1.531	80	1/2 acre lots, 25% imp, HSG C
0.227	98	Paved parking, HSG C
1.864	82	Weighted Average
1.254		67.30% Pervious Area
0.610		32.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2H: Subcat P-2H

Runoff = 2.98 cfs @ 12.09 hrs, Volume= 0.226 af, Depth= 5.77"
Routed to Pond dmh25 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.178	98	Paved parking, HSG C
0.292	80	1/2 acre lots, 25% imp, HSG C
0.470	87	Weighted Average
0.219		46.62% Pervious Area
0.251		53.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2I: Subcat P-2I

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 6.23"
Routed to Link SP2 : STUDY POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.000	70	Woods, Good, HSG C
0.049	98	Paved parking, HSG C
0.032	80	1/2 acre lots, 25% imp, HSG C
0.081	91	Weighted Average
0.024		29.52% Pervious Area
0.057		70.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2J: Subcat P-2J

Runoff = 2.88 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 4.30"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.069	70	Woods, Good, HSG C
0.432	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.083	80	1/2 acre lots, 25% imp, HSG C
0.584	74	Weighted Average
0.563		96.46% Pervious Area
0.021		3.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3A: Subcat P-3A

Runoff = 17.33 cfs @ 12.22 hrs, Volume= 1.678 af, Depth= 3.98"
Routed to Pond DB-1 : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.264	80	1/2 acre lots, 25% imp, HSG C
0.959	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
2.262	74	>75% Grass cover, Good, HSG C
5.064	71	Weighted Average
4.998		98.69% Pervious Area
0.066		1.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.3	299	0.3000	3.83		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.1	644	Total			

Summary for Subcatchment P-3B: Subcat P-3B

Runoff = 6.71 cfs @ 12.09 hrs, Volume= 0.487 af, Depth= 4.20"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.714	70	Woods, Good, HSG C
0.172	65	Brush, Good, HSG C
0.506	80	1/2 acre lots, 25% imp, HSG C
1.393	73	Weighted Average
1.267		90.91% Pervious Area
0.127		9.09% Impervious Area

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

Summary for Subcatchment P-3C: Subcat P-3C

Runoff = 3.49 cfs @ 12.09 hrs, Volume= 0.266 af, Depth= 5.89"
Routed to Pond dmh56 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG C
0.299	80	1/2 acre lots, 25% imp, HSG C
0.542	88	Weighted Average
0.224		41.33% Pervious Area
0.318		58.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3D: Subcat P-3D

Runoff = 8.76 cfs @ 12.09 hrs, Volume= 0.654 af, Depth= 5.43"
Routed to Pond dmh55 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
1.132	80	1/2 acre lots, 25% imp, HSG C
0.314	98	Paved parking, HSG C
1.446	84	Weighted Average
0.849		58.72% Pervious Area
0.597		41.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr-55 min**

Summary for Subcatchment P-3E: Subcat P-3E

Runoff = 10.08 cfs @ 12.09 hrs, Volume= 0.749 af, Depth= 5.31"
Routed to Pond dmh53 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
1.446	80	1/2 acre lots, 25% imp, HSG C
0.245	98	Paved parking, HSG C
1.691	83	Weighted Average
1.085		64.13% Pervious Area
0.607		35.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-3F: Subcat P-3F

Runoff = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af, Depth= 5.31"
Routed to Pond dmh50 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (ac)	CN	Description
1.379	80	1/2 acre lots, 25% imp, HSG C
0.237	98	Paved parking, HSG C
1.617	83	Weighted Average
1.035		63.99% Pervious Area
0.582		36.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat P-4

Runoff = 3.82 cfs @ 12.09 hrs, Volume= 0.277 af, Depth= 4.41"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
56	61	>75% Grass cover, Good, HSG B
11,411	80	1/2 acre lots, 25% imp, HSG C
6,253	70	Woods, Good, HSG C
15,134	74	>75% Grass cover, Good, HSG C
32,853	75	Weighted Average
30,001		91.32% Pervious Area
2,853		8.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.081 af, Depth= 4.53"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.30"

Area (sf)	CN	Description
2,452	70	Woods, Good, HSG C
2,321	74	>75% Grass cover, Good, HSG C
4,589	80	1/2 acre lots, 25% imp, HSG C
9,362	76	Weighted Average
8,215		87.75% Pervious Area
1,147		12.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TR-55 Min.**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

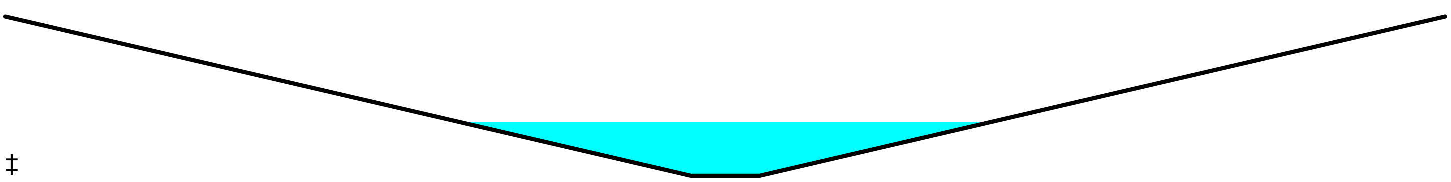
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 1.393 ac, 9.09% Impervious, Inflow Depth = 4.20" for 50-year event
Inflow = 6.71 cfs @ 12.09 hrs, Volume= 0.487 af
Outflow = 3.03 cfs @ 12.30 hrs, Volume= 0.487 af, Atten= 55%, Lag= 12.3 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.41 fps, Min. Travel Time= 29.6 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 84.0 min

Peak Storage= 5,376 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 38.91'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

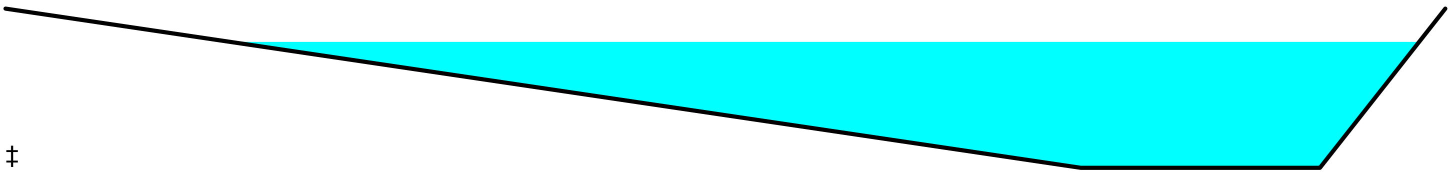
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 5.15" for 50-year event
Inflow = 20.26 cfs @ 12.20 hrs, Volume= 3.267 af
Outflow = 15.65 cfs @ 12.49 hrs, Volume= 3.265 af, Atten= 23%, Lag= 17.2 min
Routed to Pond 1P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.44 fps, Min. Travel Time= 19.8 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 53.9 min

Peak Storage= 18,618 cf @ 12.49 hrs
Average Depth at Peak Storage= 1.19' , Surface Width= 49.76'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 26.65 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 525.0' Slope= 0.0223 '/'
Inlet Invert= 875.70', Outlet Invert= 864.00'



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Summary for Pond 1P: depression

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 5.15" for 50-year event
Inflow = 15.65 cfs @ 12.49 hrs, Volume= 3.265 af
Outflow = 15.63 cfs @ 12.51 hrs, Volume= 3.265 af, Atten= 0%, Lag= 1.3 min
Primary = 15.63 cfs @ 12.51 hrs, Volume= 3.265 af
Routed to Link SP2 : STUDY POINT #2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 863.07' @ 12.51 hrs Surf.Area= 574 sf Storage= 479 cf
Flood Elev= 864.00' Surf.Area= 837 sf Storage= 1,133 cf

Plug-Flow detention time= 0.6 min calculated for 3.265 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (912.5 - 911.9)

Volume	Invert	Avail.Storage	Storage Description
#1	862.00'	1,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
862.00	334	74.0	0	0	334
864.00	837	119.0	1,133	1,133	1,052

Device	Routing	Invert	Outlet Devices
#1	Primary	859.00'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.00' / 858.73' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	862.00'	**24.0" Horiz. beehive** C= 0.600 Limited to weir flow at low heads
#3	Secondary	863.30'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=15.61 cfs @ 12.51 hrs HW=863.06' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 15.61 cfs of 26.48 cfs potential flow)
  └─**2=beehive** (Orifice Controls 15.61 cfs @ 4.97 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=862.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DB-1: detention

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth = 4.71" for 50-year event
Inflow = 43.86 cfs @ 12.11 hrs, Volume= 4.062 af
Outflow = 13.67 cfs @ 12.56 hrs, Volume= 4.042 af, Atten= 69%, Lag= 27.2 min
Primary = 13.67 cfs @ 12.56 hrs, Volume= 4.042 af
Routed to Pond G2 : gabion
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 814.33' @ 12.56 hrs Surf.Area= 21,612 sf Storage= 61,717 cf
Flood Elev= 816.00' Surf.Area= 24,900 sf Storage= 100,504 cf

Plug-Flow detention time= 84.4 min calculated for 4.036 af (99% of inflow)
Center-of-Mass det. time= 82.1 min (895.0 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	811.00'	100,504 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
811.00	15,556	576.0	0	0	15,556
812.00	17,303	594.0	16,422	16,422	17,331
813.00	19,115	613.0	18,201	34,623	19,253
814.00	20,984	632.0	20,042	54,665	21,236
815.00	22,910	651.0	21,940	76,605	23,279
816.00	24,900	670.0	23,898	100,504	25,383

Device	Routing	Invert	Outlet Devices
#1	Primary	811.00'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 811.00' / 810.30' S= 0.0219 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	811.00'	**8.0" Vert. (2) 8" Orifice (2yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	811.90'	**12.0" Vert. (2) 12" Orifice (10yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	813.20'	**24.0" x 24.0" Horiz. 24" Top of Structure** C= 0.600 Limited to weir flow at low heads
#5	Secondary	814.40'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=13.67 cfs @ 12.56 hrs HW=814.33' TW=811.44' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 13.67 cfs @ 7.73 fps)
  ├─**2=(2) 8" Orifice (2yr)** (Passes < 5.71 cfs potential flow)
  ├─**3=(2) 12" Orifice (10yr)** (Passes < 10.51 cfs potential flow)
  └─**4=24" Top of Structure** (Passes < 20.47 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=811.00' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond dmh01: dmh

Inflow Area = 0.382 ac, 45.62% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 2.28 cfs @ 12.09 hrs, Volume= 0.169 af
Outflow = 2.28 cfs @ 12.09 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 2.28 cfs @ 12.09 hrs, Volume= 0.169 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 852.09' @ 12.32 hrs
Flood Elev= 855.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	849.34'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 849.34' / 849.22' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=851.12' TW=851.25' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond dmh05: dmh

Inflow Area = 1.377 ac, 35.23% Impervious, Inflow Depth = 5.20" for 50-year event
Inflow = 8.06 cfs @ 12.09 hrs, Volume= 0.597 af
Outflow = 8.06 cfs @ 12.09 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.0 min
Primary = 8.06 cfs @ 12.09 hrs, Volume= 0.597 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 873.55' @ 12.09 hrs
Flood Elev= 883.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.52'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 868.52' / 865.12' S= 0.0351 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=7.88 cfs @ 12.09 hrs HW=873.36' TW=851.25' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.88 cfs @ 10.03 fps)

Summary for Pond dmh20: dmh

Inflow Area = 1.075 ac, 38.90% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 6.40 cfs @ 12.09 hrs, Volume= 0.476 af
Outflow = 6.40 cfs @ 12.09 hrs, Volume= 0.476 af, Atten= 0%, Lag= 0.0 min
Primary = 6.40 cfs @ 12.09 hrs, Volume= 0.476 af
Routed to Pond dmh21 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 906.56' @ 12.15 hrs
Flood Elev= 907.61'

Device	Routing	Invert	Outlet Devices
#1	Primary	902.74'	**15.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 902.74' / 900.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.11 cfs @ 12.09 hrs HW=905.01' TW=904.39' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.11 cfs @ 2.53 fps)

Summary for Pond dmh21: dmh

Inflow Area = 3.515 ac, 37.56% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 20.95 cfs @ 12.09 hrs, Volume= 1.556 af
Outflow = 20.95 cfs @ 12.09 hrs, Volume= 1.556 af, Atten= 0%, Lag= 0.0 min
Primary = 20.95 cfs @ 12.09 hrs, Volume= 1.556 af
Routed to Pond dmh23 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 905.08' @ 12.12 hrs
Flood Elev= 905.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	899.55'	**24.0" Round Culvert** L= 190.0' Ke= 0.500 Inlet / Outlet Invert= 899.55' / 897.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.24 cfs @ 12.09 hrs HW=904.39' TW=902.78' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 16.24 cfs @ 5.17 fps)

Summary for Pond dmh23: dmh

Inflow Area = 5.379 ac, 35.88% Impervious, Inflow Depth = 5.27" for 50-year event
Inflow = 31.86 cfs @ 12.09 hrs, Volume= 2.363 af
Outflow = 31.86 cfs @ 12.09 hrs, Volume= 2.363 af, Atten= 0%, Lag= 0.0 min
Primary = 31.86 cfs @ 12.09 hrs, Volume= 2.363 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 902.93' @ 12.10 hrs
Flood Elev= 910.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	897.55'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 897.55' / 897.20' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=28.52 cfs @ 12.09 hrs HW=902.78' TW=899.23' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 28.52 cfs @ 9.08 fps)

Summary for Pond dmh25: dmh

Inflow Area = 0.470 ac, 53.38% Impervious, Inflow Depth = 5.77" for 50-year event
Inflow = 2.98 cfs @ 12.09 hrs, Volume= 0.226 af
Outflow = 2.98 cfs @ 12.09 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min
Primary = 2.98 cfs @ 12.09 hrs, Volume= 0.226 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 923.72' @ 12.09 hrs
Flood Elev= 930.54'

Device	Routing	Invert	Outlet Devices
#1	Primary	922.60'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 922.60' / 915.84' S= 0.0697 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.91 cfs @ 12.09 hrs HW=923.69' TW=899.20' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.91 cfs @ 3.70 fps)

Summary for Pond dmh31: dmh

Inflow Area = 0.315 ac, 55.97% Impervious, Inflow Depth = 5.77" for 50-year event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.151 af
Outflow = 2.00 cfs @ 12.09 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.09 hrs, Volume= 0.151 af
Routed to Pond dmh33 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 876.54' @ 12.09 hrs
Flood Elev= 885.77'

Device	Routing	Invert	Outlet Devices
#1	Primary	875.76'	**12.0" Round Culvert** L= 96.0' Ke= 0.500 Inlet / Outlet Invert= 875.76' / 868.05' S= 0.0803 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 12.09 hrs HW=876.53' TW=860.91' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.95 cfs @ 2.99 fps)

Summary for Pond dmh33: dmh

Inflow Area = 0.530 ac, 64.72% Impervious, Inflow Depth = 6.05" for 50-year event
Inflow = 3.46 cfs @ 12.09 hrs, Volume= 0.267 af
Outflow = 3.46 cfs @ 12.09 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min
Primary = 3.46 cfs @ 12.09 hrs, Volume= 0.267 af
Routed to Pond DS-2b : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 861.87' @ 12.55 hrs
Flood Elev= 864.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	859.71'	**15.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.71' / 859.36' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.59 cfs @ 12.09 hrs HW=860.91' TW=860.82' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.59 cfs @ 1.67 fps)

Summary for Pond dmh50: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af
Outflow = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Primary = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af
Routed to Pond dmh51 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 930.93' @ 12.09 hrs
Flood Elev= 933.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	927.65'	**15.0" Round Culvert** L= 102.0' Ke= 0.500 Inlet / Outlet Invert= 927.65' / 919.50' S= 0.0799 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=9.41 cfs @ 12.09 hrs HW=930.81' TW=922.56' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 9.41 cfs @ 7.67 fps)

Summary for Pond dmh51: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af
Outflow = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Primary = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af
Routed to Pond dmh52 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 922.68' @ 12.09 hrs
Flood Elev= 924.04'

Device	Routing	Invert	Outlet Devices
#1	Primary	919.40'	**15.0" Round Culvert** L= 127.0' Ke= 0.500 Inlet / Outlet Invert= 919.40' / 909.50' S= 0.0780 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=9.41 cfs @ 12.09 hrs HW=922.56' TW=895.68' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 9.41 cfs @ 7.67 fps)

Summary for Pond dmh52: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af
Outflow = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Primary = 9.63 cfs @ 12.09 hrs, Volume= 0.716 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 895.80' @ 12.09 hrs
Flood Elev= 914.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.52'	**15.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 892.52' / 887.55' S= 0.0802 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=9.41 cfs @ 12.09 hrs HW=895.68' TW=891.71' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 9.41 cfs @ 7.67 fps)

Summary for Pond dmh53: dmh

Inflow Area = 1.691 ac, 35.87% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 10.08 cfs @ 12.09 hrs, Volume= 0.749 af
Outflow = 10.08 cfs @ 12.09 hrs, Volume= 0.749 af, Atten= 0%, Lag= 0.0 min
Primary = 10.08 cfs @ 12.09 hrs, Volume= 0.749 af
Routed to Pond dmh55 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 918.71' @ 12.09 hrs
Flood Elev= 921.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	916.46'	**18.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 916.46' / 916.16' S= 0.0097 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.85 cfs @ 12.09 hrs HW=918.66' TW=910.75' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 9.85 cfs @ 5.57 fps)

Summary for Pond dmh55: dmh

Inflow Area = 3.137 ac, 38.36% Impervious, Inflow Depth = 5.36" for 50-year event
Inflow = 18.84 cfs @ 12.09 hrs, Volume= 1.402 af
Outflow = 18.84 cfs @ 12.09 hrs, Volume= 1.402 af, Atten= 0%, Lag= 0.0 min
Primary = 18.84 cfs @ 12.09 hrs, Volume= 1.402 af
Routed to Pond dmh56 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 910.96' @ 12.09 hrs
Flood Elev= 911.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	905.32'	**18.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 905.32' / 903.80' S= 0.0211 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=18.40 cfs @ 12.09 hrs HW=910.75' TW=905.61' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 18.40 cfs @ 10.41 fps)

Summary for Pond dmh56: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 5.44" for 50-year event
Inflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Outflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af, Atten= 0%, Lag= 0.0 min
Primary = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Routed to Pond dmh57 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 905.94' @ 12.11 hrs
Flood Elev= 908.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	901.21'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 901.21' / 901.02' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=19.19 cfs @ 12.09 hrs HW=905.61' TW=904.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 19.19 cfs @ 6.11 fps)

Summary for Pond dmh57: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 5.44" for 50-year event
Inflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Outflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af, Atten= 0%, Lag= 0.0 min
Primary = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Routed to Pond dmh58 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 904.09' @ 12.09 hrs
Flood Elev= 908.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	900.92'	**24.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 900.92' / 896.30' S= 0.0476 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=21.80 cfs @ 12.09 hrs HW=904.00' TW=899.78' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 21.80 cfs @ 6.94 fps)

Summary for Pond dmh58: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 5.44" for 50-year event
Inflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Outflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af, Atten= 0%, Lag= 0.0 min
Primary = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Routed to Pond dmh59 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 900.06' @ 12.12 hrs
Flood Elev= 901.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	896.20'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 896.20' / 893.43' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.51 cfs @ 12.09 hrs HW=899.78' TW=897.10' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 18.51 cfs @ 5.89 fps)

Summary for Pond dmh59: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 5.44" for 50-year event
Inflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Outflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af, Atten= 0%, Lag= 0.0 min
Primary = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Routed to Pond dmh60 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 898.19' @ 12.19 hrs
Flood Elev= 909.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	893.33'	**24.0" Round Culvert** L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 893.33' / 892.50' S= 0.0101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.46 cfs @ 12.09 hrs HW=897.10' TW=895.92' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 16.46 cfs @ 5.24 fps)

Summary for Pond dmh60: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 5.44" for 50-year event
Inflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Outflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af, Atten= 0%, Lag= 0.0 min
Primary = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Routed to Pond dmh61 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 897.35' @ 12.15 hrs
Flood Elev= 901.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.40'	**24.0" Round Culvert** L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 892.40' / 889.43' S= 0.0115 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=14.03 cfs @ 12.09 hrs HW=895.92' TW=894.46' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 14.03 cfs @ 4.47 fps)

Summary for Pond dmh61: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 5.44" for 50-year event
Inflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Outflow = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af, Atten= 0%, Lag= 0.0 min
Primary = 22.32 cfs @ 12.09 hrs, Volume= 1.668 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 895.15' @ 12.11 hrs
Flood Elev= 898.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	889.33'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 889.33' / 886.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.78 cfs @ 12.09 hrs HW=894.46' TW=891.71' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 18.78 cfs @ 5.98 fps)

Summary for Pond dmh62: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 5.40" for 50-year event
Inflow = 31.96 cfs @ 12.09 hrs, Volume= 2.384 af
Outflow = 31.96 cfs @ 12.09 hrs, Volume= 2.384 af, Atten= 0%, Lag= 0.0 min
Primary = 31.96 cfs @ 12.09 hrs, Volume= 2.384 af
Routed to Pond dmh69 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 891.90' @ 12.09 hrs
Flood Elev= 902.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.45'	**24.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 886.45' / 884.91' S= 0.0248 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=31.21 cfs @ 12.09 hrs HW=891.71' TW=817.74' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 31.21 cfs @ 9.93 fps)

Summary for Pond dmh69: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 5.40" for 50-year event
Inflow = 31.96 cfs @ 12.09 hrs, Volume= 2.384 af
Outflow = 31.96 cfs @ 12.09 hrs, Volume= 2.384 af, Atten= 0%, Lag= 0.0 min
Primary = 31.96 cfs @ 12.09 hrs, Volume= 2.384 af
Routed to Pond DB-1 : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 817.93' @ 12.09 hrs
Flood Elev= 818.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	812.48'	**24.0" Round Culvert** L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 812.48' / 811.50' S= 0.0338 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=31.21 cfs @ 12.09 hrs HW=817.74' TW=813.05' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 31.21 cfs @ 9.93 fps)

Summary for Pond DS-1a: detention

Inflow Area = 2.476 ac, 30.99% Impervious, Inflow Depth = 5.02" for 50-year event
Inflow = 14.05 cfs @ 12.09 hrs, Volume= 1.036 af
Outflow = 6.32 cfs @ 12.28 hrs, Volume= 1.036 af, Atten= 55%, Lag= 11.6 min
Primary = 6.32 cfs @ 12.28 hrs, Volume= 1.036 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 852.04' @ 12.28 hrs Surf.Area= 3,840 sf Storage= 13,819 cf
Flood Elev= 853.00' Surf.Area= 3,840 sf Storage= 17,124 cf

Plug-Flow detention time= 97.1 min calculated for 1.035 af (100% of inflow)
Center-of-Mass det. time= 97.6 min (902.3 - 804.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	848.00'	0 cf	**96.00'W x 40.00'L x 5.67'H Field A** 21,760 cf Overall - 21,760 cf Embedded = 0 cf x 40.0% Voids
#2A	848.00'	17,124 cf	**retain_it retain_it 5.0'** x 60 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 12 Rows adjusted for 353.3 cf perimeter wall
		17,124 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	847.90'	**15.0" Round Culvert** L= 129.0' Ke= 0.500 Inlet / Outlet Invert= 847.90' / 846.36' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	847.90'	**3.0" Vert. 3" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	849.00'	**8.0" Vert. 8" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	850.15'	**8.0" Vert. 8" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	851.15'	**7.0" Vert. 7" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	852.80'	**4.0' long Overflow Weir** 2 End Contraction(s) 4.0' Crest Height

Primary OutFlow Max=6.31 cfs @ 12.28 hrs HW=852.03' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.31 cfs of 9.75 cfs potential flow)
  ├─**2=3" Orifice (2yr)** (Orifice Controls 0.47 cfs @ 9.64 fps)
  ├─**3=8" Orifice (10yr)** (Orifice Controls 2.76 cfs @ 7.91 fps)
  ├─**4=8" Orifice (25yr)** (Orifice Controls 2.09 cfs @ 5.99 fps)
  ├─**5=7" Orifice (50yr)** (Orifice Controls 0.99 cfs @ 3.69 fps)
  └─**6=Overflow Weir** (Controls 0.00 cfs)

Summary for Pond DS-1b: detention

Inflow Area = 0.581 ac, 6.21% Impervious, Inflow Depth = 4.20" for 50-year event
Inflow = 2.61 cfs @ 12.12 hrs, Volume= 0.203 af
Outflow = 0.61 cfs @ 12.56 hrs, Volume= 0.203 af, Atten= 77%, Lag= 26.5 min
Primary = 0.61 cfs @ 12.56 hrs, Volume= 0.203 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 861.48' @ 12.56 hrs Surf.Area= 1,536 sf Storage= 3,055 cf
Flood Elev= 862.70' Surf.Area= 1,536 sf Storage= 4,684 cf

Plug-Flow detention time= 64.9 min calculated for 0.203 af (100% of inflow)
Center-of-Mass det. time= 64.5 min (888.9 - 824.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**64.00'W x 24.00'L x 4.17'H Field A** 6,400 cf Overall - 6,400 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	4,684 cf	**retain_it retain_it 3.5'** x 24 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 8 Rows adjusted for 135.1 cf perimeter wall
		4,684 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	859.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 859.20' / 858.10' S= 0.0110 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**4.0" Vert. 4" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	862.50'	**12.0" Vert. Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.61 cfs @ 12.56 hrs HW=861.48' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.61 cfs of 4.52 cfs potential flow)
  ├─**2=4" Orifice** (Orifice Controls 0.61 cfs @ 7.00 fps)
  └─**3=Overflow** (Controls 0.00 cfs)

Summary for Pond DS-2a: detention

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth = 5.31" for 50-year event
Inflow = 34.84 cfs @ 12.09 hrs, Volume= 2.589 af
Outflow = 15.22 cfs @ 12.29 hrs, Volume= 2.586 af, Atten= 56%, Lag= 12.1 min
Primary = 15.22 cfs @ 12.29 hrs, Volume= 2.586 af
Routed to Pond G1 : gabion

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 900.99' @ 12.29 hrs Surf.Area= 4,032 sf Storage= 37,021 cf
Flood Elev= 902.66' Storage= 41,196 cf

Plug-Flow detention time= 101.8 min calculated for 2.586 af (100% of inflow)
Center-of-Mass det. time= 100.9 min (899.6 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1	892.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
#2	897.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
		41,196 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	892.00'	**24.0" Round Culvert** L= 46.0' Ke= 0.500 Inlet / Outlet Invert= 892.00' / 890.52' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	892.00'	**5.0" Vert. 5" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	895.40'	**10.0" Vert. 10" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	897.90'	**11.0" Vert. 11" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	899.90'	**10.0" Vert. 10" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	901.45'	**4.0' long Sharp-Crested Weir Overflow (100yr)** 2 End Contraction(s)

Primary OutFlow Max=15.20 cfs @ 12.29 hrs HW=900.98' TW=878.38' (Dynamic Tailwater)
└─**1=Culvert** (Passes 15.20 cfs of 42.73 cfs potential flow)
  ├─**2=5" Orifice (2yr)** (Orifice Controls 1.94 cfs @ 14.26 fps)
  ├─**3=10" Orifice (10yr)** (Orifice Controls 5.97 cfs @ 10.94 fps)
  ├─**4=11" Orifice (25yr)** (Orifice Controls 5.15 cfs @ 7.80 fps)
  ├─**5=10" Orifice (50yr)** (Orifice Controls 2.14 cfs @ 3.92 fps)
  └─**6=Sharp-Crested Weir Overflow (100yr)**(Controls 0.00 cfs)

Summary for Pond DS-2b: detention

Inflow Area = 2.278 ac, 16.89% Impervious, Inflow Depth = 4.49" for 50-year event
Inflow = 11.52 cfs @ 12.09 hrs, Volume= 0.852 af
Outflow = 2.56 cfs @ 12.51 hrs, Volume= 0.849 af, Atten= 78%, Lag= 25.3 min
Primary = 2.56 cfs @ 12.51 hrs, Volume= 0.849 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 861.86' @ 12.51 hrs Surf.Area= 5,632 sf Storage= 13,262 cf
Flood Elev= 862.70' Surf.Area= 5,632 sf Storage= 17,435 cf

Plug-Flow detention time= 79.7 min calculated for 0.849 af (100% of inflow)
Center-of-Mass det. time= 77.4 min (888.6 - 811.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**88.00'W x 64.00'L x 4.17'H Field A** 23,467 cf Overall - 23,467 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	17,435 cf	**retain_it retain_it 3.5'** x 88 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 11 Rows adjusted for 233.3 cf perimeter wall
		17,435 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	858.90'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 858.90' / 858.44' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**8.0" Vert. 8" Orifice** C= 0.600 Limited to weir flow at low heads

#3	Device 1	862.55'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.56 cfs @ 12.51 hrs HW=861.86' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.56 cfs of 5.93 cfs potential flow)
  ├─**2=8" Orifice** (Orifice Controls 2.56 cfs @ 7.34 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DW-1: House Drywell

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**7.67'W x 12.50'L x 3.50'H Field A** 0.008 af Overall - 0.004 af Embedded = 0.004 af x 40.0% Voids
#2A	0.67'	0.003 af	**Shea Dry Well 1000gal** Inside #1 Inside= 62.0"W x 30.0"H => 12.86 sf x 10.00'L = 128.6 cf Outside= 68.0"W x 34.0"H => 15.80 sf x 10.50'L = 165.9 cf
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Summary for Pond G1: gabion

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth > 5.30" for 50-year event
Inflow = 15.22 cfs @ 12.29 hrs, Volume= 2.586 af
Outflow = 15.33 cfs @ 12.30 hrs, Volume= 2.586 af, Atten= 0%, Lag= 0.5 min
Primary = 15.33 cfs @ 12.30 hrs, Volume= 2.586 af
Routed to Reach R-02 : Routing through wetland/swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 878.39' @ 12.30 hrs Surf.Area= 369 sf Storage= 271 cf
Flood Elev= 880.00' Surf.Area= 2 sf Storage= 444 cf

Plug-Flow detention time= 0.1 min calculated for 2.586 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (899.8 - 899.6)

Volume	Invert	Avail.Storage	Storage Description
#1	877.50'	442 cf	**18.0" Round Pipe Storage** L= 250.0'
#2	879.00'	2 cf	**1.50'D x 1.00'H Vertical Cone/Cylinder**
		444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	877.50'	**2.0" Horiz. invert orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	878.25'	**2.0" Vert. spring line orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	880.00'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=15.32 cfs @ 12.30 hrs HW=878.39' TW=876.81' (Dynamic Tailwater)
├─**1=invert orifices** (Orifice Controls 12.35 cfs @ 4.53 fps)
├─**2=spring line orifices** (Orifice Controls 2.97 cfs @ 1.25 fps)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Pond G2: gabion

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth > 4.68" for 50-year event
Inflow = 13.67 cfs @ 12.56 hrs, Volume= 4.042 af
Outflow = 13.66 cfs @ 12.57 hrs, Volume= 4.042 af, Atten= 0%, Lag= 0.9 min
Primary = 13.66 cfs @ 12.57 hrs, Volume= 4.042 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 811.44' @ 12.57 hrs Surf.Area= 102 sf Storage= 116 cf
Flood Elev= 811.80' Storage= 141 cf

Plug-Flow detention time= 0.1 min calculated for 4.036 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (895.1 - 895.0)

Volume	Invert	Avail.Storage	Storage Description
#1	810.30'	141 cf	**18.0" Round Pipe Storage** L= 80.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.30'	**2.0" Horiz. invert orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	811.05'	**2.0" Vert. spring line orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	811.80'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=13.66 cfs @ 12.57 hrs HW=811.44' TW=0.00' (Dynamic Tailwater)
—**1=invert orifices** (Orifice Controls 8.98 cfs @ 5.15 fps)
—**2=spring line orifices** (Orifice Controls 4.68 cfs @ 2.68 fps)
—**3=overflow grates** (Controls 0.00 cfs)

Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.491 ac, 20.86% Impervious, Inflow Depth = 4.59" for 50-year event
Inflow = 21.08 cfs @ 12.15 hrs, Volume= 2.483 af
Primary = 21.08 cfs @ 12.15 hrs, Volume= 2.483 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 9.972 ac, 29.60% Impervious, Inflow Depth > 5.00" for 50-year event
Inflow = 18.31 cfs @ 12.50 hrs, Volume= 4.156 af
Primary = 18.31 cfs @ 12.50 hrs, Volume= 4.156 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 11.753 ac, 19.54% Impervious, Inflow Depth > 4.62" for 50-year event
Inflow = 16.35 cfs @ 12.47 hrs, Volume= 4.528 af
Primary = 16.35 cfs @ 12.47 hrs, Volume= 4.528 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 0.754 ac, 8.68% Impervious, Inflow Depth = 4.41" for 50-year event
Inflow = 3.82 cfs @ 12.09 hrs, Volume= 0.277 af
Primary = 3.82 cfs @ 12.09 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.215 ac, 12.25% Impervious, Inflow Depth = 4.53" for 50-year event
Inflow = 1.11 cfs @ 12.09 hrs, Volume= 0.081 af
Primary = 1.11 cfs @ 12.09 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1A: Subcat P-1A Runoff Area=3.097 ac 14.03% Impervious Runoff Depth=5.57"
Tc=10.0 min CN=74 Runoff=17.39 cfs 1.438 af

SubcatchmentP-1B: Subcat P-1B Runoff Area=25,318 sf 6.21% Impervious Runoff Depth=5.45"
Flow Length=315' Tc=8.2 min CN=73 Runoff=3.39 cfs 0.264 af

SubcatchmentP-1C: Subcat P-1C Runoff Area=0.337 ac 34.38% Impervious Runoff Depth=6.06"
Tc=6.0 min CN=78 Runoff=2.31 cfs 0.170 af

SubcatchmentP-1D: Subcat P-1D Runoff Area=31,222 sf 15.07% Impervious Runoff Depth=5.82"
Tc=6.0 min CN=76 Runoff=4.74 cfs 0.347 af

SubcatchmentP-1E: Subcat P-1E Runoff Area=0.382 ac 45.62% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=83 Runoff=2.83 cfs 0.212 af

SubcatchmentP-1F: Subcat P-1F Runoff Area=1.377 ac 35.23% Impervious Runoff Depth=6.55"
Tc=6.0 min CN=82 Runoff=10.05 cfs 0.751 af

SubcatchmentP-2A: Subcat P-2A Runoff Area=1.764 ac 18.64% Impervious Runoff Depth=5.94"
Tc=6.0 min CN=77 Runoff=11.88 cfs 0.873 af

SubcatchmentP-2B: Subcat P-2B Runoff Area=1.164 ac 1.79% Impervious Runoff Depth=5.09"
Tc=6.0 min CN=70 Runoff=6.80 cfs 0.494 af

SubcatchmentP-2C: Subcat P-2C Runoff Area=0.216 ac 77.47% Impervious Runoff Depth=7.88"
Tc=6.0 min CN=93 Runoff=1.76 cfs 0.142 af

SubcatchmentP-2D: Subcat P-2D Runoff Area=0.315 ac 55.97% Impervious Runoff Depth=7.15"
Tc=6.0 min CN=87 Runoff=2.44 cfs 0.187 af

SubcatchmentP-2E: Subcat P-2E Runoff Area=2.441 ac 36.97% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=83 Runoff=18.06 cfs 1.356 af

SubcatchmentP-2F: Subcat P-2F Runoff Area=1.075 ac 38.90% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=83 Runoff=7.95 cfs 0.597 af

SubcatchmentP-2G: Subcat P-2G Runoff Area=1.864 ac 32.70% Impervious Runoff Depth=6.55"
Tc=6.0 min CN=82 Runoff=13.60 cfs 1.017 af

SubcatchmentP-2H: Subcat P-2H Runoff Area=0.470 ac 53.38% Impervious Runoff Depth=7.15"
Tc=6.0 min CN=87 Runoff=3.65 cfs 0.280 af

SubcatchmentP-2I: Subcat P-2I Runoff Area=0.081 ac 70.48% Impervious Runoff Depth=7.64"
Tc=6.0 min CN=91 Runoff=0.65 cfs 0.051 af

SubcatchmentP-2J: Subcat P-2J Runoff Area=0.584 ac 3.54% Impervious Runoff Depth=5.57"
Tc=6.0 min CN=74 Runoff=3.72 cfs 0.271 af

SubcatchmentP-3A: Subcat P-3A Runoff Area=5.064 ac 1.31% Impervious Runoff Depth=5.21"
Flow Length=644' Tc=16.1 min CN=71 Runoff=22.70 cfs 2.199 af

SubcatchmentP-3B: Subcat P-3B Runoff Area=1.393 ac 9.09% Impervious Runoff Depth=5.45"
Tc=6.0 min CN=73 Runoff=8.69 cfs 0.633 af

SubcatchmentP-3C: Subcat P-3C Runoff Area=0.542 ac 58.67% Impervious Runoff Depth=7.27"
Tc=6.0 min CN=88 Runoff=4.26 cfs 0.329 af

SubcatchmentP-3D: Subcat P-3D Runoff Area=1.446 ac 41.28% Impervious Runoff Depth=6.79"
Tc=6.0 min CN=84 Runoff=10.84 cfs 0.818 af

SubcatchmentP-3E: Subcat P-3E Runoff Area=1.691 ac 35.87% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=83 Runoff=12.51 cfs 0.940 af

Subcatchment P-3F: Subcat P-3F
Runoff Area=1.617 ac 36.01% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=83 Runoff=11.96 cfs 0.898 af

Subcatchment P-4: Subcat P-4
Runoff Area=32,853 sf 8.68% Impervious Runoff Depth=5.70"
Tc=6.0 min CN=75 Runoff=4.90 cfs 0.358 af

Subcatchment P-5: Subcat P-5
Runoff Area=9,362 sf 12.25% Impervious Runoff Depth=5.82"
Tc=6.0 min CN=76 Runoff=1.42 cfs 0.104 af

Reach R-01: Routing to wetlands
Avg. Flow Depth=0.39' Max Vel=0.44 fps Inflow=8.69 cfs 0.633 af
n=0.400 L=722.0' S=0.1087 '/' Capacity=43.77 cfs Outflow=4.11 cfs 0.633 af

Reach R-02: Routing through wetland/swale
Avg. Flow Depth=1.40' Max Vel=0.48 fps Inflow=41.52 cfs 4.119 af
n=0.400 L=525.0' S=0.0223 '/' Capacity=26.65 cfs Outflow=22.59 cfs 4.117 af

Pond 1P: depression
Peak Elev=863.58' Storage=809 cf Inflow=22.59 cfs 4.117 af
Primary=19.02 cfs 4.018 af Secondary=3.59 cfs 0.098 af Outflow=22.61 cfs 4.117 af

Pond DB-1: detention
Peak Elev=814.93' Storage=74,973 cf Inflow=55.40 cfs 5.183 af
Primary=15.17 cfs 4.902 af Secondary=8.12 cfs 0.260 af Outflow=23.29 cfs 5.162 af

Pond dmh01: dmh
Peak Elev=852.96' Inflow=2.83 cfs 0.212 af
12.0" Round Culvert n=0.013 L=12.0' S=0.0100 '/' Outflow=2.83 cfs 0.212 af

Pond dmh05: dmh
Peak Elev=877.63' Inflow=10.05 cfs 0.751 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0351 '/' Outflow=10.05 cfs 0.751 af

Pond dmh20: dmh
Peak Elev=911.33' Inflow=7.95 cfs 0.597 af
15.0" Round Culvert n=0.013 L=205.0' S=0.0119 '/' Outflow=7.95 cfs 0.597 af

Pond dmh21: dmh
Peak Elev=909.33' Inflow=26.01 cfs 1.953 af
24.0" Round Culvert n=0.013 L=190.0' S=0.0100 '/' Outflow=26.01 cfs 1.953 af

Pond dmh23: dmh
Peak Elev=906.64' Inflow=39.60 cfs 2.970 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=39.60 cfs 2.970 af

Pond dmh25: dmh
Peak Elev=924.03' Inflow=3.65 cfs 0.280 af
12.0" Round Culvert n=0.013 L=97.0' S=0.0697 '/' Outflow=3.65 cfs 0.280 af

Pond dmh31: dmh
Peak Elev=876.67' Inflow=2.44 cfs 0.187 af
12.0" Round Culvert n=0.013 L=96.0' S=0.0803 '/' Outflow=2.44 cfs 0.187 af

Pond dmh33: dmh
Peak Elev=862.69' Inflow=4.21 cfs 0.329 af
15.0" Round Culvert n=0.013 L=27.0' S=0.0130 '/' Outflow=4.21 cfs 0.329 af

Pond dmh50: dmh
Peak Elev=932.36' Inflow=11.96 cfs 0.898 af
15.0" Round Culvert n=0.013 L=102.0' S=0.0799 '/' Outflow=11.96 cfs 0.898 af

Pond dmh51: dmh
Peak Elev=924.11' Inflow=11.96 cfs 0.898 af
15.0" Round Culvert n=0.013 L=127.0' S=0.0780 '/' Outflow=11.96 cfs 0.898 af

Pond dmh52: dmh
Peak Elev=897.50' Inflow=11.96 cfs 0.898 af
15.0" Round Culvert n=0.013 L=62.0' S=0.0802 '/' Outflow=11.96 cfs 0.898 af

Pond dmh53: dmh
Peak Elev=919.36' Inflow=12.51 cfs 0.940 af
18.0" Round Culvert n=0.013 L=31.0' S=0.0097 '/' Outflow=12.51 cfs 0.940 af

Pond dmh55: dmh
Peak Elev=913.60' Inflow=23.35 cfs 1.758 af
18.0" Round Culvert n=0.013 L=72.0' S=0.0211 '/' Outflow=23.35 cfs 1.758 af

Pond dmh56: dmh
Peak Elev=908.07' Inflow=27.60 cfs 2.086 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0095 '/' Outflow=27.60 cfs 2.086 af

Pond dmh57: dmh
Peak Elev=906.05' Inflow=27.60 cfs 2.086 af
24.0" Round Culvert n=0.013 L=97.0' S=0.0476 '/' Outflow=27.60 cfs 2.086 af

Pond dmh58: dmh Peak Elev=905.46' Inflow=27.60 cfs 2.086 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=27.60 cfs 2.086 af

Pond dmh59: dmh Peak Elev=903.89' Inflow=27.60 cfs 2.086 af
24.0" Round Culvert n=0.013 L=82.0' S=0.0101 '/' Outflow=27.60 cfs 2.086 af

Pond dmh60: dmh Peak Elev=902.62' Inflow=27.60 cfs 2.086 af
24.0" Round Culvert n=0.013 L=258.0' S=0.0115 '/' Outflow=27.60 cfs 2.086 af

Pond dmh61: dmh Peak Elev=899.25' Inflow=27.60 cfs 2.086 af
24.0" Round Culvert n=0.013 L=278.0' S=0.0100 '/' Outflow=27.60 cfs 2.086 af

Pond dmh62: dmh Peak Elev=894.27' Inflow=39.56 cfs 2.984 af
24.0" Round Culvert n=0.013 L=62.0' S=0.0248 '/' Outflow=39.56 cfs 2.984 af

Pond dmh69: dmh Peak Elev=820.29' Inflow=39.56 cfs 2.984 af
24.0" Round Culvert n=0.013 L=29.0' S=0.0338 '/' Outflow=39.56 cfs 2.984 af

Pond DS-1a: detention Peak Elev=852.86' Storage=16,661 cf Inflow=17.61 cfs 1.311 af
Outflow=8.02 cfs 1.311 af

Pond DS-1b: detention Peak Elev=862.29' Storage=4,130 cf Inflow=3.39 cfs 0.264 af
Outflow=0.72 cfs 0.264 af

Pond DS-2a: detention Peak Elev=902.60' Storage=41,196 cf Inflow=43.25 cfs 3.250 af
Outflow=34.60 cfs 3.246 af

Pond DS-2b: detention Peak Elev=862.67' Storage=17,285 cf Inflow=14.72 cfs 1.094 af
Outflow=3.52 cfs 1.090 af

Pond DW-1: House Drywell Peak Elev=0.00' Storage=0.000 af

Pond G1: gabion Peak Elev=879.66' Storage=443 cf Inflow=34.60 cfs 3.246 af
Outflow=34.38 cfs 3.246 af

Pond G2: gabion Peak Elev=811.58' Storage=129 cf Inflow=15.17 cfs 4.902 af
Outflow=15.17 cfs 4.902 af

Link SP1: STUDY POINT #1 Inflow=27.01 cfs 3.183 af
Primary=27.01 cfs 3.183 af

Link SP2: STUDY POINT #2 Inflow=25.98 cfs 5.259 af
Primary=25.98 cfs 5.259 af

Link SP3: STUDY POINT #3 Inflow=26.97 cfs 5.795 af
Primary=26.97 cfs 5.795 af

Link SP4: STUDY POINT #4 Inflow=4.90 cfs 0.358 af
Primary=4.90 cfs 0.358 af

Link SP5: STUDY POINT #5 Inflow=1.42 cfs 0.104 af
Primary=1.42 cfs 0.104 af

Total Runoff Area = 29.185 ac Runoff Volume = 14.730 af Average Runoff Depth = 6.06"
77.07% Pervious = 22.491 ac 22.93% Impervious = 6.693 ac

Summary for Subcatchment P-1A: Subcat P-1A

Runoff = 17.39 cfs @ 12.14 hrs, Volume= 1.438 af, Depth= 5.57"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.021	74	>75% Grass cover, Good, HSG C
0.017	61	>75% Grass cover, Good, HSG B
0.188	55	Woods, Good, HSG B
0.290	70	1/2 acre lots, 25% imp, HSG B
1.448	80	1/2 acre lots, 25% imp, HSG C
1.132	70	Woods, Good, HSG C
3.097	74	Weighted Average
2.662		85.97% Pervious Area
0.434		14.03% Impervious Area

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

Summary for Subcatchment P-1B: Subcat P-1B

Runoff = 3.39 cfs @ 12.12 hrs, Volume= 0.264 af, Depth= 5.45"
Routed to Pond DS-1b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
43	98	Paved parking, HSG B
3,925	61	>75% Grass cover, Good, HSG B
760	70	1/2 acre lots, 25% imp, HSG B
5,357	80	1/2 acre lots, 25% imp, HSG C
3,003	70	Woods, Good, HSG C
12,230	74	>75% Grass cover, Good, HSG C
25,318	73	Weighted Average
23,746		93.79% Pervious Area
1,572		6.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0960	0.13		**Sheet Flow, A-B** Grass: Bermuda n= 0.410 P2= 3.28"
1.4	183	0.0960	2.17		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.2	82	0.0840	5.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	315	Total			

Summary for Subcatchment P-1C: Subcat P-1C

Runoff = 2.31 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 6.06"
Routed to Link SP1 : STUDY POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.077	61	>75% Grass cover, Good, HSG B
0.002	98	Paved parking, HSG C
0.066	98	Paved parking, HSG B
0.035	70	1/2 acre lots, 25% imp, HSG B
0.156	80	1/2 acre lots, 25% imp, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.337	78	Weighted Average
0.221		65.62% Pervious Area
0.116		34.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-1D: Subcat P-1D

Runoff = 4.74 cfs @ 12.09 hrs, Volume= 0.347 af, Depth= 5.82"
Routed to Pond DS-1a : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
4,573	61	>75% Grass cover, Good, HSG B
2,625	98	Paved parking, HSG B
1	70	1/2 acre lots, 25% imp, HSG B
3,514	80	1/2 acre lots, 25% imp, HSG C
1,200	98	Paved parking, HSG C
19,309	74	>75% Grass cover, Good, HSG C
31,222	76	Weighted Average
26,518		84.93% Pervious Area
4,704		15.07% Impervious Area

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

Summary for Subcatchment P-1E: Subcat P-1E

Runoff = 2.83 cfs @ 12.09 hrs, Volume= 0.212 af, Depth= 6.67"
Routed to Pond dmh01 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.031	98	Paved parking, HSG B
0.046	61	>75% Grass cover, Good, HSG B
0.118	74	>75% Grass cover, Good, HSG C
0.129	98	Paved parking, HSG C
0.059	80	1/2 acre lots, 25% imp, HSG C
0.382	83	Weighted Average
0.208		54.38% Pervious Area
0.174		45.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-1F: Subcat P-1F

Runoff = 10.05 cfs @ 12.09 hrs, Volume= 0.751 af, Depth= 6.55"
Routed to Pond dmh05 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
1.135	80	1/2 acre lots, 25% imp, HSG C
0.201	98	Paved parking, HSG C
0.041	74	>75% Grass cover, Good, HSG C
1.377	82	Weighted Average
0.892		64.77% Pervious Area
0.485		35.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2A: Subcat P-2A

Runoff = 11.88 cfs @ 12.09 hrs, Volume= 0.873 af, Depth= 5.94"
Routed to Reach R-02 : Routing through wetland/swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.449	70	Woods, Good, HSG C
1.315	80	1/2 acre lots, 25% imp, HSG C
1.764	77	Weighted Average
1.435		81.36% Pervious Area
0.329		18.64% Impervious Area

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

Summary for Subcatchment P-2B: Subcat P-2B

Runoff = 6.80 cfs @ 12.09 hrs, Volume= 0.494 af, Depth= 5.09"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.512	70	Woods, Good, HSG C
0.254	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.314	65	Brush, Good, HSG C
0.084	80	1/2 acre lots, 25% imp, HSG C
1.164	70	Weighted Average
1.143		98.21% Pervious Area
0.021		1.79% Impervious Area

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

Summary for Subcatchment P-2C: Subcat P-2C

Runoff = 1.76 cfs @ 12.09 hrs, Volume= 0.142 af, Depth= 7.88"
Routed to Pond dmh33 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.000	74	>75% Grass cover, Good, HSG C
0.151	98	Paved parking, HSG C
0.065	80	1/2 acre lots, 25% imp, HSG C
0.216	93	Weighted Average
0.049		22.53% Pervious Area
0.167		77.47% Impervious Area

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

Summary for Subcatchment P-2D: Subcat P-2D

Runoff = 2.44 cfs @ 12.09 hrs, Volume= 0.187 af, Depth= 7.15"
Routed to Pond dmh31 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.116	74	>75% Grass cover, Good, HSG C
0.169	98	Paved parking, HSG C
0.030	80	1/2 acre lots, 25% imp, HSG C
0.315	87	Weighted Average
0.138		44.03% Pervious Area
0.176		55.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2E: Subcat P-2E

Runoff = 18.06 cfs @ 12.09 hrs, Volume= 1.356 af, Depth= 6.67"
Routed to Pond dmh21 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
2.051	80	1/2 acre lots, 25% imp, HSG C
0.390	98	Paved parking, HSG C
2.441	83	Weighted Average
1.539		63.03% Pervious Area
0.902		36.97% Impervious Area

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

Summary for Subcatchment P-2F: Subcat P-2F

Runoff = 7.95 cfs @ 12.09 hrs, Volume= 0.597 af, Depth= 6.67"
Routed to Pond dmh20 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.199	98	Paved parking, HSG C
0.875	80	1/2 acre lots, 25% imp, HSG C
1.075	83	Weighted Average
0.657		61.10% Pervious Area
0.418		38.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2G: Subcat P-2G

Runoff = 13.60 cfs @ 12.09 hrs, Volume= 1.017 af, Depth= 6.55"
Routed to Pond dmh23 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.106	74	>75% Grass cover, Good, HSG C
1.531	80	1/2 acre lots, 25% imp, HSG C
0.227	98	Paved parking, HSG C
1.864	82	Weighted Average
1.254		67.30% Pervious Area
0.610		32.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2H: Subcat P-2H

Runoff = 3.65 cfs @ 12.09 hrs, Volume= 0.280 af, Depth= 7.15"
Routed to Pond dmh25 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.178	98	Paved parking, HSG C
0.292	80	1/2 acre lots, 25% imp, HSG C
0.470	87	Weighted Average
0.219		46.62% Pervious Area
0.251		53.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2I: Subcat P-2I

Runoff = 0.65 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 7.64"
Routed to Link SP2 : STUDY POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.000	70	Woods, Good, HSG C
0.049	98	Paved parking, HSG C
0.032	80	1/2 acre lots, 25% imp, HSG C
0.081	91	Weighted Average
0.024		29.52% Pervious Area
0.057		70.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-2J: Subcat P-2J

Runoff = 3.72 cfs @ 12.09 hrs, Volume= 0.271 af, Depth= 5.57"
Routed to Pond DS-2b : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.069	70	Woods, Good, HSG C
0.432	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.083	80	1/2 acre lots, 25% imp, HSG C
0.584	74	Weighted Average
0.563		96.46% Pervious Area
0.021		3.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3A: Subcat P-3A

Runoff = 22.70 cfs @ 12.22 hrs, Volume= 2.199 af, Depth= 5.21"
Routed to Pond DB-1 : detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.264	80	1/2 acre lots, 25% imp, HSG C
0.959	70	Woods, Good, HSG C
1.578	65	Brush, Good, HSG C
2.262	74	>75% Grass cover, Good, HSG C
5.064	71	Weighted Average
4.998		98.69% Pervious Area
0.066		1.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0180	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.0	91	0.0850	1.46		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.1	204	0.1800	2.97		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
1.3	299	0.3000	3.83		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.1	644	Total			

Summary for Subcatchment P-3B: Subcat P-3B

Runoff = 8.69 cfs @ 12.09 hrs, Volume= 0.633 af, Depth= 5.45"
Routed to Reach R-01 : Routing to wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.714	70	Woods, Good, HSG C
0.172	65	Brush, Good, HSG C
0.506	80	1/2 acre lots, 25% imp, HSG C
1.393	73	Weighted Average
1.267		90.91% Pervious Area
0.127		9.09% Impervious Area

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

Summary for Subcatchment P-3C: Subcat P-3C

Runoff = 4.26 cfs @ 12.09 hrs, Volume= 0.329 af, Depth= 7.27"
Routed to Pond dmh56 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG C
0.299	80	1/2 acre lots, 25% imp, HSG C
0.542	88	Weighted Average
0.224		41.33% Pervious Area
0.318		58.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-3D: Subcat P-3D

Runoff = 10.84 cfs @ 12.09 hrs, Volume= 0.818 af, Depth= 6.79"
Routed to Pond dmh55 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
1.132	80	1/2 acre lots, 25% imp, HSG C
0.314	98	Paved parking, HSG C
1.446	84	Weighted Average
0.849		58.72% Pervious Area
0.597		41.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr-55 min**

Summary for Subcatchment P-3E: Subcat P-3E

Runoff = 12.51 cfs @ 12.09 hrs, Volume= 0.940 af, Depth= 6.67"
Routed to Pond dmh53 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
1.446	80	1/2 acre lots, 25% imp, HSG C
0.245	98	Paved parking, HSG C
1.691	83	Weighted Average
1.085		64.13% Pervious Area
0.607		35.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-3F: Subcat P-3F

Runoff = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af, Depth= 6.67"
Routed to Pond dmh50 : dmh

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (ac)	CN	Description
1.379	80	1/2 acre lots, 25% imp, HSG C
0.237	98	Paved parking, HSG C
1.617	83	Weighted Average
1.035		63.99% Pervious Area
0.582		36.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat P-4

Runoff = 4.90 cfs @ 12.09 hrs, Volume= 0.358 af, Depth= 5.70"
Routed to Link SP4 : STUDY POINT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
56	61	>75% Grass cover, Good, HSG B
11,411	80	1/2 acre lots, 25% imp, HSG C
6,253	70	Woods, Good, HSG C
15,134	74	>75% Grass cover, Good, HSG C
32,853	75	Weighted Average
30,001		91.32% Pervious Area
2,853		8.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, tr55 min**

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.42 cfs @ 12.09 hrs, Volume= 0.104 af, Depth= 5.82"
Routed to Link SP5 : STUDY POINT #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.72"

Area (sf)	CN	Description
2,452	70	Woods, Good, HSG C
2,321	74	>75% Grass cover, Good, HSG C
4,589	80	1/2 acre lots, 25% imp, HSG C
9,362	76	Weighted Average
8,215		87.75% Pervious Area
1,147		12.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TR-55 Min.**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach R-01: Routing to wetlands

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

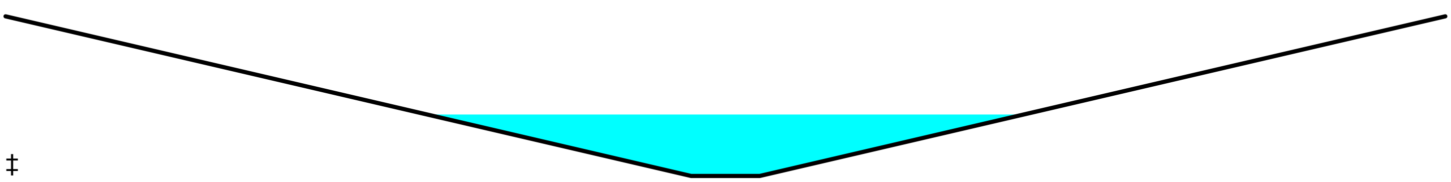
This reach demonstrates a procedure for performing a shallow concetrated flow routing through woods. In this case, the "reach" is defined as a channel with very low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 1.393 ac, 9.09% Impervious, Inflow Depth = 5.45" for 100-year event
Inflow = 8.69 cfs @ 12.09 hrs, Volume= 0.633 af
Outflow = 4.11 cfs @ 12.27 hrs, Volume= 0.633 af, Atten= 53%, Lag= 10.9 min
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.44 fps, Min. Travel Time= 27.4 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 79.5 min

Peak Storage= 6,752 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 43.53'
Bank-Full Depth= 1.00' Flow Area= 55.0 sf, Capacity= 43.77 cfs

5.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 '/' Top Width= 105.00'
Length= 722.0' Slope= 0.1087 '/'
Inlet Invert= 889.50', Outlet Invert= 811.00'



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Summary for Reach R-02: Routing through wetland/swale

A subcatchment performs runoff calculations, including the associated Tc anc CN determinations. It does not have any facility for routing an inflow hydrograph from another source. However, a reach may be used to perform this type of specialized routing.

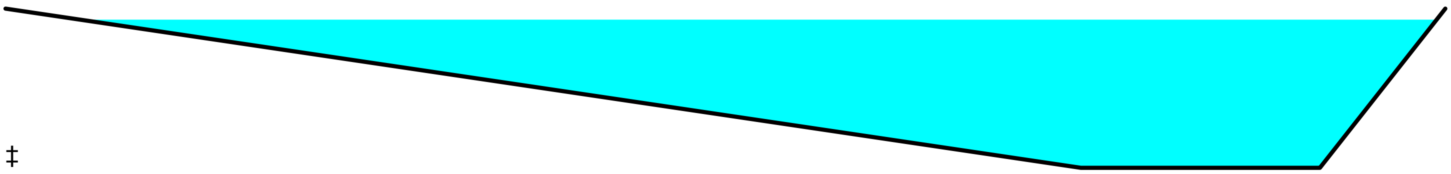
This reach demonstrates a procedure for performing a shallow concetrated flow routing through the wooded wetland/swale adjacent to the stone wall. In this case, the "reach" is defined as a channel with low side slopes. The Manning's value of 0.40 is selected from the table of sheet flow roughness coefficients, which is comparable to the Manning's value for "woods with light underbrush".

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 6.49" for 100-year event
Inflow = 41.52 cfs @ 12.20 hrs, Volume= 4.119 af
Outflow = 22.59 cfs @ 12.37 hrs, Volume= 4.117 af, Atten= 46%, Lag= 10.3 min
Routed to Pond 1P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.48 fps, Min. Travel Time= 18.1 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 50.9 min

Peak Storage= 24,455 cf @ 12.37 hrs
Average Depth at Peak Storage= 1.40' , Surface Width= 56.75'
Bank-Full Depth= 1.50' Flow Area= 52.7 sf, Capacity= 26.65 cfs

10.00' x 1.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 3.5 '/' Top Width= 60.25'
Length= 525.0' Slope= 0.0223 '/'
Inlet Invert= 875.70', Outlet Invert= 864.00'



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Summary for Pond 1P: depression

Inflow Area = 7.613 ac, 32.96% Impervious, Inflow Depth > 6.49" for 100-year event
Inflow = 22.59 cfs @ 12.37 hrs, Volume= 4.117 af
Outflow = 22.61 cfs @ 12.39 hrs, Volume= 4.117 af, Atten= 0%, Lag= 1.2 min
Primary = 19.02 cfs @ 12.39 hrs, Volume= 4.018 af
Routed to Link SP2 : STUDY POINT #2
Secondary = 3.59 cfs @ 12.39 hrs, Volume= 0.098 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 863.58' @ 12.39 hrs Surf.Area= 713 sf Storage= 809 cf
Flood Elev= 864.00' Surf.Area= 837 sf Storage= 1,133 cf

Plug-Flow detention time= 0.6 min calculated for 4.111 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (897.2 - 896.7)

Volume	Invert	Avail.Storage	Storage Description
#1	862.00'	1,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
862.00	334	74.0	0	0	334
864.00	837	119.0	1,133	1,133	1,052

Device	Routing	Invert	Outlet Devices
#1	Primary	859.00'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.00' / 858.73' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	862.00'	**24.0" Horiz. beehive** C= 0.600 Limited to weir flow at low heads
#3	Secondary	863.30'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=19.01 cfs @ 12.39 hrs HW=863.58' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 19.01 cfs of 28.62 cfs potential flow)
↑—**2=beehive** (Orifice Controls 19.01 cfs @ 6.05 fps)

Secondary OutFlow Max=3.54 cfs @ 12.39 hrs HW=863.58' TW=0.00' (Dynamic Tailwater)
↑—**3=Broad-Crested Rectangular Weir** (Weir Controls 3.54 cfs @ 1.27 fps)

Summary for Pond DB-1: detention

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth = 6.00" for 100-year event
Inflow = 55.40 cfs @ 12.11 hrs, Volume= 5.183 af
Outflow = 23.29 cfs @ 12.47 hrs, Volume= 5.162 af, Atten= 58%, Lag= 21.8 min
Primary = 15.17 cfs @ 12.47 hrs, Volume= 4.902 af
Routed to Pond G2 : gabion
Secondary = 8.12 cfs @ 12.47 hrs, Volume= 0.260 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 814.93' @ 12.47 hrs Surf.Area= 22,770 sf Storage= 74,973 cf
Flood Elev= 816.00' Surf.Area= 24,900 sf Storage= 100,504 cf

Plug-Flow detention time= 80.1 min calculated for 5.162 af (100% of inflow)
Center-of-Mass det. time= 77.6 min (884.2 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1	811.00'	100,504 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
811.00	15,556	576.0	0	0	15,556
812.00	17,303	594.0	16,422	16,422	17,331
813.00	19,115	613.0	18,201	34,623	19,253
814.00	20,984	632.0	20,042	54,665	21,236
815.00	22,910	651.0	21,940	76,605	23,279
816.00	24,900	670.0	23,898	100,504	25,383

Device	Routing	Invert	Outlet Devices
#1	Primary	811.00'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 811.00' / 810.30' S= 0.0219 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	811.00'	**8.0" Vert. (2) 8" Orifice (2yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	811.90'	**12.0" Vert. (2) 12" Orifice (10yr) X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	813.20'	**24.0" x 24.0" Horiz. 24" Top of Structure** C= 0.600 Limited to weir flow at low heads
#5	Secondary	814.40'	**8.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=15.16 cfs @ 12.47 hrs HW=814.92' TW=811.58' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 15.16 cfs @ 8.58 fps)
  ├─**2=(2) 8" Orifice (2yr)** (Passes < 6.14 cfs potential flow)
  ├─**3=(2) 12" Orifice (10yr)** (Passes < 12.02 cfs potential flow)
  └─**4=24" Top of Structure** (Passes < 25.29 cfs potential flow)

Secondary OutFlow Max=8.02 cfs @ 12.47 hrs HW=814.92' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 8.02 cfs @ 1.91 fps)

Summary for Pond dmh01: dmh

Inflow Area = 0.382 ac, 45.62% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 2.83 cfs @ 12.09 hrs, Volume= 0.212 af
Outflow = 2.83 cfs @ 12.09 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.0 min
Primary = 2.83 cfs @ 12.09 hrs, Volume= 0.212 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 852.96' @ 12.31 hrs
Flood Elev= 855.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	849.34'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 849.34' / 849.22' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=851.89' TW=851.92' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond dmh05: dmh

Inflow Area = 1.377 ac, 35.23% Impervious, Inflow Depth = 6.55" for 100-year event
Inflow = 10.05 cfs @ 12.09 hrs, Volume= 0.751 af
Outflow = 10.05 cfs @ 12.09 hrs, Volume= 0.751 af, Atten= 0%, Lag= 0.0 min
Primary = 10.05 cfs @ 12.09 hrs, Volume= 0.751 af
Routed to Pond DS-1a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 877.63' @ 12.09 hrs
Flood Elev= 883.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.52'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 868.52' / 865.12' S= 0.0351 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=9.81 cfs @ 12.09 hrs HW=877.13' TW=851.92' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 9.81 cfs @ 12.49 fps)

Summary for Pond dmh20: dmh

Inflow Area = 1.075 ac, 38.90% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 7.95 cfs @ 12.09 hrs, Volume= 0.597 af
Outflow = 7.95 cfs @ 12.09 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.0 min
Primary = 7.95 cfs @ 12.09 hrs, Volume= 0.597 af
Routed to Pond dmh21 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 911.33' @ 12.17 hrs
Flood Elev= 907.61'

Device	Routing	Invert	Outlet Devices
#1	Primary	902.74'	**15.0" Round Culvert** L= 205.0' Ke= 0.500 Inlet / Outlet Invert= 902.74' / 900.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.81 cfs @ 12.09 hrs HW=907.96' TW=907.75' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.81 cfs @ 1.48 fps)

Summary for Pond dmh21: dmh

Inflow Area = 3.515 ac, 37.56% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 26.01 cfs @ 12.09 hrs, Volume= 1.953 af
Outflow = 26.01 cfs @ 12.09 hrs, Volume= 1.953 af, Atten= 0%, Lag= 0.0 min
Primary = 26.01 cfs @ 12.09 hrs, Volume= 1.953 af
Routed to Pond dmh23 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 909.33' @ 12.13 hrs
Flood Elev= 905.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	899.55'	**24.0" Round Culvert** L= 190.0' Ke= 0.500 Inlet / Outlet Invert= 899.55' / 897.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.18 cfs @ 12.09 hrs HW=907.75' TW=906.15' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 16.18 cfs @ 5.15 fps)

Summary for Pond dmh23: dmh

Inflow Area = 5.379 ac, 35.88% Impervious, Inflow Depth = 6.63" for 100-year event
Inflow = 39.60 cfs @ 12.09 hrs, Volume= 2.970 af
Outflow = 39.60 cfs @ 12.09 hrs, Volume= 2.970 af, Atten= 0%, Lag= 0.0 min
Primary = 39.60 cfs @ 12.09 hrs, Volume= 2.970 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 906.64' @ 12.11 hrs
Flood Elev= 910.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	897.55'	**24.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 897.55' / 897.20' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=34.98 cfs @ 12.09 hrs HW=906.16' TW=900.81' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 34.98 cfs @ 11.14 fps)

Summary for Pond dmh25: dmh

Inflow Area = 0.470 ac, 53.38% Impervious, Inflow Depth = 7.15" for 100-year event
Inflow = 3.65 cfs @ 12.09 hrs, Volume= 0.280 af
Outflow = 3.65 cfs @ 12.09 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.65 cfs @ 12.09 hrs, Volume= 0.280 af
Routed to Pond DS-2a : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 924.03' @ 12.09 hrs
Flood Elev= 930.54'

Device	Routing	Invert	Outlet Devices
#1	Primary	922.60'	**12.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 922.60' / 915.84' S= 0.0697 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.56 cfs @ 12.09 hrs HW=923.99' TW=900.79' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.56 cfs @ 4.53 fps)

Summary for Pond dmh31: dmh

Inflow Area = 0.315 ac, 55.97% Impervious, Inflow Depth = 7.15" for 100-year event
Inflow = 2.44 cfs @ 12.09 hrs, Volume= 0.187 af
Outflow = 2.44 cfs @ 12.09 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min
Primary = 2.44 cfs @ 12.09 hrs, Volume= 0.187 af
Routed to Pond dmh33 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 876.67' @ 12.09 hrs
Flood Elev= 885.77'

Device	Routing	Invert	Outlet Devices
#1	Primary	875.76'	**12.0" Round Culvert** L= 96.0' Ke= 0.500 Inlet / Outlet Invert= 875.76' / 868.05' S= 0.0803 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.38 cfs @ 12.09 hrs HW=876.65' TW=861.40' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.38 cfs @ 3.22 fps)

Summary for Pond dmh33: dmh

Inflow Area = 0.530 ac, 64.72% Impervious, Inflow Depth = 7.45" for 100-year event
Inflow = 4.21 cfs @ 12.09 hrs, Volume= 0.329 af
Outflow = 4.21 cfs @ 12.09 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min
Primary = 4.21 cfs @ 12.09 hrs, Volume= 0.329 af
Routed to Pond DS-2b : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 862.69' @ 12.53 hrs
Flood Elev= 864.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	859.71'	**15.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 859.71' / 859.36' S= 0.0130 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.64 cfs @ 12.09 hrs HW=861.40' TW=861.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.64 cfs @ 1.34 fps)

Summary for Pond dmh50: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af
Outflow = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af, Atten= 0%, Lag= 0.0 min
Primary = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af
Routed to Pond dmh51 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 932.36' @ 12.09 hrs
Flood Elev= 933.94'

Device	Routing	Invert	Outlet Devices
#1	Primary	927.65'	**15.0" Round Culvert** L= 102.0' Ke= 0.500 Inlet / Outlet Invert= 927.65' / 919.50' S= 0.0799 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=11.67 cfs @ 12.09 hrs HW=932.18' TW=923.93' (Dynamic Tailwater)
1=Culvert (Inlet Controls 11.67 cfs @ 9.51 fps)

Summary for Pond dmh51: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af
Outflow = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af, Atten= 0%, Lag= 0.0 min
Primary = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af
Routed to Pond dmh52 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 924.11' @ 12.09 hrs
Flood Elev= 924.04'

Device	Routing	Invert	Outlet Devices
#1	Primary	919.40'	**15.0" Round Culvert** L= 127.0' Ke= 0.500 Inlet / Outlet Invert= 919.40' / 909.50' S= 0.0780 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=11.67 cfs @ 12.09 hrs HW=923.93' TW=897.29' (Dynamic Tailwater)
1=Culvert (Inlet Controls 11.67 cfs @ 9.51 fps)

Summary for Pond dmh52: dmh

Inflow Area = 1.617 ac, 36.01% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af
Outflow = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af, Atten= 0%, Lag= 0.0 min
Primary = 11.96 cfs @ 12.09 hrs, Volume= 0.898 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 897.50' @ 12.11 hrs
Flood Elev= 914.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.52'	**15.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 892.52' / 887.55' S= 0.0802 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=10.45 cfs @ 12.09 hrs HW=897.29' TW=893.97' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 10.45 cfs @ 8.52 fps)

Summary for Pond dmh53: dmh

Inflow Area = 1.691 ac, 35.87% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 12.51 cfs @ 12.09 hrs, Volume= 0.940 af
Outflow = 12.51 cfs @ 12.09 hrs, Volume= 0.940 af, Atten= 0%, Lag= 0.0 min
Primary = 12.51 cfs @ 12.09 hrs, Volume= 0.940 af
Routed to Pond dmh55 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 919.36' @ 12.09 hrs
Flood Elev= 921.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	916.46'	**18.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 916.46' / 916.16' S= 0.0097 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=12.21 cfs @ 12.09 hrs HW=919.27' TW=913.32' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 12.21 cfs @ 6.91 fps)

Summary for Pond dmh55: dmh

Inflow Area = 3.137 ac, 38.36% Impervious, Inflow Depth = 6.72" for 100-year event
Inflow = 23.35 cfs @ 12.09 hrs, Volume= 1.758 af
Outflow = 23.35 cfs @ 12.09 hrs, Volume= 1.758 af, Atten= 0%, Lag= 0.0 min
Primary = 23.35 cfs @ 12.09 hrs, Volume= 1.758 af
Routed to Pond dmh56 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 913.60' @ 12.10 hrs
Flood Elev= 911.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	905.32'	**18.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 905.32' / 903.80' S= 0.0211 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=20.27 cfs @ 12.09 hrs HW=913.32' TW=907.56' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 20.27 cfs @ 11.47 fps)

Summary for Pond dmh56: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 6.80" for 100-year event
Inflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Outflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Routed to Pond dmh57 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 908.07' @ 12.11 hrs
Flood Elev= 908.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	901.21'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 901.21' / 901.02' S= 0.0095 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=23.75 cfs @ 12.09 hrs HW=907.56' TW=905.09' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 23.75 cfs @ 7.56 fps)

Summary for Pond dmh57: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 6.80" for 100-year event
Inflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Outflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Routed to Pond dmh58 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 906.05' @ 12.28 hrs
Flood Elev= 908.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	900.92'	**24.0" Round Culvert** L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 900.92' / 896.30' S= 0.0476 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=23.02 cfs @ 12.09 hrs HW=905.09' TW=902.77' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 23.02 cfs @ 7.33 fps)

Summary for Pond dmh58: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 6.80" for 100-year event
Inflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Outflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Routed to Pond dmh59 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 905.46' @ 12.23 hrs
Flood Elev= 901.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	896.20'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 896.20' / 893.43' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=21.37 cfs @ 12.09 hrs HW=902.77' TW=899.21' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 21.37 cfs @ 6.80 fps)

Summary for Pond dmh59: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 6.80" for 100-year event
Inflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Outflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Routed to Pond dmh60 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 903.89' @ 12.19 hrs
Flood Elev= 909.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	893.33'	**24.0" Round Culvert** L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 893.33' / 892.50' S= 0.0101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=899.21' TW=899.77' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond dmh60: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 6.80" for 100-year event
Inflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Outflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Routed to Pond dmh61 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 902.62' @ 12.14 hrs
Flood Elev= 901.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	892.40'	**24.0" Round Culvert** L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 892.40' / 889.43' S= 0.0115 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=14.65 cfs @ 12.09 hrs HW=899.77' TW=898.18' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 14.65 cfs @ 4.66 fps)

Summary for Pond dmh61: dmh

Inflow Area = 3.679 ac, 41.36% Impervious, Inflow Depth = 6.80" for 100-year event
Inflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Outflow = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.09 hrs, Volume= 2.086 af
Routed to Pond dmh62 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 899.25' @ 12.11 hrs
Flood Elev= 898.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	889.33'	**24.0" Round Culvert** L= 278.0' Ke= 0.500 Inlet / Outlet Invert= 889.33' / 886.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=23.22 cfs @ 12.09 hrs HW=898.18' TW=893.96' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 23.22 cfs @ 7.39 fps)

Summary for Pond dmh62: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 6.76" for 100-year event
Inflow = 39.56 cfs @ 12.09 hrs, Volume= 2.984 af
Outflow = 39.56 cfs @ 12.09 hrs, Volume= 2.984 af, Atten= 0%, Lag= 0.0 min
Primary = 39.56 cfs @ 12.09 hrs, Volume= 2.984 af
Routed to Pond dmh69 : dmh

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 894.27' @ 12.09 hrs
Flood Elev= 902.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.45'	**24.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 886.45' / 884.91' S= 0.0248 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=38.61 cfs @ 12.09 hrs HW=893.96' TW=819.99' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 38.61 cfs @ 12.29 fps)

Summary for Pond dmh69: dmh

Inflow Area = 5.296 ac, 39.72% Impervious, Inflow Depth = 6.76" for 100-year event
Inflow = 39.56 cfs @ 12.09 hrs, Volume= 2.984 af
Outflow = 39.56 cfs @ 12.09 hrs, Volume= 2.984 af, Atten= 0%, Lag= 0.0 min
Primary = 39.56 cfs @ 12.09 hrs, Volume= 2.984 af
Routed to Pond DB-1 : detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 820.29' @ 12.09 hrs
Flood Elev= 818.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	812.48'	**24.0" Round Culvert** L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 812.48' / 811.50' S= 0.0338 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=38.45 cfs @ 12.09 hrs HW=819.99' TW=813.53' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 38.45 cfs @ 12.24 fps)

Summary for Pond DS-1a: detention

Inflow Area = 2.476 ac, 30.99% Impervious, Inflow Depth = 6.35" for 100-year event
Inflow = 17.61 cfs @ 12.09 hrs, Volume= 1.311 af
Outflow = 8.02 cfs @ 12.28 hrs, Volume= 1.311 af, Atten= 54%, Lag= 11.2 min
Primary = 8.02 cfs @ 12.28 hrs, Volume= 1.311 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 852.86' @ 12.28 hrs Surf.Area= 3,840 sf Storage= 16,661 cf
Flood Elev= 853.00' Surf.Area= 3,840 sf Storage= 17,124 cf

Plug-Flow detention time= 87.6 min calculated for 1.309 af (100% of inflow)
Center-of-Mass det. time= 88.2 min (886.4 - 798.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	848.00'	0 cf	**96.00'W x 40.00'L x 5.67'H Field A** 21,760 cf Overall - 21,760 cf Embedded = 0 cf x 40.0% Voids
#2A	848.00'	17,124 cf	**retain_it retain_it 5.0'** x 60 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 12 Rows adjusted for 353.3 cf perimeter wall
		17,124 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	847.90'	**15.0" Round Culvert** L= 129.0' Ke= 0.500 Inlet / Outlet Invert= 847.90' / 846.36' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	847.90'	**3.0" Vert. 3" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	849.00'	**8.0" Vert. 8" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	850.15'	**8.0" Vert. 8" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	851.15'	**7.0" Vert. 7" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	852.80'	**4.0' long Overflow Weir** 2 End Contraction(s) 4.0' Crest Height

Primary OutFlow Max=7.99 cfs @ 12.28 hrs HW=852.86' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.99 cfs of 10.63 cfs potential flow)
├─**2=3" Orifice (2yr)** (Orifice Controls 0.52 cfs @ 10.59 fps)
├─**3=8" Orifice (10yr)** (Orifice Controls 3.16 cfs @ 9.04 fps)
├─**4=8" Orifice (25yr)** (Orifice Controls 2.59 cfs @ 7.42 fps)
├─**5=7" Orifice (50yr)** (Orifice Controls 1.53 cfs @ 5.73 fps)
└─**6=Overflow Weir** (Weir Controls 0.19 cfs @ 0.80 fps)

Summary for Pond DS-1b: detention

Inflow Area = 0.581 ac, 6.21% Impervious, Inflow Depth = 5.45" for 100-year event
Inflow = 3.39 cfs @ 12.12 hrs, Volume= 0.264 af
Outflow = 0.72 cfs @ 12.57 hrs, Volume= 0.264 af, Atten= 79%, Lag= 27.5 min
Primary = 0.72 cfs @ 12.57 hrs, Volume= 0.264 af
Routed to Link SP1 : STUDY POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 862.29' @ 12.57 hrs Surf.Area= 1,536 sf Storage= 4,130 cf
Flood Elev= 862.70' Surf.Area= 1,536 sf Storage= 4,684 cf

Plug-Flow detention time= 70.2 min calculated for 0.263 af (100% of inflow)
Center-of-Mass det. time= 70.0 min (886.9 - 816.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**64.00'W x 24.00'L x 4.17'H Field A** 6,400 cf Overall - 6,400 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	4,684 cf	**retain_it retain_it 3.5'** x 24 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 8 Rows adjusted for 135.1 cf perimeter wall
		4,684 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	859.20'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 859.20' / 858.10' S= 0.0110 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**4.0" Vert. 4" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	862.50'	**12.0" Vert. Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.72 cfs @ 12.57 hrs HW=862.28' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.72 cfs of 5.22 cfs potential flow)
├─**2=4" Orifice** (Orifice Controls 0.72 cfs @ 8.22 fps)
└─**3=Overflow** (Controls 0.00 cfs)

Summary for Pond DS-2a: detention

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 43.25 cfs @ 12.09 hrs, Volume= 3.250 af
Outflow = 34.60 cfs @ 12.20 hrs, Volume= 3.246 af, Atten= 20%, Lag= 6.6 min
Primary = 34.60 cfs @ 12.20 hrs, Volume= 3.246 af
Routed to Pond G1 : gabion

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 902.60' @ 12.20 hrs Storage= 41,196 cf
Flood Elev= 902.66' Storage= 41,196 cf

Plug-Flow detention time= 92.6 min calculated for 3.242 af (100% of inflow)
Center-of-Mass det. time= 92.5 min (885.0 - 792.5)

Volume	Invert	Avail.Storage	Storage Description
#1	892.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
#2	897.00'	20,598 cf	**retain_it retain_it 5.0'** x 72 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 6 Rows adjusted for 374.0 cf perimeter wall
		41,196 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	892.00'	**24.0" Round Culvert** L= 46.0' Ke= 0.500 Inlet / Outlet Invert= 892.00' / 890.52' S= 0.0322 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	892.00'	**5.0" Vert. 5" Orifice (2yr)** C= 0.600 Limited to weir flow at low heads
#3	Device 1	895.40'	**10.0" Vert. 10" Orifice (10yr)** C= 0.600 Limited to weir flow at low heads
#4	Device 1	897.90'	**11.0" Vert. 11" Orifice (25yr)** C= 0.600 Limited to weir flow at low heads
#5	Device 1	899.90'	**10.0" Vert. 10" Orifice (50yr)** C= 0.600 Limited to weir flow at low heads
#6	Device 1	901.45'	**4.0' long Sharp-Crested Weir Overflow (100yr)** 2 End Contraction(s)

Primary OutFlow Max=34.06 cfs @ 12.20 hrs HW=902.57' TW=879.62' (Dynamic Tailwater)
└─**1=Culvert** (Passes 34.06 cfs of 46.80 cfs potential flow)
  ├─**2=5" Orifice (2yr)** (Orifice Controls 2.11 cfs @ 15.50 fps)
  ├─**3=10" Orifice (10yr)** (Orifice Controls 6.83 cfs @ 12.51 fps)
  ├─**4=11" Orifice (25yr)** (Orifice Controls 6.52 cfs @ 9.88 fps)
  ├─**5=10" Orifice (50yr)** (Orifice Controls 3.94 cfs @ 7.23 fps)
  └─**6=Sharp-Crested Weir Overflow (100yr)**(Weir Controls 14.66 cfs @ 3.46 fps)

Summary for Pond DS-2b: detention

Inflow Area = 2.278 ac, 16.89% Impervious, Inflow Depth = 5.76" for 100-year event
Inflow = 14.72 cfs @ 12.09 hrs, Volume= 1.094 af
Outflow = 3.52 cfs @ 12.50 hrs, Volume= 1.090 af, Atten= 76%, Lag= 24.3 min
Primary = 3.52 cfs @ 12.50 hrs, Volume= 1.090 af
Routed to Link SP2 : STUDY POINT #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 862.67' @ 12.50 hrs Surf.Area= 5,632 sf Storage= 17,285 cf
Flood Elev= 862.70' Surf.Area= 5,632 sf Storage= 17,435 cf

Plug-Flow detention time= 81.2 min calculated for 1.090 af (100% of inflow)
Center-of-Mass det. time= 79.4 min (884.2 - 804.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	859.20'	0 cf	**88.00'W x 64.00'L x 4.17'H Field A** 23,467 cf Overall - 23,467 cf Embedded = 0 cf x 40.0% Voids
#2A	859.20'	17,435 cf	**retain_it retain_it 3.5'** x 88 Inside #1 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 11 Rows adjusted for 233.3 cf perimeter wall
		17,435 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	858.90'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 858.90' / 858.44' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	859.20'	**8.0" Vert. 8" Orifice** C= 0.600 Limited to weir flow at low heads

#3	Device 1	862.55'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=3.51 cfs @ 12.50 hrs HW=862.67' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.51 cfs of 6.84 cfs potential flow)
  ├─**2=8" Orifice** (Orifice Controls 2.98 cfs @ 8.53 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.53 cfs @ 1.13 fps)

Summary for Pond DW-1: House Drywell

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**7.67'W x 12.50'L x 3.50'H Field A** 0.008 af Overall - 0.004 af Embedded = 0.004 af x 40.0% Voids
#2A	0.67'	0.003 af	**Shea Dry Well 1000gal** Inside #1 Inside= 62.0"W x 30.0"H => 12.86 sf x 10.00'L = 128.6 cf Outside= 68.0"W x 34.0"H => 15.80 sf x 10.50'L = 165.9 cf
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Summary for Pond G1: gabion

Inflow Area = 5.849 ac, 37.28% Impervious, Inflow Depth > 6.66" for 100-year event
Inflow = 34.60 cfs @ 12.20 hrs, Volume= 3.246 af
Outflow = 34.38 cfs @ 12.20 hrs, Volume= 3.246 af, Atten= 1%, Lag= 0.1 min
Primary = 34.38 cfs @ 12.20 hrs, Volume= 3.246 af
Routed to Reach R-02 : Routing through wetland/swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 879.66' @ 12.20 hrs Surf.Area= 2 sf Storage= 443 cf
Flood Elev= 880.00' Surf.Area= 2 sf Storage= 444 cf

Plug-Flow detention time= 0.1 min calculated for 3.246 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (885.1 - 885.0)

Volume	Invert	Avail.Storage	Storage Description
#1	877.50'	442 cf	**18.0" Round Pipe Storage** L= 250.0'
#2	879.00'	2 cf	**1.50'D x 1.00'H Vertical Cone/Cylinder**
		444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	877.50'	**2.0" Horiz. invert orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	878.25'	**2.0" Vert. spring line orifices X 125.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	880.00'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=34.32 cfs @ 12.20 hrs HW=879.65' TW=876.97' (Dynamic Tailwater)
├─**1=invert orifices** (Orifice Controls 19.25 cfs @ 7.06 fps)
├─**2=spring line orifices** (Orifice Controls 15.07 cfs @ 5.53 fps)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Pond G2: gabion

Inflow Area = 10.360 ac, 20.94% Impervious, Inflow Depth > 5.68" for 100-year event
Inflow = 15.17 cfs @ 12.47 hrs, Volume= 4.902 af
Outflow = 15.17 cfs @ 12.47 hrs, Volume= 4.902 af, Atten= 0%, Lag= 0.2 min
Primary = 15.17 cfs @ 12.47 hrs, Volume= 4.902 af
Routed to Link SP3 : STUDY POINT #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 811.58' @ 12.47 hrs Surf.Area= 84 sf Storage= 129 cf
Flood Elev= 811.80' Storage= 141 cf

Plug-Flow detention time= 0.1 min calculated for 4.902 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (891.3 - 891.2)

Volume	Invert	Avail.Storage	Storage Description
#1	810.30'	141 cf	**18.0" Round Pipe Storage** L= 80.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.30'	**2.0" Horiz. invert orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	811.05'	**2.0" Vert. spring line orifices X 80.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	811.80'	**18.0" Horiz. overflow grates X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=15.16 cfs @ 12.47 hrs HW=811.58' TW=0.00' (Dynamic Tailwater)
├─**1=invert orifices** (Orifice Controls 9.52 cfs @ 5.46 fps)
├─**2=spring line orifices** (Orifice Controls 5.64 cfs @ 3.23 fps)
└─**3=overflow grates** (Controls 0.00 cfs)

Summary for Link SP1: STUDY POINT #1

Inflow Area = 6.491 ac, 20.86% Impervious, Inflow Depth = 5.89" for 100-year event
Inflow = 27.01 cfs @ 12.15 hrs, Volume= 3.183 af
Primary = 27.01 cfs @ 12.15 hrs, Volume= 3.183 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: STUDY POINT #2

Inflow Area = 9.972 ac, 29.60% Impervious, Inflow Depth > 6.33" for 100-year event
Inflow = 25.98 cfs @ 12.41 hrs, Volume= 5.259 af
Primary = 25.98 cfs @ 12.41 hrs, Volume= 5.259 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: STUDY POINT #3

Inflow Area = 11.753 ac, 19.54% Impervious, Inflow Depth > 5.92" for 100-year event
Inflow = 26.97 cfs @ 12.46 hrs, Volume= 5.795 af
Primary = 26.97 cfs @ 12.46 hrs, Volume= 5.795 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: STUDY POINT #4

Inflow Area = 0.754 ac, 8.68% Impervious, Inflow Depth = 5.70" for 100-year event
Inflow = 4.90 cfs @ 12.09 hrs, Volume= 0.358 af
Primary = 4.90 cfs @ 12.09 hrs, Volume= 0.358 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP5: STUDY POINT #5

Inflow Area = 0.215 ac, 12.25% Impervious, Inflow Depth = 5.82" for 100-year event
Inflow = 1.42 cfs @ 12.09 hrs, Volume= 0.104 af
Primary = 1.42 cfs @ 12.09 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

TABLE OF CONTENTS

REV	DATE	DESCRIPTION

APPLICANT:

MKEP 770 LLC
265 SUNRISE HIGHWAY, SUITE 1368
ROCKVILLE CENTER, NY 11570

PROJECT:

SKYVIEW ESTATES
RESIDENTIAL SUBDIVISION
MAIN STREET
LEICESTER, MA

PROJECT NO.	2889-01	DATE:	06-23-21
SCALE:	1" = 80'	DWG.:	C-2889-01_Watershed-Proposed
DESIGNED BY:	SM	CHECKED BY:	MAM

PREPARED BY:

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DRAWING TITLE: PROPOSED WATERSHED PLAN

SHEET No. WS-2

SECTION 6.0 - APPENDIX

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.892 degrees West
Latitude	42.243 degrees North
Elevation	0 feet
Date/Time	Tue, 22 Jun 2021 15:07:34 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.42	0.52	0.69	0.86	1.08	**1yr**	0.74	1.06	1.26	1.60	2.05	2.63	2.89	**1yr**	2.33	2.78	3.18	3.86	4.48	**1yr**
2yr	0.35	0.53	0.66	0.87	1.10	1.39	**2yr**	0.95	1.26	1.61	2.03	2.55	3.23	3.49	**2yr**	2.86	3.35	3.86	4.57	5.20	**2yr**
5yr	0.41	0.63	0.80	1.06	1.36	1.74	**5yr**	1.18	1.57	2.02	2.56	3.22	4.07	4.44	**5yr**	3.60	4.27	4.89	5.72	6.44	**5yr**
10yr	0.46	0.72	0.91	1.23	1.60	2.06	**10yr**	1.38	1.85	2.41	3.06	3.85	4.85	5.34	**10yr**	4.29	5.13	5.85	6.79	7.57	**10yr**
25yr	0.54	0.85	1.09	1.50	1.98	2.58	**25yr**	1.71	2.29	3.03	3.85	4.87	6.12	6.81	**25yr**	5.42	6.55	7.42	8.52	9.38	**25yr**
50yr	0.60	0.96	1.23	1.73	2.34	3.07	**50yr**	2.02	2.70	3.62	4.62	5.83	7.30	8.20	**50yr**	6.46	7.89	8.89	10.12	11.03	**50yr**
100yr	0.69	1.11	1.43	2.02	2.75	3.64	**100yr**	2.38	3.18	4.30	5.51	6.96	8.72	9.89	**100yr**	7.72	9.51	10.66	12.02	12.98	**100yr**
200yr	0.77	1.26	1.64	2.35	3.25	4.33	**200yr**	2.80	3.75	5.13	6.58	8.32	10.42	11.93	**200yr**	9.23	11.47	12.77	14.29	15.28	**200yr**
500yr	0.92	1.52	1.98	2.88	4.04	5.44	**500yr**	3.49	4.66	6.47	8.32	10.54	13.20	15.31	**500yr**	11.69	14.72	16.24	17.97	18.96	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.21	0.32	0.39	0.52	0.64	0.97	**1yr**	0.55	0.95	1.11	1.47	1.90	2.35	2.50	**1yr**	2.08	2.40	2.63	3.26	4.07	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.25	**2yr**	0.93	1.23	1.43	1.89	2.43	3.13	3.38	**2yr**	2.77	3.25	3.74	4.42	5.02	**2yr**
5yr	0.38	0.59	0.73	1.01	1.28	1.49	**5yr**	1.10	1.46	1.71	2.23	2.85	3.79	4.11	**5yr**	3.35	3.95	4.52	5.26	5.90	**5yr**
10yr	0.42	0.65	0.81	1.13	1.46	1.70	**10yr**	1.26	1.67	1.93	2.53	3.21	4.37	4.75	**10yr**	3.87	4.57	5.21	5.99	6.63	**10yr**
25yr	0.49	0.75	0.93	1.33	1.75	2.03	**25yr**	1.51	1.99	2.29	3.00	3.78	5.30	5.93	**25yr**	4.69	5.71	6.30	7.22	7.81	**25yr**
50yr	0.55	0.83	1.04	1.49	2.01	2.32	**50yr**	1.73	2.27	2.61	3.40	4.27	6.16	6.95	**50yr**	5.45	6.68	7.27	8.28	8.82	**50yr**
100yr	0.62	0.93	1.17	1.68	2.31	2.65	**100yr**	1.99	2.59	2.98	3.87	4.83	7.14	8.18	**100yr**	6.32	7.87	8.41	9.51	9.94	**100yr**
200yr	0.69	1.04	1.32	1.91	2.66	3.03	**200yr**	2.30	2.96	3.39	4.42	5.48	8.31	9.69	**200yr**	7.35	9.32	9.73	10.91	11.21	**200yr**
500yr	0.82	1.22	1.56	2.27	3.23	3.63	**500yr**	2.79	3.55	4.04	5.28	6.49	10.15	12.12	**500yr**	8.98	11.65	12.49	13.16	13.12	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.47	0.58	0.78	0.96	1.18	**1yr**	0.83	1.15	1.37	1.75	2.31	2.87	3.16	**1yr**	2.54	3.04	3.47	4.16	4.84	**1yr**
2yr	0.36	0.55	0.68	0.92	1.14	1.33	**2yr**	0.98	1.30	1.53	2.00	2.57	3.34	3.62	**2yr**	2.96	3.49	4.00	4.75	5.44	**2yr**
5yr	0.43	0.67	0.83	1.14	1.44	1.73	**5yr**	1.25	1.69	1.99	2.55	3.22	4.38	4.82	**5yr**	3.88	4.64	5.29	6.23	7.05	**5yr**
10yr	0.50	0.77	0.96	1.34	1.73	2.10	**10yr**	1.49	2.05	2.42	3.07	3.83	5.39	5.96	**10yr**	4.77	5.73	6.52	7.65	8.59	**10yr**
25yr	0.62	0.94	1.17	1.68	2.21	2.73	**25yr**	1.90	2.66	3.14	3.90	4.82	7.07	7.87	**25yr**	6.26	7.57	8.63	9.92	11.06	**25yr**
50yr	0.72	1.10	1.37	1.97	2.65	3.32	**50yr**	2.29	3.24	3.83	4.69	5.73	8.70	9.73	**50yr**	7.70	9.36	10.66	12.16	13.48	**50yr**
100yr	0.85	1.29	1.61	2.33	3.19	4.04	**100yr**	2.75	3.95	4.67	5.64	6.82	10.68	12.04	**100yr**	9.45	11.58	13.17	14.89	16.44	**100yr**
200yr	1.00	1.50	1.90	2.75	3.84	4.92	**200yr**	3.32	4.81	5.70	6.77	8.11	13.14	14.90	**200yr**	11.63	14.33	16.27	18.23	20.04	**200yr**
500yr	1.25	1.85	2.38	3.46	4.93	6.39	**500yr**	4.25	6.25	7.42	8.63	10.19	17.25	19.70	**500yr**	15.26	18.95	20.84	23.81	26.04	**500yr**

Powered by ACIS
Northeast Regional Climate Center

Manning's Roughness Coefficients ("n")

Conduit	Manning's Coefficients
Closed Conduits	
Asbestos-Cement Pipe	0.011 to 0.015
Brick	0.013 to 0.017
Cast Iron Pipe	
Cement-lined and seal-coated	0.011 to 0.015
Concrete (Monolithic)	
Smooth forms	0.012 to 0.014
Rough forms	0.015 to 0.017
Concrete Pipe	0.011 to 0.015
Corrugated-Metal Pipe (1/2 - STUL 34470 2 1/2-inch corrgtn.)	
Plain	0.022 to 0.026
Paved invert	0.018 to 0.022
Spun asphalt-lined	0.011 to 0.015
Plastic Pipe (Smooth)	0.011 to 0.015
Vitrified Clay	
Pipes	0.011 to 0.015
Liner channels	0.013 to 0.017
Open Channels	
Lined Channels	
Asphalt	0.013 to 0.017
Brick	0.012 to 0.018
Concrete	0.011 to 0.020
Rubble or riprap	0.020 to 0.035
Vegetal	0.030 to 0.040
Excavated or Dredged	
Earth, straight and uniform	0.020 to 0.030
Earth, winding, fairly uniform	0.025 to 0.040
Rock	0.030 to 0.045
Unmaintained	0.050 to 0.140
Natural Channels (minor streams, top width at flood state < 100 feet)	
Fairly regular section	0.030 to 0.070
Irregular section with pools	0.040 to 0.100

Source: Design and Construction of Sanitary and Storm Sewers, American Society of Civil Engineers and the Water Pollution Control Federation, 1969.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Worcester County, Massachusetts, Southern Part

June 21, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

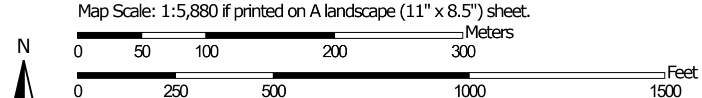
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:5,880 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 13, Jun 11, 2020

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

Date(s) aerial images were photographed: Apr 8, 2011—Jul 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
70B	Ridgebury fine sandy loam, 3 to 8 percent slopes	14.9	15.2%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	0.5	0.5%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	0.6	0.6%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	10.6	10.8%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	16.6	16.9%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	30.1	30.7%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	8.6	8.7%
407C	Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony	2.9	3.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	12.9	13.2%
651	Udorthents, smoothed	0.2	0.2%
Totals for Area of Interest		**97.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Worcester County, Massachusetts, Southern Part

70B—Ridgebury fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xffw
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury

Setting

Landform: Ground moraines, depressions, drumlins, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge

Percent of map unit: 8 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Footslope, summit, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Scituate

Percent of map unit: 4 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Summit, footslope, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Whitman

Percent of map unit: 3 percent
Landform: Depressions, drainageways, hills, ground moraines, drumlins
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69c
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Depressions, drumlins, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 10 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Footslope, summit, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 8 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Paxton, extremely stony

Percent of map unit: 2 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex

Across-slope shape: Convex, linear
Hydric soil rating: No

73A—Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w695
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Whitman, extremely stony, and similar soils: 81 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitman, Extremely Stony

Setting

Landform: Depressions, drainageways, hills, ground moraines, drumlins
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY041MA - Very Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ridgebury, extremely stony

Percent of map unit: 10 percent
Landform: Drainageways, hills, ground moraines, depressions, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Outwash deltas, outwash terraces, depressions, drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent
Landform: Swamps, bogs, marshes
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, extremely stony

Percent of map unit: 1 percent
Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

305B—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qp
Elevation: 0 to 1,570 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Paxton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge

Percent of map unit: 9 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 6 percent
Landform: Drainageways, hills, ground moraines, depressions

Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, base slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w66y
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton
Percent of map unit: 7 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge
Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury
Percent of map unit: 2 percent
Landform: Depressions, drainageways, drumlins, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

305D—Paxton fine sandy loam, 15 to 25 percent slopes

Map Unit Setting
National map unit symbol: 2w67j
Elevation: 0 to 1,450 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 8 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 1 percent
Landform: Drumlins, drainageways, hills, ground moraines, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qs
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Woodbridge, extremely stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Extremely Stony

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam

Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, extremely stony

Percent of map unit: 10 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 8 percent
Landform: Ground moraines, depressions, drumlins, drainageways, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

407C—Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 9bd8
Elevation: 280 to 920 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable coarse-loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 34 inches: fine sandy loam
H3 - 34 to 65 inches: sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Hydric soil rating: No

Canton

Percent of map unit: 10 percent
Hydric soil rating: No

Woodbridge

Percent of map unit: 5 percent
Hydric soil rating: No

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w81b
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Canton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 10 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Footslope, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk

Percent of map unit: 5 percent
Landform: Drumlins, hills, ground moraines, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton

Percent of map unit: 4 percent
Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Marshes, kettles, swamps, bogs, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

651—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9bfc
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent
Urban land: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Made land over firm coarse-loamy basal till and/or dense coarse-loamy lodgment till

Typical profile

H1 - 0 to 6 inches: variable
H2 - 6 to 60 inches: variable

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

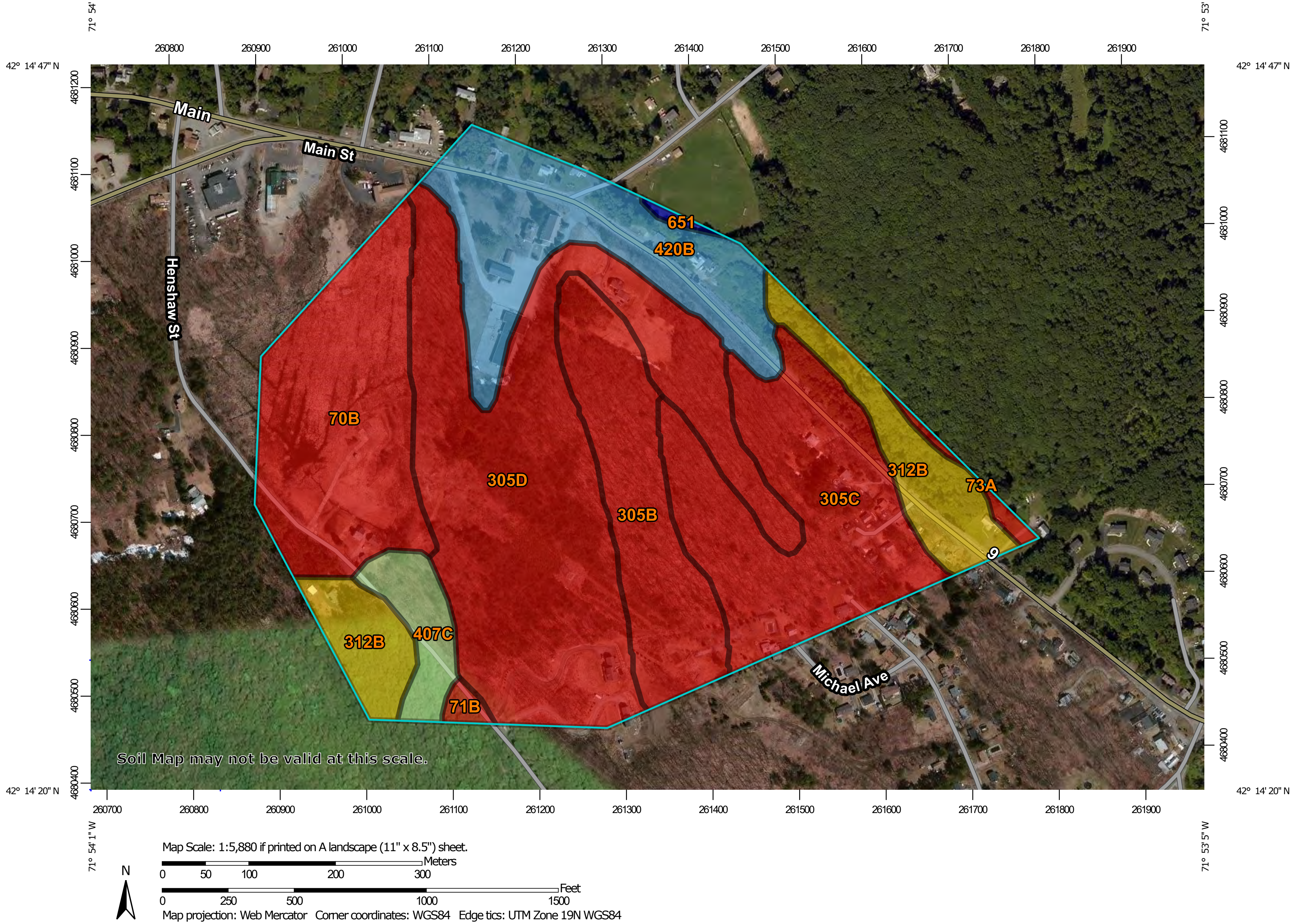
Saturated Hydraulic Conductivity (Ksat)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Map—Saturated Hydraulic Conductivity (Ksat)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- <= 4.5628
- > 4.5628 and <= 7.4641
- > 7.4641 and <= 23.2900
- > 23.2900 and <= 46.0000
- > 46.0000 and <= 70.7800
- Not rated or not available

Soil Rating Lines
- <= 4.5628
- > 4.5628 and <= 7.4641
- > 7.4641 and <= 23.2900
- > 23.2900 and <= 46.0000
- > 46.0000 and <= 70.7800
- Not rated or not available

Soil Rating Points
- <= 4.5628
- > 4.5628 and <= 7.4641
- > 7.4641 and <= 23.2900
- > 23.2900 and <= 46.0000
- > 46.0000 and <= 70.7800
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 13, Jun 11, 2020

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

Date(s) aerial images were photographed: Apr 8, 2011—Jul 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
70B	Ridgebury fine sandy loam, 3 to 8 percent slopes	4.5628	14.9	15.2%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	4.5628	0.5	0.5%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	4.5559	0.6	0.6%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	4.0600	10.6	10.8%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	4.0600	16.6	16.9%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	4.0600	30.1	30.7%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	7.4641	8.6	8.7%
407C	Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony	23.2900	2.9	3.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	46.0000	12.9	13.2%
651	Udorthents, smoothed	70.7800	0.2	0.2%
Totals for Area of Interest			**97.9**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 100

Units of Measure: Inches

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

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

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

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

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

Custom Soil Resource Report
Map—Hydrologic Soil Group

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 13, Jun 11, 2020

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

Date(s) aerial images were photographed: Apr 8, 2011—Jul 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
70B	Ridgebury fine sandy loam, 3 to 8 percent slopes	D	14.9	15.2%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	0.5	0.5%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	0.6	0.6%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	10.6	10.8%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	16.6	16.9%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	C	30.1	30.7%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	8.6	8.7%
407C	Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony	A	2.9	3.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	12.9	13.2%
651	Udorthents, smoothed	A	0.2	0.2%
Totals for Area of Interest			**97.9**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Project:	**Skyview Estates Residential Subdivision**
Location:	**Leicester, MA**
Prepared For:	**Allen & Major Associates**

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

Q = (qu) (A) (WQV)

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
CB-21A	0.42	0.0006484	6.0	0.100	1.00	774.00	0.50
CB-22A	0.36	0.0005625	6.0	0.100	1.00	774.00	0.44
CB-22B	0.23	0.0003641	6.0	0.100	1.00	774.00	0.28
CB-23A	0.24	0.0003703	6.0	0.100	1.00	774.00	0.29
CB-23B	0.19	0.0002953	6.0	0.100	1.00	774.00	0.23
CB-24A	0.43	0.0006781	6.0	0.100	1.00	774.00	0.52
CB-24B	0.23	0.0003656	6.0	0.100	1.00	774.00	0.28
CB-26	0.39	0.0006047	6.0	0.100	1.00	774.00	0.47

Project:	**Skyview Estates Residential Subdivision**	
Location:	**Leicester, MA**	
Prepared For:	**Allen & Major Associates**	CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

Q = (qu) (A) (WQV)

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A ($miles^2$)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
DMH-02	0.70	0.0010969	6.0	0.100	1.00	774.00	0.85
DMH-05	0.35	0.0005422	6.0	0.100	1.00	774.00	0.42
DMH-06	0.26	0.0004016	6.0	0.100	1.00	774.00	0.31
DMH-11	0.34	0.0005281	6.0	0.100	1.00	774.00	0.41
DMH-20	0.60	0.0009406	6.0	0.100	1.00	774.00	0.73
DMH-30	1.10	0.0017172	6.0	0.100	1.00	774.00	1.33

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	0.42 ac	Unit Site Designation	CB-21A
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	2015-4	CDS Treatment Capacity	1.4 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.03	0.03	23.5
0.12	13.7%	53.4%	0.04	0.04	13.0
0.16	9.4%	62.8%	0.06	0.06	8.9
0.20	6.6%	69.5%	0.07	0.07	6.2
0.24	5.2%	74.7%	0.09	0.09	4.9
0.28	4.8%	79.5%	0.10	0.10	4.4
0.32	3.1%	82.6%	0.12	0.12	2.9
0.36	2.7%	85.3%	0.13	0.13	2.5
0.40	2.1%	87.4%	0.15	0.15	1.9
0.48	2.5%	89.9%	0.18	0.18	2.2
0.56	2.0%	91.9%	0.21	0.21	1.8
0.64	1.4%	93.3%	0.24	0.24	1.2
0.72	1.0%	94.3%	0.27	0.27	0.8
0.80	1.1%	95.4%	0.30	0.30	0.9
1.00	1.6%	97.1%	0.37	0.37	1.3
1.20	0.9%	98.0%	0.45	0.45	0.7
1.40	0.6%	98.6%	0.52	0.52	0.4
1.60	0.5%	99.1%	0.60	0.60	0.3
1.80	0.5%	99.6%	0.67	0.67	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					92.7

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**92.7%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	0.36 ac	Unit Site Designation	CB-22A
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.03	0.03	23.5
0.12	13.7%	53.4%	0.04	0.04	13.0
0.16	9.4%	62.8%	0.05	0.05	8.8
0.20	6.6%	69.5%	0.06	0.06	6.2
0.24	5.2%	74.7%	0.08	0.08	4.8
0.28	4.8%	79.5%	0.09	0.09	4.4
0.32	3.1%	82.6%	0.10	0.10	2.8
0.36	2.7%	85.3%	0.12	0.12	2.4
0.40	2.1%	87.4%	0.13	0.13	1.9
0.48	2.5%	89.9%	0.16	0.16	2.1
0.56	2.0%	91.9%	0.18	0.18	1.7
0.64	1.4%	93.3%	0.21	0.21	1.2
0.72	1.0%	94.3%	0.23	0.23	0.8
0.80	1.1%	95.4%	0.26	0.26	0.9
1.00	1.6%	97.1%	0.32	0.32	1.2
1.20	0.9%	98.0%	0.39	0.39	0.7
1.40	0.6%	98.6%	0.45	0.45	0.4
1.60	0.5%	99.1%	0.52	0.52	0.3
1.80	0.5%	99.6%	0.58	0.58	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					91.8

Removal Efficiency Adjustment[2] = 0.0%

Predicted % Annual Rainfall Treated = 99.6%

Predicted Net Annual Load Removal Efficiency = 91.8%

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	0.23 ac	Unit Site Designation	CB-22B
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.02	0.02	23.6
0.12	13.7%	53.4%	0.03	0.03	13.1
0.16	9.4%	62.8%	0.03	0.03	8.9
0.20	6.6%	69.5%	0.04	0.04	6.3
0.24	5.2%	74.7%	0.05	0.05	4.9
0.28	4.8%	79.5%	0.06	0.06	4.5
0.32	3.1%	82.6%	0.07	0.07	2.9
0.36	2.7%	85.3%	0.08	0.08	2.5
0.40	2.1%	87.4%	0.08	0.08	1.9
0.48	2.5%	89.9%	0.10	0.10	2.2
0.56	2.0%	91.9%	0.12	0.12	1.8
0.64	1.4%	93.3%	0.13	0.13	1.3
0.72	1.0%	94.3%	0.15	0.15	0.9
0.80	1.1%	95.4%	0.17	0.17	0.9
1.00	1.6%	97.1%	0.21	0.21	1.4
1.20	0.9%	98.0%	0.25	0.25	0.7
1.40	0.6%	98.6%	0.29	0.29	0.5
1.60	0.5%	99.1%	0.34	0.34	0.4
1.80	0.5%	99.6%	0.38	0.38	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					93.6
				Removal Efficiency Adjustment[2] =	0.0%
				Predicted % Annual Rainfall Treated =	99.6%
				Predicted Net Annual Load Removal Efficiency =	**93.6%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	**0.24 ac**	Unit Site Designation	**CB-23A**
Weighted C	**0.9**	Rainfall Station #	**70**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.02	0.02	23.6
0.12	13.7%	53.4%	0.03	0.03	13.1
0.16	9.4%	62.8%	0.03	0.03	8.9
0.20	6.6%	69.5%	0.04	0.04	6.3
0.24	5.2%	74.7%	0.05	0.05	4.9
0.28	4.8%	79.5%	0.06	0.06	4.5
0.32	3.1%	82.6%	0.07	0.07	2.9
0.36	2.7%	85.3%	0.08	0.08	2.5
0.40	2.1%	87.4%	0.09	0.09	1.9
0.48	2.5%	89.9%	0.10	0.10	2.2
0.56	2.0%	91.9%	0.12	0.12	1.8
0.64	1.4%	93.3%	0.14	0.14	1.3
0.72	1.0%	94.3%	0.15	0.15	0.9
0.80	1.1%	95.4%	0.17	0.17	0.9
1.00	1.6%	97.1%	0.21	0.21	1.4
1.20	0.9%	98.0%	0.26	0.26	0.7
1.40	0.6%	98.6%	0.30	0.30	0.5
1.60	0.5%	99.1%	0.34	0.34	0.4
1.80	0.5%	99.6%	0.38	0.38	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					93.5

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**93.5%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	0.43 ac	Unit Site Designation	CB-24A
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.02	0.02	14.6
0.08	24.6%	39.7%	0.03	0.03	23.4
0.12	13.7%	53.4%	0.05	0.05	12.9
0.16	9.4%	62.8%	0.06	0.06	8.7
0.20	6.6%	69.5%	0.08	0.08	6.1
0.24	5.2%	74.7%	0.09	0.09	4.8
0.28	4.8%	79.5%	0.11	0.11	4.3
0.32	3.1%	82.6%	0.12	0.12	2.8
0.36	2.7%	85.3%	0.14	0.14	2.4
0.40	2.1%	87.4%	0.16	0.16	1.8
0.48	2.5%	89.9%	0.19	0.19	2.1
0.56	2.0%	91.9%	0.22	0.22	1.7
0.64	1.4%	93.3%	0.25	0.25	1.1
0.72	1.0%	94.3%	0.28	0.28	0.8
0.80	1.1%	95.4%	0.31	0.31	0.8
1.00	1.6%	97.1%	0.39	0.39	1.2
1.20	0.9%	98.0%	0.47	0.47	0.6
1.40	0.6%	98.6%	0.55	0.55	0.4
1.60	0.5%	99.1%	0.62	0.62	0.3
1.80	0.5%	99.6%	0.70	0.70	0.2
0.00	0.0%	99.6%	0.00	0.00	0.0
					90.8

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**90.8%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	**0.23 ac**	Unit Site Designation	**CB-24B**
Weighted C	**0.9**	Rainfall Station #	**70**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.02	0.02	23.6
0.12	13.7%	53.4%	0.03	0.03	13.1
0.16	9.4%	62.8%	0.03	0.03	8.9
0.20	6.6%	69.5%	0.04	0.04	6.3
0.24	5.2%	74.7%	0.05	0.05	4.9
0.28	4.8%	79.5%	0.06	0.06	4.5
0.32	3.1%	82.6%	0.07	0.07	2.9
0.36	2.7%	85.3%	0.08	0.08	2.5
0.40	2.1%	87.4%	0.08	0.08	1.9
0.48	2.5%	89.9%	0.10	0.10	2.2
0.56	2.0%	91.9%	0.12	0.12	1.8
0.64	1.4%	93.3%	0.13	0.13	1.3
0.72	1.0%	94.3%	0.15	0.15	0.9
0.80	1.1%	95.4%	0.17	0.17	0.9
1.00	1.6%	97.1%	0.21	0.21	1.4
1.20	0.9%	98.0%	0.25	0.25	0.7
1.40	0.6%	98.6%	0.29	0.29	0.5
1.60	0.5%	99.1%	0.34	0.34	0.4
1.80	0.5%	99.6%	0.38	0.38	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					93.6

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**93.6%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	**0.19 ac**	Unit Site Designation	**CB-23B**
Weighted C	**0.9**	Rainfall Station #	**70**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.7
0.08	24.6%	39.7%	0.01	0.01	23.7
0.12	13.7%	53.4%	0.02	0.02	13.1
0.16	9.4%	62.8%	0.03	0.03	9.0
0.20	6.6%	69.5%	0.03	0.03	6.3
0.24	5.2%	74.7%	0.04	0.04	4.9
0.28	4.8%	79.5%	0.05	0.05	4.5
0.32	3.1%	82.6%	0.05	0.05	2.9
0.36	2.7%	85.3%	0.06	0.06	2.5
0.40	2.1%	87.4%	0.07	0.07	1.9
0.48	2.5%	89.9%	0.08	0.08	2.3
0.56	2.0%	91.9%	0.10	0.10	1.8
0.64	1.4%	93.3%	0.11	0.11	1.3
0.72	1.0%	94.3%	0.12	0.12	0.9
0.80	1.1%	95.4%	0.14	0.14	0.9
1.00	1.6%	97.1%	0.17	0.17	1.4
1.20	0.9%	98.0%	0.20	0.20	0.8
1.40	0.6%	98.6%	0.24	0.24	0.5
1.60	0.5%	99.1%	0.27	0.27	0.4
1.80	0.5%	99.6%	0.31	0.31	0.4
0.00	0.0%	99.6%	0.00	0.00	0.0
					94.2

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**94.2%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	0.39 ac	Unit Site Designation	CB-26
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	2015-4	CDS Treatment Capacity	1.4 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.03	0.03	23.6
0.12	13.7%	53.4%	0.04	0.04	13.0
0.16	9.4%	62.8%	0.06	0.06	8.9
0.20	6.6%	69.5%	0.07	0.07	6.2
0.24	5.2%	74.7%	0.08	0.08	4.9
0.28	4.8%	79.5%	0.10	0.10	4.4
0.32	3.1%	82.6%	0.11	0.11	2.9
0.36	2.7%	85.3%	0.13	0.13	2.5
0.40	2.1%	87.4%	0.14	0.14	1.9
0.48	2.5%	89.9%	0.17	0.17	2.2
0.56	2.0%	91.9%	0.20	0.20	1.8
0.64	1.4%	93.3%	0.22	0.22	1.2
0.72	1.0%	94.3%	0.25	0.25	0.9
0.80	1.1%	95.4%	0.28	0.28	0.9
1.00	1.6%	97.1%	0.35	0.35	1.3
1.20	0.9%	98.0%	0.42	0.42	0.7
1.40	0.6%	98.6%	0.49	0.49	0.4
1.60	0.5%	99.1%	0.56	0.56	0.3
1.80	0.5%	99.6%	0.63	0.63	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					93.0

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**93.0%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	0.70 ac	Unit Site Designation	DMH-02
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	2015-4	CDS Treatment Capacity	1.4 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.03	0.03	14.5
0.08	24.6%	39.7%	0.05	0.05	23.3
0.12	13.7%	53.4%	0.08	0.08	12.8
0.16	9.4%	62.8%	0.10	0.10	8.7
0.20	6.6%	69.5%	0.13	0.13	6.0
0.24	5.2%	74.7%	0.15	0.15	4.7
0.28	4.8%	79.5%	0.18	0.18	4.2
0.32	3.1%	82.6%	0.20	0.20	2.7
0.36	2.7%	85.3%	0.23	0.23	2.3
0.40	2.1%	87.4%	0.25	0.25	1.8
0.48	2.5%	89.9%	0.30	0.30	2.0
0.56	2.0%	91.9%	0.35	0.35	1.6
0.64	1.4%	93.3%	0.40	0.40	1.1
0.72	1.0%	94.3%	0.45	0.45	0.8
0.80	1.1%	95.4%	0.51	0.51	0.8
1.00	1.6%	97.1%	0.63	0.63	1.1
1.20	0.9%	98.0%	0.76	0.76	0.6
1.40	0.6%	98.6%	0.88	0.88	0.3
1.60	0.5%	99.1%	1.01	1.01	0.2
1.80	0.5%	99.6%	1.14	1.14	0.2
0.00	0.0%	99.6%	0.00	0.00	0.0
					89.9
				Removal Efficiency Adjustment[2] =	0.0%
				Predicted % Annual Rainfall Treated =	99.6%
				Predicted Net Annual Load Removal Efficiency =	**89.9%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	0.35 ac	Unit Site Designation	DMH-05
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.02	0.02	23.5
0.12	13.7%	53.4%	0.04	0.04	13.0
0.16	9.4%	62.8%	0.05	0.05	8.8
0.20	6.6%	69.5%	0.06	0.06	6.2
0.24	5.2%	74.7%	0.07	0.07	4.8
0.28	4.8%	79.5%	0.09	0.09	4.4
0.32	3.1%	82.6%	0.10	0.10	2.8
0.36	2.7%	85.3%	0.11	0.11	2.4
0.40	2.1%	87.4%	0.12	0.12	1.9
0.48	2.5%	89.9%	0.15	0.15	2.1
0.56	2.0%	91.9%	0.17	0.17	1.7
0.64	1.4%	93.3%	0.20	0.20	1.2
0.72	1.0%	94.3%	0.22	0.22	0.8
0.80	1.1%	95.4%	0.25	0.25	0.9
1.00	1.6%	97.1%	0.31	0.31	1.3
1.20	0.9%	98.0%	0.37	0.37	0.7
1.40	0.6%	98.6%	0.44	0.44	0.4
1.60	0.5%	99.1%	0.50	0.50	0.3
1.80	0.5%	99.6%	0.56	0.56	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					92.0

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**92.0%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	**0.26 ac**	Unit Site Designation	**DMH-06**
Weighted C	**0.9**	Rainfall Station #	**70**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.02	0.02	23.6
0.12	13.7%	53.4%	0.03	0.03	13.1
0.16	9.4%	62.8%	0.04	0.04	8.9
0.20	6.6%	69.5%	0.05	0.05	6.2
0.24	5.2%	74.7%	0.06	0.06	4.9
0.28	4.8%	79.5%	0.06	0.06	4.4
0.32	3.1%	82.6%	0.07	0.07	2.9
0.36	2.7%	85.3%	0.08	0.08	2.5
0.40	2.1%	87.4%	0.09	0.09	1.9
0.48	2.5%	89.9%	0.11	0.11	2.2
0.56	2.0%	91.9%	0.13	0.13	1.8
0.64	1.4%	93.3%	0.15	0.15	1.2
0.72	1.0%	94.3%	0.17	0.17	0.9
0.80	1.1%	95.4%	0.19	0.19	0.9
1.00	1.6%	97.1%	0.23	0.23	1.3
1.20	0.9%	98.0%	0.28	0.28	0.7
1.40	0.6%	98.6%	0.32	0.32	0.5
1.60	0.5%	99.1%	0.37	0.37	0.4
1.80	0.5%	99.6%	0.42	0.42	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					93.2

Removal Efficiency Adjustment[2] = 0.0%

Predicted % Annual Rainfall Treated = 99.6%

Predicted Net Annual Load Removal Efficiency = 93.2%

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	0.34 ac	Unit Site Designation	DMH-11
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.01	0.01	14.6
0.08	24.6%	39.7%	0.02	0.02	23.5
0.12	13.7%	53.4%	0.04	0.04	13.0
0.16	9.4%	62.8%	0.05	0.05	8.8
0.20	6.6%	69.5%	0.06	0.06	6.2
0.24	5.2%	74.7%	0.07	0.07	4.8
0.28	4.8%	79.5%	0.09	0.09	4.4
0.32	3.1%	82.6%	0.10	0.10	2.8
0.36	2.7%	85.3%	0.11	0.11	2.4
0.40	2.1%	87.4%	0.12	0.12	1.9
0.48	2.5%	89.9%	0.15	0.15	2.2
0.56	2.0%	91.9%	0.17	0.17	1.7
0.64	1.4%	93.3%	0.19	0.19	1.2
0.72	1.0%	94.3%	0.22	0.22	0.8
0.80	1.1%	95.4%	0.24	0.24	0.9
1.00	1.6%	97.1%	0.30	0.30	1.3
1.20	0.9%	98.0%	0.37	0.37	0.7
1.40	0.6%	98.6%	0.43	0.43	0.4
1.60	0.5%	99.1%	0.49	0.49	0.3
1.80	0.5%	99.6%	0.55	0.55	0.3
0.00	0.0%	99.6%	0.00	0.00	0.0
					92.1

Removal Efficiency Adjustment[2] = 0.0%

Predicted % Annual Rainfall Treated = 99.6%

Predicted Net Annual Load Removal Efficiency = 92.1%

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION LEICESTER, MA

Area	0.60 ac	Unit Site Designation	DMH-20
Weighted C	0.9	Rainfall Station #	70
t_c	6 min		
CDS Model	2015-4	CDS Treatment Capacity	1.4 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.02	0.02	14.6
0.08	24.6%	39.7%	0.04	0.04	23.4
0.12	13.7%	53.4%	0.07	0.07	12.9
0.16	9.4%	62.8%	0.09	0.09	8.8
0.20	6.6%	69.5%	0.11	0.11	6.1
0.24	5.2%	74.7%	0.13	0.13	4.8
0.28	4.8%	79.5%	0.15	0.15	4.3
0.32	3.1%	82.6%	0.17	0.17	2.8
0.36	2.7%	85.3%	0.20	0.20	2.4
0.40	2.1%	87.4%	0.22	0.22	1.8
0.48	2.5%	89.9%	0.26	0.26	2.1
0.56	2.0%	91.9%	0.30	0.30	1.7
0.64	1.4%	93.3%	0.35	0.35	1.1
0.72	1.0%	94.3%	0.39	0.39	0.8
0.80	1.1%	95.4%	0.43	0.43	0.8
1.00	1.6%	97.1%	0.54	0.54	1.2
1.20	0.9%	98.0%	0.65	0.65	0.6
1.40	0.6%	98.6%	0.76	0.76	0.4
1.60	0.5%	99.1%	0.87	0.87	0.3
1.80	0.5%	99.6%	0.98	0.98	0.2
0.00	0.0%	99.6%	0.00	0.00	0.0
					90.9

Removal Efficiency Adjustment[2] = 0.0%

Predicted % Annual Rainfall Treated = 99.6%

Predicted Net Annual Load Removal Efficiency = 90.9%

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

SKYVIEW ESTATES RESIDENTIAL SUBDIVISION
LEICESTER, MA

Area	**1.10 ac**	Unit Site Designation	**DMH-30**
Weighted C	**0.9**	Rainfall Station #	**70**
t_c	**6 min**		
CDS Model	**2015-5**	CDS Treatment Capacity	**1.4 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.04	15.1%	15.1%	0.04	0.04	14.4
0.08	24.6%	39.7%	0.08	0.08	22.9
0.12	13.7%	53.4%	0.12	0.12	12.5
0.16	9.4%	62.8%	0.16	0.16	8.4
0.20	6.6%	69.5%	0.20	0.20	5.8
0.24	5.2%	74.7%	0.24	0.24	4.5
0.28	4.8%	79.5%	0.28	0.28	4.0
0.32	3.1%	82.6%	0.32	0.32	2.6
0.36	2.7%	85.3%	0.36	0.36	2.2
0.40	2.1%	87.4%	0.40	0.40	1.6
0.48	2.5%	89.9%	0.47	0.47	1.8
0.56	2.0%	91.9%	0.55	0.55	1.4
0.64	1.4%	93.3%	0.63	0.63	0.9
0.72	1.0%	94.3%	0.71	0.71	0.6
0.80	1.1%	95.4%	0.79	0.79	0.6
1.00	1.6%	97.1%	0.99	0.99	0.8
1.20	0.9%	98.0%	1.19	1.19	0.4
1.40	0.6%	98.6%	1.38	1.38	0.2
1.60	0.5%	99.1%	1.58	1.40	0.1
1.80	0.5%	99.6%	1.78	1.40	0.1
0.00	0.0%	99.6%	0.00	0.00	0.0
					86.0

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.4%
Predicted Net Annual Load Removal Efficiency =	**86.0%**

1 - Based on 14 years of 15-minute rainfall data from NCDC Station 2107, East Brimfield Lake, Worcester County, M

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

ALLEN & MAJOR ASSOCIATES, INC.

DRAINAGE PIPE DESIGN ANALYSIS

A&M Job No.	2889-01
Date:	9/29/2021

Project Location:
Skyview Estates
Main Street
Leicester, MA

Prepared For:
MKEP 770 LLC
265 Sunrise Highway, Suite 1368
Rockville Center, NY 11570

Manning's Formula

$V=1.486/n*R^{2/3}*S^{1/2}$
Q = V*A
(25-Year storm)

Where: V is the velocity in Ft/sec.
n is Manning's coefficient of friction
R is the Hydraulic Radius
S is the slope of the pipe

Where: Area=Pi*(R/12)2
Wetted Perimeter=2*Pi*R/12

PIPE	Q_{design} (cfs)	n	Diameter (inches)	A (ft^2)	Wp (ft)	R (ft)	S (feet/foot)	Q_{full} (cfs)	$Q_{full} \geq Q_{design}$	V_{full} (ft/s)	Q_d/Q_f	Results Fig. 4-4A	V_{design} (ft/s)	2 ft/s ≤ V_{design} ≤ 10 ft/s
DMH-01	1.82	0.013	12	0.79	3.14	0.25	0.010	3.56	OK	4.54	0.51	1.00	4.54	OK
DMH-03	6.41	0.013	15	1.23	3.93	0.31	0.010	6.46	OK	5.26	0.99	1.15	6.05	OK
DMH-04	6.41	0.013	12	0.79	3.14	0.25	0.035	6.67	OK	8.49	0.96	1.14	9.67	OK
DMH-05	6.41	0.013	12	0.79	3.14	0.25	0.035	6.67	OK	8.49	0.96	1.14	9.67	OK
DMH-07	4.54	0.013	15	1.23	3.93	0.31	0.010	6.46	OK	5.26	0.70	1.08	5.69	OK
DMH-09	0.51	0.013	12	0.79	3.14	0.25	0.010	3.56	OK	4.54	0.14	0.65	2.95	OK
DMH-20	5.12	0.013	15	1.23	3.93	0.31	0.012	7.02	OK	5.72	0.73	1.10	6.29	OK
DMH-21	16.74	0.013	24	3.14	6.28	0.50	0.010	22.62	OK	7.20	0.74	1.10	7.92	OK
DMH-23	25.42	0.013	24	3.14	6.28	0.50	0.013	25.79	OK	8.21	0.99	1.15	9.44	OK
DMH-24	2.42	0.013	12	0.79	3.14	0.25	0.070	9.43	OK	12.00	0.26	0.82	9.84	OK
DMH-25	2.42	0.013	12	0.79	3.14	0.25	0.070	9.43	OK	12.00	0.26	0.82	9.84	OK
DMH-26	25.42	0.013	24	3.14	6.28	0.50	0.013	25.79	OK	8.21	0.99	1.15	9.44	OK
DMH-27	2.42	0.013	15	1.23	3.93	0.31	0.078	18.05	OK	14.71	0.13	0.64	9.41	OK
DMH-29	10.40	0.013	18	1.77	4.71	0.38	0.070	27.79	OK	15.73	0.37	0.89	14.00	WAIVER REQUESTED
DMH-30	10.40	0.013	18	1.77	4.71	0.38	0.013	11.74	OK	6.65	0.89	1.13	7.51	OK
DMH-31	1.62	0.013	12	0.79	3.14	0.25	0.080	10.08	OK	12.83	0.16	0.69	8.85	OK
DMH-32	1.62	0.013	12	0.79	3.14	0.25	0.080	10.08	OK	12.83	0.16	0.69	8.85	OK
DMH-33	2.83	0.013	15	1.23	3.93	0.31	0.013	7.34	OK	5.98	0.39	0.91	5.44	OK
DMH-50 (CDS)	7.70	0.013	15	1.23	3.93	0.31	0.080	18.27	OK	14.89	0.42	0.94	14.00	WAIVER REQUESTED
DMH-51	7.70	0.013	15	1.23	3.93	0.31	0.078	18.01	OK	14.67	0.43	0.95	13.94	WAIVER REQUESTED
DMH-52	7.70	0.013	15	1.23	3.93	0.31	0.080	18.27	OK	14.89	0.42	0.94	14.00	WAIVER REQUESTED
DMH-53	8.05	0.013	18	1.77	4.71	0.38	0.010	10.50	OK	5.94	0.77	1.11	6.60	OK
DMH-54	8.05	0.013	18	1.77	4.71	0.38	0.030	18.19	OK	10.30	0.44	0.95	9.78	OK
DMH-55	15.08	0.013	18	1.77	4.71	0.38	0.021	15.22	OK	8.61	0.99	1.15	9.91	OK
DMH-56	17.92	0.013	24	3.14	6.28	0.50	0.010	22.62	OK	7.20	0.79	1.11	7.99	OK
DMH-57 (CDS)	17.92	0.013	24	3.14	6.28	0.50	0.048	49.36	OK	15.71	0.36	0.89	13.98	WAIVER REQUESTED
DMH-58	17.92	0.013	24	3.14	6.28	0.50	0.010	22.62	OK	7.20	0.79	1.11	7.99	OK
DMH-59	17.92	0.013	24	3.14	6.28	0.50	0.010	22.62	OK	7.20	0.79	1.11	7.99	OK
DMH-60	17.92	0.013	24	3.14	6.28	0.50	0.012	24.26	OK	7.72	0.74	1.10	8.49	OK
DMH-61	17.92	0.013	24	3.14	6.28	0.50	0.010	22.62	OK	7.20	0.79	1.11	7.99	OK
DMH-62	25.62	0.013	24	3.14	6.28	0.50	0.023	34.01	OK	10.83	0.75	1.10	11.91	WAIVER REQUESTED

ALLEN & MAJOR ASSOCIATES, INC.

DRAINAGE PIPE DESIGN ANALYSIS

A&M Job No.	2889-01
Date:	9/29/2021

<u>Project Location:</u>
Skyview Estates
Main Street
Leicester, MA

<u>Prepared For:</u>
MKEP 770 LLC
265 Sunrise Highway, Suite 1368
Rockville Center, NY 11570

Manning's Formula

$V=1.486/n*R^{2/3}*S^{1/2}$
Q = V*A
(25-Year storm)

Where: V is the velocity in Ft/sec.
n is Manning's coefficient of friction
R is the Hydraulic Radius
S is the slope of the pipe

Where: Area=Pi*(R/12)2
Wetted Perimeter=2*Pi*R/12

PIPE	Q_{design} (cfs)	n	Diameter (inches)	A (ft^2)	Wp (ft)	R (ft)	S (feet/foot)	Q_{full} (cfs)	Q_{full} ≥ Q_{design}	V_{full} (ft/s)	Q_d/Q_f	Results Fig. 4-4A	V_{design} (ft/s)	2 ft/s ≤ V_{design} ≤ 10 ft/s
DMH-63	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-64	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-65	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-66	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-67	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-68	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-69	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
DMH-70	25.62	0.013	24	3.14	6.28	0.50	0.034	41.71	OK	13.28	0.61	1.05	13.94	WAIVER REQUESTED
OCS-01	4.54	0.013	15	1.23	3.93	0.31	0.012	7.08	OK	5.77	0.64	1.06	6.11	OK
OCS-02	10.40	0.013	18	1.77	4.71	0.38	0.025	16.61	OK	9.40	0.63	1.05	9.87	OK
OCS-03	2.17	0.013	12	0.79	3.14	0.25	0.016	4.44	OK	5.65	0.49	0.98	5.53	OK
OCS-04	11.66	0.013	18	1.77	4.71	0.38	0.022	15.62	OK	8.84	0.75	1.10	9.72	OK
OCS-05	0.51	0.013	12	0.79	3.14	0.25	0.010	3.56	OK	4.54	0.14	0.65	2.95	OK

ALLEN & MAJOR ASSOCIATES, INC.

Project No.	2889-01	**Sheet**	1
Project Description	Skyview Estates		
	Leicester, MA		
Calculated By	SM	**Date**	09/28/21
Checked By	MAM		

These calculations provide the TSS removal rate of the stormwater management system for runoff directed to the open detention basin

Stormwater Management BMP	TSS Removal rate
Parking Lot Sweeping	5%
Hooded Catch Basins	25%
Proprietary Device (CDS Unit)	80%

Average Annual Load	=	100%	
Parking Lot Sweeping	=	5%	Removal Rate
		95%	TSS Load Remains
TSS Load Remaining	=	95%	
Hooded Catch Basins	=	25%	Removal Rate
		71.3%	TSS Load Remains
TSS Load Remaining	=	71.3%	
Proprietary Device (CDS Unit)	=	80%	Removal Rate
		14.3%	% TSS Load Remains

Percentage of TSS Remaining - Initial TSS Load = Final TSS Removal Rate

100% - 14.3% = 85.8%

For this drainage area, this system as designed will remove an estimated 86% of the annual TSS load and therefore will meet the TSS removal standard.

Project No.	2889-01	**Sheet**	2
Project Description	Skyview Estates		
	Leicester, MA		
Calculated By	SM	**Date**	09/28/21
Checked By	MAM		

These calculations provide the TSS removal rate of the stormwater management system for runoff directed to the retain-it detention systems

Stormwater Management BMP	TSS Removal rate
Parking Lot Sweeping	5%
Hooded Catch Basins	25%
Retain-It Advanced Sedimentation	80%

Average Annual Load	=	100%	
Parking Lot Sweeping	=	5%	Removal Rate
		95%	TSS Load Remains

TSS Load Remaining	=	95%	
Hooded Catch Basins	=	25%	Removal Rate
		71.3%	TSS Load Remains

TSS Load Remaining	=	71.3%	
Retain-It Advanced Sedimentation	=	80%	Removal Rate
		14.3%	% TSS Load Remains

Percentage of TSS Remaining - Initial TSS Load = Final TSS Removal Rate

100% - 14.3% = 85.8%

For this drainage area, this system as designed will remove an estimated 86% of the annual TSS load and therefore will meet the TSS removal standard.

Project No.	2889-01	**Sheet**	1 of 1
Project Description	Skyview Estates		
	Leicester, MA		
Calculated By	JG	**Date**	09/30/21
Checked By	MAM		

ALLEN & MAJOR ASSOCIATES, INC.

Standard # 3: Groundwater Recharge

Proposed recharge system: Dry Well

In accordance with *MADEP – Volume 2, Technical Guide for Compliance with Massachusetts Stormwater Management Standards, dated January 2008*

A soils require a Volume to recharge of	**0.60**	**inches**
B soils require a Volume to recharge of	**0.35**	**inches**
C soils require a Volume to recharge of	**0.25**	**inches**
D soils require a Volume to recharge of	**0.10**	**inches**

Impervious area within: A-soils =	0	sf
Impervious area within: B-soils =	11,467	sf
Impervious area within: C-soils =	314,982	sf
Impervious area within: D-soils =	0	sf

Weighted Groundwater Recharge Depth = **0.25** **in**

Total Site Volume required to be recharged =

326,449 sf x 1" / 12 x 0.25 in = **6,897** **cf**

Site volume recharge provided by = volume within residential drywells

36 Drywells at each grouping of homes Volume= 196.3

= **7,067** c.f. Total Volume Recharged > **6,897** **cf** (OK)

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ALLEN & MAJOR ASSOCIATES, INC.

October 5, 2021

To:
Brooke Hultgren, Department Assistant
Leicester Development and Inspectional Services
3 Washburn Square
Leicester, Massachusetts 01524

Copy:

A&M Project #: 2889-01
Re: Skyview Estates
Special Permit /
Definitive Subdivision
Town & Engineer Comments
651 Main Street
Map 21/Parcel B5.1

Dear Ms. Hultgren,

Please find Allen & Major Associates, Inc. (A&M) responses to the Town's review letter dated August 19, 2021, in reference to the Skyview Estates Special Permit/Definitive Subdivision Application, to be located at along Main Street in Leicester, Massachusetts. Also included are A&M's responses to the review letter provided by Quinn Engineering, Inc. dated August 27, 2021.

Town Comments:

Subdivision Rules and Regulations

1. *Plans don't show proposed street names. §III.B.2.d.) requires that "The proposed names of streets shall be shown, and are subject to approval by the Planning Board."*

Response: The proposed street names have been added to the plans.

Special Permit Regulations

2. *§I.E. (Special Permit Criteria Evaluation). The applicable special permit criteria are those in Section 5.8 of the Zoning Bylaw for the Business District (See §5.8.04.B, attached).*

Response: The updated narrative has been expanded to discuss these items.

3. *§I.F.1.: Plans should conform to Site Plan Regulations (see below).*
   Response: The plans have been updated.

4. *§I.F.4: Plans for Two-Family plans should conform to this section of the Special permit Regulations.*

Response: More detailed architectural plans will be updated to address these items.

Site Plan Review Regulations

Site Plan Review is required for multi-family structures.

5. *The following information is not included in the required project narrative (see Site Plan Review Regulations Section §II.E):*
   a. *§II.E.1.b. "size of proposed structures, lot size, and building coverage %. In the Watershed Overlay district, include total impervious area."*

Response: The requested information has been included in the project narrative.

b. *§II.E.1.d. Number of existing and/or proposed parking spaces proposed, and description of conformance with the Planning Board's Parking Regulations.*

Response: Parking requirements have been discussed in the updated project narrative. Each residential dwelling will include a two car garage and paved driveway to reasonably accommodate two additional vehicles.

c. *§II.E.2.: A description of how the project meets each of the Standards for Site Plan Approval (see §5.2.05 of the Zoning Bylaw, attached) – applicable to multi-family. Where applicable, a description of how the project meets the criteria for issuance of a Special Permit (see Special Permit Regulations).*

Response: This has been included in the update project narrative.

d. *§II.E.3.: Description of permits/approvals needed from other permitting authorities*

Response: The project anticipates the need for a Notice of Intent from the Conservation Commission and a highway access permit from MassHighway. Both permits have been submitted and are currently under review.

e. *§II.E.4.: Proposed development schedule*

Response: As the project has not received full approval both at the local level and from the appropriate state agencies, the development of a construction schedule is pre-mature.

6. *Site Plan Requirements (II.F):*
   a. *§II.F.2.: location of all existing and proposed buildings and structures within the development including dimensions, height and floor area.*

Response: Approximate areas for proposed residential dwellings have been shown on the updated plans. Final architectural plans are still evolving and more detailed architectural plans will be submitted to address these items.

b. *§II.F.3. Zoning district boundaries (the boundary of the Water Resource Protection Overlay District is not shown)*

Response: Zoning district boundaries have been added as requested, see sheets C-101, C-101A, C-101B, and C-101C.

c. *§II.F.4. Location of all driveways (no driveways are shown for the multi-family structure on Lot 9*

Response: The design has been revised and this multi-family structure is no longer proposed.

d. *§I.F.10 of the Planning Board's Site Plan Regulations requires "Elevations for all exterior facades of the proposed structure including the type and color of materials to be used." No elevation plans were submitted.*

Response: More detailed architectural plans will be updated to address these items.

Parking Regulations

7. *Insufficient information is provided to determine conformance with the Planning Board's Parking Regulations. Two-family units require 2 spaces/unit. Multi-family structures require 1.5 spaces per dwelling unit for 1 bedroom; 2 spaces per dwelling unit for units with 2 or more bedrooms, plus 1 space per every 3 units.*

Response: Parking requirements have been discussed in the updated project narrative. Each residential dwelling will include a two car garage and paved driveway to reasonably accommodate two additional vehicles.

<u>*Zoning Bylaw*</u>

8. *Section 4.2-Table II.: application doesn't include density calculations to determine conformance with dimensional requirements (minimum lot size) for multi-family structures.*

Response: Density calculations have been added to the plan.

9. *The driveway for the townhouse building on Lot 7 is not on the same lot. Leicester's Zoning Bylaw §1.3 (definition of ACCESS) requires access to be via the lot's frontage.*

Response: The design has been revised and this multi-family structure is no longer proposed.

10. *No information is provided to determine conformance with the Water Resources Protection Overlay District (§7.1)*

Response: The Water Resources Protection Overlay District has been illustrated on the updated plans. Residential developments are permitted uses as they are allowed in the underlying district and since this project is serviced by municipal sewer there is no potential for contamination. Although the project proposes impervious coverage of 22.93% which is less than the 30% outlined in Section 7.1, a comprehensive stormwater management system has been designed to treat stormwater associated with the impervious cover prior to discharge. The implementation of drywells for the project will provide the required recharge.

Quinn Engineering Inc. Comments:

1. *Waive §V, A, 1, f, to permit "tighter" roadway curves; centerline radii of 75 feet and 120 feet are requested; centerline radius of 200 feet required.*

The Massachusetts Department of Transportation "Highway Design Manual" recommends a minimum centerline radius of curvature of 135 feet for a design speed of 25 miles per hour.

Note that in the same location where plans request a waiver to permit radius of curvature reduced to 120 feet, a waiver to permit a steeper road grade of 14% is also requested. The combined relief requests create concerns for roadway safety extending over hundreds of feet of roadway.

We are unable to recommend approval of either requested waiver.

Response: The project no longer includes a standard subdivision road. While the typical cross section has been maintained, the site roadways will be privately owned and maintained through a condo association, or similar entity. The roadway design has been revised to a significant extent and now the minimum centerline radius has been increased from 75 feet to 120 feet. The location mentioned in the comment above, where a road grade of 14% is requested, the centerline radius has been increased to 300 feet. This is the developments main connection to Main Street

2. *Waive §V, a, 3, a, to permit steeper than maximum road slopes. Road grades (slopes) of 14% (Alignment 9, Station 1+00 – 5+00) and 20% (Alignment 7, Station 13+50 – 16+00) are requested. Maximum road grade of 10% permitted.*

In the Massachusetts Department of Transportation "Highway Design Manual", for local, rural roads in "Rolling" terrain a maximum road grade of 10% is recommended. In "Mountainous" terrain a maximum slope of 14% is permitted. It is the opinion of this office that the terrain is "Rolling", and not "Mountainous".

As mentioned above, the area where relief to permit the 14% road grade is requested is the same area where relief to permit reduced road curvature is also requested. The combined relief requests create concern for roadway safety extending over hundreds of feet of roadway.

A 20% road grade for municipal streets is considered unsuitable under any circumstances. The requested relief, if granted, would permit a roadway grade of 20% over 240 feet of road, connecting to the existing Colonial Drive, itself a 14% road grade. Vehicles would be required to pass over 500 feet of exceptionally steep road, coming to a stop before entering Main Street. This plan would create a significant vehicle hazard.

We are unable to recommend approval of either requested waiver.

Planning Board members who wish to observe a 14% road grade could visit Colonial Drive, which has a grade of 14%.

Response: The Preliminary Subdivision Plan that was submitted in April 2021 showed a 10% roadway with a connection to the north, near the entrance to the church. It was discussed at the meeting that grades steeper than 10% would be acceptable if the driveway connection was relocated further to the south. The driveway connection was relocated as requested and we've maintained a maximum of 14%. As mentioned above, 14% is permitted by MassDOT for mountainous terrain. Much of the existing slopes on the site are 3:1 or steeper and extend to nearly the right of way. In our professional opinion, this would be considered mountainous. As mentioned above, Colonial Drive is 14%, which is an example of the grades necessary to construct a road in this area.

As mentioned above, the geometry has been modified such that the primary connection to Main Street no longer seeks relief from the minimum curvature.

The secondary connection to Colonial Drive has been reduced from 20% to 14%, which matches existing grades in this area.

3. *Waive §VI, B, 1A to permit pipe materials other than reinforced concrete pipe required for storm drains. HDPE plastic, or approved equal requested.*

Historically, Leicester Highway Department has permitted and encouraged the use of HDPE (High Density Poly Ethylene) pipe for culverts. Leicester Planning Board may wish to confirm this with the current Highway Superintendent. A waiver of this requirement should be conditional upon approval by Leicester Highway Department Superintendent.

Response: Please note that the corrugated metal pipe has been removed from the design. The standard pipe used for stormwater conveyance is HDPE and the proposed detention systems are precast concrete chambers.

4. *Waive §VI, E, 3, to permit "Private driveway lighting". Street lights required.*

We defer this non engineering-related waiver request to the Planning Board. On Sheet C-102 a note requires a light post at each driveway, at the street line, presumably in lieu of conventional street lights. Plans should provide a detail of the proposed "private driveway lighting".

Response: The final design of a light fixture has yet to be determined, but is anticipated to be dark sky compliant.

5. *Waive §VI, I, to permit street trees on one side of road. Street trees required on both sides of road.*

We defer this non engineering-related waiver request to the Planning Board.

Response: This will be discussed with the Planning Board.

6. *Waive §VI, G, 1, to permit sidewalks on one side of road. Sidewalks are required on both sides of road.*

We defer this non engineering-related waiver request to the Planning Board.

Response: This will be discussed with the Planning Board.

Plan comments:

1. *Where Alignment 7 meets the existing Colonial Drive, plans must call for horizontal curves, for the proposed road to transition into Colonial Drive.*

Response: The design has been modified as requested.

2. *It is likely that high groundwater conditions prevail on this site. We recommend the roadway plans call for subdrains in cut areas and areas where the gravel road base will be below existing grade, to control water in the road base.*

Response: The standard roadway cross-section on sheet C-201 has been updated as requested. Also see detail 5 on sheet C-504.

3. *Given the likelihood of high groundwater tables in the area, test pits should be conducted on all proposed roads in locations of cuts.*

Response: It is impractical to conduct an extensive exploratory excavation in these locations as the proponent is not in full control of the property. The project team is in agreement with a condition requiring additional test pits prior to construction and re-certification by the design engineer should the in situ materials be different than presumed.

4. *It is recommended that a temporary easement be provided on lots proposed for future development, where cut/fill slopes or street trees are proposed outside ROW*

Response: The project no longer proposes a public ROW and there are no longer lots shown for future development. This comment no longer applies.

5. *Grade slopes of 2:1 are called out in several areas on plan. On any grade slope steeper than 3:1, plans must call for surface protection against erosion of unstabilized soil surfaces including loam and seeded slopes. Plans should establish a time frame for finishing slopes.*

Response: See Erosion Control Notes 14 and 19 on the Site Preparation Plan, sheet C-100.

6. *No erosion/sedimentation controls are found on the subdivision plans. Wetland filling is proposed on Alignment 7, as well as work in direct proximity to wetland resource areas.*

Response: See Site Preparation Plan, sheet C-100.

7. *Plans should document, in a general way, that parking can be provided in accordance with Bylaw requirements.*

Response: The following note was added to sheet C-101: "Parking requirements shall be met through the construction of an attached two car garage for each residential structure".

8. *Retaining walls are called out in two locations which abut private property, adjacent to Alignment 9, (Sta 0+50 – 1+50, Right and 4+00 – 5+50 Right):*

Response: The design has been modified such that the second retaining wall mentioned above has been eliminated. A new retaining wall is proposed along the north side of the Colonial Drive Extension.

a) *Plans must require the contractor to stabilize and otherwise protect the abutting property from subsidence, or other property damage resulting from excavation, retaining wall construction or other contractor operations.*

Response: The above note has been added as requested, see note 7, detail 2, on sheet C-505.

b) *Plans must provide specify the type of retaining wall (precast concrete, cast-in-place concrete). Retaining walls of timber or other degradable materials are not acceptable*

Response: See detail 2, on sheet C-505.

c) *Plans must require retaining walls designed in accordance with Massachusetts State Building Code, by a registered professional engineer.*

Response: See note 4, detail 2, on sheet C-505

d) *Per Massachusetts State Building Code, plans must require a fence at the top of the retaining walls, to protect persons from falling over the edge.*

Response: See details 3 and 4 on sheet C-505.

9. *Main Street in this area is under control of Massachusetts Department of Transportation. A Permit to Access State Highway will be required.*

Response: Understood, this process is underway.

10. *Plans do not indicate any Open Space is proposed; §IV, E allows the Planning Board to require park or recreational land.*

Response: Understood. Although the residential development will be provide and under the control of a home owner association or similar model, designated open space would be outlined in the individual covenants.

11. *Plans must detail wheel chair ramps, and clearly identify locations of them on plan.*

Response: The ramps have been added to the plan as requested. See also detail 7 on sheet C-506.

12. *It is likely that wetland replication, or other mitigation, will be required to offset filling of wetland at the location where Alignment 7 crosses the wetland/channel identified by wetland flags 33 through 59.*

Response: The above comment will be addressed by the Conservation Commission through the Notice of Intent process.

13. *Pertaining to drainage design:*

a) *Plans for detention systems DS-1a, DS-1b, DS-2, and DS-3 call for exceptionally large diameter corrugated metal pipe assemblies. Corrugated metal pipe is not accepted in Leicester, due to its susceptibility to corrosion. HDPE or other non- corrosive pipe material should be proposed.*

Response: The corrugated metal pipe detention systems have been replaced with precast concrete chambers.

b) *On plans, no details of construction of the large-diameter pipe assemblies are provided. Details including pipe trench cross section and bedding materials, manholes, culvert connections into and out of the culvert system, culvert angle change and manifold details, etc. must be provided.*

Response: The large diameter corrugated metal pipe detention systems have been replaced with precast concrete chambers. Details have been provided. Shop drawings will be required as well.

c) *Large diameter culverts systems appear to have standard manhole accesses. Plans must document access to large diameter culverts for maintenance.*

Response: The corrugated metal pipe detention systems have been replaced with precast concrete chambers. Access to the chambers will be as directed by the manufacturer and shop drawings reviewed by the engineer of record.

d) *Whatever material is proposed for the large-diameter pipe assemblies, the pipe material and specification must be defined (for example: SDR 35 PVC, or SCH 40 PVC), to ensure that structurally adequate pipe is provided. Naming only the material of construction is not sufficient. Engineer must submit information documenting the pipe specified is adequate for the use.*

Response: The corrugated metal pipe detention systems have been replaced with proprietary precast concrete chambers.

e) *The design of the large-diameter pipe assemblies must include anti-flotation computations, to document stability under conditions when the pipe is not full, but high groundwater conditions prevail.*

Response: The corrugated metal pipe detention systems have been replaced with precast concrete chambers.

f) *At the location where Alignment 9 intersects Main Street (Route 9), a drain connects into an existing catch basin. Drains must connect into drain manholes, not catch basins.*

Response: Within this section of Main Street, there are no municipal drain manholes and the existing catch basins are connected together.

g) *Plans call out "Gabion Style Stormwater Energy Dissipation Discharge" devices in two locations on plan. No information is provided as to what they are; no product definition is provided, no details of construction are provided. Plans must fully define what these are, and how they are constructed.*

Response: See detail 1 on sheet C-504.

h) *Detention systems are proposed in two locations on plan, which utilize "Retain-It" underground chambers. Details of construction must be provided, including bedding materials, outlet control structures, risers and interconnecting pipes, etc.*

Response: See details 2, 3, and 4 on sheet C-504 for Retain-It system details. Outlet control structures are detailed on sheet C-503, detail 3.

i) *Technical information as to the "Retain-It" chambers must be provided, including storage volume, and basis for design.*

Response: Sizing of the Retain-It systems are provided in the Proposed HydroCAD worksheets.

j) *Please submit Post-Development Hydrologic Routing Plan, and Watershed Plan, and Pre-Development Watershed Plan on larger paper; 8 ½ x 11" plans are virtually unreadable.*

Response: The above have been provided as requested.

k) *Swales along the sides of Alignment 7, Station 13+50 – 16+00 are exceptionally steep, and must be protected against erosion. Engineer must determine velocity of flow and document that proposed armor is sufficient to withstand velocity.*

Response: The grades within this area (the connection to Colonial Drive) have been reduced and are no longer exceptionally steep.

l) *Engineer must document that Catch Basins CB-25 and CB-26 on Alignment 7, have sufficient "grate capacity" to admit design flow. Catch basins must be designed to capture high- velocity flow anticipated in these swales.*

Response: As mentioned above, the grades within this area (the connection to Colonial Drive) have been reduced and are no longer exceptionally steep. Additionally, the catch basin detail, detail 4 on sheet C-502, requires vane style grates for catch basins within swales.

m) *It is likely that the channel/wetland identified by wetland flags 33 through 59 conducts flow of water. At the location where Alignment 7 crosses the channel/wetland, plans should call out a culvert to permit continued flow of water.*

Response: In the existing conditions, the stormwater runoff enters the wetlands and discharges to the catch basin at the end of Colonial Drive. The project proposes to fill approximately 900 square feet of wetlands in the vicinity of wetland flags 55 through 59. This filling is required in order to make the driveway connection to Colonial Drive. To maintain the existing flow path, a depression will be created with a beehive area drain and piped connection to the existing catch basin. Any runoff that collects on the opposite side of the driveway will be collected by the proposed catch basin (CB-34) and detained within Detention System #2B.

n) *Engineer proposes to meet the Massachusetts Stormwater Management Policy standard for recharge of stormwater to groundwater with the use of dry wells, installed at each residence in the subdivision. Dry wells will become private property. Dry wells on private property are not recommended for meeting the recharge standard for municipal stormwater facilities. The Town will lack the authority to implement maintenance of dry wells on private property.*

Response: The development is now proposed to be entirely private and thus the only option for infiltration would be on private property. Dry wells are currently proposed to be constructed at each residential building. Maintenance of the overall drainage system, including drywells will be incorporated into the covenants for the development.

o) *Field test pit evaluation of soils must be conducted at all locations where infiltration will take place per Massachusetts DEP Stormwater Management Policy, to verify suitability of soils and compliance with groundwater table separation requirements.*

Response: Additional test pits will be required to determine the final location of the individual structure drywells, see Soil Testing Notes on sheet C-102.

p) *The hydrologic analysis should include allowance for parking areas on individual home sites as well as multifamily lots.*

Response: In the hydraulic analysis, the developed portions of the site surrounding the residential structures have been modeled as ½ acre lots with 25% impervious cover. This takes into account the roof cover, driveways, and surrounding lawn areas.

We thank you in advance for your anticipated cooperation regarding this project and look forward to meeting to discuss the plans.

Very Truly Yours,
ALLEN & MAJOR ASSOCIATES, INC.

Michael Malynowski, PE
Senior Project Manager