July 18, 2018

Nover-Armstrong Associates, Inc.
124 Main Street, Suite 2GG
Carver MA 02330

Attention: Henry T. Nover, P.E.

RE: Windsor Place, 24 School Street, Wayland MA

Dear Mr. Nover:

I have received your letter to Linda Hansen, Conservation Administrator and the Wayland Conservation Commission, dated June 6, 2018 containing review comments regarding the site plan set for proposed redevelopment of the property located at 24 School Street in Wayland. The Civil Drawings, Hydrologic Analysis and Stormwater Report have been revised to address the comments from your letter. The Site Plans, Sheets One through Five have been revised bearing a revision date of July 5, 2018. The Stormwater Report has been revised and bears a revision date of June, 2018. The Revised Stormwater Report includes; the Hydrologic Analysis, Operation and Maintenance Plan, and supporting calculations documenting compliance with the Mass DEP Stormwater Standards.

I offer the following comments in response, following the same format as your letter. Please note that responses are listed below the original comment in bold.

5.0 STORMWATER MANAGEMENT COMMENTS

5.1
The September 2017 Stormwater Report narrative and O&M Plan should be updated to reflect the revisions to the propose stormwater management system provided in the May 2018 Revised Hydrologic Analysis.

The Stormwater Operation and Maintenance Plan was revised and is included within Chapter 11 of the Revised Stormwater Report.

5.2
Under the Stormwater Standards, this project is classified as a mix of new and redevelopment as there is an increase in impervious surfaces of 11,283 square feet (MWE-Revised Hydrologic Analysis).

No response required for this comment.

5.3
Due to the fact that there is an increase in the amount of impervious surface, the project is classified as a mix of "New" and "Redevelopment". The Wetland Regulations Stormwater Standards require that the runoff from the new impervious surfaces fully meet the Standards and

the existing or redeveloped impervious surface meet the Standards to the maximum extent practicable.

No response required for this comment.

5.4
It appears that the proposed stormwater infiltration system could meet full compliance with the standards for the 11,283 square feet increase in impervious surface reported in MWE's Revised Hydrologic Analysis. The system is designed to treat a total of 14,145 square feet of impervious surface. The capacity of the system to treat more impervious area than the new impervious surface should be considered to be as improvement of the existing conditions.

No response required for this comment.

5.5
There is little difference between the pre-development and post-development runoff Time of Concentration. Nover-Armstrong recommends that the Velocity Method found in TR-55 versus the LAG method be used to estimate the times of concentrations and that the overland flow paths cross perpendicular to the topographic contour lines.

Time of concentration values for the existing and proposed watersheds have been computed using the TR-55 method instead of the LAG method. Minor differences were noted in terms of time of concentration between the LAG and TR-55 methods but have no measurable impact on the existing or proposed hydrologic models. A list of Time of concentration values for each watershed is listed below:

Watershed	Lag Method Tc	TR-55 Tc
E.C.B.-1	5.4 minutes (LAG)	6.9 minutes
E.C.B.-2	5.0 minutes (Manual)	7.5 minutes
E.C.B.-3	5.8 minutes (LAG)	7.4 minutes
P.D.B-1	6.7 minutes (LAG)	7.4 minutes
P.D.B.-2	5.0 minutes (Manual)	5.1 minutes
P.D.B.-3	5.0 minutes (Manual)	7.5 minutes
P.D.B.-3A	5.0 minutes (Manual)	8.6 minutes
P.D.B.-4	5.0 minutes (Manual)	5.0 minutes (Manual)

5.6
Part 630, Hydrology, National Engineering Handbook states that the velocity method (TR-55 overland flow) is the "best method for calculating time of concentration for an urbanizing watershed or if hydraulic changes to the watercourse are being considered." Our experience has found using the LAG Methods versus the Velocity Method estimates smaller Peak rates of runoff.

Time of concentration values for the existing and proposed watersheds have been computed using the TR-55 method instead of the LAG method. Minor differences were noted in terms of time of concentration between the LAG and TR-55 methods but have no measurable impact on the existing or proposed hydrologic models.

5.7
The CN value used for the existing block driveway and walk should be adjusted to reflect some level of perviousness instead of considering it as a complete impervious paved surface.

A runoff curve number of 88 was used for the portions of the driveway that are presently constructed of pavers. The composite runoff curve numbers for E.C.B. 2 changed from 79.8 to 77.7 and composite runoff curve numbers changed from 70.4 to 68.8 for E.C.B.-3. The hydrologic model and report have been revised accordingly.

6.0 STORMWATER SYSTEM COMMENTS

6.1 Subsurface Infiltration BMP

6.1.1
The subsurface infiltration BMP does not have the required 2 feet of separation form seasonal high groundwater. The March 12, 2018 groundwater level in MW 3 was 160.14 feet. On the plans and calculations by MWE, the bottom of the 3.0' high subsurface infiltration precast structure is 162.25 feet. The bottom of the crushed stone needs to be 2 feet above groundwater. The mounding calculations be CREATIVE used 162.25 as the bottom of the stone.

The stone under the system is provided for a solid foundation for the infiltration chambers and is not included for storage within the hydrologic model or computations. MWE has removed the stone from under the system and replaced with filter fabric solely to accommodate Nover-Armstrong's request, however we feel strongly that the system and pavement structure over the system will be more prone to differential settlement over time without the stone foundation under the system.

The 12-inch layer of stone has been replaced with a layer of filter fabric underneath the infiltration system and is shown on the *Proposed Details Plan*, Sheet 4 of 5.

6.1.2
The manifold inlet fittings to the infiltration BMP should be detailed. The fitting layout is conceptual. Nover-Armstrong does not recommend 12" diameter connections to an 8" diameter manifold.

The manifold materials are specified to be H.D.P.E. pipe for which elbows, reducers and tee fittings are readily available. The detail for the infiltration system and manifolds is shown on the *Proposed Details Plan*, Sheet 4 of 5. Connections into the galleys will be sealed with hydraulic cement.

6.1.3
The two 6" diameter outlets from the infiltration BMP are labelled as 8" diameter on the plans and should be corrected.

The outlet pipes for the subsurface infiltration system have been labeled as 6-inch diameter on the *Proposed Site Plan* and *Proposed Details Plan*, Sheets 3 and 4 of 5.

6.1.4
Design information should be provided to support the diversion manhole outlet invert elevations to the Stormceptor units and the infiltration BMP.

The Stormceptor "offline" configuration has been designed to accommodate flows less than or equal to 1.1 c.f.s. through each unit with no bypass flow occurring. Storm events with a flow rate greater than or equal to approximately 2 c.f.s. will cause bypass around the stormceptor units. Rational method calculations demonstrate that peak flow rates for the 25-year storm are 0.5 and 1.1 c.f.s. passing through drainage structures D.M.H. 3 and D.M.H.-4 respectively. The elevation difference between the outlet to the stormceptor and bypass flow will allow the 25-year storm to completely pass through the stormceptor units with no bypass flow.

6.1.5
The pipe run from CB2 to DMH3 should not be located within the SAS reserve area.

The location of the drain line running from D.D.C.B.-2 AND D.M.H.-3 has been relocated to a location outside the S.A.S. expansion trench. This is shown on the *Proposed Site Plan*, Sheet 3 of 5.

6.1.6
Design information to support the Level Spreader manifold sizing needs to be provided. The Detail and plan view its layout are inconsistent. Additional detail of the inspection cover should be provided as its is conceptual in nature. A second inspection point on the manifold inside of the wall should be provided. Future access for maintenance and/or repair of the manifolds and the outlet pipe on the south side of Unit 1B will be difficult.

The level spreader manifold has the following design parameters:
Length = 20-feet
Number of holes per linear foot = 18 holes (one-inch diameter)
Total number of holes for manifold = 360 holes
Area of holes on manifold = 1.96 square feet
Peak flow rate through overflow for 100-year storm = 1.60 cubic feet per second (0.0044 c.f.s. per hole in manifold)
Velocity through manifold outlet holes = 0.82 feet per second

Details for the construction of the inspection cover have been added to the Level Spreader Manhole Detail on the *Proposed Details Plan*, Sheet 5 of 5.

6.1.7
The location of gutter downspouts and pipe connections to the subsurface infiltration BMP should be added to the plans. Nover-Armstrong is of the opinion that the roof runoff collection system would not be able to capture and convey the roof runoff from large storm events. Depending on the roof configuration, overflow from the gutters may by-pass the infiltration BMP, particularly from Units 1A and 1B.

Downspouts from the front of buildings A and B will run overland to proposed D.D.C.B. -3. Runoff from the rear of Building A will run overland into the proposed rain garden and runoff from the rear of Building B will run overland off property.

6.1.8
The grading at the top of the driveway from East Plain Street will allow runoff to by-pass CB 3 and discharge out to East Plain Street.

A berm has been added to the top of the access drive to East Plain Street to direct runoff to proposed double catch basin 3 (D.D.C.B.3). This is shown on the proposed grading plan, Sheet 2 of 5.

6.1.9
Subsurface Infiltration BMPs have an expected TSS removal rate of 80% versus the 99% reported. Requisite pretreatment BMPs receive no additional TSS credit per the Handbook.

The 80% TSS removal rate has been used for the calculations within Chapter 7 of the Stormwater Report. Overall TSS removal for the paved portions of the site are calculated to approximately 99% when employing other BMPS on the site including street sweeping, deep sump catch basins, StormCeptor 450 units and the proposed subsurface infiltration system.

6.2 Rain Garden BMP

6.2.4
The design of the Rain Garden BMP is not consistent with the Stormwater Handbook. The planting soil and stone specifications and thicknesses do not match the Handbook detail.

The planting soil specification on the rain garden detail has been adjusted to be more consistent with the Stormwater Management Policy. The revised detail is shown on the Proposed Details Plan, Sheet 4 of 5. Additionally, the handbook provides guidance only and is not a design handbook.

6.2.5
Rain Garden BMPs have an expected TSS removal rate of 90% if designed in accordance with the Handbook. The BMP better resembles a landscaped infiltration basin that has an expected TSS removal rate of 80%.

The proposed rain garden will receive flow from the easterly half of the roof of Building A and the lawn area between Building A and School Street. The rain garden will not receive flow from any impervious surface that will be subject to vehicle traffic.

6.2.6
Separation of the bottom of the Rain Garden BMP and seasonal high groundwater appears to be about 2.5 feet.

No response required for this comment.

6.2.7
The limits of the bottom of the Rain Garden (elevation 103.5) should be shown on the plans.

The limits of the rain garden bottom have been added to the plans and shown on the *Proposed Grading Plan*, Sheet 2 of 5.

6.2.8
To specifications notes for seeding the bottom of the Rain Garden are inconsistent. We don't think "New England Wet Mix" is appropriate considering the amount of groundwater separation.

The note specifying the use of "New England Wet Mix" seed blend has been removed from the Proposed Rain Garden Detail on the *Proposed Details Plan*, Sheet 4 of 5.

6.2.9
There are a lot of plants proposed for the Rain Garden. The planting schedule should be reviewed for spacing guidelines.

The planting schedule has been revised to reduce the quantity of plantings within the rain garden and is shown on the Proposed Rain Garden Detail on the *Proposed Detail Sheet*, Sheet 4 of 5.

6.3 Stormceptor Proprietary BMP

6.3.1
The Stormceptor 450i was originally designed by the manufacturer to be used as a stand alone inlet. The manufacturer claims it will remove 93% of the annual TSS loading on this project. It is Nover-Armstrong's opinion that the removal efficiency of proprietary BMPs claimed by the manufacturers exceed actual rates found in the field.

The contributing watersheds to both StormCeptor units are relatively small in area (approximately 0.15-acres) and will have low peak flow rates. Relatively high efficiency rates under these conditions are not unreasonable.

TSS removal calculations have been conservatively revised to show 25% TSS removal for the StormCeptor treatment units which provides approximately 89% TSS removal from the site in the post-development condition.

If Nover-Armstrong can provide us with the literature on which they base their opinion, we will adjust the TSS removal rates using the published values.

6.3.2
As the unit is provided here in and "off-line" configuration and captures a relatively small amount of impervious area, it is our opinion however that the units combined with the Deep-Sump Catch Basin BMPs will remove at a minimum 44% of the TSS required for the discharges near or to critical areas or within an area of soils with rapid infiltration.

The contributing watersheds to both StormCeptor units are relatively small in area (approximately 0.15-acres) and will have low peak flow rates. Relatively high efficiency rates under these conditions are not unreasonable.

TSS removal calculations have been conservatively revised to show 25% TSS removal for the StormCeptor treatment units which provides approximately 89% TSS removal from the site in the post-development condition.

Please feel free to contact me should you have any questions or if you require any additional information.

Sincerely yours,

Brian Nelson, P.E.
Project Engineer

STORMWATER REPORT

Proposed Site Redevelopment
Windsor Place
24 School Street
Wayland, MA 01778

Prepared for: ***Windsor Place LLC***
73 Pelham Island Road
Wayland, MA 01778

Prepared by: ***MetroWest Engineering, Inc.***
75 Franklin Street
Framingham, MA 01702
(508) 626-0063

September, 2017
Revised June, 2018

STORMWATER REPORT INDEX:

CHAPTER 1: HYDROLOGIC ANALYSIS

Revised Hydrologic Analysis:
Proposed Site Redevelopment
24 School Street
Wayland, MA

Prepared for: ***Windsor Place, LLC***
73 Pelham Island Road
Wayland, MA 01778

Prepared by: ***MetroWest Engineering, Inc.***
75 Franklin Street
Framingham, MA 01702
(508) 626-0063

Original Submittal: September, 2017
Revised: May 2018
Second Revision: July 2018

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Hydrologic Analysis (Second Revision, July 2018)
Proposed Site Redevelopment
24 School Street, Wayland MA

Introduction

The project site is located on the northerly side of East Plain Street at the intersection of East Plain Street and School Street. The locus is shown on *Figure One: Locus Map, 24 School Street, Wayland MA.*

The subject parcel (Assessors' Map 52, Lot 189) has an area of 37,865 square feet (0.87 acres). The property is improved with a two-story house, a one-story barn, a detached garage, and a patio. The lot consists of mostly gravel, landscaped and lawn areas with moderate topographic relief across the site. The site slopes from higher elevations near School Street to the southwest with a maximum elevation differential on site of approximately ten-feet. A wetland is located west of the property and a portion of the lot falls within the 100' buffer zone.

According to the NRCS Soil Survey, the southerly portion of the lot consists of Narragansett Silt Loam (415B) soil series and are classified within hydrologic soil group A. Narragansett soils are a well drained glacial till that exhibit moderately high to high infiltration rates when saturated. The northerly portion of the site consists of Hinckley loamy sand soil group (253C). Hinckley soils are a very well-drained soil with good hydraulic conductivity. Runoff curve numbers for Hydrologic Soil Group B were used for the analysis based on soil conditions observed during field testing and the inconsistencies between hydrologic soil group and soil descriptions in the soil survey.

An on-site soil evaluation program consisting of twelve deep test holes was conducted on July 21 and August 21, 2014. DTH-1, 2, 3, 6, 7, 9, and 10 were all conducted on the north side of the lot. Results revealed the A horizon consisting of fine sandy loam at a depth of roughly 12 inches, the B horizon consisting of fine sandy loam to a depth of roughly 24 inches, with C horizons consisting of sandy loam at 60 inches and 120 inches respectively.

DTH-4 and 5 were conducted on the south side of the lot. DTH-4 had the A horizon at 28 inches, with the first 20 inches being fill. The B horizon consisted of fine sandy loam and had a depth of 40 inches. The C horizons consisted of sandy loam and were found at 86 and 116 inches respectively. DTH-5's A horizon consisting of fine sandy loam was found at 16 inches. The B horizon consisting of fine sandy loam was found at 34 inches. The C horizons consisting of sandy loam were found at 84 and 117 inches respectively.

DTH-11 and 12 were conducted on the east side of the lot. DTH-11 has fill to a depth 18 inches, with the A horizon of fine sandy loam at 30 inches, the B horizon of fine sandy loam at 36 inches, and the C horizons of sandy loam at 58 and 128 inches respectively. DTH-12 has fill to a depth of 54 inches, bypassing the A and B horizons, the C horizons of sandy loam were found at 82 and 114 inches respectively.

No refusal was observed in any of the test pits. Redoximorphic features were found in 10 of the 12 test pits at depths of 5 to 7 feet. The groundwater elevations varied from 155-feet to 162-feet.

The site redevelopment program includes the construction of two new multifamily dwellings, paved parking areas, storm water management system and supporting utilities. See site plans for details regarding the proposed development.

The property presently contains 8,780 square feet of impervious area. Redevelopment of the property will increase the amount of impervious area by adding 11,283 square feet for a total of 20,063 square feet.

Drainage Approach

There are presently no controls in place to manage stormwater runoff rates or volumes. Stormwater runoff drains to the west and south to abutting properties and into East Plain Street. The goal of the proposed stormwater management system is to reduce runoff rates and volumes for all design storms compared to the existing condition and to promote groundwater recharge using a subsurface infiltration system and a rain garden.

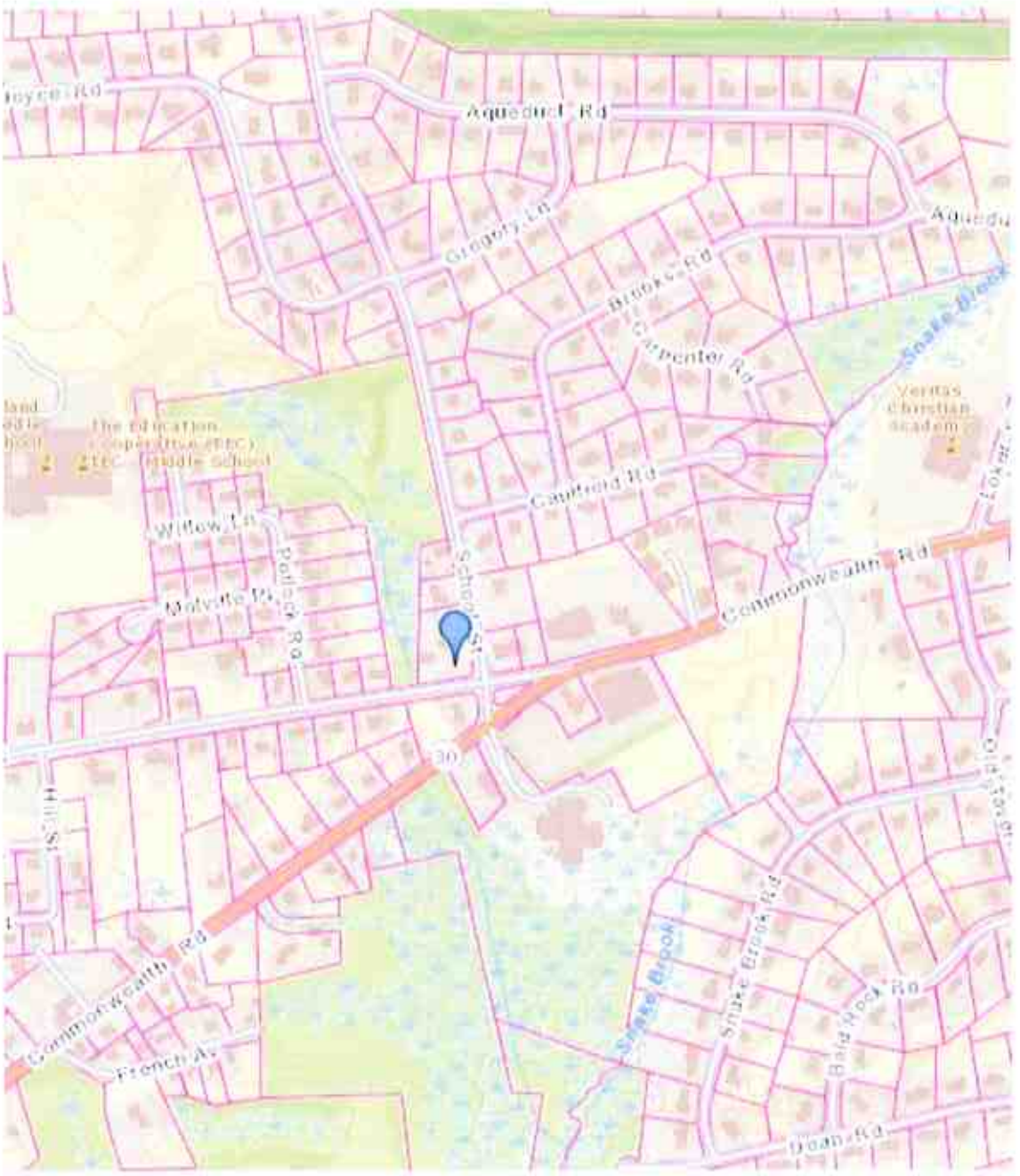
The proposed subsurface infiltration system will be located under the parking lot between the two structures. The system will consist of 84 precast concrete infiltration galleys surrounded by two feet of double washed, crushed stone. The infiltration system will collect runoff from Post-Development Basin 4, which consists of the parking area and a portion of the proposed roof structures. The proposed infiltration system is designed to completely contain and recharge runoff from storms up to the 10-year storm. The proposed rain garden will collect and store runoff from Post-Development Basin 3A which consists of the easterly portion of the roof of Building A and the surrounding lawn and landscaped areas. The storm water management system will significantly reduce runoff rates and volumes from the subject parcel for all storm events.

Overall reductions in runoff rates and volumes can be found in the Model Results section of this report and detailed hydrologic analysis and basin models can be found in Appendix A.

Hydrologic Analysis

A hydrologic analysis of the project has been performed to establish pre-development conditions, assess post-development impacts and evaluate the effectiveness of the proposed drainage infiltration systems. The analysis employs an SCS TR-55 hydrologic computer model and analyzes design storms with return periods of 2, 10, 25 and 100-years. An SCS Type 3 24-hour rainfall distribution pattern is used for the theoretical design storm. Time of concentration values were determined by the TR-55 method or manually entered at five minutes for watersheds having relatively small areas or hydraulic lengths to allow for the use of a three-minute time interval for all hydrograph computations. Precipitation rates of 3.20, 4.73, 5.95 and 8.45-inches were used for the 2, 10, 25 and 100-year storm events respectively. Runoff curve numbers for Hydrologic Soil Group B were used for the analysis based on soil conditions observed during field

Figure One: Locus Map, 24 School Street, Wayland MA



testing and the inconsistencies between hydrologic soil group and soil descriptions in the soil survey.

Existing Conditions

The existing conditions model analyzes the site as three drainage basins; Existing Conditions Basins One, Two, and Three.

Existing Conditions Basin 1 (E.C.B.-1) has an area of 15,276 square feet and flows in a southwesterly direction to Design Point A located at the west side of the property.

Existing Conditions Basin 2 (E.C.B.-2) has an area of 2,901 square feet and flows in a northeasterly direction to Design Point B located at the northeast side of the property.

Existing Conditions Basin 3 (E.C.B.-3) has an area of 19,688 square feet and flows in a southwesterly direction to Design Point C located at the southwest corner of the property.

The Existing Conditions Basins are shown on Figure Two, *Existing Conditions Watershed Delineation Plan* and information for all Existing Conditions Basins is listed on the plan and below.

Existing Conditions Basin 1 (E.C.B.-1)

Area = 15,276 square feet
Impervious Area = 2,205 square feet, curve number = 98.0
Lawn area (good condition) = 13,071 square feet, curve number = 61.0
Hydrologic soil group B
Weighted Curve Number = 66.4
Basin slope = 5.2%
Hydraulic length = 189 feet
Time of concentration = 6.9 minutes (TR-55 Method)

Existing Conditions Basin 2 (E.C.B.-2)

Area = 2,901 square feet
Impervious Area = 899 square feet, curve number = 98.0
Lawn area (good condition) = 1,440 square feet, curve number = 61.0
Paver Drive (fair condition) = 561 square feet, curve number = 88.0
Hydrologic soil group B
Weighted Curve Number = 77.8
Basin slope = 1.9%
Hydraulic length = 68 feet
Time of concentration = 7.5 minutes (TR-55 Method)

Existing Conditions Basin 3 (E.C.B.-3)

Area = 19,688 square feet
Impervious Area = 1,619 square feet, curve number = 98.0

NOTES:

1. SUBJECT PARCEL IS SHOWN AS ASSESSORS MAP 52, LOT 189. RECORD TITLE FROM BOOK 31869, PAGE 55.
2. UTILITY LOCATIONS DEPICTED ON THIS PLAN, BOTH ABOVE- AND BELOW-GROUND, ARE BASED UPON DIRECT FIELD OBSERVATIONS MADE BY METROWEST ENGINEERING, INC. PERSONNEL DURING A FIELD SURVEY, RECORD PLAN LOCATIONS, OR DIGSAFE PAINT-INDICATORS. METROWEST ENGINEERING, INC. DOES NOT WARRANT THAT ALL UTILITIES ARE SHOWN OR THAT UTILITIES THAT ARE DEPICTED ARE SHOWN IN THE CORRECT LOCATION, OR WITH THE PROPER MATERIAL DESIGNATION. METROWEST ENGINEERING, INC. DOES NOT WARRANT OR PROVIDE AN EXPRESS OR IMPLIED WARRANTY THAT ALL SUBSURFACE IMPROVEMENTS ARE SHOWN OR ARE SHOWN CORRECTLY, INCLUDING, BUT NOT LIMITED TO, UTILITIES, UNDERGROUND VAULTS, UNDERGROUND TANKS OR CHAMBERS, BUNKERS, DUCT BANKS, AND/OR OTHER MAN-MADE IMPROVEMENTS THAT LIE BENEATH THE GROUND SURFACE AT THE TIME OF THE SURVEY.
3. CONTRACTOR IS SOLELY RESPONSIBLE FOR ESTABLISHING EXISTING LOCATIONS OF ALL SUB-SURFACE UTILITIES AND MAN-MADE IMPROVEMENTS AND FOR THE REQUIREMENTS TO REPLACE, RELOCATE OR REPAIR EXISTING UTILITIES IN THE EVENT OF DAMAGE OCCURRING DURING CONSTRUCTION. MWE IS NOT RESPONSIBLE OR LIABLE FOR DELAYS OR COSTS ASSOCIATED WITH REMOVING/REPLACING/RELOCATING OF EXISTING UTILITIES REGARDLESS OF WHETHER SAID UTILITIES ARE ACCURATELY DEPICTED ON THIS SURVEY.
4. THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY; THE PROPERTY LIES WITHIN ZONE "X" OF THE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NUMBER 25017C0528F, BEARING AN EFFECTIVE DATE OF JULY 7, 2014.

BENCHMARKS

ELEVATIONS SHOWN ON THIS PLAN REFER TO RM 11 (ELEV.=163.84'), A CHISELED SQUARE IN THE NORTH HEADWALL OF THE CULVERT UNDER COMMONWEALTH ROAD FOR SNAKE BROOK N.G.V.D. 1929.)

T.B.M.	DESCRIPTION	ELEVATION
C	DHN SET IN 14" BLACK LOCUST	161.89'
D	DHN SET IN 10" NORWAY MAPLE	168.74'

EXISTING TREE DESCRIPTION LEGEND

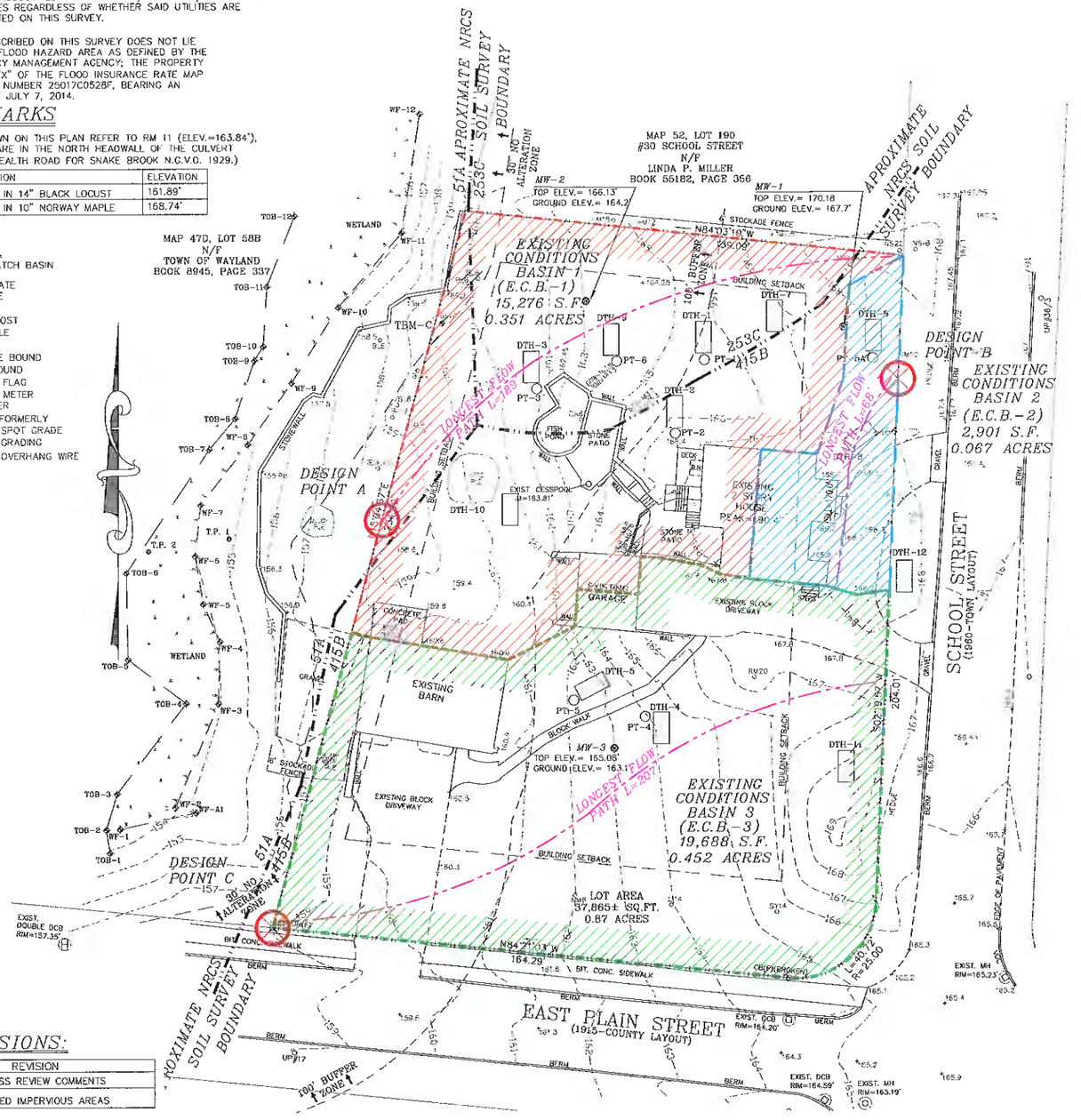
CODE	DESCRIPTION
BL#	BALCK LOCUST
CA#	CRAB APPLE
HM#	HEMLOCK
LI#	LINDEN
NM#	NORWAY MAPLE
NS#	NORWAY SPRUCE
RM#	RED MAPLE
SY#	SYCAMORE

DETAIL: TREE LOCATION; TREE CODE; TREE DIAMETER

CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING UTILITY SERVICES IN THE FIELD PRIOR TO CONSTRUCTION (WATER, ELECTRICAL, ETC.) CALL DIG-SAFE BEFORE YOU DIG 811.

LEGEND

DCB	DRAIN CATCH BASIN
HM	MANHOLE
WG	WATER GATE
GG	GAS GATE
	HYDRANT
U.P.	UTILITY POST
DH	DRILL HOLE
(F)	FOUND
CB	CONCRETE BOUND
SB	STONE BOUND
WF	WETLAND FLAG
E.M.	ELECTRIC METER
G.M.	GAS METER
N/F	NOW OR FORMERLY
	EXISTING SPOT GRADE
	EXISTING GRADING
	EXISTING OVERHANG WIRE



REVISIONS:

No.	DATE	REVISION
1	11/04/17	ADDRESS REVIEW COMMENTS
2	06/19/18	CHANGED IMPERVIOUS AREAS

SOIL TEST RESULTS

SOIL LOGS No:

DTH-1 ELEV=165.7'	DTH-2 ELEV=165.9'	DTH-3 ELEV=161.7'	DTH-4 ELEV=164.1'	DTH-5 ELEV=162.6'
0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-24" Bw FINE SANDY LOAM 10YR5/6 24"-62" C1 SANDY LOAM 2.5Y5/3 62"-126" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER NO REFUSAL, C2 HORIZON IS TIGHT REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=159.87'	0"-22" Ap FINE SANDY LOAM 10YR3/3 22"-42" Bw FINE SANDY LOAM 10YR5/6 42"-96" C1 SANDY LOAM 2.5Y5/3 96"-116" C2 SILT LOAM 2.5Y6/3 WATER WEEPING @108" NO STANDING WATER, NO REFUSAL REDOX @60" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=159.23'	0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-22" Bw FINE SANDY LOAM 10YR5/6 22"-84" C1 SANDY LOAM 2.5Y5/3 84"-110" C2 SILT LOAM 2.5Y6/3 NO STANDING WATER, NO REFUSAL C2 HORIZON IS DAMP REDOX @82" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=154.87'	0"-20" FILL 20"-28" Ap FINE SANDY LOAM 10YR3/3 28"-40" Bw FINE SANDY LOAM 10YR5/6 40"-86" C1 SANDY LOAM 2.5Y5/4 86"-116" C2 SANDY LOAM 2.5Y4/4 NO REFUSAL, NO STANDING OR WEEPING WATER NO REDOX ESTIMATED DESIGN GROUNDWATER=NONE	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-34" Bw FINE SANDY LOAM 10YR5/6 34"-84" C1 SANDY LOAM 2.5Y5/4 84"-118" C2 SANDY LOAM 2.5Y4/3 WEEPING WATER @112" NO REFUSAL REDOX @72" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=156.6'
DATE: JULY 31, 2014				
BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)				
INSPECTOR: BILL MURPHY, WAYLAND BOARD OF HEALTH				

SOIL TEST RESULTS

SOIL LOGS No:

DTH-6 ELEV=167.7'	DTH-7 ELEV=166.8'	DTH-8 ELEV=168.2'	DTH-9 ELEV=163.0'	DTH-10 ELEV=160.75'
0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-26" Bw FINE SANDY LOAM 10YR5/6 26"-64" C1 SANDY LOAM 2.5Y5/3 64"-122" C2 SANDY LOAM 2.5Y4/4 NO STANDING OR WEEPING WATER NO REFUSAL REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.87'	0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-32" Bw FINE SANDY LOAM 10YR5/6 32"-58" C1 SANDY LOAM 2.5Y5/3 58"-114" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER LENSES OF SILT LOAM FROM 76" DOWN ESTIMATED DESIGN GROUNDWATER=NONE	0"-26" FILL 26"-40" Bw FINE SANDY LOAM 10YR5/6 40"-78" C1 SANDY LOAM 2.5Y5/4 78"-108" C2 LOAMY SAND 2.5Y5/3 108"-126" C3 SILT LOAM 2.5Y6/3 C3 HORIZON IS DAMP NO REFUSAL REDOX @60" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=161.53'	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-30" Bw FINE SANDY LOAM 10YR5/6 30"-46" Bc SANDY LOAM 2.5Y5/4 46"-98" C1 SANDY LOAM 2.5Y5/3 98"-118" C2 SANDY LOAM 2.5Y4/4 WATER STANDING @108" WATER WEEPING @88" REDOX SEEN @62", NO REFUSAL ESTIMATED DESIGN GROUNDWATER=157.8'	0"-15" Ap FINE SANDY LOAM 10YR3/3 15"-30" Bw FINE SANDY LOAM 10YR5/6 30"-66" C1 LOAMY SAND 2.5Y5/3 66"-112" C2 SILT LOAM 2.5Y5/4 WATER STANDING @100" WATER WEEPING @96" NO REFUSAL REDOX SEEN @68" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=155.08'

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	INSP.
PT-1	60"	8 MPI	07/31/14	B.N.	B.M.
PT-2	68"	13 MPI	07/31/14	B.N.	B.M.
PT-3	90"	10 MPI	07/31/14	B.N.	B.M.
PT-4	55"	MPI	07/31/14	B.N.	B.M.
PT-5	60"	MPI	07/31/14	B.N.	B.M.

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	INSP.
PT-5A	54"	10 MPI	08/21/14	B.N.	J.J.
PT-6	60"	3 MPI	08/21/14	B.N.	J.J.

DTH-11 ELEV=166.0'	DTH-12 ELEV=168.2'
0"-18" FILL 18"-30" Ap FINE SANDY LOAM 10YR3/3 30"-36" Bw FINE SANDY LOAM 10YR5/6 36"-58" C1 SANDY LOAM 2.5Y5/3 58"-128" C2 SANDY LOAM 2.5Y6/3 WATER STANDING @125" NO WEEPING WATER REDOX SEEN @60" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.0'	0"-54" FILL 58"-82" C1 SANDY LOAM 2.5Y4/4 82"-114" C2 SANDY LOAM 2.5Y5/4 C2 HORIZON HAS LENSES OF SILT LOAM NO STANDING OR WEEPING WATER NO REFUSAL REDOX SEEN @64" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=161.0'
DATE: AUGUST 21, 2014	
BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)	
INSPECTOR: JULIA JUNGHANNS, WAYLAND BOARD OF HEALTH	

USDA SOIL CLASSIFICATION

SOIL NUMBER	SOIL SERIES	HYDROLOGIC SOIL GROUP
51A	SWANSEA MUCK	B/D
253C	HINCKLEY LOAMY SAND	A
415B	NARRAGANSETT SILT LOAM	B

HYDROLOGIC SOIL CROUP B USED FOR ANALSYIS

SOILS ON SITE ARE SANDY LOAM TEXTURES AND CLASSIFIED WITHIN HYDROLOGIC SOIL GROUP B.

EXISTING CONDITIONS BASIN PROPERTIES:

EXISTING CONDITIONS BASIN 1 (E.C.B.-1)

TOTAL BASIN AREA = 15,276 S.F. (0.351 ACRES)
HYDRAULIC LENGTH = 189 FEET
CHANGE IN ELEVATION = 9.8 FEET
BASIN SLOPE = 0.052 (5.2%)

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 2,205 S.F. (0.051 ACRES)	98	0.051	4.998
LAWN AREA (GOOD COND.) = 13,071 S.F. (0.300 ACRES)	61	0.300	18.300
		SUM 0.351	SUM 23.298

WEIGHTED CURVE NUMBER (C_N) = (23.298/0.351) = 66.4

EXISTING CONDITIONS BASIN 2 (E.C.B.-2)

TOTAL BASIN AREA = 2,901 S.F. (0.067 ACRES)
HYDRAULIC LENGTH = 68 FEET
CHANGE IN ELEVATION = 1.3 FEET
BASIN SLOPE = 0.019 (1.9%)

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 899 S.F. (0.021 ACRES)	98	0.021	2.058
LAWN AREA (GOOD COND.) = 1,441 S.F. (0.033 ACRES)	61	0.033	2.013
BLOCK DRIVE = 561 S.F. (0.013 ACRES)	88	0.013	1.144
		SUM 0.067	SUM 5.215

WEIGHTED CURVE NUMBER (C_N) = (5.215/0.067) = 77.8

EXISTING CONDITIONS BASIN 3 (E.C.B.-3)

TOTAL BASIN AREA = 19,688 S.F. (0.452 ACRES)
HYDRAULIC LENGTH = 207 FEET
CHANGE IN ELEVATION = 8.8 FEET
BASIN SLOPE = 0.042 (4.2%)

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 1,619 S.F. (0.037 ACRES)	98	0.037	3.626
LAWN AREA (GOOD COND.) = 14,573 S.F. (0.335 ACRES)	61	0.335	20.435
BLOCK DRIVE/WALK = 3,496 S.F. (0.080 ACRES)	88	0.080	7.040
		SUM 0.452	SUM 31.101

WEIGHTED CURVE NUMBER (C_N) = (31.101/0.452) = 68.8

EXISTING CONDITIONS - TOTAL IMPERVIOUS AREA = 4,723 S.F.
EXISTING CONDITIONS - TOTAL LAWN AREA = 29,085 S.F.
EXISTING CONDITIONS - TOTAL BLOCK DRIVE/WALK = 4,057 S.F.

FOR METROWEST ENGINEERING, INC. DATE
ROBERT A. GEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046

GRAPHIC SCALE
1 inch = 20 ft.
(FEET) 0 10 20 40 80
(METERS) 0 5 10 20 30

FIGURE TWO

EXISTING CONDITIONS WATERSHED DELINEATION PLAN

#24 SCHOOL STREET
IN
WAYLAND, MASS

PREPARED FOR:
CHADWICK HOMES
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
LINDA C. KNOWLES &
GARY W. RIDGE
24 SCHOOL STREET
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:
MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
FRAMINGHAM, MA 01702
TEL.: (508)626-0063
FAX: (508)875-6440

SHEET 1 OF 1		DATE: DECEMBER 19, 2016
CALC'D BY: RAG	FIELD BK: 621	CAD FILE: EC_HYDRO_R2.dwg
DRAFTER:	PROJECT: WY_SCH	DWG FILE: SK121916_R2.dwg

Lawn area (good condition) = 14,573 square feet, curve number = 61.0
Paver Drive (fair condition) = 3,496 square feet, curve number = 88.0
Hydrologic soil group B
Weighted Curve Number = 68.8
Basin slope = 4.2%
Hydraulic length = 207 feet
Time of concentration = 7.4 minutes (TR-55 Method)

Proposed Conditions

The proposed condition model analyzes the site as five Post-Development drainage basins, Post-Development Basins One through Four (including Basin 3A).

Post-Development Basin 1 (P.D.B.-1) has an area of 5,991 square feet and flows west to Design Point A located at the west of the property.

Post-Development Basin 2 (P.D.B.-2) has an area of 1,877 square feet and flows north to Design Point B located at the northeastern side of the property.

Post-Development Basin 3 (P.D.B.-3) has an area of 7,081 square feet and flows west to design point C located at the southwest corner of the property.

Post-Development Basin 3A (P.D.B.-3A) has an area of 5,856 square feet and flows into the proposed rain garden on the easterly side of Building A.

Post-Development Basin 4 (P.D.B.-4) has an area of 17,059 square feet and flows to the Proposed Infiltration System located at the center of the property.

The Proposed Conditions Basins are shown on Figure Three, *The Post Development Watershed Delineation Plan* and information for all Post Development Basins is listed on the plan and shown below.

Post-Development Basin 1 (P.D.B.-1)

Area = 5,991 square feet
Impervious area = 857 square feet; curve number = 98.0
Lawn area (good condition) = 3,815 square feet, curve number = 61.0
Landscaped area (good condition) = 1,323 square feet, curve number = 61.0
Hydrologic soil group B
Weighted Curve Number = 66.4
Basin slope = 4.4%
Hydraulic length = 222 feet
Time of concentration = 7.4 minutes (TR-55 Method)

Post-Development Basin 2 (P.D.B.-2)

Area = 1,877 square feet
Impervious area = 356 square feet; curve number = 98.0

NOTES:

1. SUBJECT PARCEL IS SHOWN AS ASSESSORS MAP 52, LOT 189. RECORD TITLE FROM BOOK 31869, PAGE 55.

2. UTILITY LOCATIONS DEPICTED ON THIS PLAN, BOTH ABOVE-- AND BELOW-GROUND, ARE BASED UPON DIRECT FIELD OBSERVATIONS MADE BY METROWEST ENGINEERING, INC. PERSONNEL DURING A FIELD SURVEY, RECORD PLAN LOCATIONS, OR DIGSAFE PAINT-INDICATORS. METROWEST ENGINEERING, INC. DOES NOT WARRANT THAT ALL UTILITIES ARE SHOWN OR THAT UTILITIES THAT ARE DEPICTED ARE SHOWN IN THE CORRECT LOCATION, OR WITH THE PROPER MATERIAL DESIGNATION. METROWEST ENGINEERING, INC. DOES NOT WARRANT OR PROVIDE AN EXPRESS OR IMPLIED WARRANTY THAT ALL SUBSURFACE IMPROVEMENTS ARE SHOWN OR ARE SHOWN CORRECTLY, INCLUDING, BUT NOT LIMITED TO, UTILITIES, UNDERGROUND VAULTS, UNDERGROUND TANKS OR CHAMBERS, BUNKERS, DUCT BANKS, AND/OR OTHER MAN-MADE IMPROVEMENTS THAT LIE BENEATH THE GROUND SURFACE AT THE TIME OF THE SURVEY.

3. CONTRACTOR IS SOLELY RESPONSIBLE FOR ESTABLISHING EXISTING LOCATIONS OF ALL SUB-SURFACE UTILITIES AND MAN-MADE IMPROVEMENTS AND FOR THE REQUIREMENTS TO REPLACE, RELOCATE OR REPAIR EXISTING UTILITIES IN THE EVENT OF DAMAGE OCCURRING DURING CONSTRUCTION. MWE IS NOT RESPONSIBLE OR LIABLE FOR DELAYS OR COSTS ASSOCIATED WITH REMOVING/REPLACING/RELOCATING OF EXISTING UTILITIES REGARDLESS OF WHETHER SAID UTILITIES ARE ACCURATELY DEPICTED ON THIS SURVEY.

4. THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY; THE PROPERTY LIES WITHIN ZONE "X" OF THE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NUMBER 25017C0528F, BEARING AN EFFECTIVE DATE OF JULY 7, 2014.

BENCHMARKS

ELEVATIONS SHOWN ON THIS PLAN REFER TO RM 11 (ELEV.=163.84'), A CHISELED SQUARE IN THE NORTH HEADWALL OF THE CULVERT UNDER COMMONWEALTH ROAD FOR SNAKE BROOK N.G.V.D. 1929.

T.B.M.	DESCRIPTION	ELEVATION
C	DHN SET IN 14" BLACK LOCUST	161.89'
D	DHN SET IN 10" NORWAY MAPLE	168.74'

CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING UTILITY SERVICES IN THE FIELD PRIOR TO CONSTRUCTION (WATER, ELECTRICAL, ETC.) CALL DIG-SAFE BEFORE YOU DIG 811.

ZONING:

RESIDENCE ZONE 20,000 – 120' FRONT

MINIMUM LOT AREA= 20,000[15] S.F.
MINIMUM LOT COVERAGE= 20%
MINIMUM FRONTAGE= 200 FT.
SETBACKS:
FRONT LOT LINE= 30[2] FT.
FRONT ROW CENTER LINE= 55 FT.
SIDE YARD= 15[3] FT.
REAR YARD=30 FT.
MAX. HEIGHT = 35 FT./2½ STORIES

2) IF §198-702 SHALL REQUIRE A GREATER SETBACK OR PERMIT A LESSER SETBACK, THE PROVISIONS OF SAID §198-702 SHALL PREVAIL OVER THIS TABLE.

3) SIDE YARDS SHALL MEET THE REQUIREMENTS OF §§198-702.4 AND 703.2, AND THE REQUIRED MINIMUM SIDE YARD MAY BE REDUCED IN ACCORDANCE WITH PROVISIONS OF §198-703.2

15) MINIMUM FRONT YARD WIDTH SHALL BE CALCULATED IN ACCORDANCE WITH THE REQUIREMENTS OF §198-705.1 OF THE ZONING BYLAW.

EXISTING TREE DESCRIPTION LEGEND

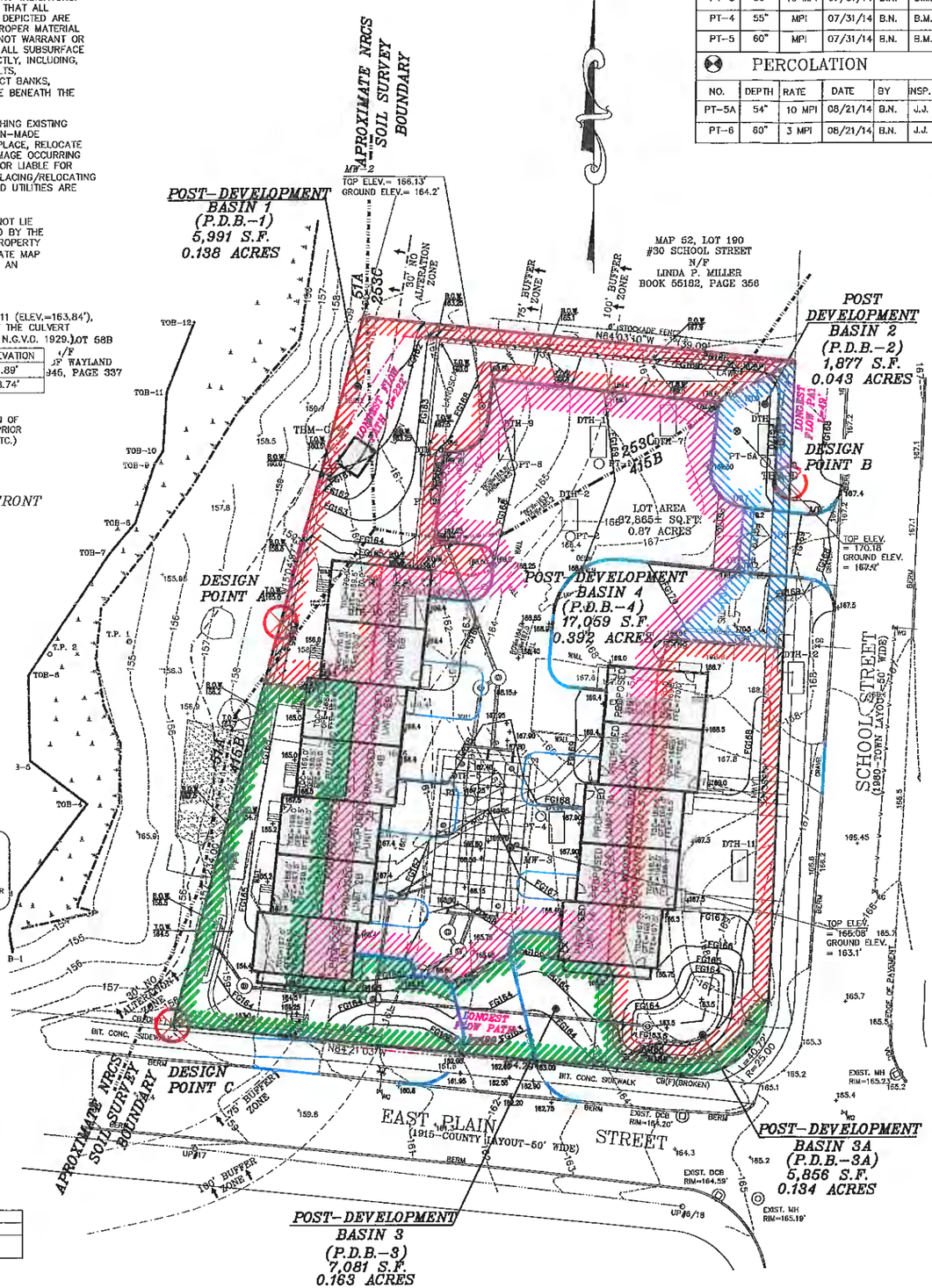
CODE	DESCRIPTION
BL#	BALCK LOCUST
CA#	CRAB APPLE
HM#	HEMLOCK
LI#	LINDEN
NM#	NORWAY MAPLE
NS#	NORWAY SPRUCE
RM#	RED MAPLE
SY#	SYCAMORE

DETAIL
TREE LOCATION
TREE CODE
TREE DIAMETER

LEGEND

DCB	DRAIN CATCH BASIN
HM	MANHOLE
WG	WATER GATE
GG	GAS GATE
	HYDRANT
U.P.	UTILITY POST
DH	DRILL HOLE
(F)	FOUND
CB	CONCRETE BOUND
SB	STONE BOUND
WF	WETLAND FLAG
E.M.	ELECTRIC METER
G.M.	GAS METER
N/F	NOW OR FORMERLY
+200.0	EXISTING SPOT GRADE
----200----	EXISTING GRADING
----------	EXISTING OVERHANG WIRE

No.	DATE	REVISION
2	07/29/15	ADD TOP OF BANK
3	11/01/16	ADD ELEVATION DATUM REFERENCE REVISE WF#11, WF#12



PERCOLATION					
NO.	DEPTH	RATE	DATE	BY	NSP.
PT-1	60"	8 MPI	07/31/14	B.N.	B.M.
PT-2	68"	13 MPI	07/31/14	B.N.	B.M.
PT-3	50"	10 MPI	07/31/14	B.N.	B.M.
PT-4	55"	MPI	07/31/14	B.N.	B.M.
PT-5	60"	MPI	07/31/14	B.N.	B.M.

PERCOLATION					
NO.	DEPTH	RATE	DATE	BY	NSP.
PT-5A	54"	10 MPI	08/21/14	B.N.	J.J.
PT-6	60"	3 MPI	08/21/14	B.N.	J.J.

SOIL TEST RESULTS

SOIL LOGS No:

DTH-1 ELEV=165.7'	DTH-2 ELEV=165.9'	DTH-3 ELEV=161.7'	DTH-4 ELEV=164.1'	DTH-5 ELEV=162.6'
0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-24" Bw FINE SANDY LOAM 10YR5/6 24"-62" C1 SANDY LOAM 2.5Y5/3 62"-126" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER NO REFUSAL, C2 HORIZON IS TIGHT REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=159.87'	0"-22" Ap FINE SANDY LOAM 10YR3/3 22"-42" Bw FINE SANDY LOAM 10YR5/6 42"-96" C1 SANDY LOAM 2.5Y5/3 96"-118" C2 SILT LOAM 2.5Y6/3 WATER WEEPING @106" NO STANDING WATER, NO REFUSAL REDOX @80" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=159.23'	0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-22" Bw FINE SANDY LOAM 10YR5/6 22"-84" C1 SANDY LOAM 2.5Y5/3 84"-110" C2 SILT LOAM 2.5Y6/3 NO STANDING WATER, NO REFUSAL C2 HORIZON IS DAMP REDOX @62" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=154.87'	0"-20" FILL 20"-28" Ap FINE SANDY LOAM 10YR3/3 28"-40" Bw FINE SANDY LOAM 10YR5/6 40"-86" C1 SANDY LOAM 2.5Y5/4 86"-116" C2 SANDY LOAM 2.5Y4/4 NO REFUSAL, NO STANDING OR WEEPING WATER NO REDOX ESTIMATED DESIGN GROUNDWATER=NONE	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-34" Bw FINE SANDY LOAM 10YR5/6 34"-84" C1 SANDY LOAM 2.5Y5/4 84"-116" C2 SANDY LOAM 2.5Y4/3 WEEPING WATER @112" NO REFUSAL REDOX @72" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=156.6'
DATE: JULY 31, 2014				
BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)				
INSPECTOR: BILL MURPHY, WAYLAND BOARD OF HEALTH				

SOIL LOGS No:

DTH-6 ELEV=167.7'	DTH-7 ELEV=166.8'	DTH-8 ELEV=168.2'	DTH-9 ELEV=163.0'	DTH-10 ELEV=160.75'
0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-26" Bw FINE SANDY LOAM 10YR5/6 26"-64" C1 SANDY LOAM 2.5Y5/3 64"-122" C2 SANDY LOAM 2.5Y4/4 NO STANDING OR WEEPING WATER NO REFUSAL REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.87'	0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-32" Bw FINE SANDY LOAM 10YR5/6 32"-58" C1 SANDY LOAM 2.5Y5/3 58"-114" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER LENSES OF SILT LOAM FROM 76" DOWN ESTIMATED DESIGN GROUNDWATER=NONE	0"-26" FILL 26"-40" Bw FINE SANDY LOAM 10YR5/6 40"-78" C1 SANDY LOAM 2.5Y5/4 78"-108" C2 LOAMY SAND 2.5Y5/3 108"-126" C3 SILT LOAM 2.5Y6/3 C3 HORIZON IS DAMP NO REFUSAL REDOX @80" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=161.53'	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-30" Bw FINE SANDY LOAM 10YR5/6 30"-46" Bc SANDY LOAM 2.5Y5/4 46"-98" C1 SANDY LOAM 2.5Y5/3 98"-118" C2 SANDY LOAM 2.5Y4/4 WATER STANDING @108" WATER WEEPING @98" REDOX SEEN @62", NO REFUSAL ESTIMATED DESIGN GROUNDWATER=157.8'	0"-15" Ap FINE SANDY LOAM 10YR3/3 15"-30" Bw FINE SANDY LOAM 10YR5/6 30"-66" C1 LOAMY SAND 2.5Y5/3 66"-112" C2 SILT LOAM 2.5Y5/4 WATER STANDING @100" WATER WEEPING @98" NO REFUSAL REDOX SEEN @68" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=155.08'
			DTH-11 ELEV=166.0'	DTH-12 ELEV=168.2'
			0"-18" FILL 18"-30" Ap FINE SANDY LOAM 10YR3/3 30"-35" Bw FINE SANDY LOAM 10YR5/6 35"-58" C1 SANDY LOAM 2.5Y5/3 58"-126" C2 SANDY LOAM 2.5Y6/3 WATER STANDING @125" NO WEEPING WATER REDOX SEEN @60" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.0'	0"-54" FILL 54"-82" C1 SANDY LOAM 2.5Y4/4 82"-114" C2 SANDY LOAM 2.5Y5/4 C2 HORIZON HAS LENSES OF SILT LOAM NO STANDING OR WEEPING WATER NO REFUSAL REDOX SEEN @64" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=161.0'
			DATE: AUGUST 21, 2014	
			BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)	
			INSPECTOR: JULIA JUNGHANNS, WAYLAND BOARD OF HEALTH	

PROPOSED CONDITIONS – TOTAL IMPERVIOUS AREA = 20,063 S.F.
PROPOSED CONDITIONS – TOTAL LAWN AREA = 10,402 S.F.
PROPOSED CONDITIONS – TOTAL LANDSCAPED AREA = 7,403 S.F.

POST-DEVELOPMENT BASIN PROPERTIES:

POST-DEVELOPMENT BASIN 1 (P.D.B.-1)

TOTAL BASIN AREA = 5,991 S.F. (0.138 ACRES)
HYDRAULIC LENGTH = 222 FEET
CHANGE IN ELEVATION = 9.7 FEET
BASIN SLOPE = 0.044 (4.4%)

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 857 S.F. (0.020 ACRES)	98	0.020	1.960
LAWN AREA (GOOD COND.) = 3,815 S.F. (0.087 ACRES)	61	0.087	5.307
LANDSCAPED AREA (GOOD COND.) = 1,323 S.F. (0.031 ACRES)	61	0.031	1.891
		SUM 0.138	SUM 9.158

WEIGHTED CURVE NUMBER (C_N) = (9.158/0.138) = 66.4

POST-DEVELOPMENT BASIN 2 (P.D.B.-2)

TOTAL BASIN AREA = 1,877 S.F. (0.043 ACRES)
HYDRAULIC LENGTH = 49 FEET
CHANGE IN ELEVATION = 0.5 FEET
BASIN SLOPE = 0.010 (1.0%)

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 356 S.F. (0.008 ACRES)	98	0.008	0.784
LAWN AREA (GOOD COND.) = 880 S.F. (0.020 ACRES)	61	0.020	1.220
LANDSCAPED AREA (GOOD COND.)= 640 S.F. (0.015 ACRES)	61	0.015	0.915
		SUM 0.043	SUM 2.919

WEIGHTED CURVE NUMBER (C_N) = (2.919/0.043) = 67.9

POST-DEVELOPMENT BASIN 3 (P.D.B.-3)

TOTAL BASIN AREA = 7,081 S.F. (0.163 ACRES)
HYDRAULIC LENGTH = 196 FEET
CHANGE IN ELEVATION = 7.5 FEET
BASIN SLOPE = 0.038 (3.8%)

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 2,745 S.F. (0.063 ACRES)	98	0.063	6.174
LAWN AREA (GOOD COND.) = 2,391 S.F. (0.055 ACRES)	61	0.055	3.355
LANDSCAPED AREA (GOOD COND.)= 1,946 S.F. (0.045 ACRES)	61	0.045	2.745
		SUM 0.163	SUM 12.274

WEIGHTED CURVE NUMBER (C_N) = (12.274/0.163) = 75.3

POST-DEVELOPMENT BASIN 3A (P.D.B.-3A)

TOTAL BASIN AREA = 5,856 S.F. (0.133 ACRES)
HYDRAULIC LENGTH = N.A.
CHANGE IN ELEVATION = N.A.
BASIN SLOPE = N.A.

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 1,960 S.F. (0.045 ACRES)	98	0.045	4.410
LAWN AREA (GOOD COND.) = 1,914 S.F. (0.044 ACRES)	61	0.044	2.684
LANDSCAPED AREA (GOOD COND.) = 1,983 S.F. (0.045 ACRES)	61	0.045	2.684
		SUM 0.134	SUM 9.778

WEIGHTED CURVE NUMBER (C_N) = (9.778/0.133) = 73.5

POST-DEVELOPMENT BASIN 4 (P.D.B.-4)

TOTAL BASIN AREA = 17,059 S.F. (0.392 ACRES)
HYDRAULIC LENGTH = N.A.
CHANGE IN ELEVATION = N.A.
BASIN SLOPE = N.A.

GROUND COVER	Cn	AREA (ACRES)	PRODUCT
IMPERVIOUS AREA = 14,145 S.F. (0.325 ACRES)	98	0.325	31.850
LAWN AREA (GOOD COND.) = 1,402 S.F. (0.032 ACRES)	61	0.032	1.952
LANDSCAPED AREA (GOOD COND.) = 1,511 S.F. (0.035 ACRES)	61	0.035	2.135
		SUM 0.392	SUM 35.937

WEIGHTED CURVE NUMBER (C_N) = (35.937/0.392) = 91.7

USDA SOIL CLASSIFICATION

SOIL NUMBER	SOIL SERIES	HYDROLOGIC SOIL GROUP
51A	SWANSEA MUCK	B/D
253C	HINCKLEY LOAMY SAND	A
415B	NARRAGANSETT SILT LOAM	B

HYDROLOGIC SOIL GROUP B USED FOR ANALSYIS
SOILS ON SITE ARE SANDY LOAM TEXTURES AND CLASSIFIED WITHIN HYDROLOGIC SOIL GROUP B.

FOR METROWEST ENGINEERING, INC. DATE
ROBERT A. CEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046

GRAPHIC SCALE
1 inch = 20 ft.
(FEET) 20 0 10 20 40 80
(METERS) 0 5 10 20 30

FIGURE THREE

POST-DEVELOPMENT WATERSHED DELINEATION PLAN

#24 SCHOOL STREET
IN
WAYLAND, MASS

PREPARED FOR:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:
MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
WAYLAND, MA 01702
TEL.: (508)626-0063
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SHEET 1 OF 1		DATE: APRIL 23, 2018
CALC'D BY: RAG	FIELD BK: 821	CAD FILE: PD_HYDRO.dwg
DRAFTER:	PROJECT: WY_SCH	DWG FILE: SK042318.dwg

Lawn area (good condition) = 880 square feet, curve number = 61.0
Landscaped area (good condition) = 640 square feet, curve number = 61.0
Hydrologic soil group B
Weighted Curve Number = 67.9
Basin slope = 1.0%
Hydraulic length = 49 feet
Time of concentration = 5.1 minutes (TR-55 Method)

Post-Development Basin 3 (P.D.B.-3)

Area = 7,081 square feet
Impervious area = 2,745 square feet; curve number = 98.0
Lawn area (good condition) = 2,391 square feet, curve number = 61.0
Landscaped area (good condition) = 1,946 square feet, curve number = 61.0
Hydrologic soil group B
Weighted Curve Number = 75.3
Basin slope = 3.8%
Hydraulic length = 196 feet
Time of concentration = 7.5 minutes (TR-55 Method)

Post-Development Basin 3A (P.D.B.-3A)

Area = 5,856 square feet
Impervious area = 1,960 square feet; curve number = 98.0
Lawn area (good condition) = 1,914 square feet, curve number = 61.0
Landscaped area (good condition) = 1,983 square feet, curve number = 61.0
Hydrologic soil group B
Weighted Curve Number = 73.5
Basin slope = n.a.
Hydraulic length = n.a.
Time of concentration = 8.6 minutes (TR-55 Method)

Post-Development Basin 4 (P.D.B.-4)

Area = 17,059 square feet
Impervious area = 14,145 square feet; curve number = 98.0
Lawn area (good condition) = 1,402 square feet, curve number = 61.0
Landscaped area (good condition) = 1,511 square feet, curve number = 61.0
Hydrologic soil group B
Weighted Curve Number = 91.7
Basin slope = n.a.
Hydraulic length = n.a.
Time of concentration = 5.0 minutes (Manually Entered)

Drain Infiltration Systems

Proposed Infiltration System 1

Basic geometry:	32.0 feet wide by 52.0 feet long
System type:	Shea Leaching Galleys; 360 gallons each
	Use 84 Galleys; 4-feet long by 4.5-feet wide by 3.0-feet high
	Surrounded by two feet of double washed, crushed stone
Infiltration rate:	1.02 inches per hour over 1,664 square foot bed

Proposed Rain Garden

Basic geometry:	Irregular shaped basin
System type:	Constructed basin approximately 1.5-feet deep
	Total Storage approximately 742 cubic feet
Infiltration rate:	1.02 inches per hour over 450 square foot bed area

The proposed condition model analyzes the infiltration system using a reservoir-analysis method. Consistent with DEP stormwater management standards, design infiltration rates are based on the Rawls table for soils with sandy loam and loamy sand textures.

Model Results

The model results for the design points A, B and C are shown in Tables one through ten below:

Table 1: Comparison of Pre and Post-Development Peak Runoff Rates at Design Point A

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
E.C.B.-1	0.19 c.f.s.	0.54 c.f.s.	0.86 c.f.s.	1.59 c.f.s.
P.D.B.-1	0.08 c.f.s.	0.21 c.f.s.	0.34 c.f.s.	0.63 c.f.s.
Difference	-0.11 c.f.s.	-0.33 c.f.s.	-0.52 c.f.s.	-0.96 c.f.s.

Table 2: Comparison of Pre and Post-Development Runoff Volumes at Design Point A

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
E.C.B.-1	789 c.f.	1,881 c.f.	2,913 c.f.	5,287 c.f.
P.D.B.-1	310 c.f.	740 c.f.	1,145 c.f.	2,079 c.f.
Difference	-479 c.f.	-1,141 c.f.	-1,768 c.f.	-3,208 c.f.

Table 3: Comparison of Pre and Post Development Peak Runoff Rates at Design Point B

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
E.C.B.-2	0.09 c.f.s.	0.17 c.f.s.	0.24 c.f.s.	0.39 c.f.s.
P.D.B.-2	0.03 c.f.s.	0.07 c.f.s.	0.11 c.f.s.	0.20 c.f.s.
Difference	-0.06 c.f.s.	-0.11 c.f.s.	-0.14 c.f.s.	-0.19 c.f.s.

Table 4: Comparison of Pre and Post-Development Runoff Volumes at Design Point B

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
E.C.B.-2	287 c.f.	562 c.f.	801 c.f.	1,319 c.f.
P.D.B.-2	107 c.f.	246 c.f.	377 c.f.	674 c.f.
Difference	-180 c.f.	-316 c.f.	-424 c.f.	-645 c.f.

Table 5: Comparison of Pre and Post Development Peak Runoff Rates at Design Point C

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
E.C.B.-3	0.31 c.f.s.	0.79 c.f.s.	1.22 c.f.s.	2.18 c.f.s.
P.D.B.-3 + overflow	0.18 c.f.s.	0.63 c.f.s.	1.16 c.f.s.	2.99 c.f.s.
Difference	-0.13 c.f.s.	-0.16 c.f.s.	-0.06 c.f.s.	0.81 c.f.s.

Table 6: Comparison of Pre and Post-Development Runoff Volumes at Design Point C

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
E.C.B.-3	1,185 c.f.	2,690 c.f.	4,084 c.f.	7,246 c.f.
P.D.B.-3 + overflow	743 c.f.	2,847 c.f.	5,003 c.f.	9,870 c.f.
Difference	-628 c.f.	157 c.f.	919 c.f.	2,624 c.f.

Table 7: Comparison of Total Pre and Post Development Peak Runoff Rates Leaving the Project Site

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
Total Existing	0.59 c.f.s.	1.50 c.f.s.	2.32 c.f.s.	4.16 c.f.s.
Total Proposed	0.28 c.f.s.	0.80 c.f.s.	1.53 c.f.s.	3.82 c.f.s.
Difference	-0.31 c.f.s.	-0.70 c.f.s.	-0.79 c.f.s.	-0.34 c.f.s.

Table 8: Comparison of Total Pre and Post-Development Runoff Volumes Leaving the Project Site

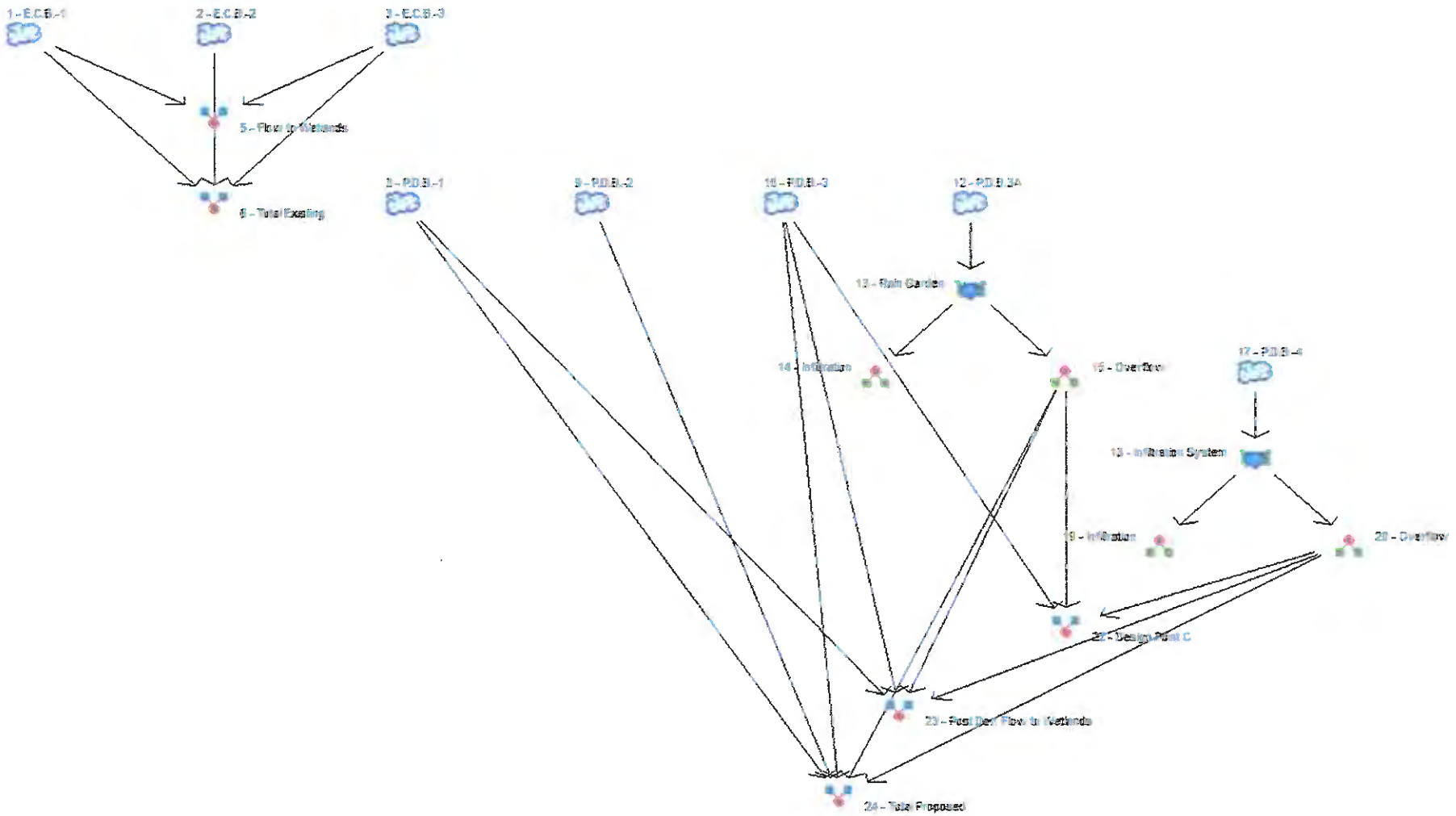
Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
Total Existing	2,261 c.f.	5,133 c.f.	7,799 c.f.	13,853 c.f.
Total Proposed	1,160 c.f.	3,833 c.f.	6,524 c.f.	12,622 c.f.
Difference	-1,101 c.f.	-1,300 c.f.	-1,275 c.f.	-1,231 c.f.

Conclusion

The results provided in Tables One through Eight demonstrate that the project, with the stormwater controls in place, will result in an overall decrease both in peak runoff rates and total runoff volume discharged from the project site. The project will impact neither the municipal stormwater drainage system or abutting properties.

Additionally, a portion of the proposed roof and the majority of driveway surfaces will be collected and recharged. The stormwater management system as designed is consistent with MADEP Stormwater Management Policy and accepted design practice.

Appendix A:
Hydrologic Assessment


1 - E.C.B.-1
2 - E.C.B.-2
3 - E.C.B.-3
5 - Flow to Wetlands
6 - Total Existing
7 - P.D.B.-1
9 - P.D.B.-2
10 - P.D.B.-3
12 - P.D.B.-3A
13 - Rain Garden
14 - Infiltration
15 - Overflow
17 - P.D.B.-4
18 - Infiltration System
19 - Infiltration
20 - Overflow
21 - Design Point C
23 - Post Dev. Flow to Wetlands
24 - Total Proposed

2-Year Storm, Pre and Post-Development

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.22

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.194	3	726	789	----	------	------	E.C.B.-1
2	SCS Runoff	0.085	3	726	287	----	------	------	E.C.B.-2
3	SCS Runoff	0.311	3	726	1,185	----	------	------	E.C.B.-3
5	Combine	0.505	3	726	1,973	1, 3,	------	------	Flow to Wetlands
6	Combine	0.590	3	726	2,261	1, 2, 3,	------	------	Total Existing
8	SCS Runoff	0.076	3	726	310	----	------	------	P.D.B.-1
9	SCS Runoff	0.027	3	726	107	----	------	------	P.D.B.-2
10	SCS Runoff	0.178	3	726	616	----	------	------	P.D.B.-3
12	SCS Runoff	0.130	3	726	457	----	------	------	P.D.B.3A
13	Reservoir	0.011	3	843	443	12	164.12	209	Rain Garden
14	Diversion1	0.011	3	843	443	13	------	------	Infiltration
15	Diversion2	0.000	3	1221	0	13	------	------	Overflow
17	SCS Runoff	0.908	3	726	3,098	----	------	------	P.D.B.-4
18	Reservoir	0.066	3	816	3,091	17	163.83	1,684	Infiltration System
19	Diversion1	0.046	3	816	2,964	18	------	------	Infiltration
20	Diversion2	0.021	3	816	126	18	------	------	Overflow
22	Combine	0.178	3	726	743	10, 15, 20,	------	------	Design Point C
23	Combine	0.255	3	726	1,053	8, 10, 15, 20,	------	------	Post Dev. Flow to Wetlands
24	Combine	0.282	3	726	1,160	8, 9, 10, 15, 20,	------	------	Total Proposed

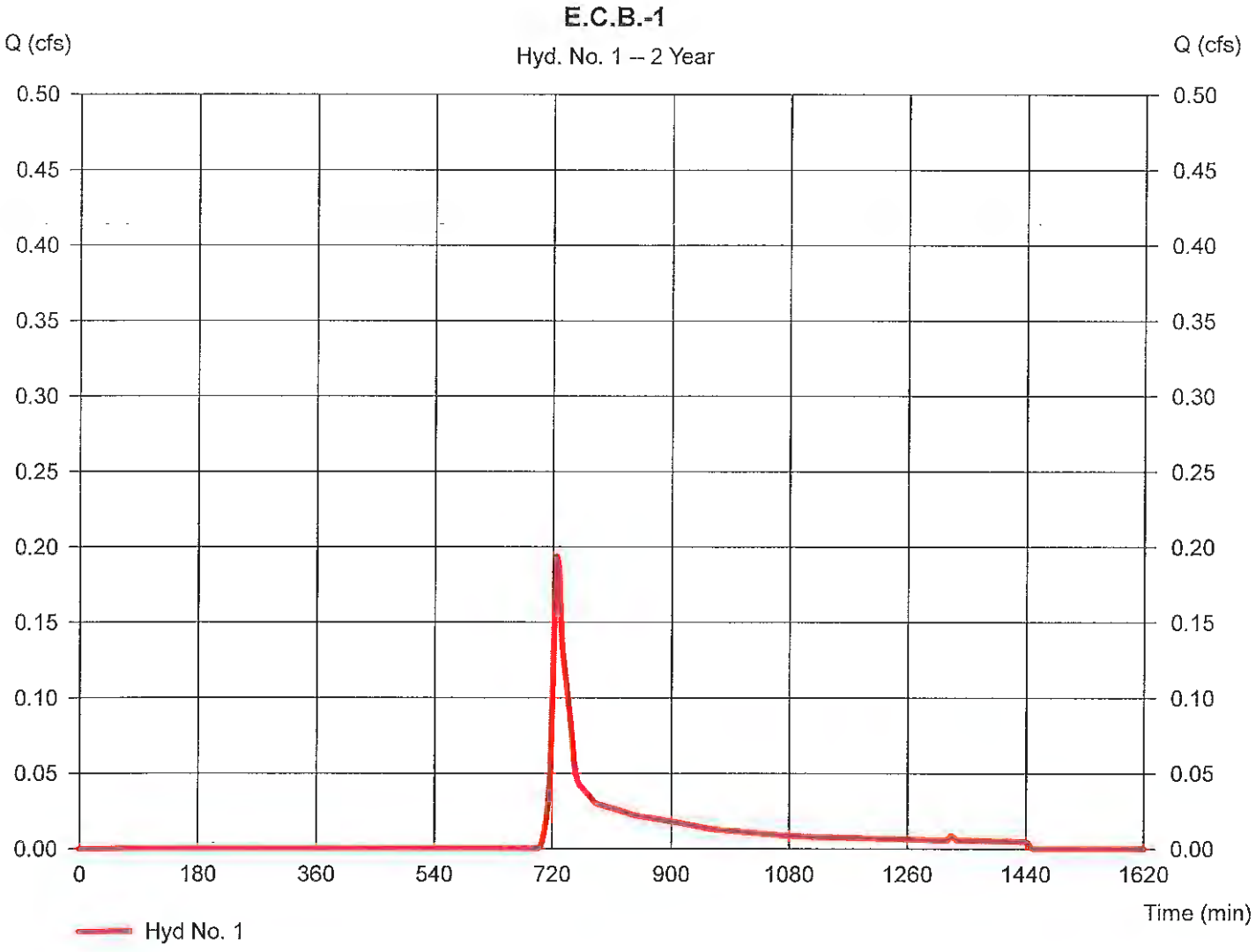
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.22 Friday, Jul 6, 2018

Hyd. No. 1

E.C.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.194 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 789 cuft
Drainage area	= 0.351 ac	Curve number	= 66.4
Basin Slope	= 5.2 %	Hydraulic length	= 189 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.90 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

E.C.B.-1

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 5.50	0.00	0.00	
Travel Time (min)	**= 6.54 +**	**0.00 +**	**0.00 =**	**6.54**
Shallow Concentrated Flow				
Flow length (ft)	= 89.00	0.00	0.00	
Watercourse slope (%)	= 5.10	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.64	0.00	0.00	
Travel Time (min)	**= 0.41 +**	**0.00 +**	**0.00 =**	**0.41**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

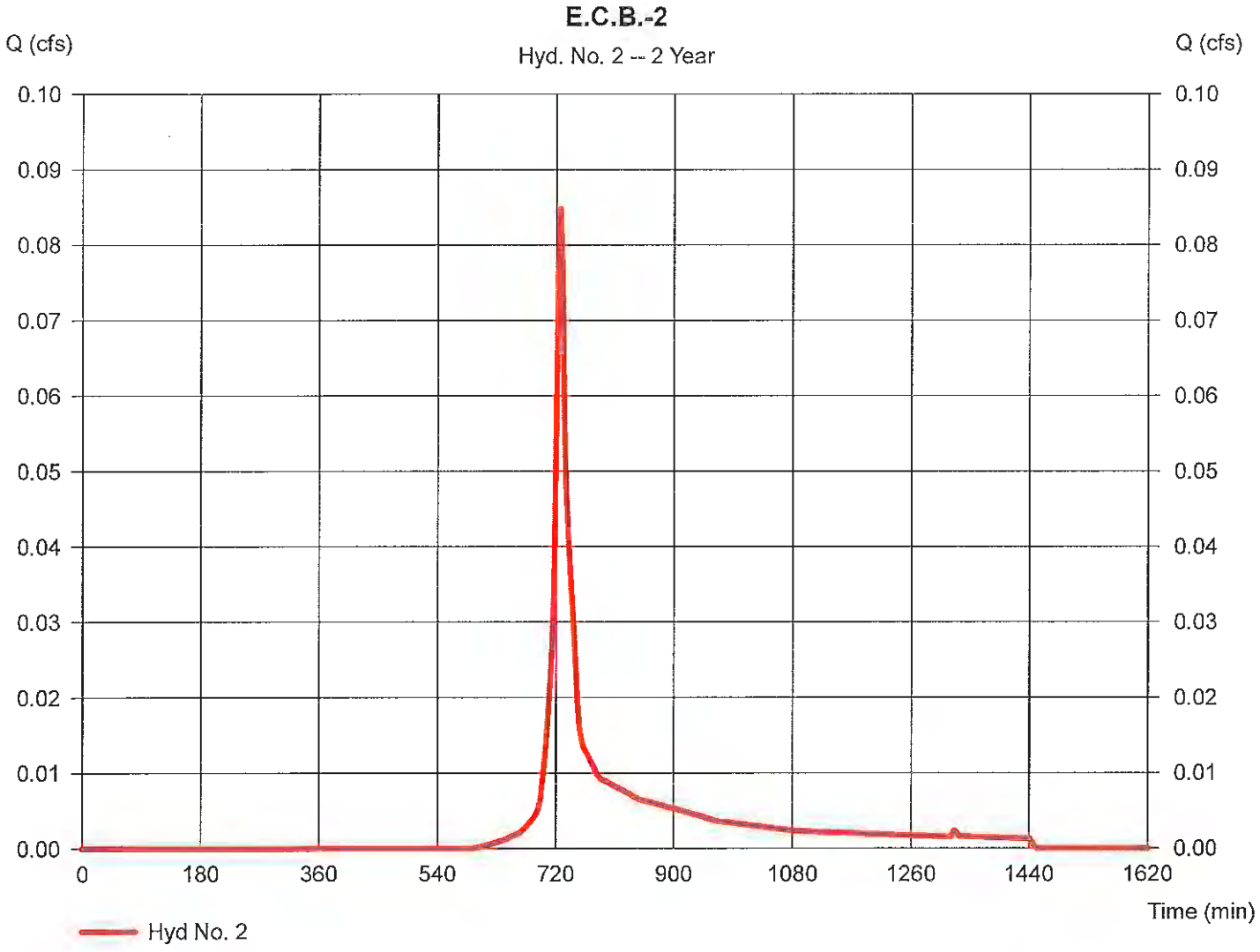
Total Travel Time, Tc ..... 6.90 min

Hydrograph Report

Hyd. No. 2

E.C.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.085 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 287 cuft
Drainage area	= 0.067 ac	Curve number	= 77.8
Basin Slope	= 1.9 %	Hydraulic length	= 68 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 2

E.C.B.-2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 68.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 1.80		0.00		0.00		
Travel Time (min)	**= 7.51**	**+**	**0.00**	**+**	**0.00**	**=**	**7.51**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

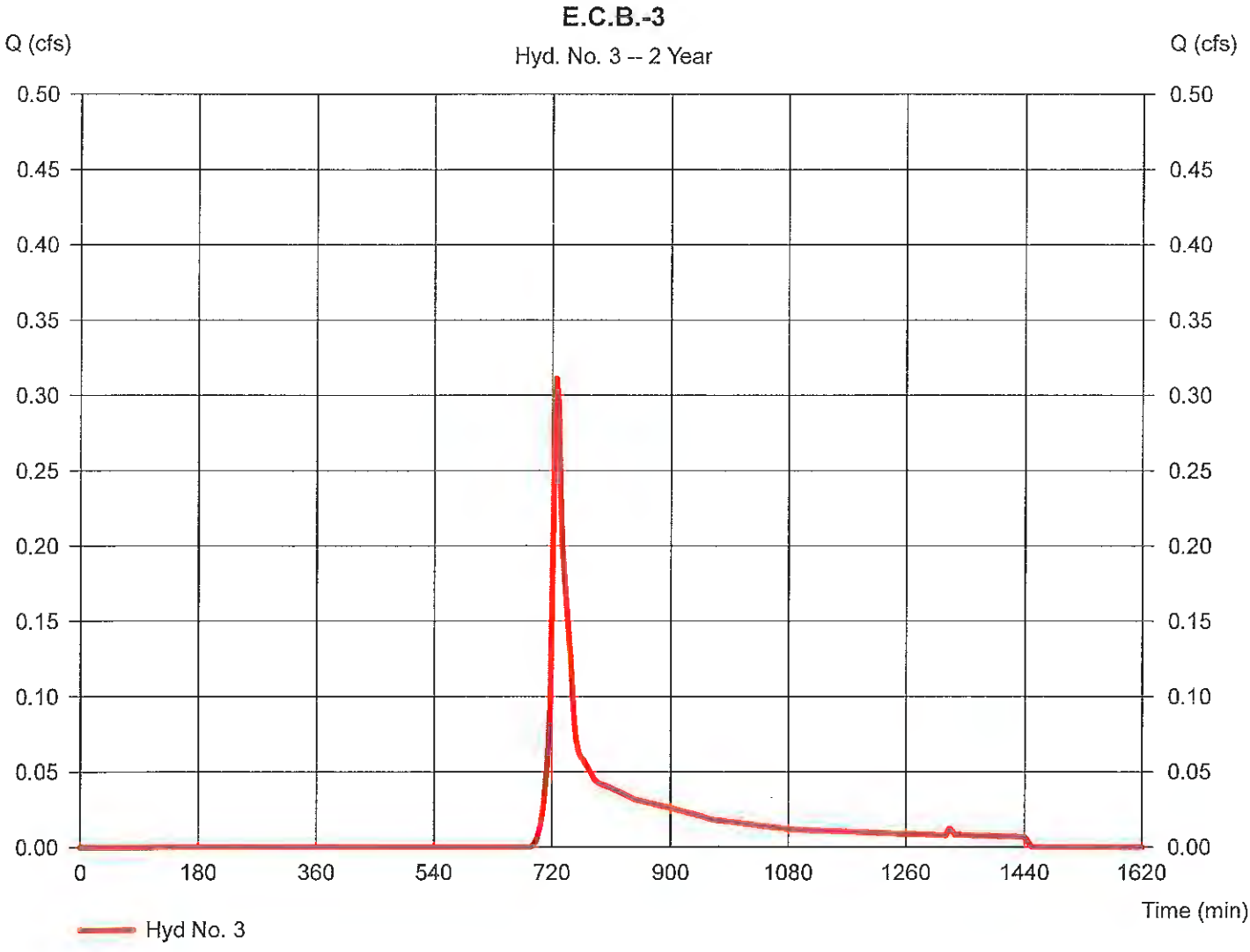
Total Travel Time, Tc ..... 7.50 min

Hydrograph Report

Hyd. No. 3

E.C.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.311 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,185 cuft
Drainage area	= 0.452 ac	Curve number	= 68.8
Basin Slope	= 4.2 %	Hydraulic length	= 207 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 3

E.C.B.-3

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 5.00	0.00	0.00	
Travel Time (min)	**= 6.79 +**	**0.00 +**	**0.00 =**	**6.79**
Shallow Concentrated Flow				
Flow length (ft)	= 107.00	0.00	0.00	
Watercourse slope (%)	= 3.30	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.93	0.00	0.00	
Travel Time (min)	**= 0.61 +**	**0.00 +**	**0.00 =**	**0.61**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

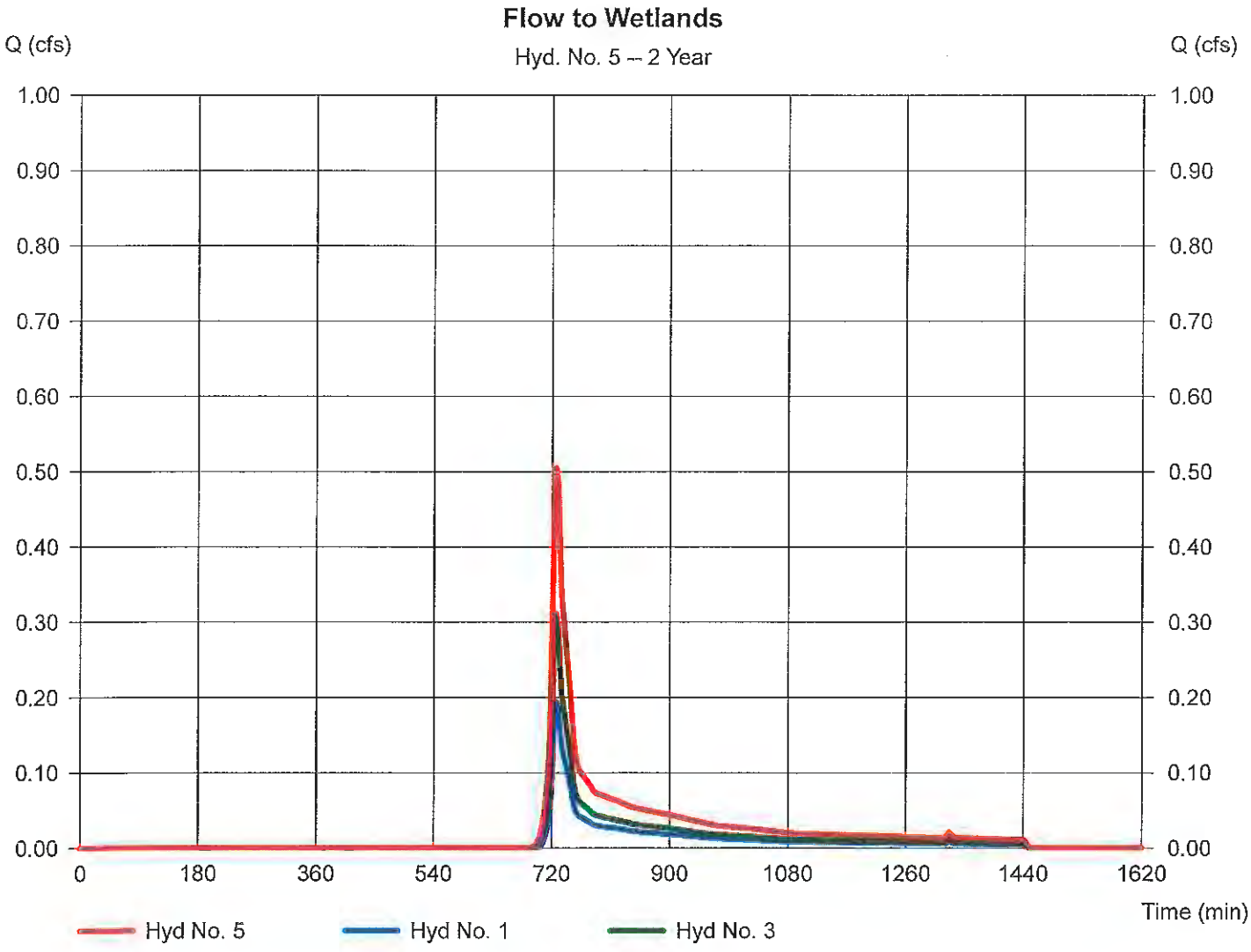
Total Travel Time, Tc ..... 7.40 min

Hydrograph Report

Hyd. No. 5

Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 0.505 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,973 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 0.803 ac

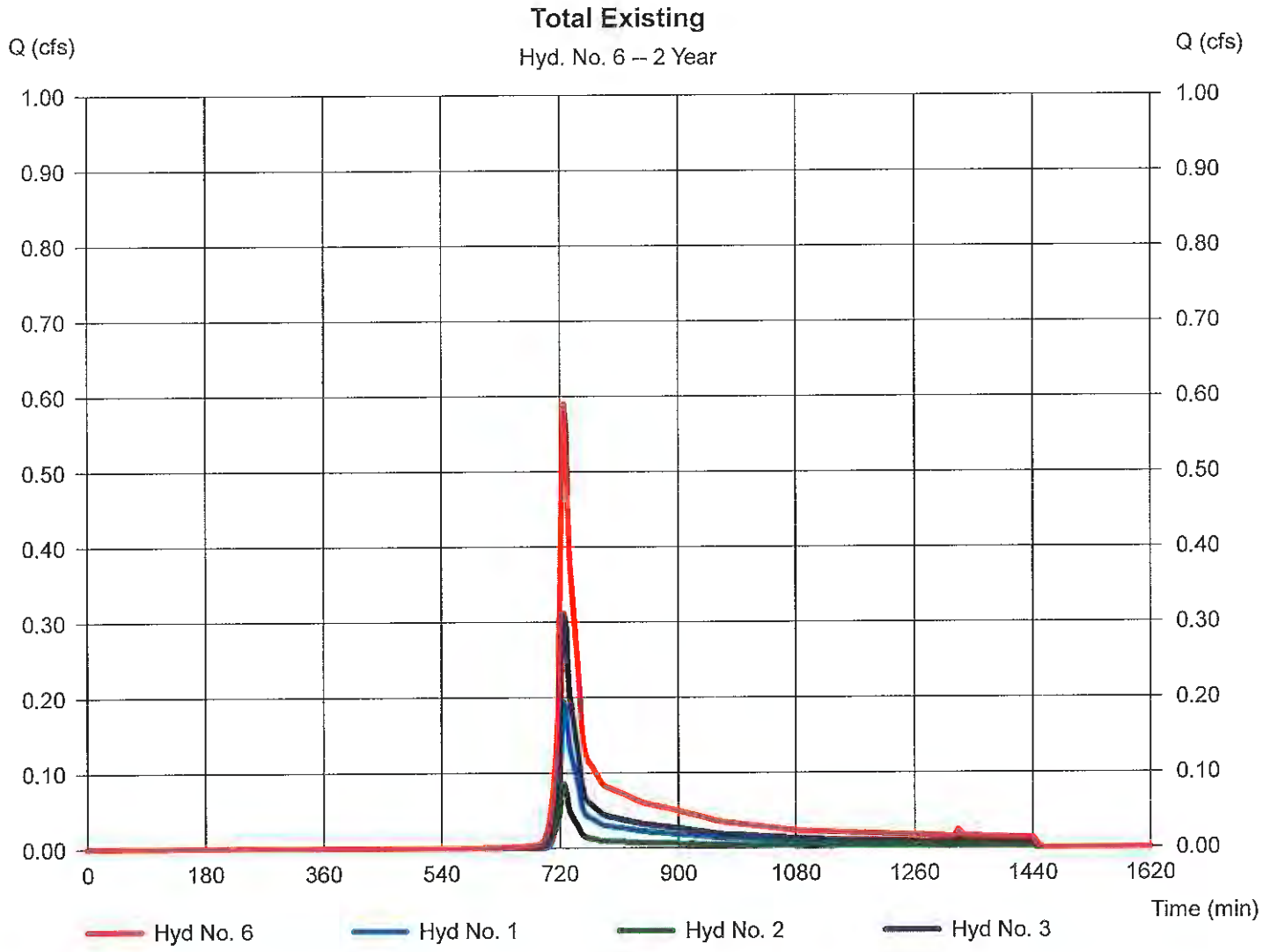


Hydrograph Report

Hyd. No. 6

Total Existing

Hydrograph type	= Combine	Peak discharge	= 0.590 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,261 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 0.870 ac

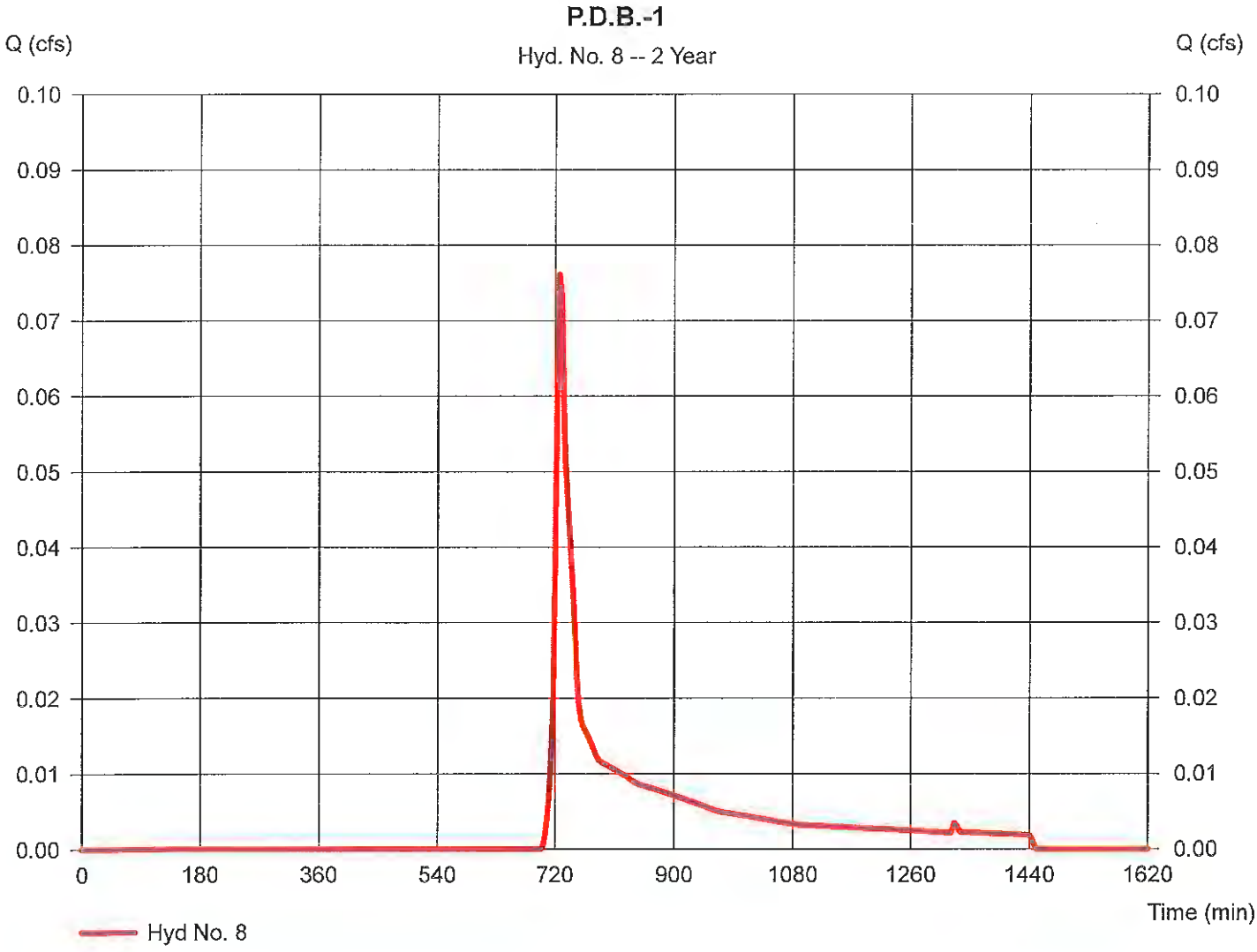


Hydrograph Report

Hyd. No. 8

P.D.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.076 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 310 cuft
Drainage area	= 0.138 ac	Curve number	= 66.4
Basin Slope	= 4.4 %	Hydraulic length	= 222 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 8

P.D.B.-1

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 5.50	0.00	0.00	
Travel Time (min)	**= 6.54 +**	**0.00 +**	**0.00 =**	**6.54**
Shallow Concentrated Flow				
Flow length (ft)	= 122.00	0.00	0.00	
Watercourse slope (%)	= 2.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.28	0.00	0.00	
Travel Time (min)	**= 0.89 +**	**0.00 +**	**0.00 =**	**0.89**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

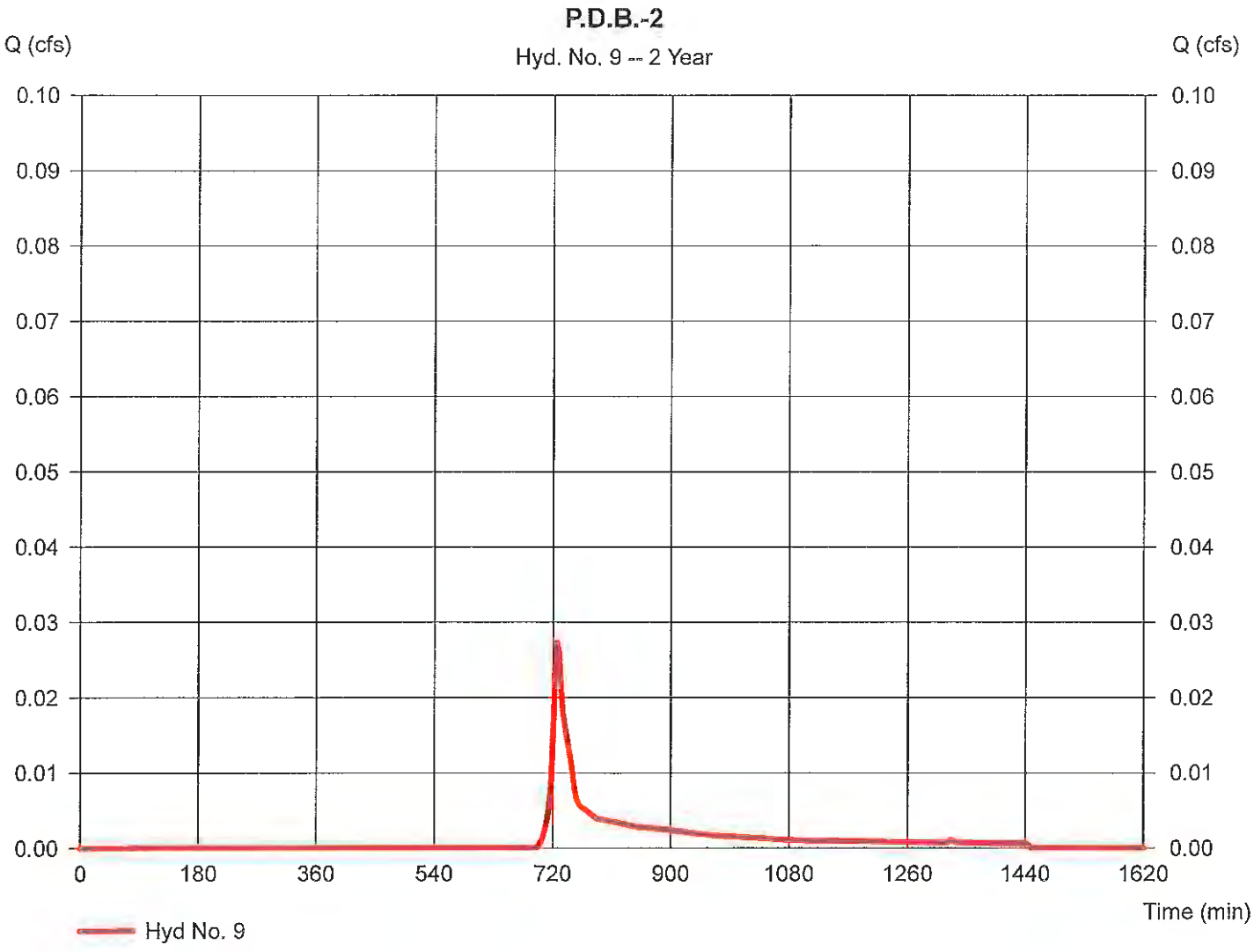
Total Travel Time, Tc ..... 7.40 min

Hydrograph Report

Hyd. No. 9

P.D.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.027 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 107 cuft
Drainage area	= 0.043 ac	Curve number	= 67.9
Basin Slope	= 1.0 %	Hydraulic length	= 49 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.10 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 9

P.D.B.-2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 49.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 2.40		0.00		0.00		
Travel Time (min)	**= 5.15**	**+**	**0.00**	**+**	**0.00**	**=**	**5.15**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

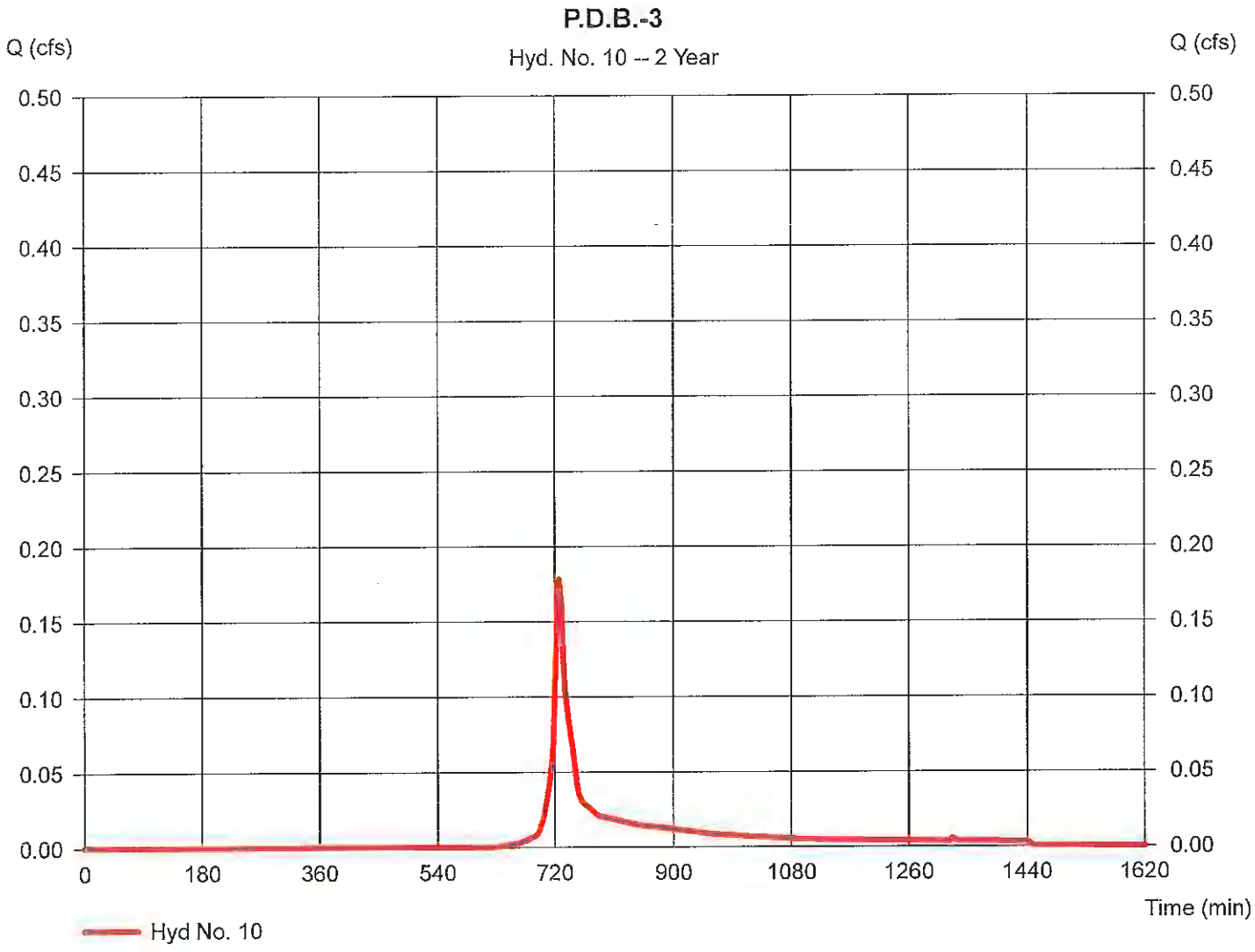
Total Travel Time, Tc ..... **5.10 min**

Hydrograph Report

Hyd. No. 10

P.D.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.178 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 616 cuft
Drainage area	= 0.163 ac	Curve number	= 75.3
Basin Slope	= 3.8 %	Hydraulic length	= 196 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 10

P.D.B.-3

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 4.50	0.00	0.00	
Travel Time (min)	**= 7.08 +**	**0.00 +**	**0.00 =**	**7.08**
Shallow Concentrated Flow				
Flow length (ft)	= 96.00	0.00	0.00	
Watercourse slope (%)	= 5.70	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.85	0.00	0.00	
Travel Time (min)	**= 0.42 +**	**0.00 +**	**0.00 =**	**0.42**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

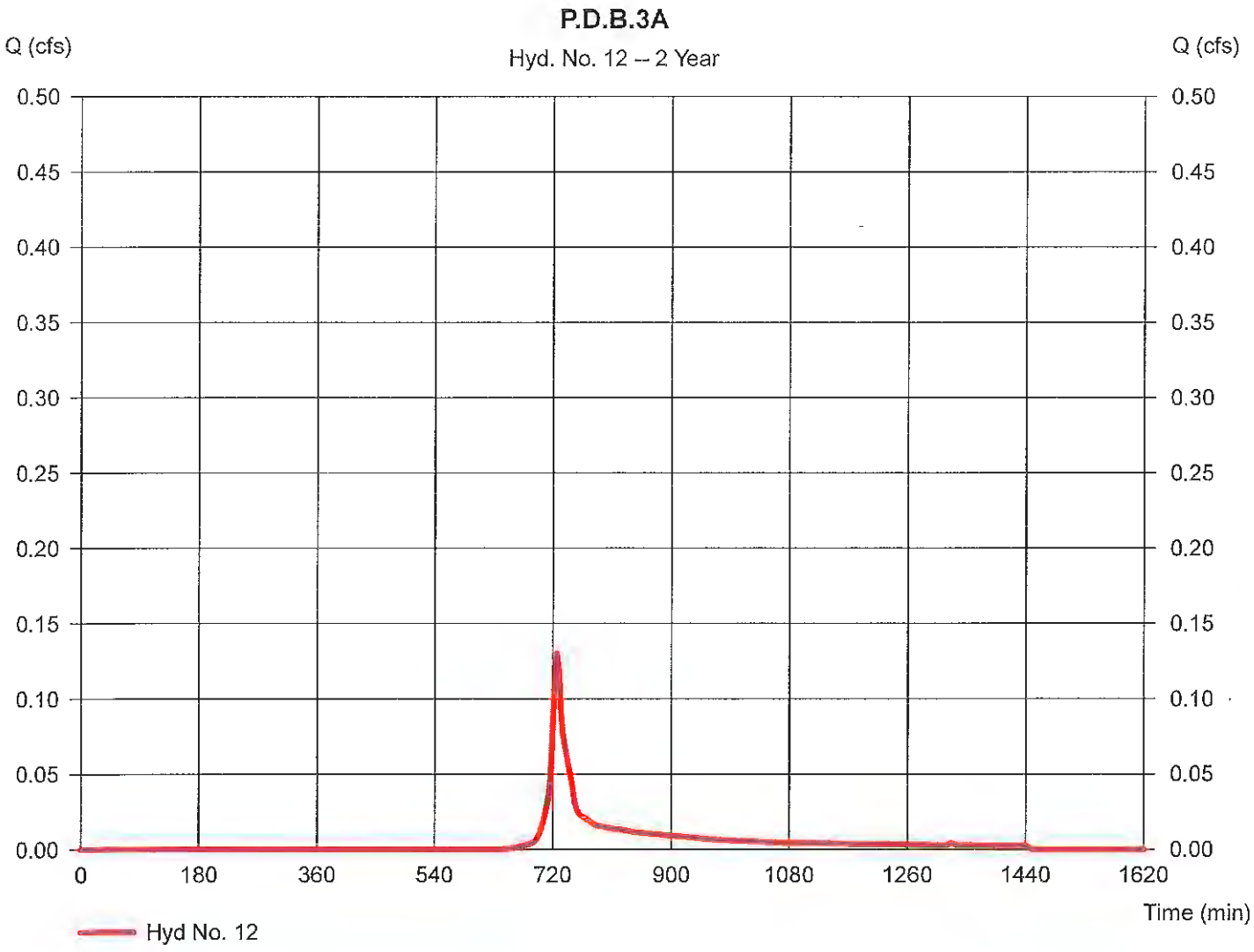
Total Travel Time, Tc ..... **7.50 min**

Hydrograph Report

Hyd. No. 12

P.D.B.3A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.130 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 457 cuft
Drainage area	= 0.133 ac	Curve number	= 73.5
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 12

P.D.B.3A

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 123.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 4.20		0.00		0.00		
Travel Time (min)	**= 8.59**	**+**	**0.00**	**+**	**0.00**	**=**	**8.59**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... **8.60 min**

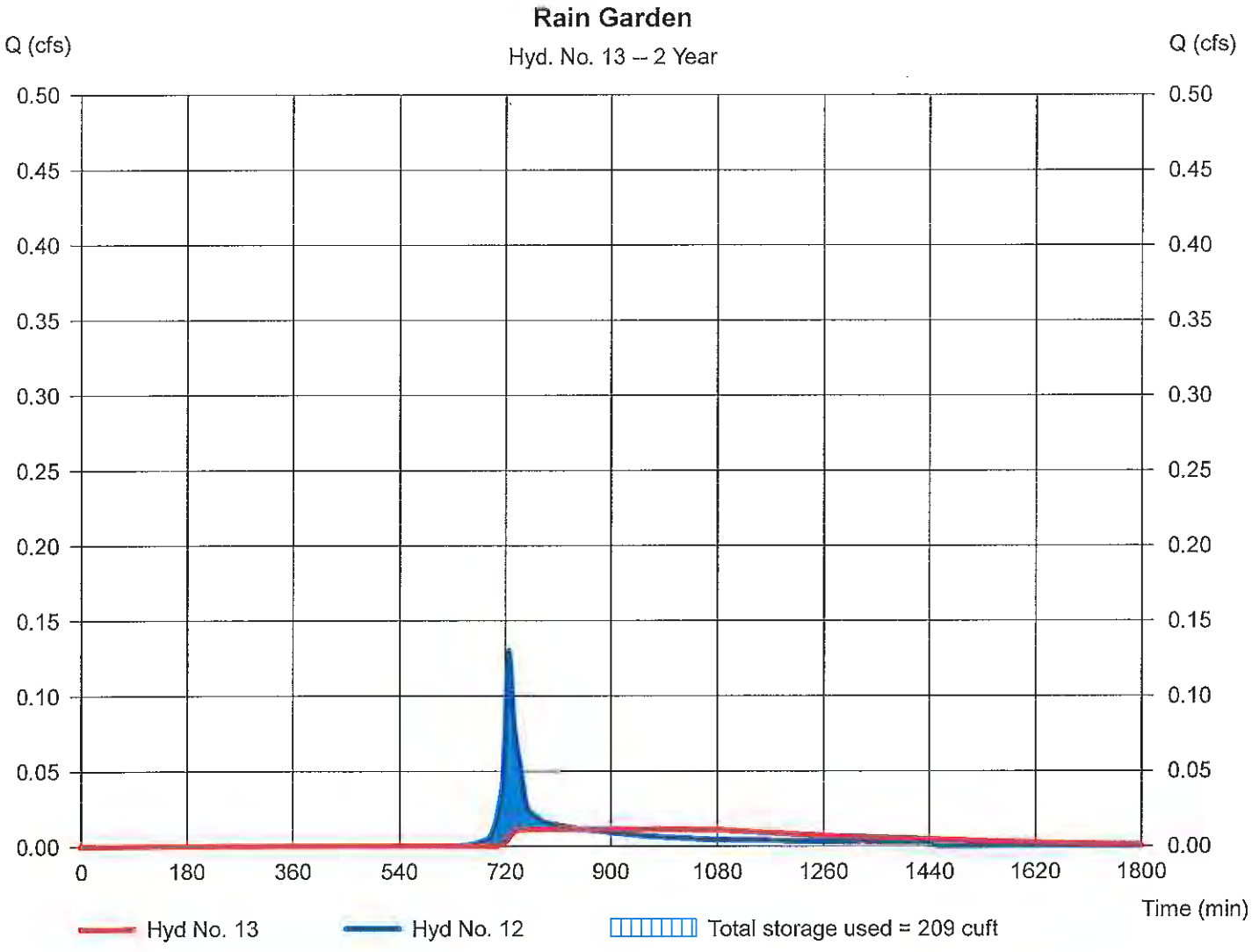
Hydrograph Report

Hyd. No. 13

Rain Garden

Hydrograph type	= Reservoir	Peak discharge	= 0.011 cfs
Storm frequency	= 2 yrs	Time to peak	= 843 min
Time interval	= 3 min	Hyd. volume	= 443 cuft
Inflow hyd. No.	= 12 - P.D.B.3A	Max. Elevation	= 164.12 ft
Reservoir name	= Rain Garden	Max. Storage	= 209 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond Report

Pond No. 5 - Rain Garden

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 163.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	163.50	140	0	0
0.50	164.00	448	147	147
1.00	164.50	591	260	407
1.50	165.00	748	335	742

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

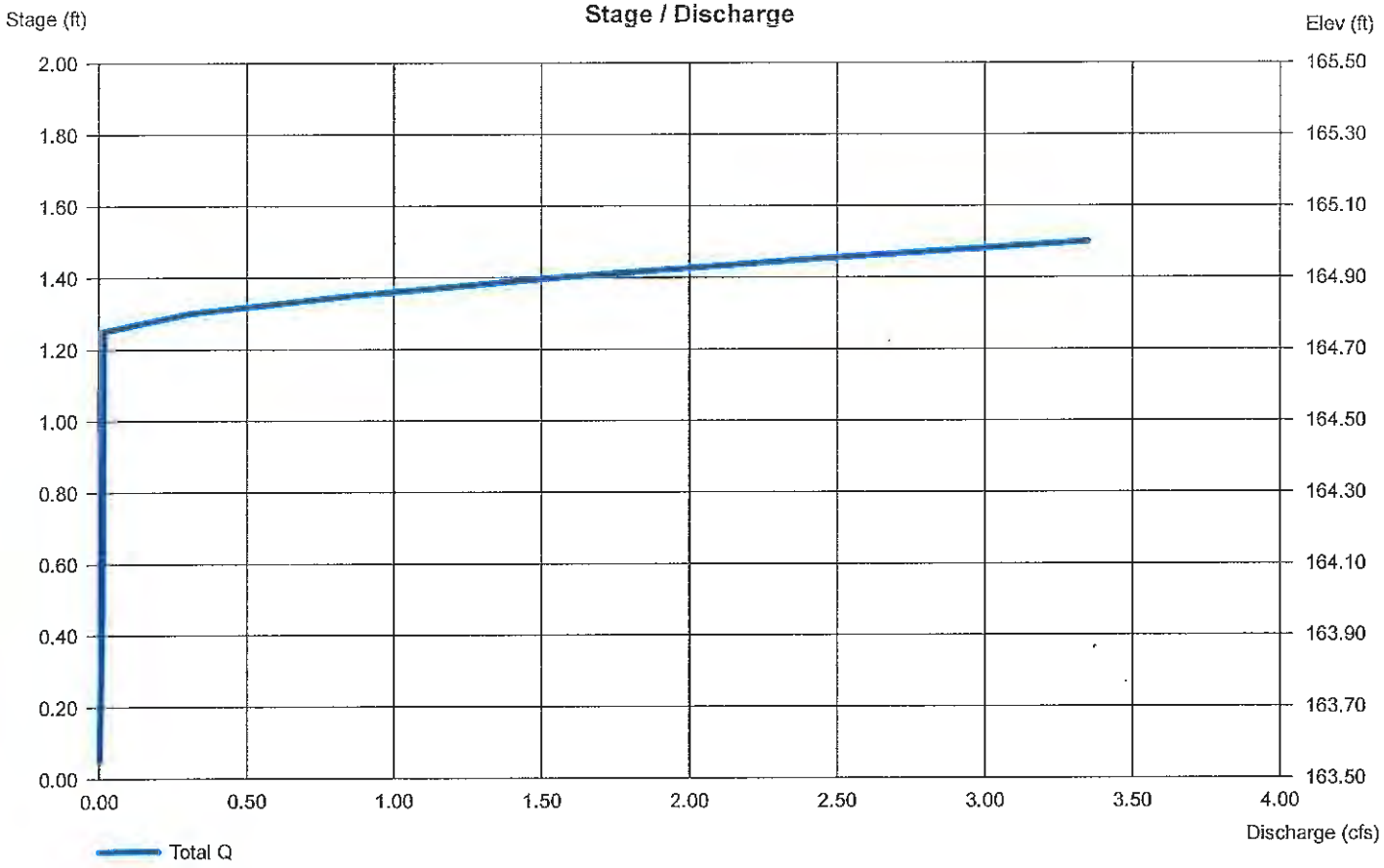
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 164.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 1.020 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

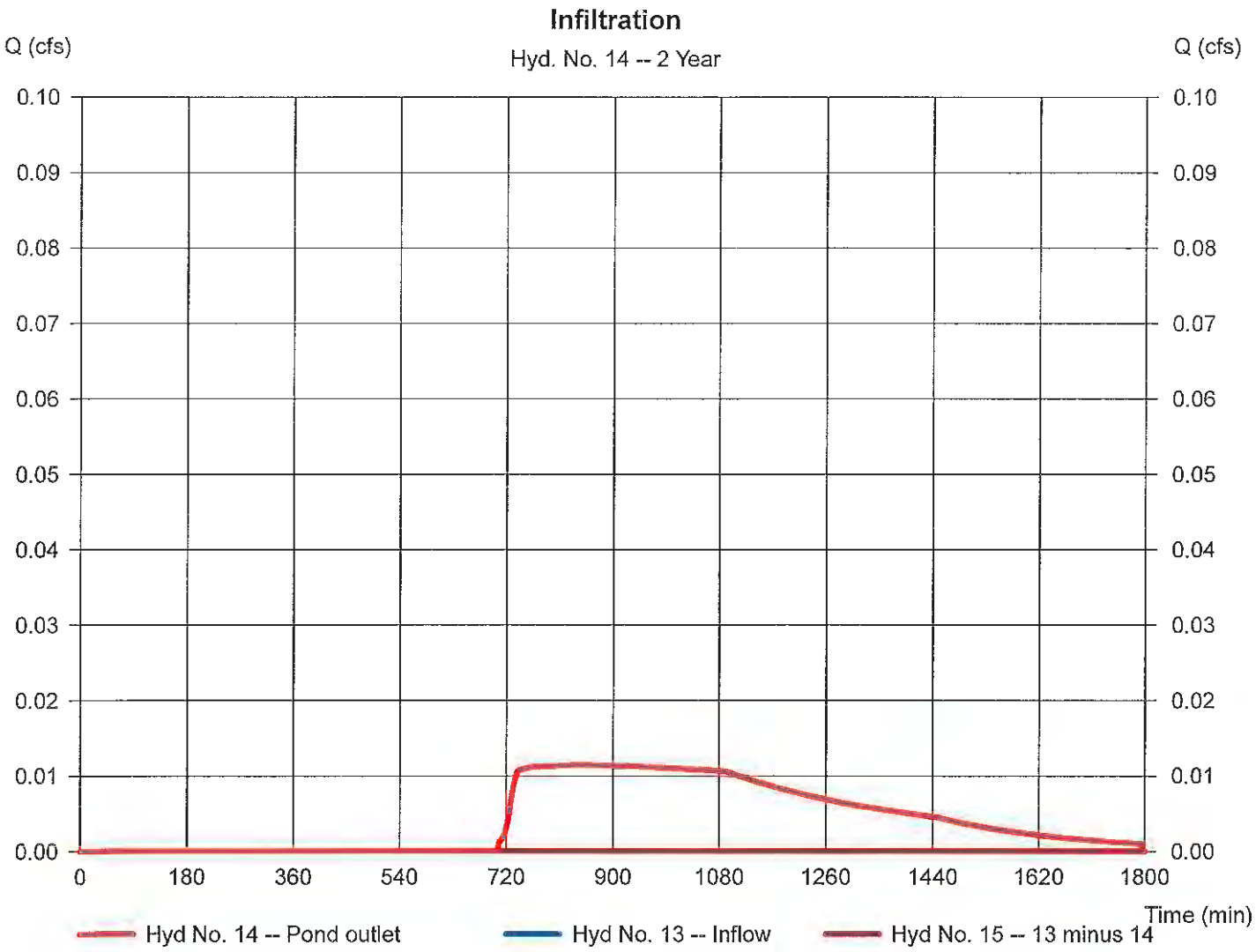


Hydrograph Report

Hyd. No. 14

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.011 cfs
Storm frequency	= 2 yrs	Time to peak	= 843 min
Time interval	= 3 min	Hyd. volume	= 443 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 15
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

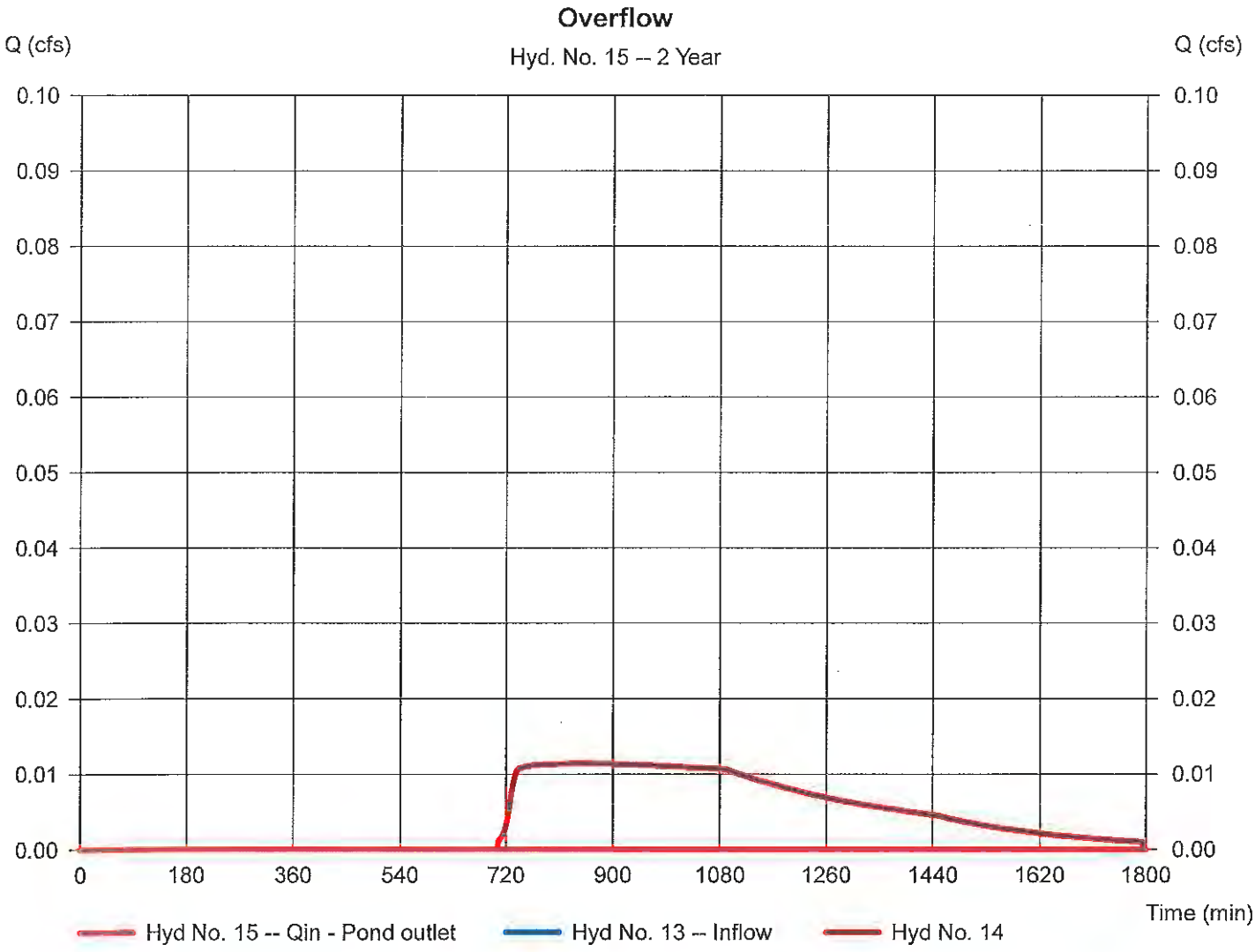


Hydrograph Report

Hyd. No. 15

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 1218 min
Time interval	= 3 min	Hyd. volume	= 0 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 14
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

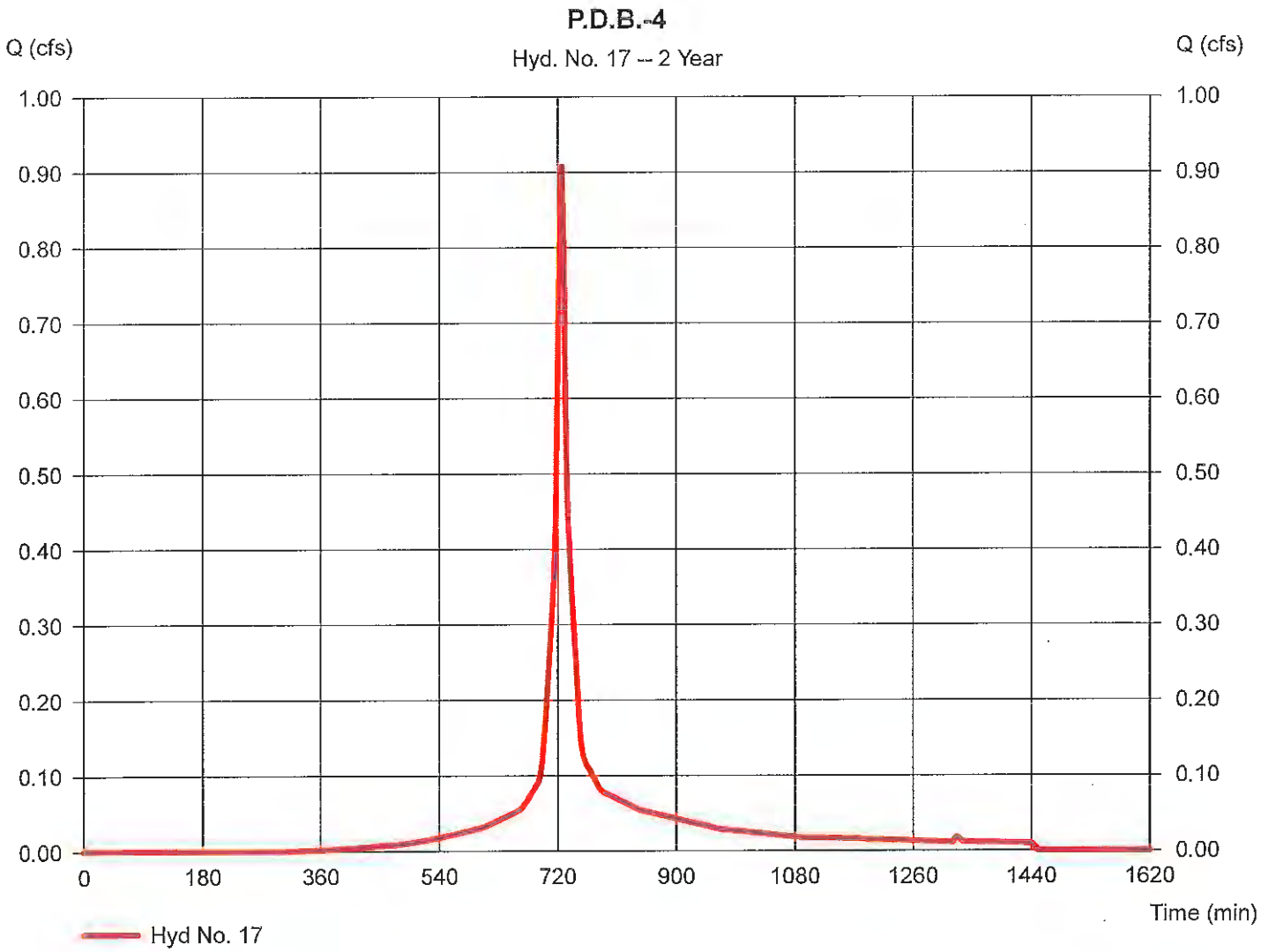


Hydrograph Report

Hyd. No. 17

P.D.B.-4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.908 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 3,098 cuft
Drainage area	= 0.392 ac	Curve number	= 91.7
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



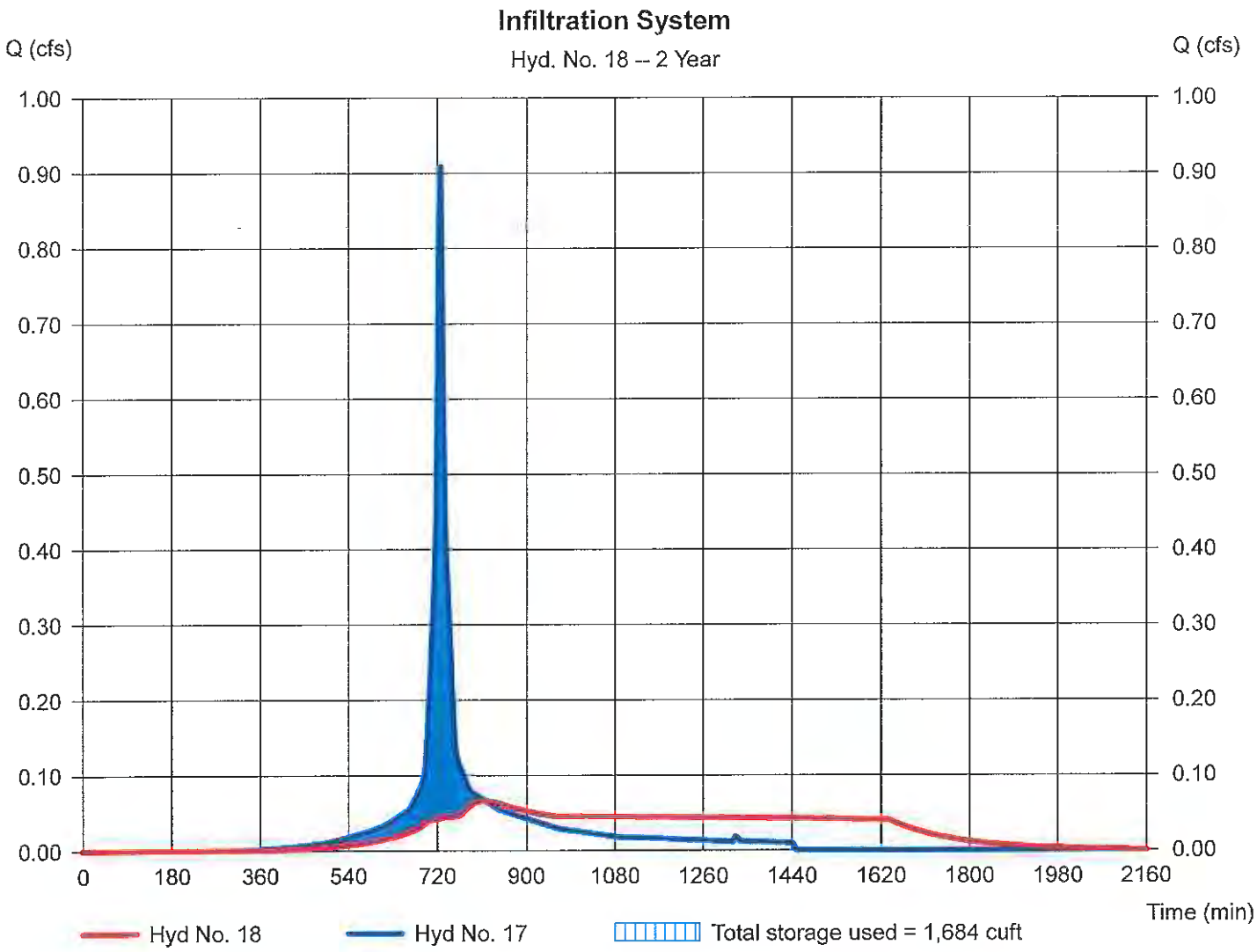
Hydrograph Report

Hyd. No. 18

Infiltration System

Hydrograph type	=	Reservoir	Peak discharge	=	0.066 cfs
Storm frequency	=	2 yrs	Time to peak	=	816 min
Time interval	=	3 min	Hyd. volume	=	3,091 cuft
Inflow hyd. No.	=	17 - P.D.B.-4	Max. Elevation	=	163.83 ft
Reservoir name	=	Infiltration System	Max. Storage	=	1,684 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond Report

Pond No. 1 - Infiltration System

Pond Data

Trapezoid - Bottom L x W = 52.0 x 32.0 ft, Side slope = 0.00:1, Bottom elev. = 162.25 ft, Depth = 3.00 ft, Voids = 64.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	162.25	1,664	0	0
0.30	162.55	1,664	319	319
0.60	162.85	1,664	319	639
0.90	163.15	1,664	319	958
1.20	163.45	1,664	319	1,278
1.50	163.75	1,664	319	1,597
1.80	164.05	1,664	319	1,917
2.10	164.35	1,664	319	2,236
2.40	164.65	1,664	319	2,556
2.70	164.95	1,664	319	2,875
3.00	165.25	1,664	319	3,195

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	6.00	0.00	0.00
Span (in)	= 6.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 163.75	164.50	0.00	0.00
Length (ft)	= 50.00	50.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.000	n/a
Orifice Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

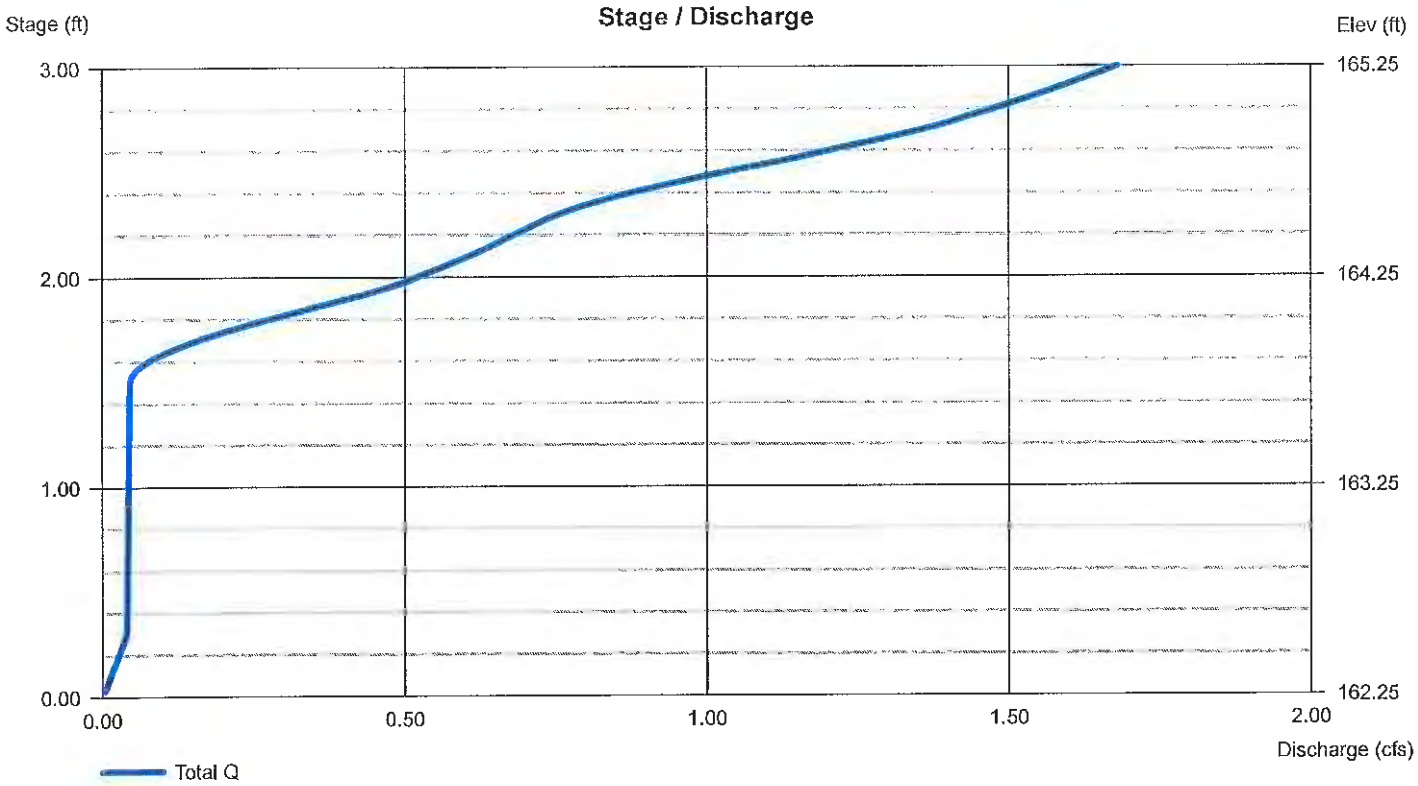
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 1.020 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

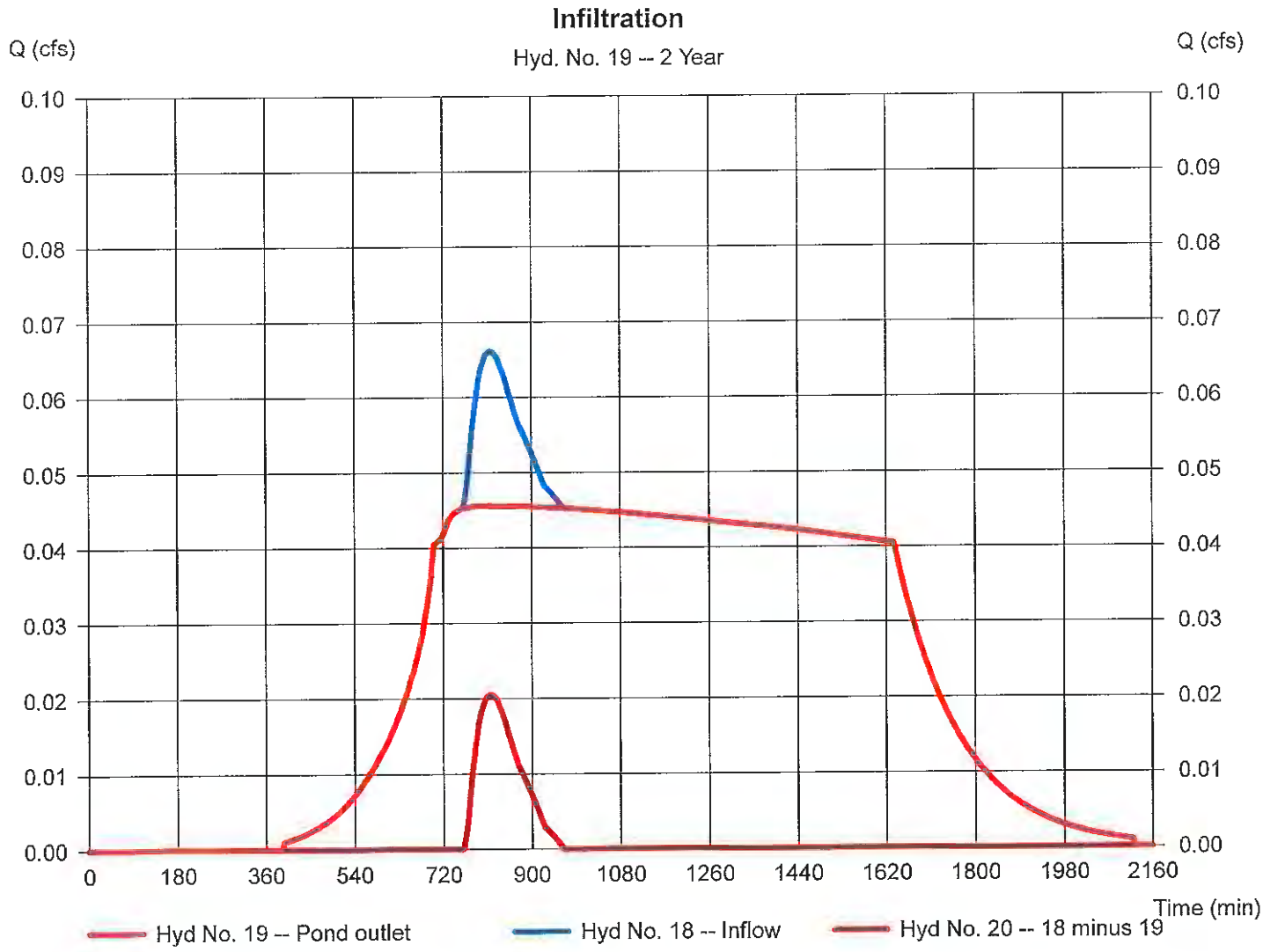


Hydrograph Report

Hyd. No. 19

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.046 cfs
Storm frequency	= 2 yrs	Time to peak	= 816 min
Time interval	= 3 min	Hyd. volume	= 2,964 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 20
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

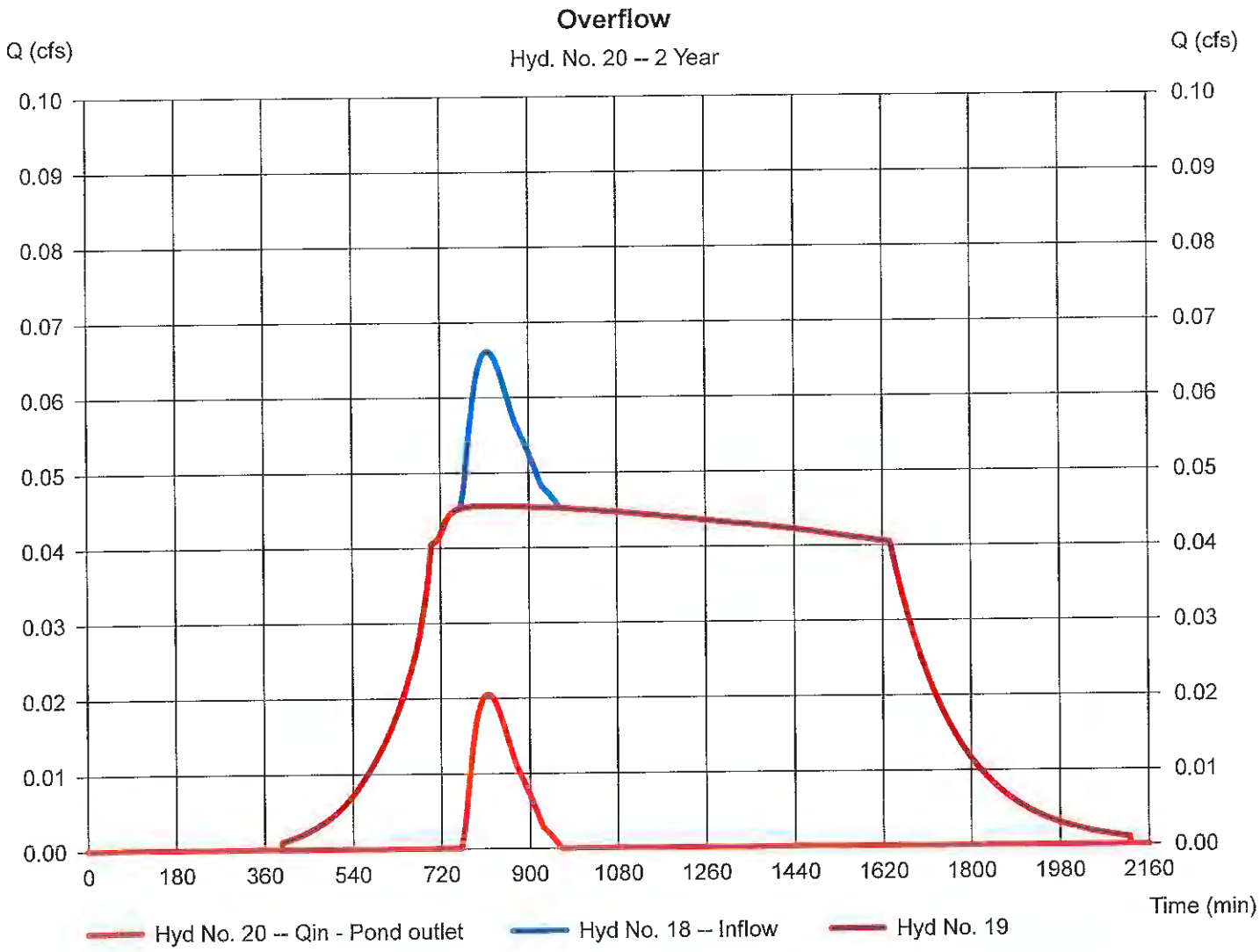


Hydrograph Report

Hyd. No. 20

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.021 cfs
Storm frequency	= 2 yrs	Time to peak	= 816 min
Time interval	= 3 min	Hyd. volume	= 126 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 19
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

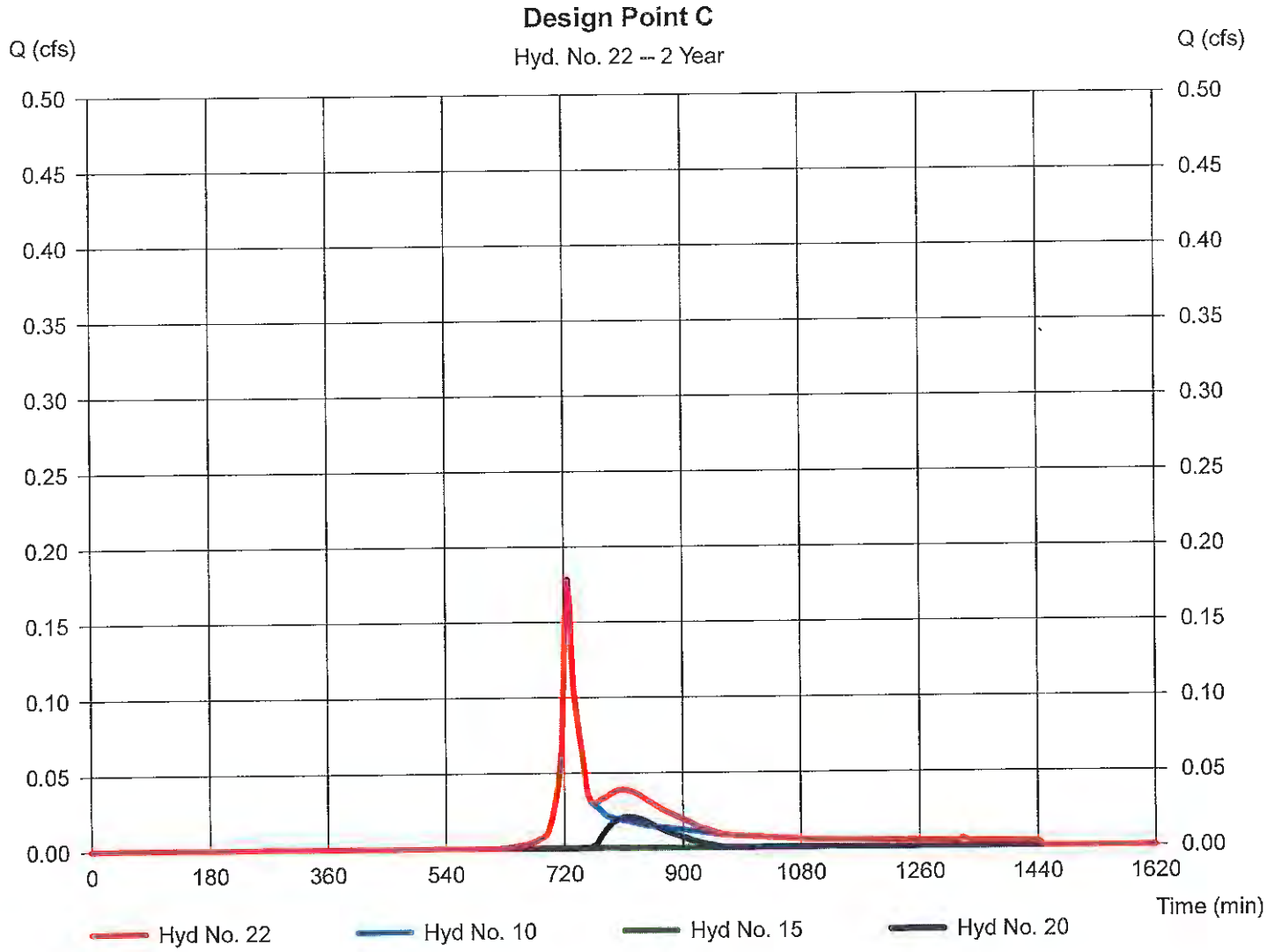


Hydrograph Report

Hyd. No. 22

Design Point C

Hydrograph type	= Combine	Peak discharge	= 0.178 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 743 cuft
Inflow hyds.	= 10, 15, 20	Contrib. drain. area	= 0.163 ac

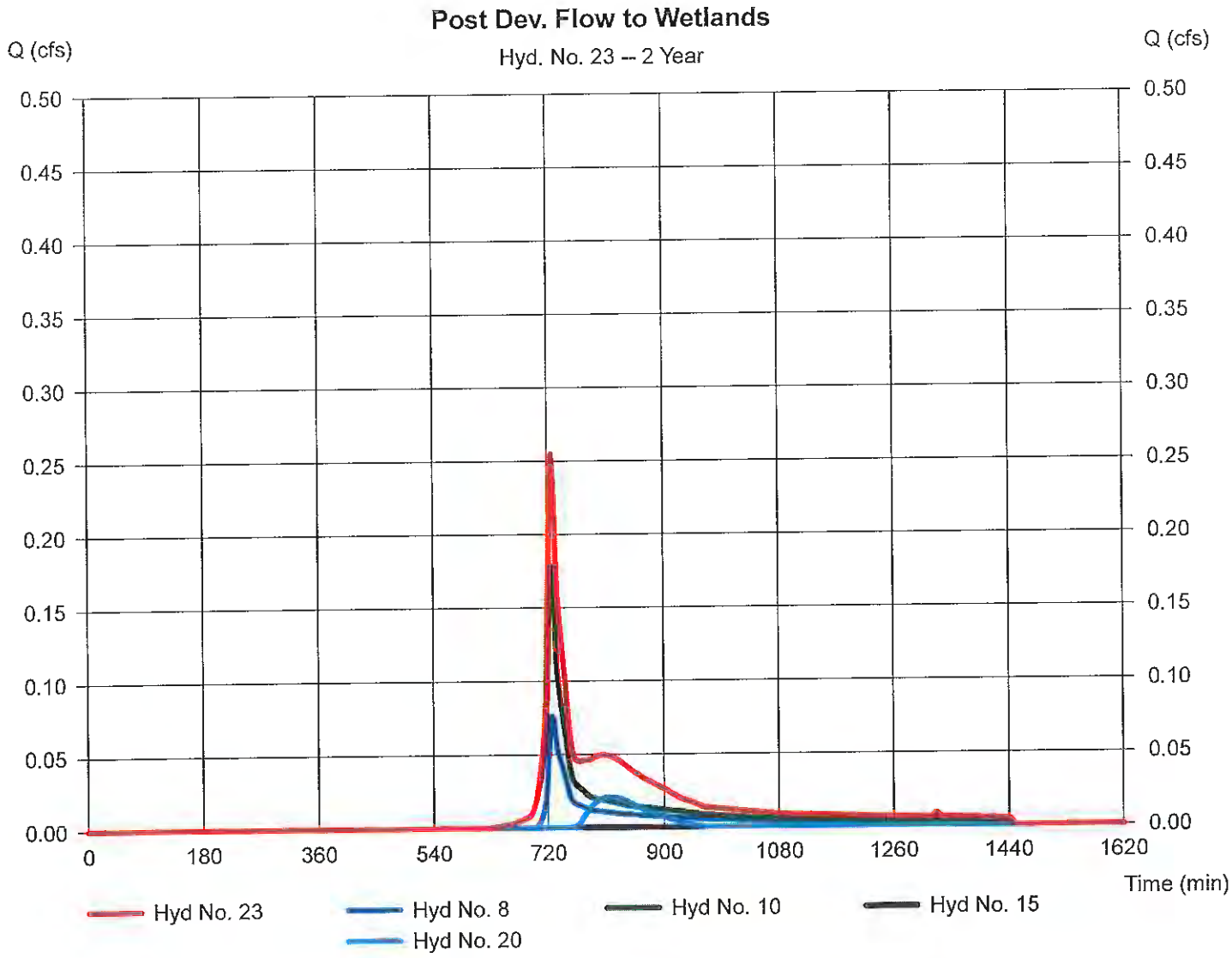


Hydrograph Report

Hyd. No. 23

Post Dev. Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 0.255 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,053 cuft
Inflow hyds.	= 8, 10, 15, 20	Contrib. drain. area	= 0.301 ac

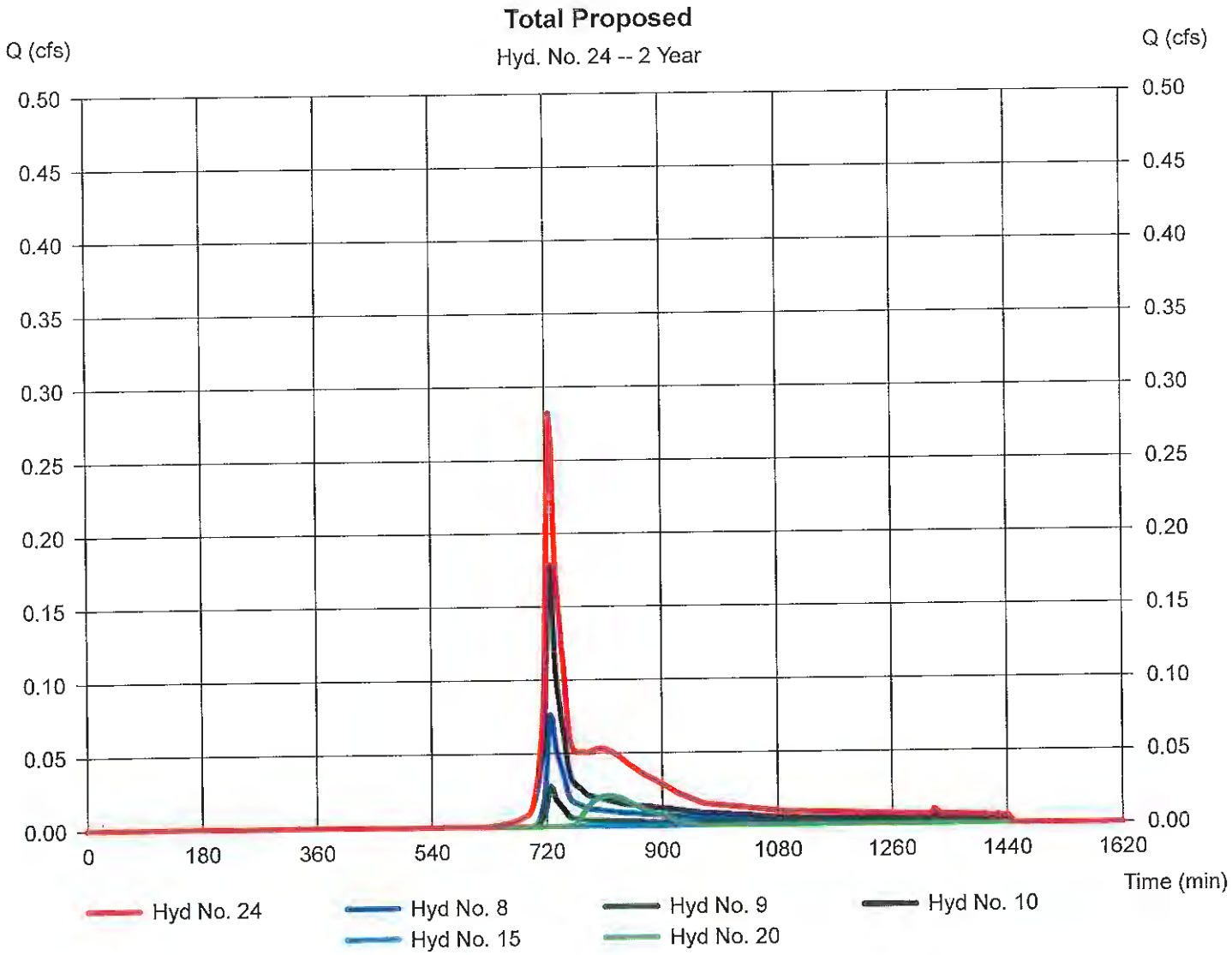


Hydrograph Report

Hyd. No. 24

Total Proposed

Hydrograph type	= Combine	Peak discharge	= 0.282 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,160 cuft
Inflow hyds.	= 8, 9, 10, 15, 20	Contrib. drain. area	= 0.344 ac



10-Year Storm, Pre and Post-Development

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.22

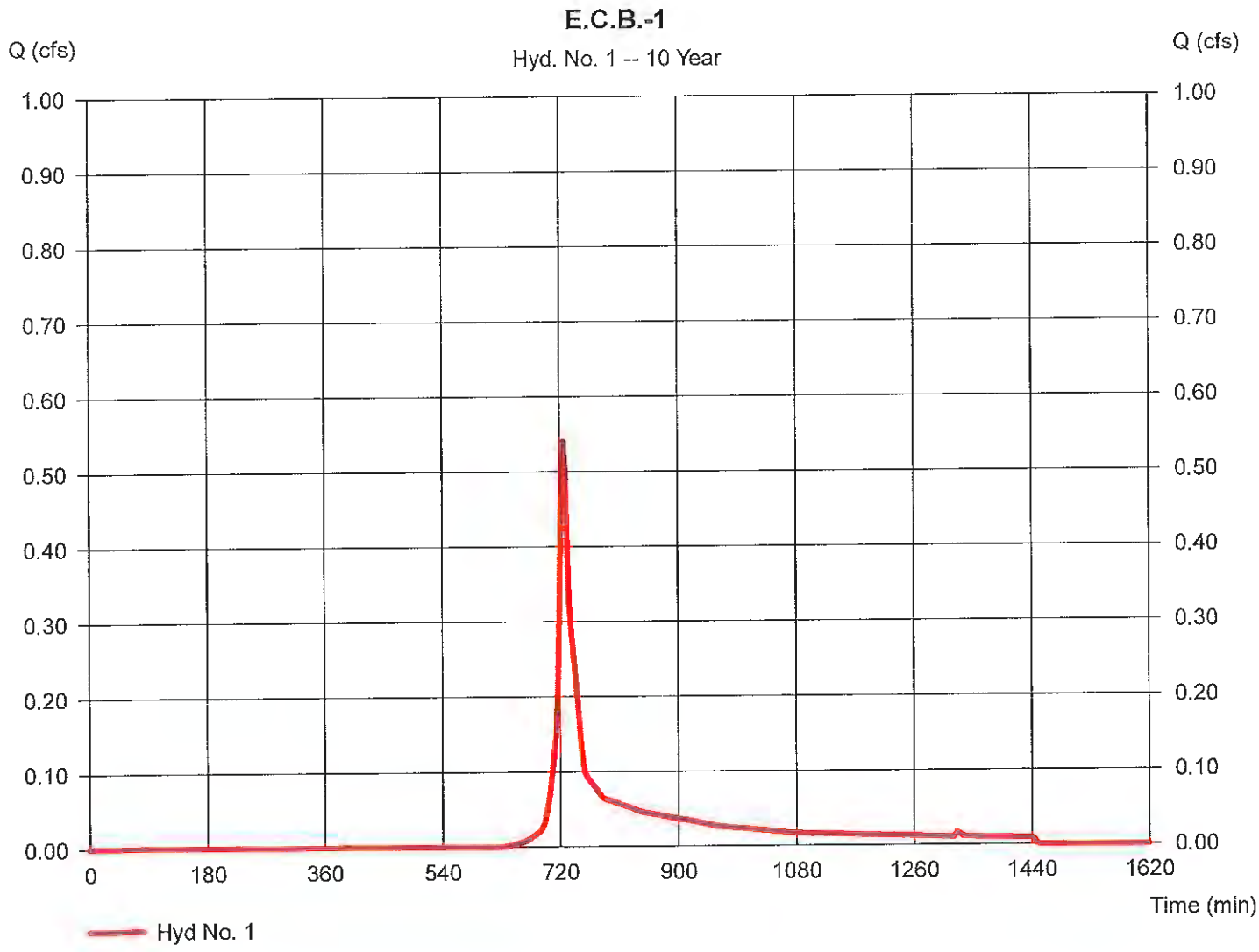
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.541	3	726	1,881	----	------	------	E.C.B.-1
2	SCS Runoff	0.169	3	726	562	----	------	------	E.C.B.-2
3	SCS Runoff	0.787	3	726	2,690	----	------	------	E.C.B.-3
5	Combine	1.327	3	726	4,571	1, 3,	------	------	Flow to Wetlands
6	Combine	1.496	3	726	5,133	1, 2, 3,	------	------	Total Existing
8	SCS Runoff	0.213	3	726	740	----	------	------	P.D.B.-1
9	SCS Runoff	0.072	3	726	246	----	------	------	P.D.B.-2
10	SCS Runoff	0.375	3	726	1,252	----	------	------	P.D.B.-3
12	SCS Runoff	0.285	3	726	955	----	------	------	P.D.B.3A
13	Reservoir	0.015	3	915	941	12	164.70	542	Rain Garden
14	Diversion1	0.015	3	915	941	13	------	------	Infiltration
15	Diversion2	0.000	3	915	0	13	------	------	Overflow
17	SCS Runoff	1.445	3	726	5,061	----	------	------	P.D.B.-4
18	Reservoir	0.512	3	744	5,053	17	164.24	2,119	Infiltration System
19	Diversion1	0.047	3	744	3,458	18	------	------	Infiltration
20	Diversion2	0.465	3	744	1,595	18	------	------	Overflow
22	Combine	0.632	3	738	2,847	10, 15, 20,	------	------	Design Point C
23	Combine	0.751	3	735	3,587	8, 10, 15, 20,	------	------	Post Dev. Flow to Wetlands
24	Combine	0.795	3	732	3,833	8, 9, 10, 15, 20,	------	------	Total Proposed

Hydrograph Report

Hyd. No. 1

E.C.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.541 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,881 cuft
Drainage area	= 0.351 ac	Curve number	= 66.4
Basin Slope	= 5.2 %	Hydraulic length	= 189 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.90 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

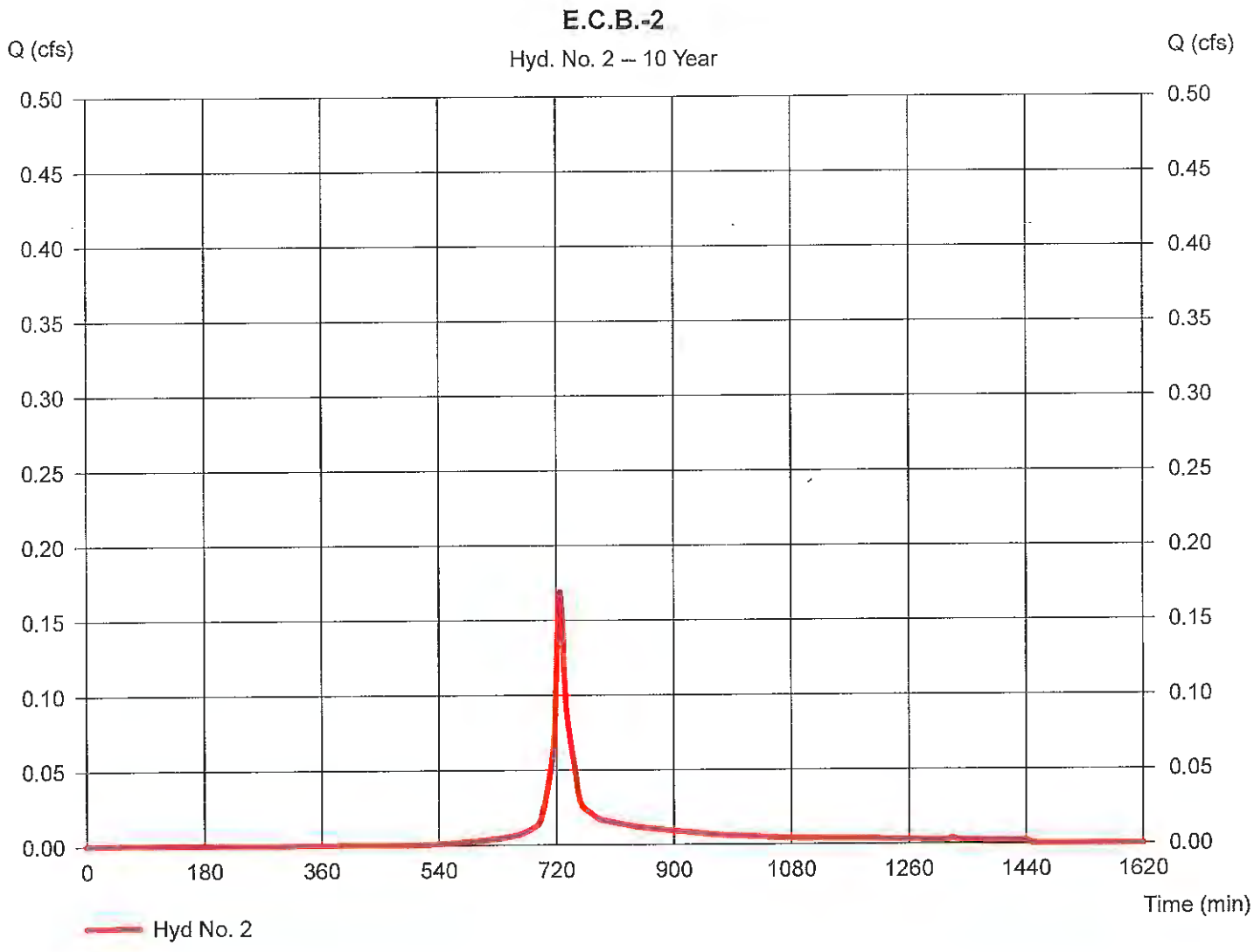


Hydrograph Report

Hyd. No. 2

E.C.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.169 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 562 cuft
Drainage area	= 0.067 ac	Curve number	= 77.8
Basin Slope	= 1.9 %	Hydraulic length	= 68 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

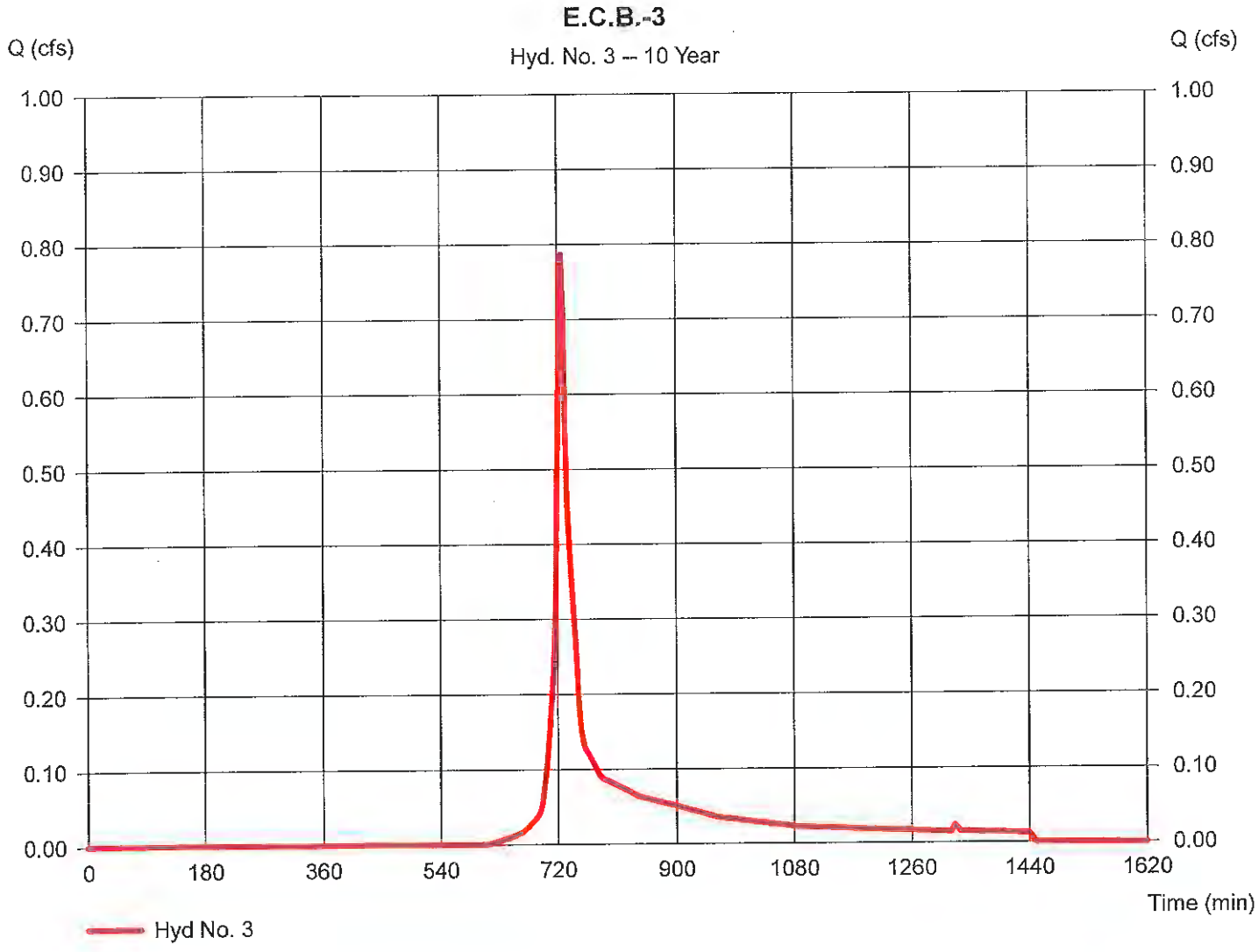


Hydrograph Report

Hyd. No. 3

E.C.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.787 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,690 cuft
Drainage area	= 0.452 ac	Curve number	= 68.8
Basin Slope	= 4.2 %	Hydraulic length	= 207 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

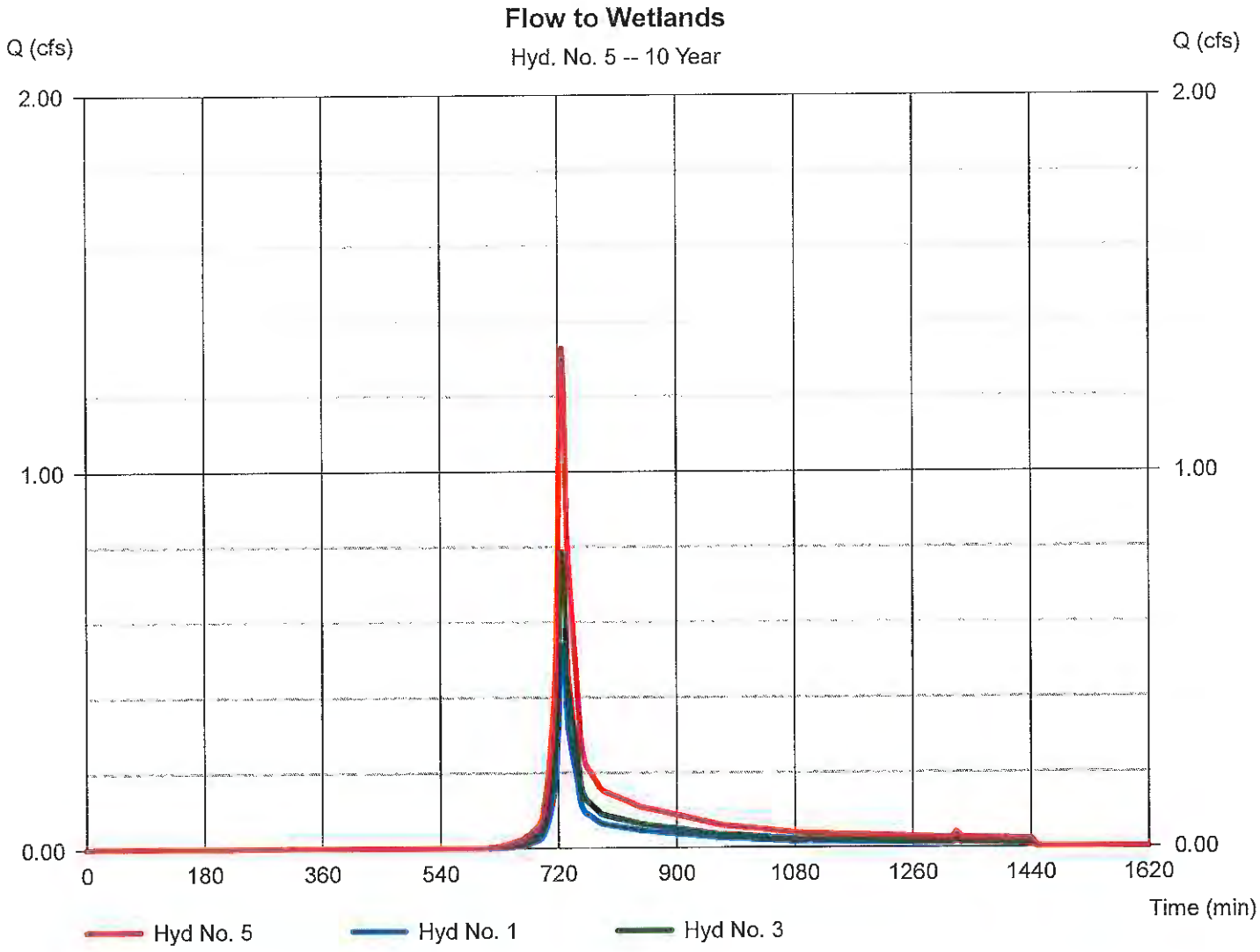


Hydrograph Report

Hyd. No. 5

Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 1.327 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 4,571 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 0.803 ac

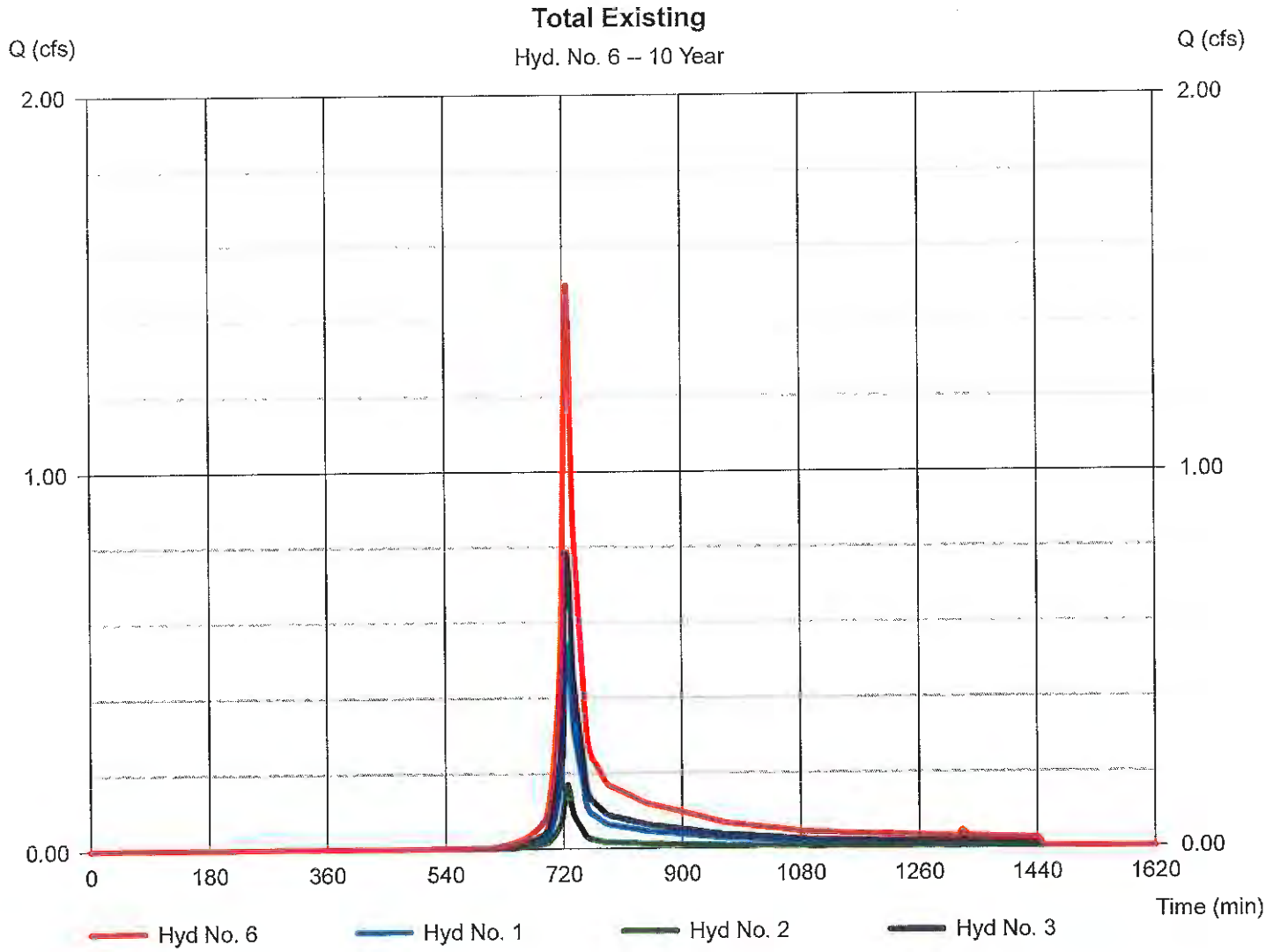


Hydrograph Report

Hyd. No. 6

Total Existing

Hydrograph type	= Combine	Peak discharge	= 1.496 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 5,133 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 0.870 ac



Hydrograph Report

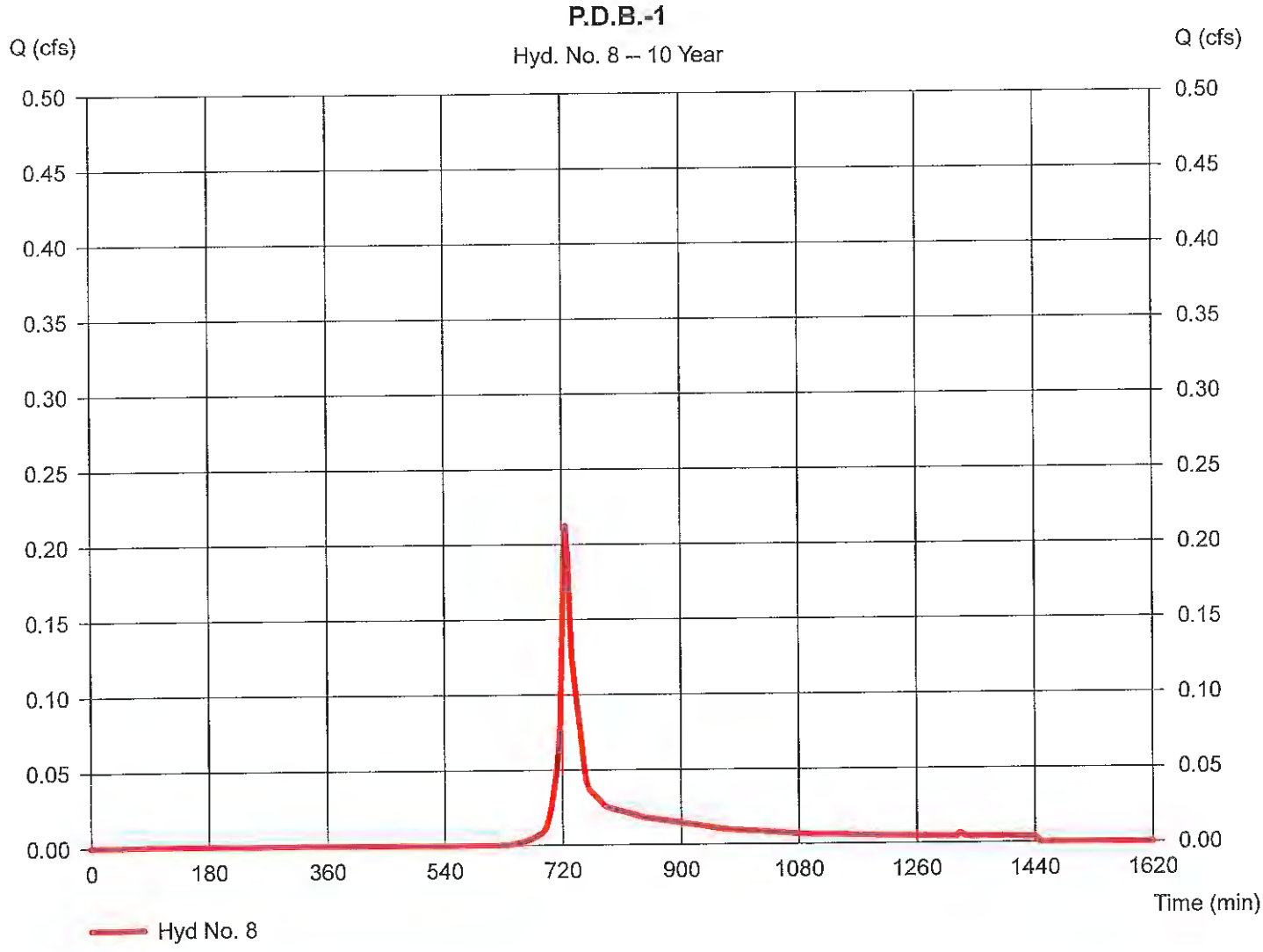
Hydraflow Hydrographs by Intelisolve v9.22

Friday, Jul 6, 2018

Hyd. No. 8

P.D.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.213 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 740 cuft
Drainage area	= 0.138 ac	Curve number	= 66.4
Basin Slope	= 4.4 %	Hydraulic length	= 222 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

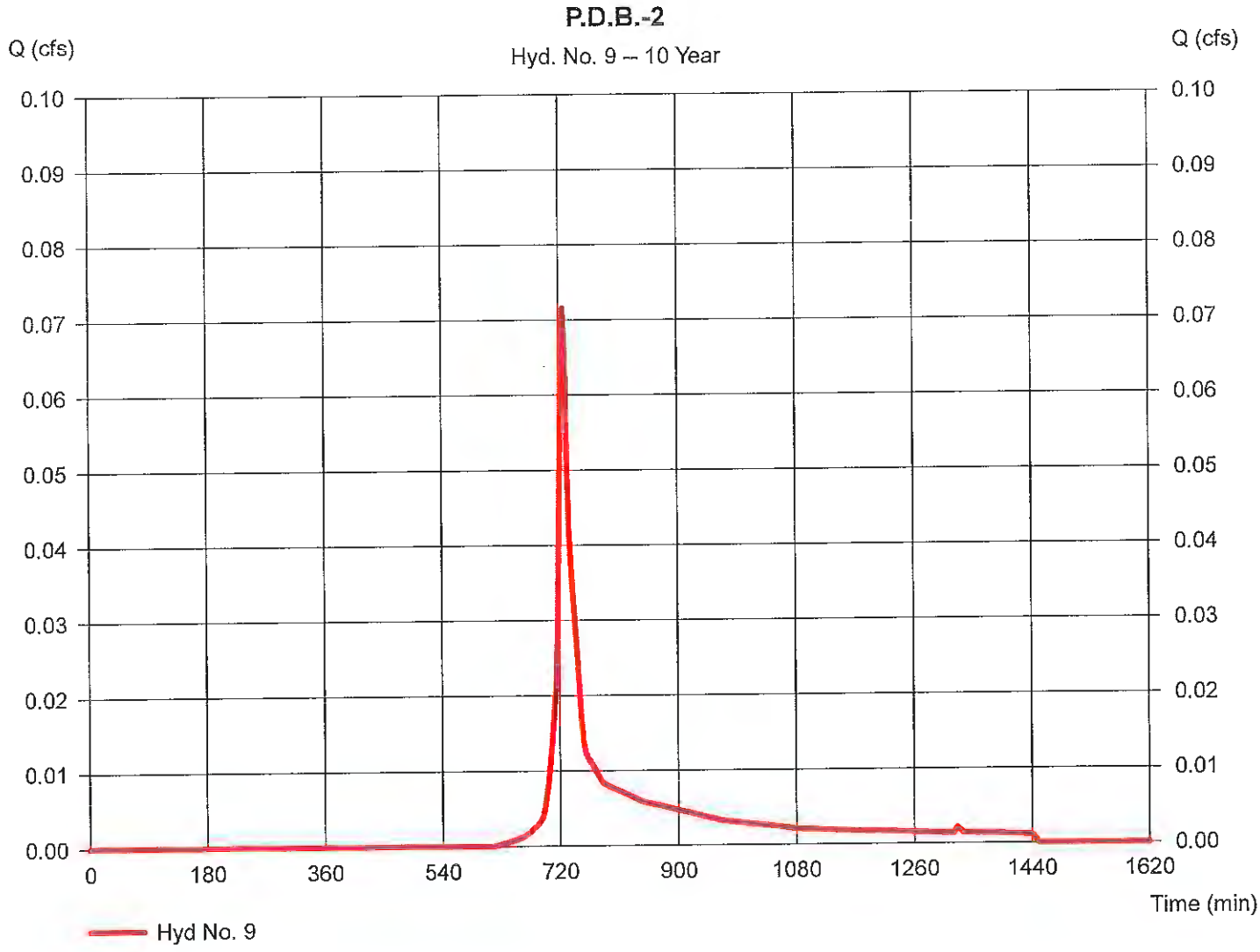


Hydrograph Report

Hyd. No. 9

P.D.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.072 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 246 cuft
Drainage area	= 0.043 ac	Curve number	= 67.9
Basin Slope	= 1.0 %	Hydraulic length	= 49 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.10 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

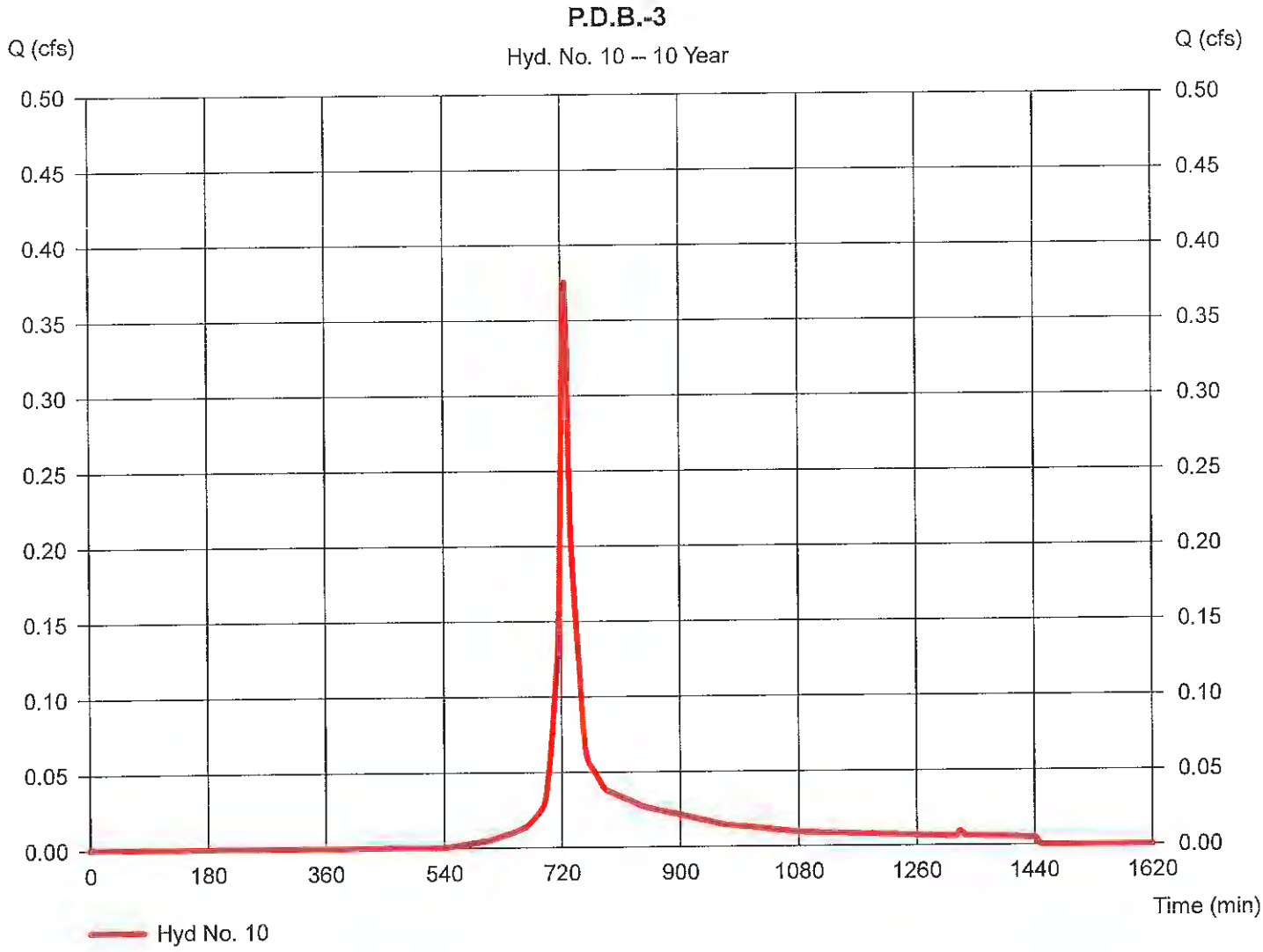
Hydraflow Hydrographs by Intelisolve v9.22

Friday, Jul 6, 2018

Hyd. No. 10

P.D.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.375 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,252 cuft
Drainage area	= 0.163 ac	Curve number	= 75.3
Basin Slope	= 3.8 %	Hydraulic length	= 196 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

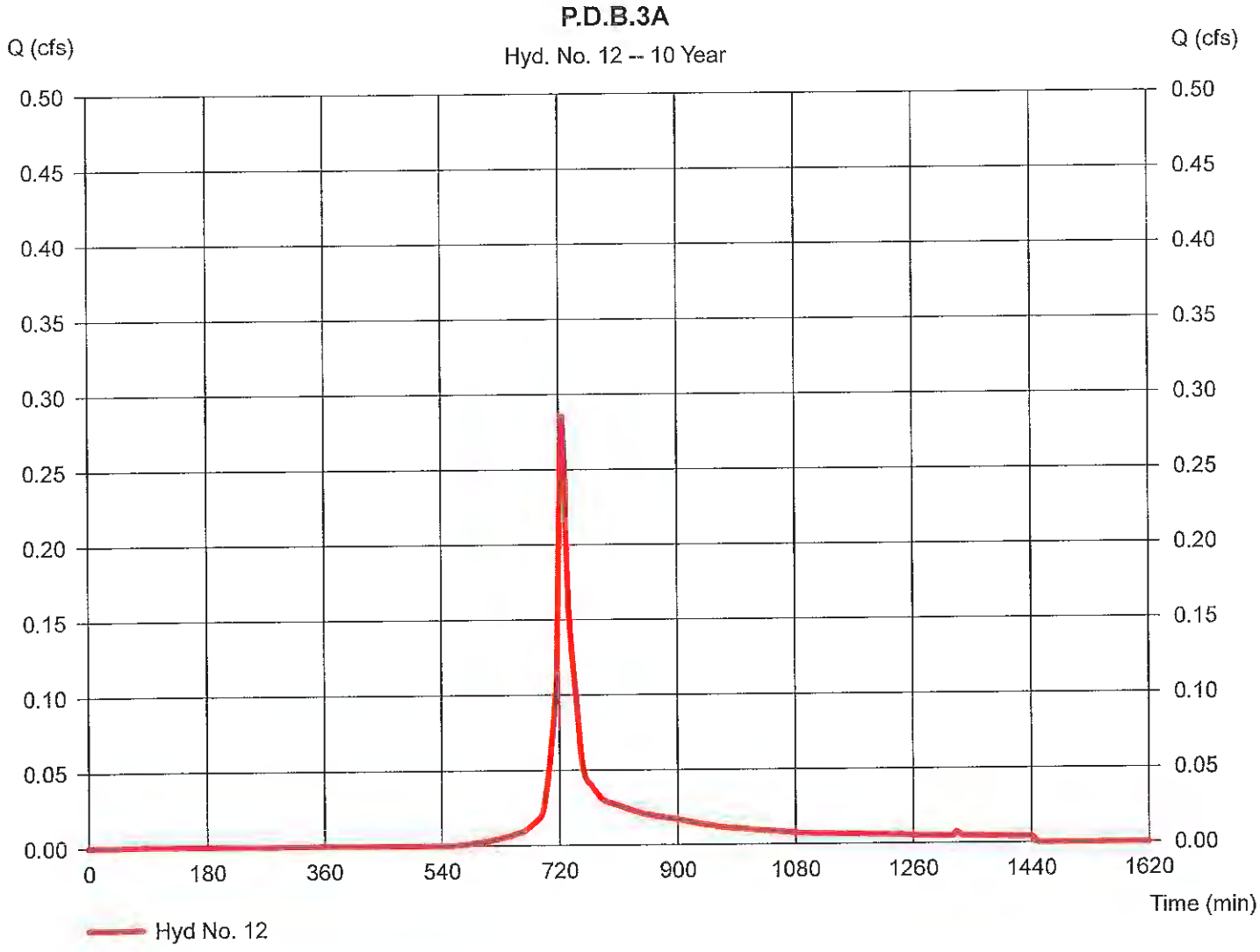


Hydrograph Report

Hyd. No. 12

P.D.B.3A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.285 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 955 cuft
Drainage area	= 0.133 ac	Curve number	= 73.5
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.22

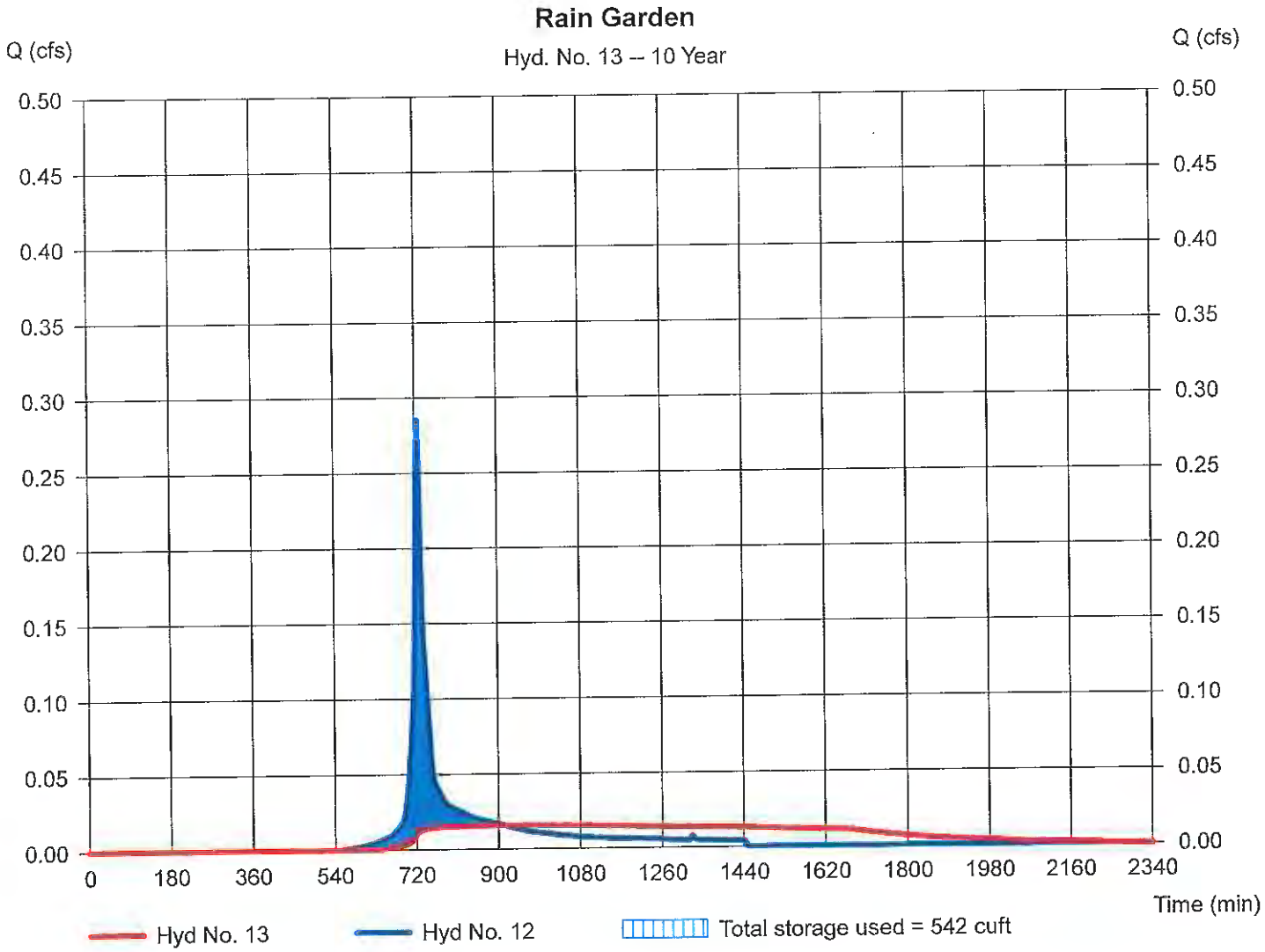
Friday, Jul 6, 2018

Hyd. No. 13

Rain Garden

Hydrograph type	= Reservoir	Peak discharge	= 0.015 cfs
Storm frequency	= 10 yrs	Time to peak	= 915 min
Time interval	= 3 min	Hyd. volume	= 941 cuft
Inflow hyd. No.	= 12 - P.D.B.3A	Max. Elevation	= 164.70 ft
Reservoir name	= Rain Garden	Max. Storage	= 542 cuft

Storage Indication method used. Outflow includes exfiltration.

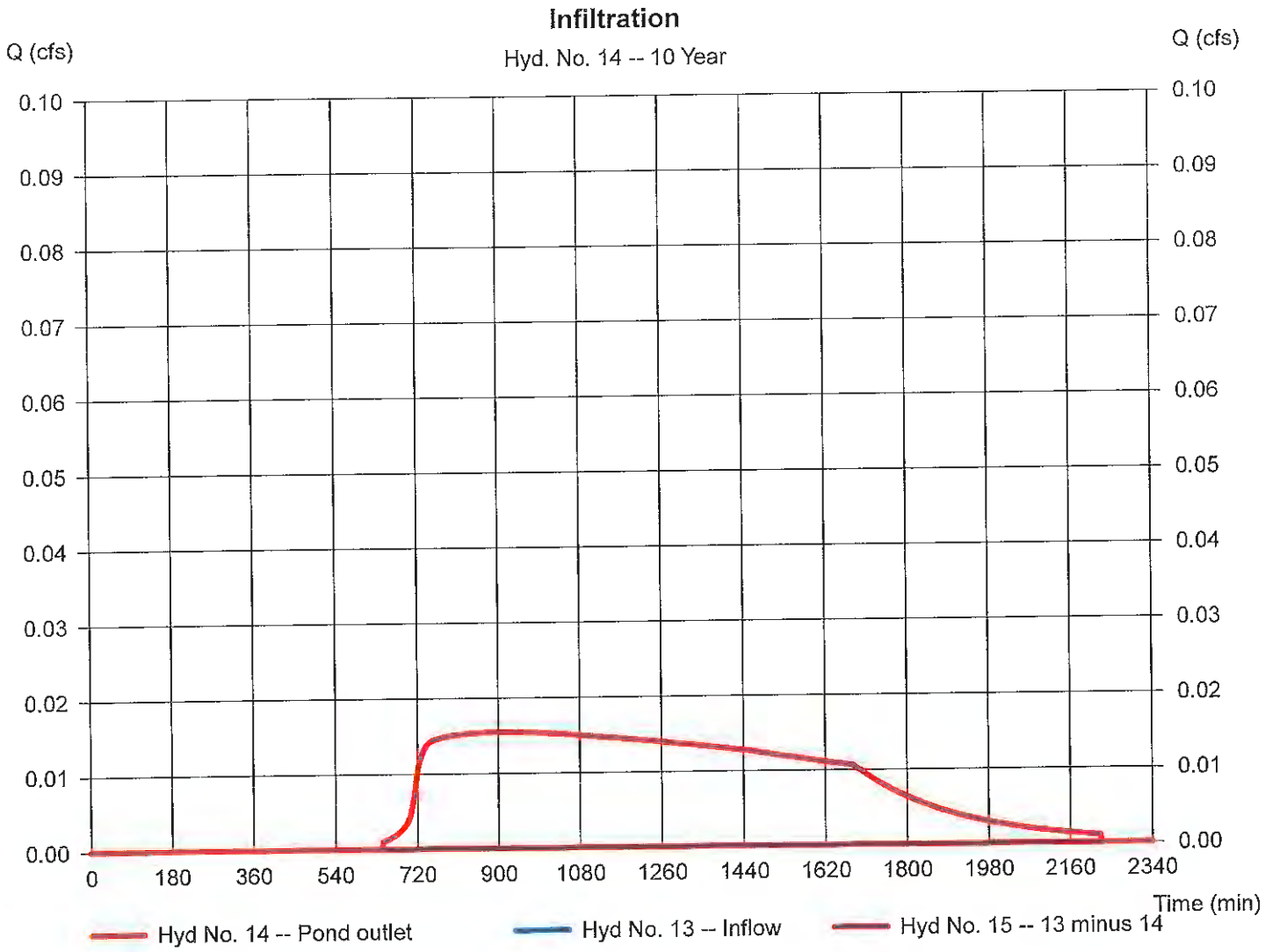


Hydrograph Report

Hyd. No. 14

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.015 cfs
Storm frequency	= 10 yrs	Time to peak	= 915 min
Time interval	= 3 min	Hyd. volume	= 941 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 15
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

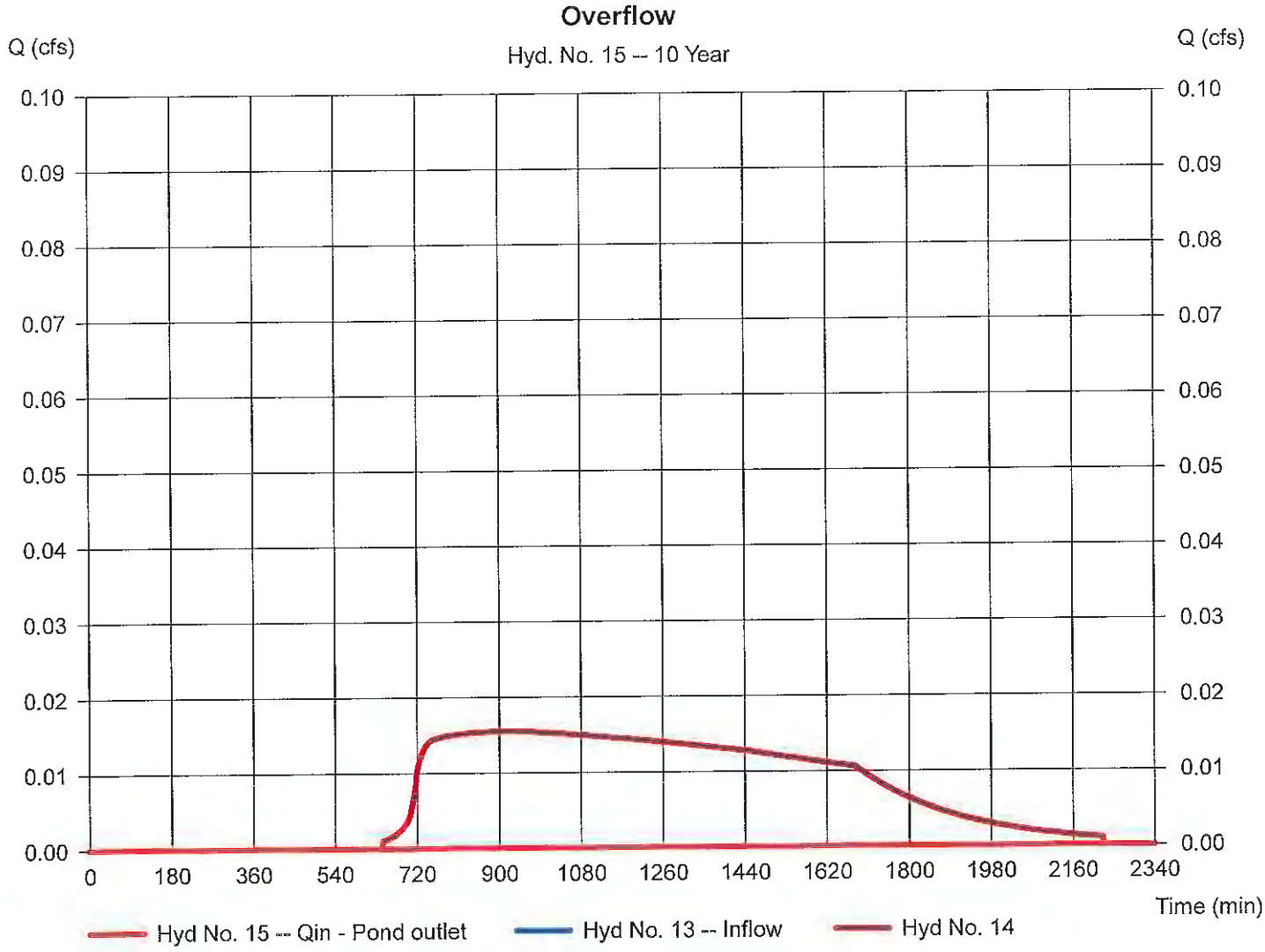


Hydrograph Report

Hyd. No. 15

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 915 min
Time interval	= 3 min	Hyd. volume	= 0 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 14
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

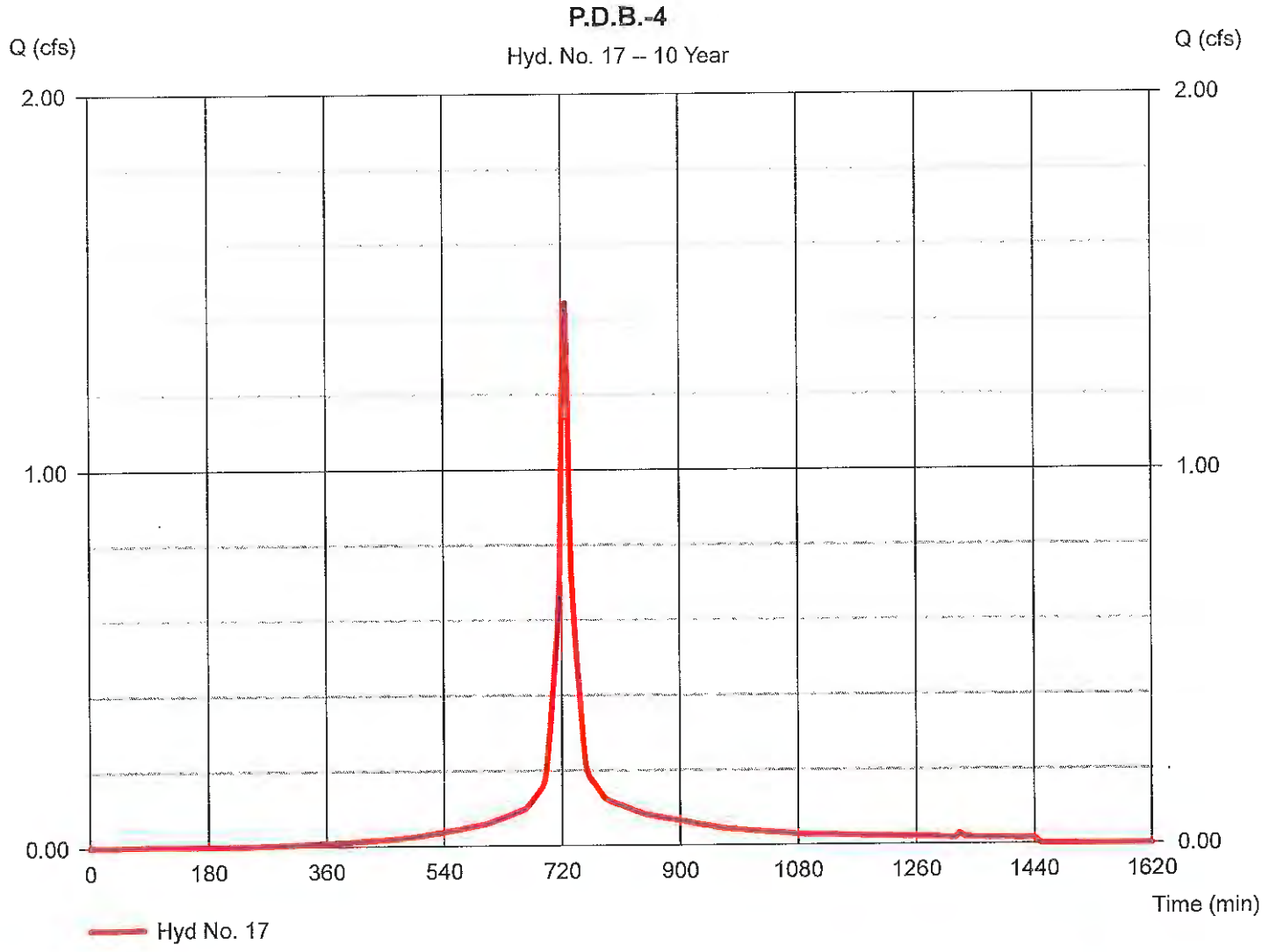


Hydrograph Report

Hyd. No. 17

P.D.B.-4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.445 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 5,061 cuft
Drainage area	= 0.392 ac	Curve number	= 91.7
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.73 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.22

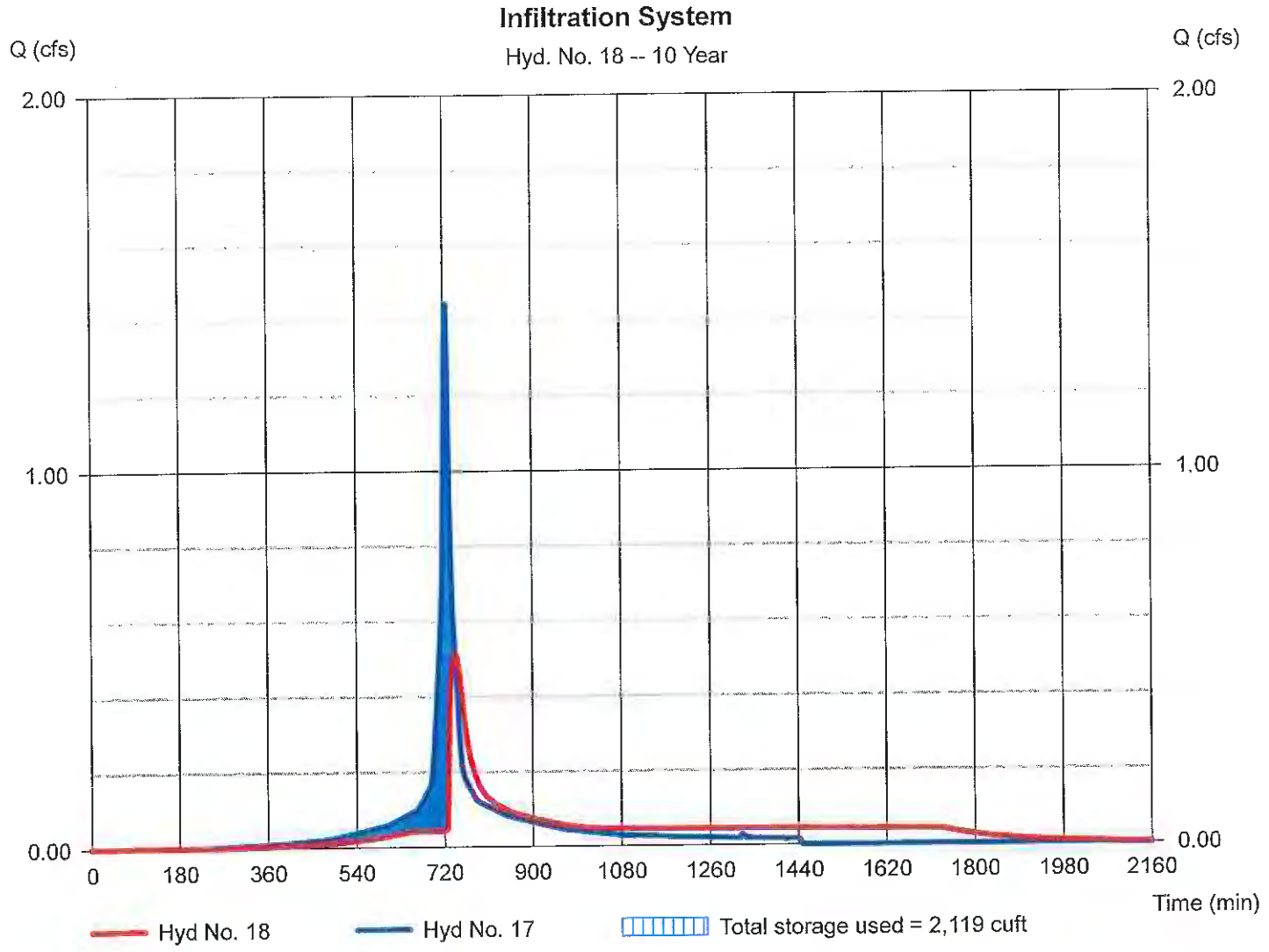
Friday, Jul 6, 2018

Hyd. No. 18

Infiltration System

Hydrograph type	= Reservoir	Peak discharge	= 0.512 cfs
Storm frequency	= 10 yrs	Time to peak	= 744 min
Time interval	= 3 min	Hyd. volume	= 5,053 cuft
Inflow hyd. No.	= 17 - P.D.B.-4	Max. Elevation	= 164.24 ft
Reservoir name	= Infiltration System	Max. Storage	= 2,119 cuft

Storage Indication method used. Outflow includes exfiltration.

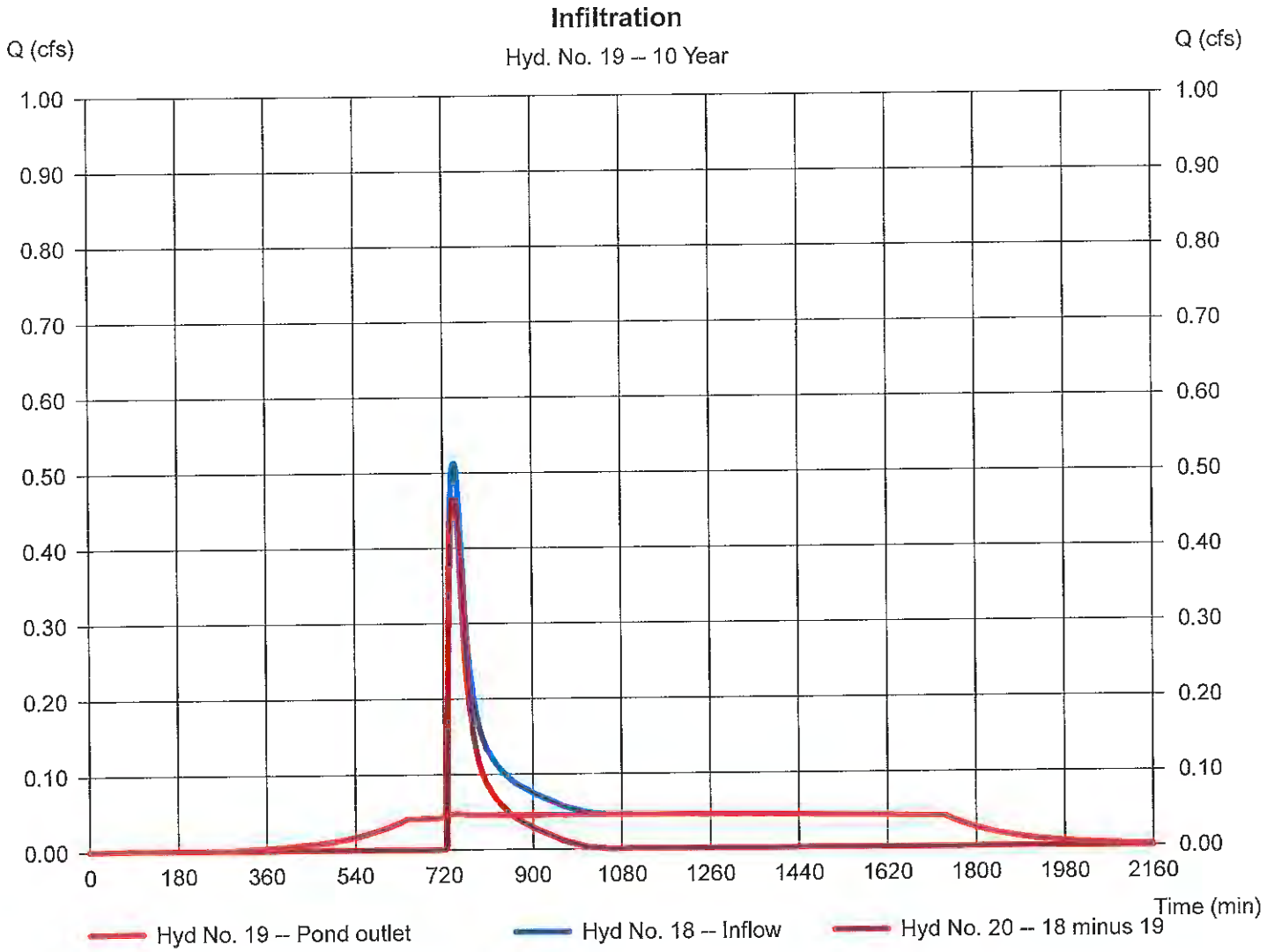


Hydrograph Report

Hyd. No. 19

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.047 cfs
Storm frequency	= 10 yrs	Time to peak	= 744 min
Time interval	= 3 min	Hyd. volume	= 3,458 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 20
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

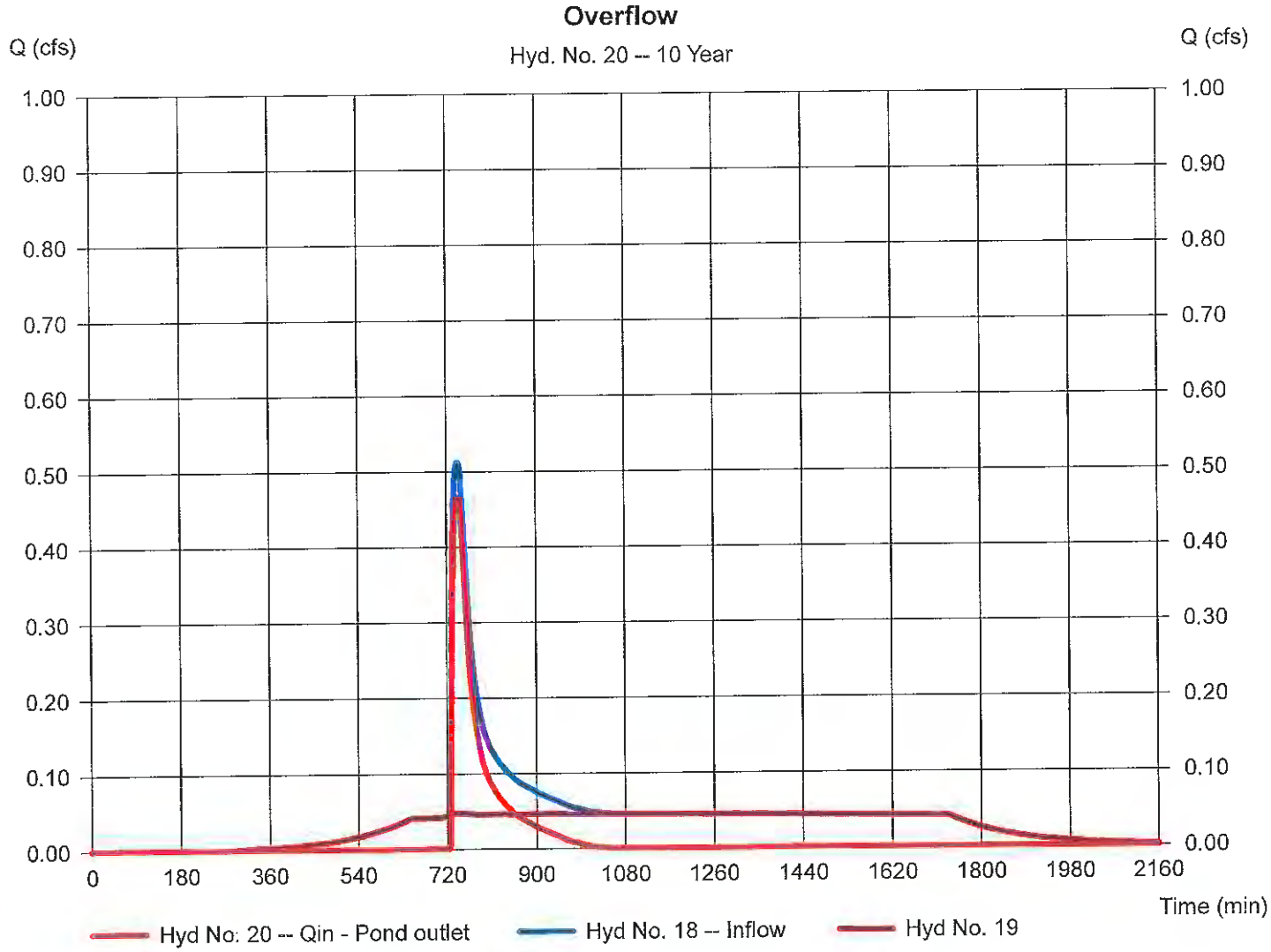


Hydrograph Report

Hyd. No. 20

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.465 cfs
Storm frequency	= 10 yrs	Time to peak	= 744 min
Time interval	= 3 min	Hyd. volume	= 1,595 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 19
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

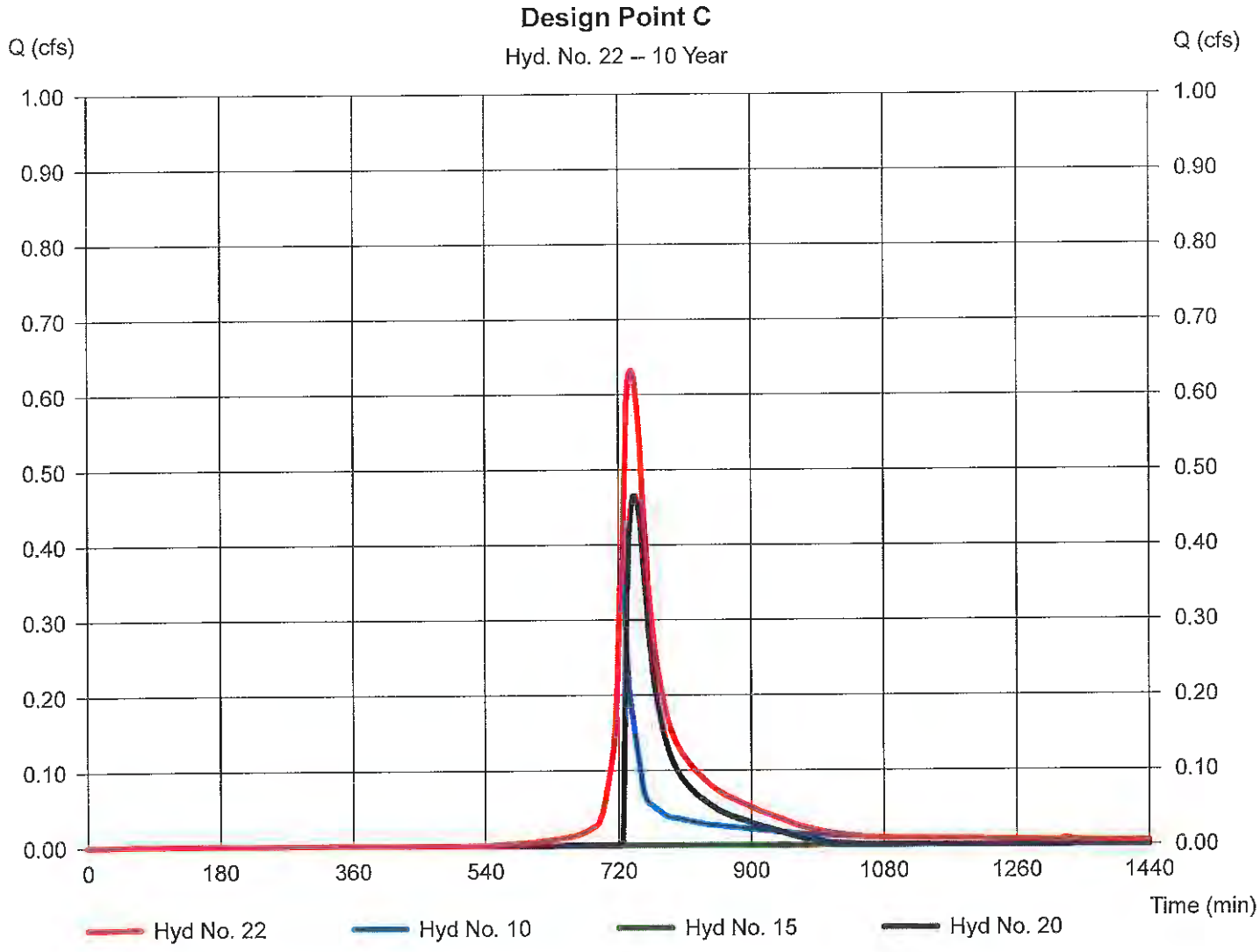


Hydrograph Report

Hyd. No. 22

Design Point C

Hydrograph type	= Combine	Peak discharge	= 0.632 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 3 min	Hyd. volume	= 2,847 cuft
Inflow hyds.	= 10, 15, 20	Contrib. drain. area	= 0.163 ac

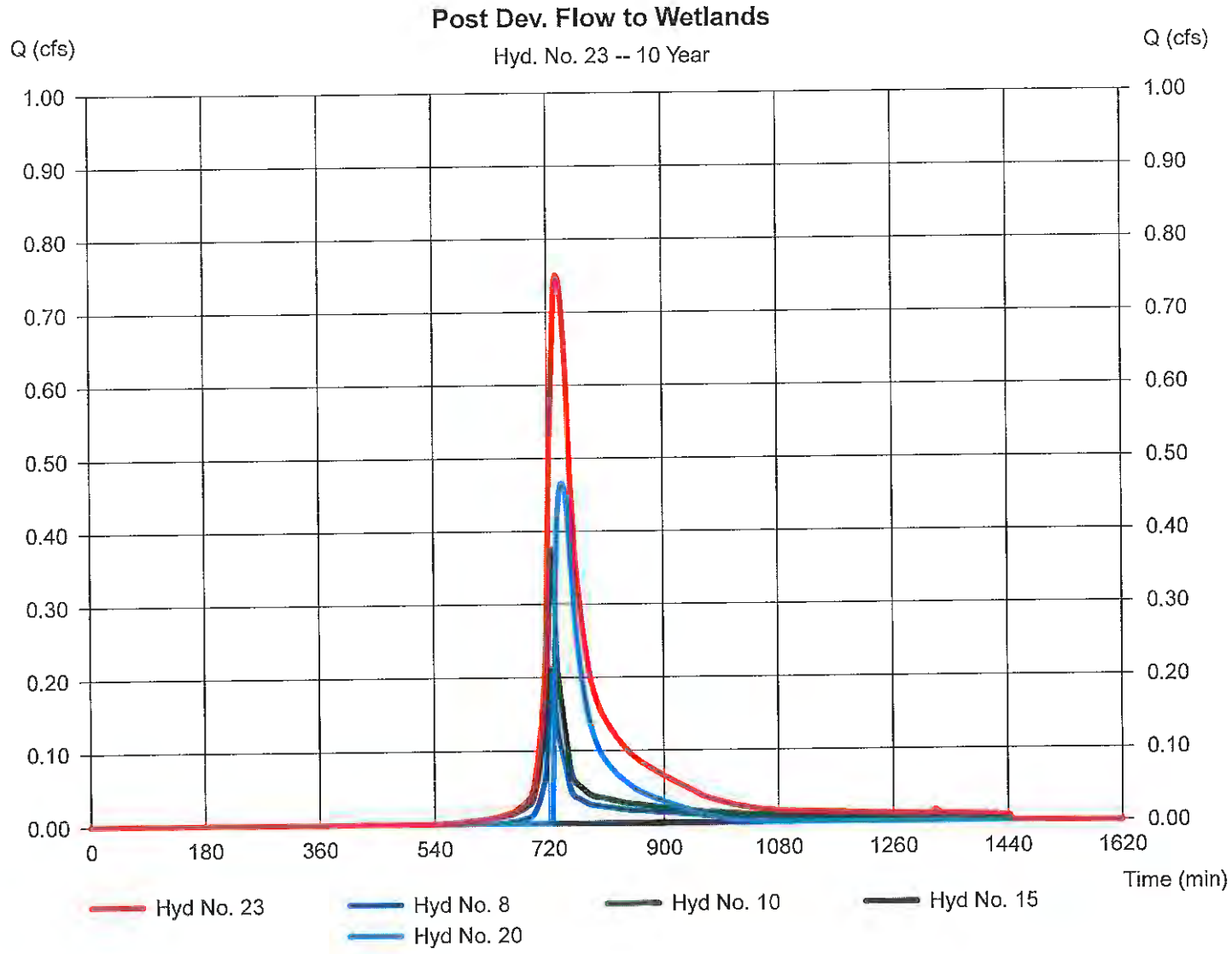


Hydrograph Report

Hyd. No. 23

Post Dev. Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 0.751 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 3 min	Hyd. volume	= 3,587 cuft
Inflow hyds.	= 8, 10, 15, 20	Contrib. drain. area	= 0.301 ac

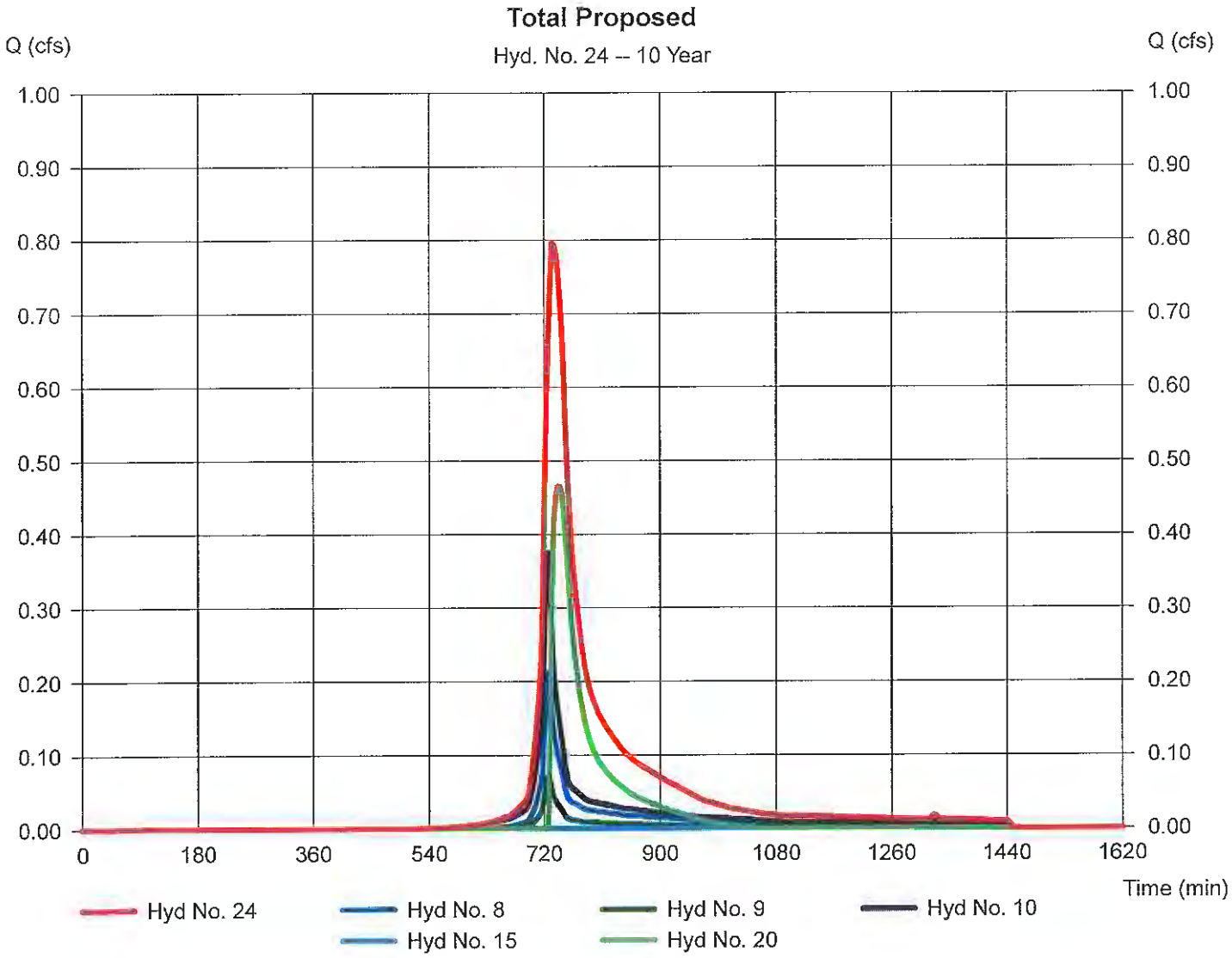


Hydrograph Report

Hyd. No. 24

Total Proposed

Hydrograph type	= Combine	Peak discharge	= 0.795 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 3 min	Hyd. volume	= 3,833 cuft
Inflow hyds.	= 8, 9, 10, 15, 20	Contrib. drain. area	= 0.344 ac



25-Year Storm, Pre and Post-Development

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.22

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.863	3	726	2,913	----	------	------	E.C.B.-1
2	SCS Runoff	0.241	3	726	801	----	------	------	E.C.B.-2
3	SCS Runoff	1.220	3	726	4,084	----	------	------	E.C.B.-3
5	Combine	2.083	3	726	6,997	1, 3,	------	------	Flow to Wetlands
6	Combine	2.323	3	726	7,799	1, 2, 3,	------	------	Total Existing
8	SCS Runoff	0.339	3	726	1,145	----	------	------	P.D.B.-1
9	SCS Runoff	0.112	3	726	377	----	------	------	P.D.B.-2
10	SCS Runoff	0.545	3	726	1,813	----	------	------	P.D.B.-3
12	SCS Runoff	0.421	3	726	1,401	----	------	------	P.D.B.3A
13	Reservoir	0.169	3	741	1,387	12	164.78	591	Rain Garden
14	Diversion1	0.016	3	741	1,075	13	------	------	Infiltration
15	Diversion2	0.153	3	741	312	13	------	------	Overflow
17	SCS Runoff	1.869	3	726	6,652	----	------	------	P.D.B.-4
18	Reservoir	0.851	3	738	6,644	17	164.64	2,536	Infiltration System
19	Diversion1	0.049	3	738	3,767	18	------	------	Infiltration
20	Diversion2	0.802	3	738	2,878	18	------	------	Overflow
22	Combine	1.161	3	741	5,003	10, 15, 20,	------	------	Design Point C
23	Combine	1.433	3	729	6,148	8, 10, 15, 20,	------	------	Post Dev. Flow to Wetlands
24	Combine	1.533	3	729	6,524	8, 9, 10, 15, 20,	------	------	Total Proposed

Hydrograph Report

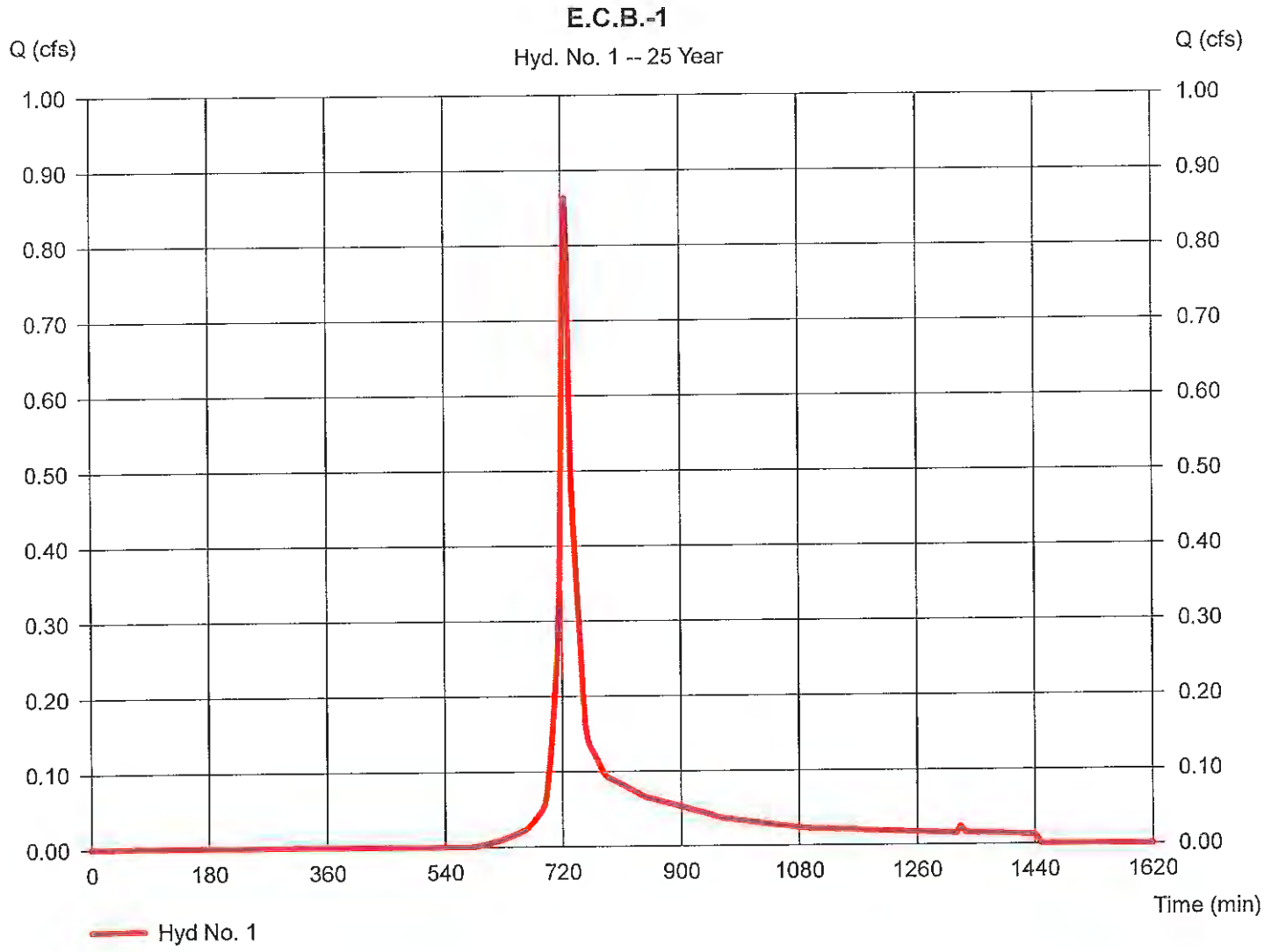
Hydraflow Hydrographs by Intelisolve v9.22

Friday, Jul 6, 2018

Hyd. No. 1

E.C.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.863 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,913 cuft
Drainage area	= 0.351 ac	Curve number	= 66.4
Basin Slope	= 5.2 %	Hydraulic length	= 189 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.90 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

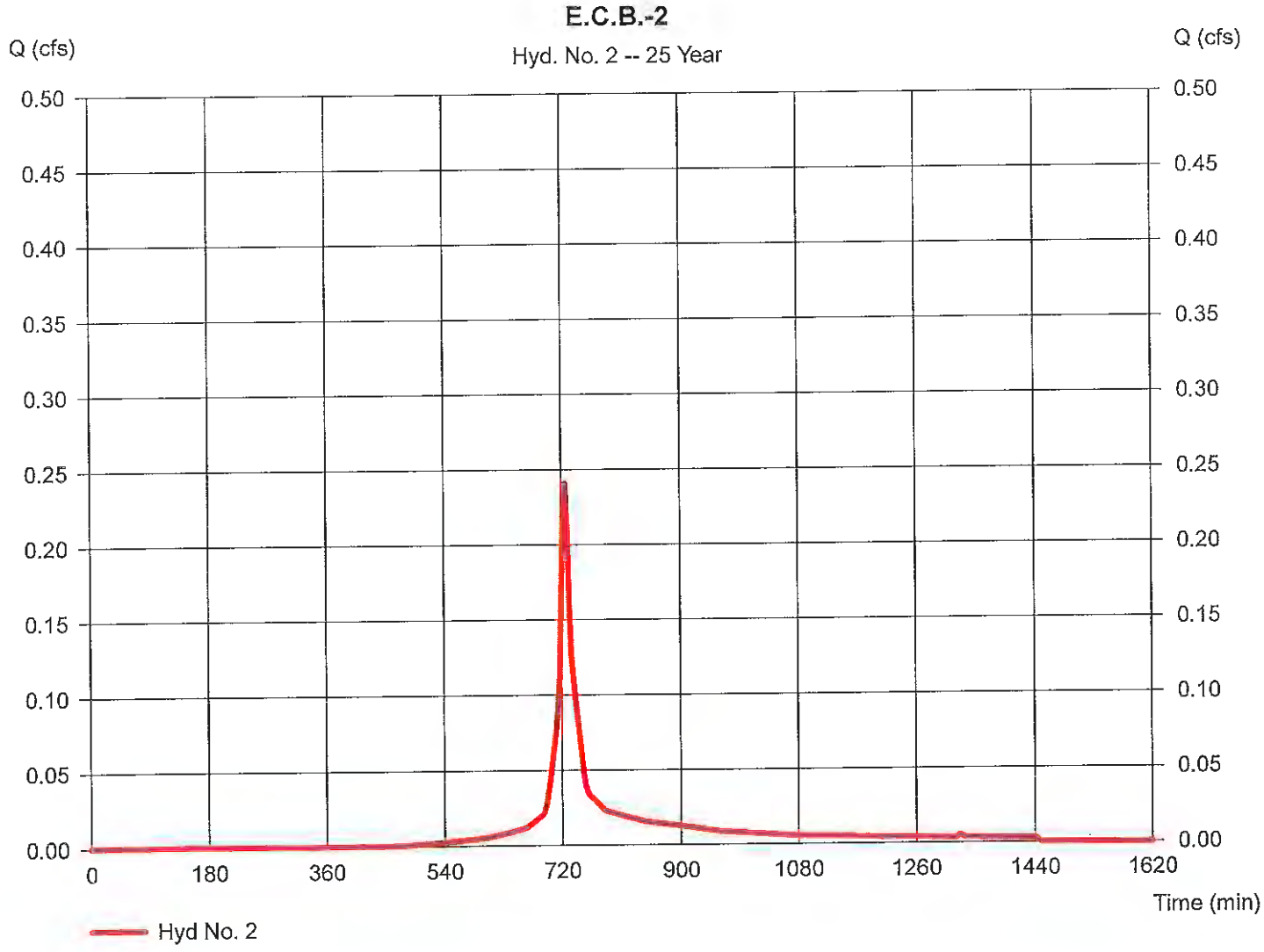


Hydrograph Report

Hyd. No. 2

E.C.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.241 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 801 cuft
Drainage area	= 0.067 ac	Curve number	= 77.8
Basin Slope	= 1.9 %	Hydraulic length	= 68 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

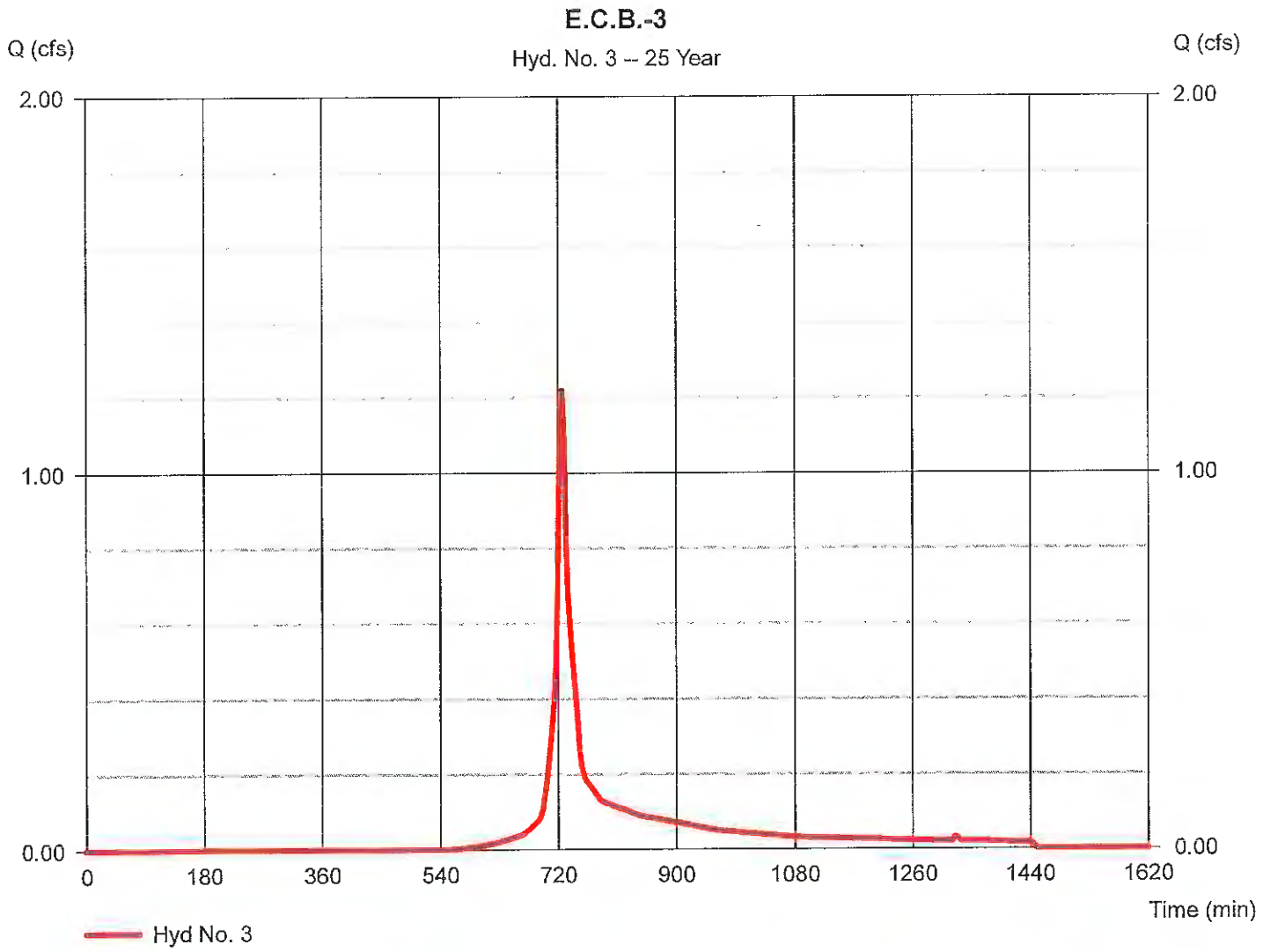


Hydrograph Report

Hyd. No. 3

E.C.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.220 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 4,084 cuft
Drainage area	= 0.452 ac	Curve number	= 68.8
Basin Slope	= 4.2 %	Hydraulic length	= 207 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

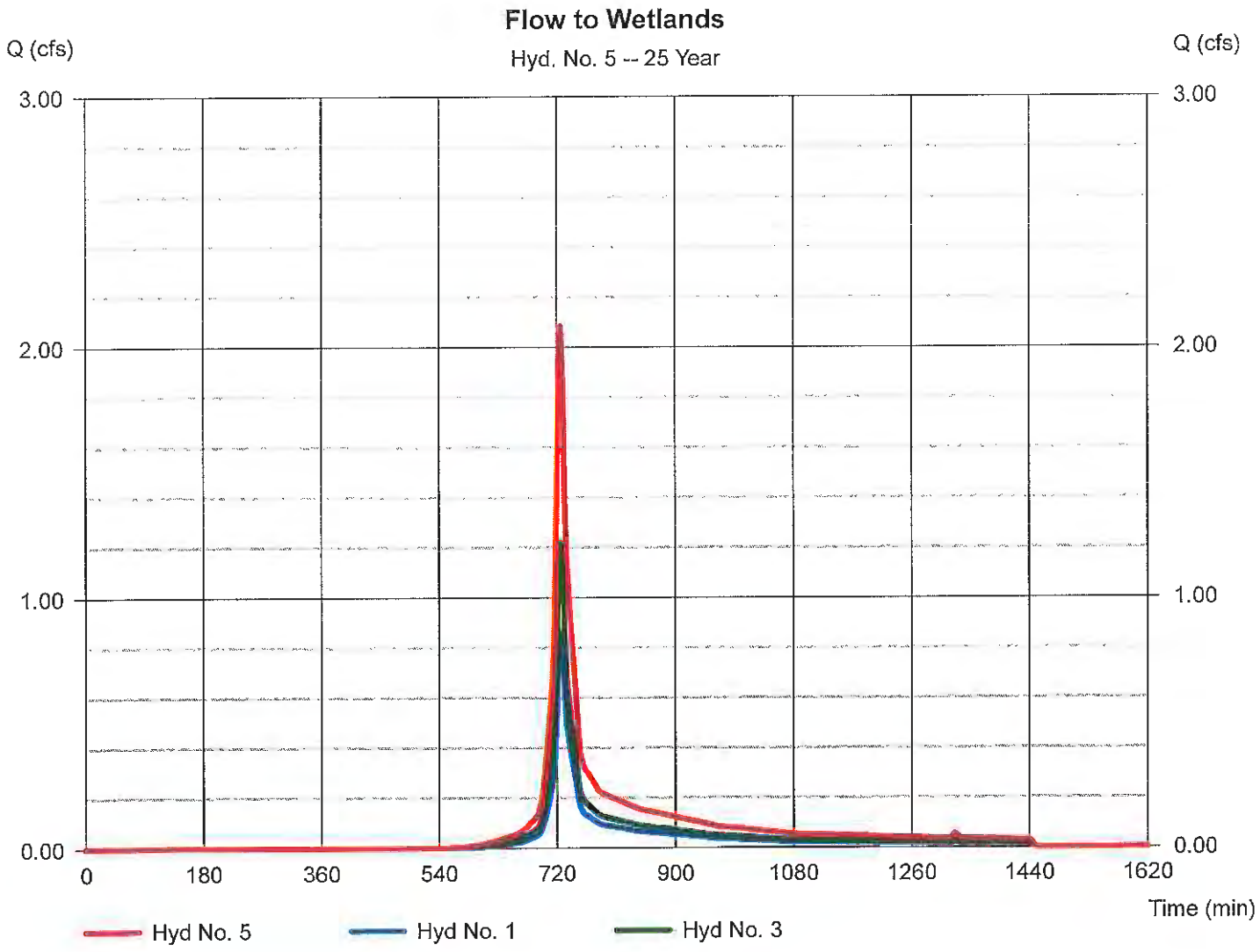


Hydrograph Report

Hyd. No. 5

Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 2.083 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 6,997 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 0.803 ac

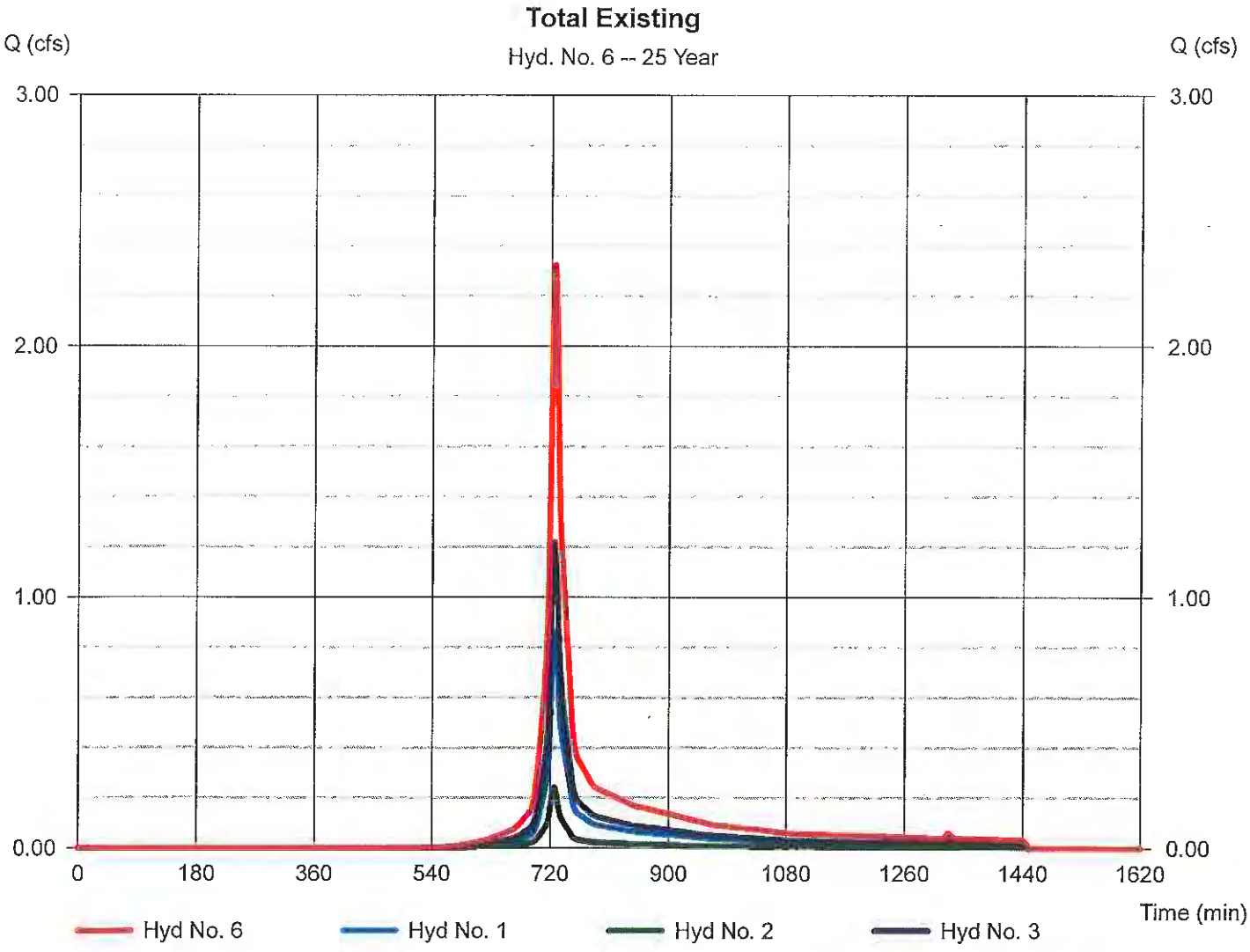


Hydrograph Report

Hyd. No. 6

Total Existing

Hydrograph type	= Combine	Peak discharge	= 2.323 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 7,799 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 0.870 ac

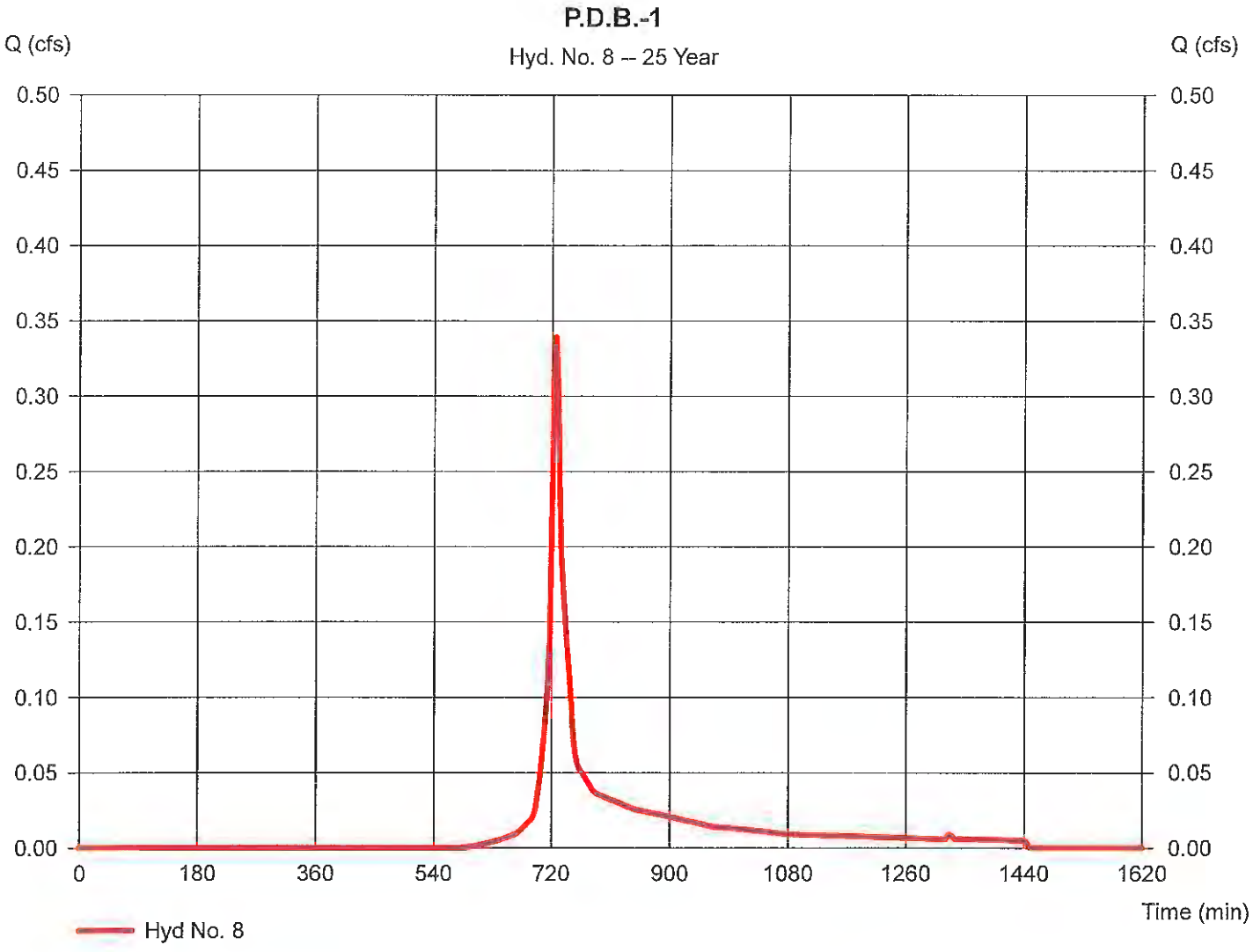


Hydrograph Report

Hyd. No. 8

P.D.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.339 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,145 cuft
Drainage area	= 0.138 ac	Curve number	= 66.4
Basin Slope	= 4.4 %	Hydraulic length	= 222 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

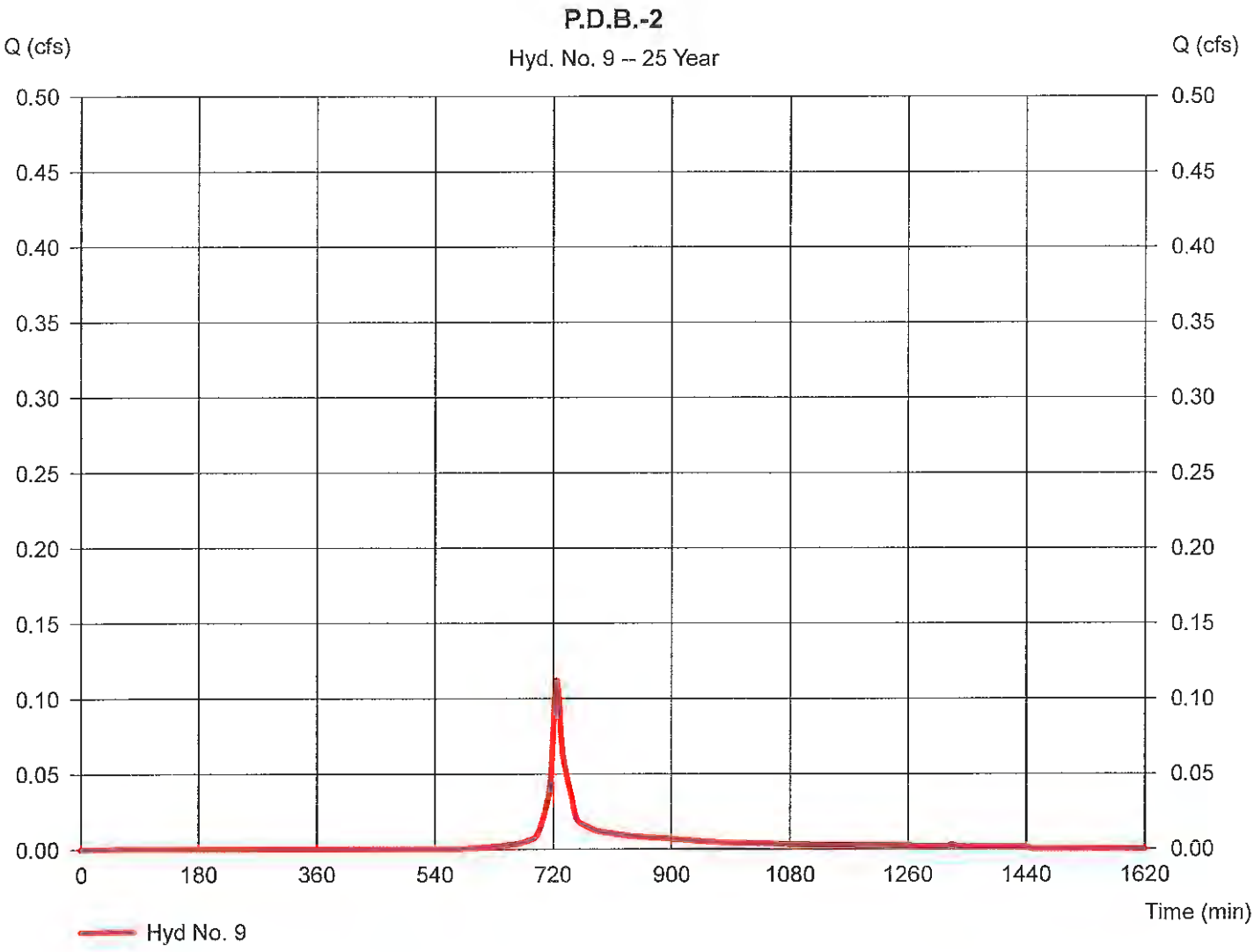


Hydrograph Report

Hyd. No. 9

P.D.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.112 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 377 cuft
Drainage area	= 0.043 ac	Curve number	= 67.9
Basin Slope	= 1.0 %	Hydraulic length	= 49 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.10 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

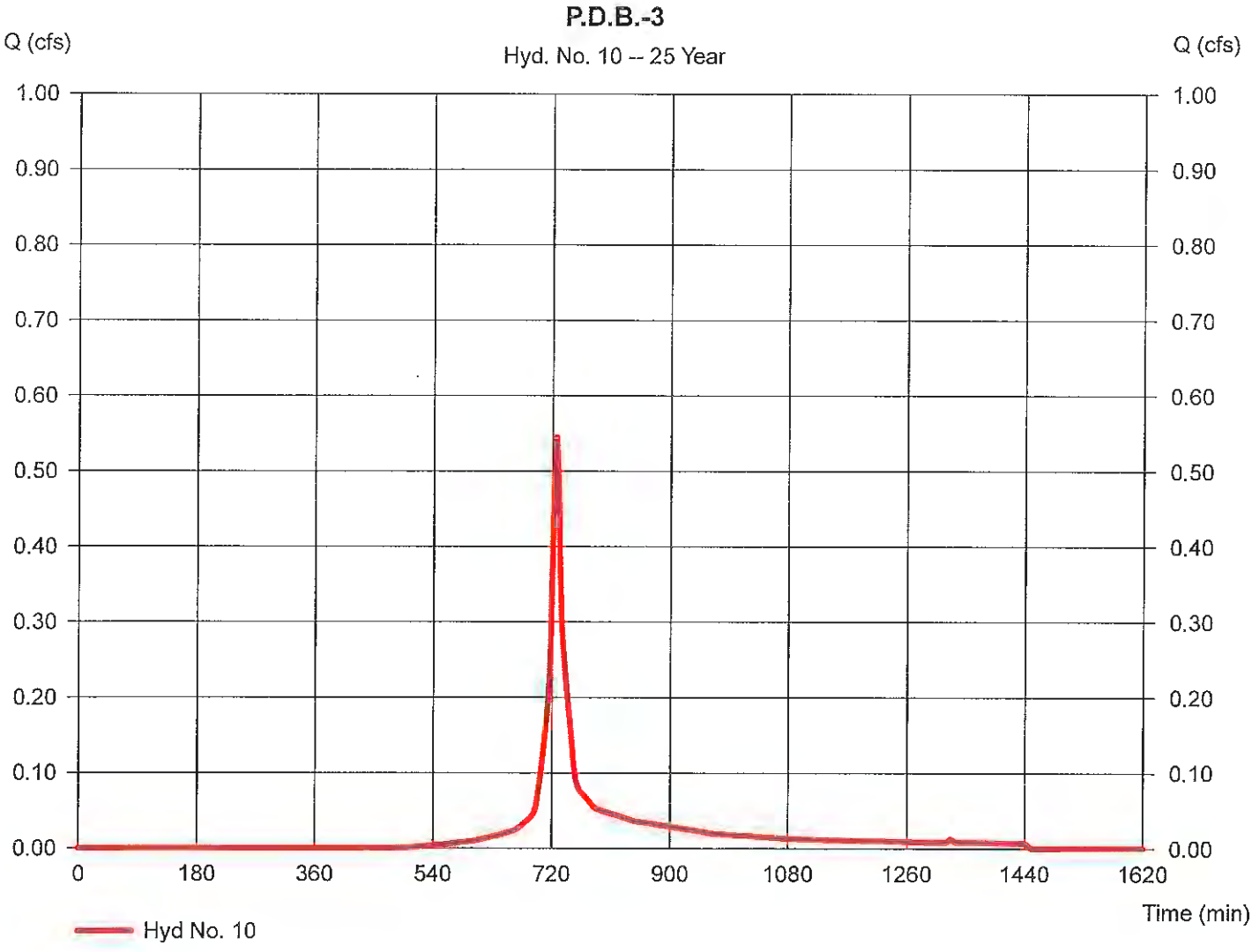


Hydrograph Report

Hyd. No. 10

P.D.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.545 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,813 cuft
Drainage area	= 0.163 ac	Curve number	= 75.3
Basin Slope	= 3.8 %	Hydraulic length	= 196 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

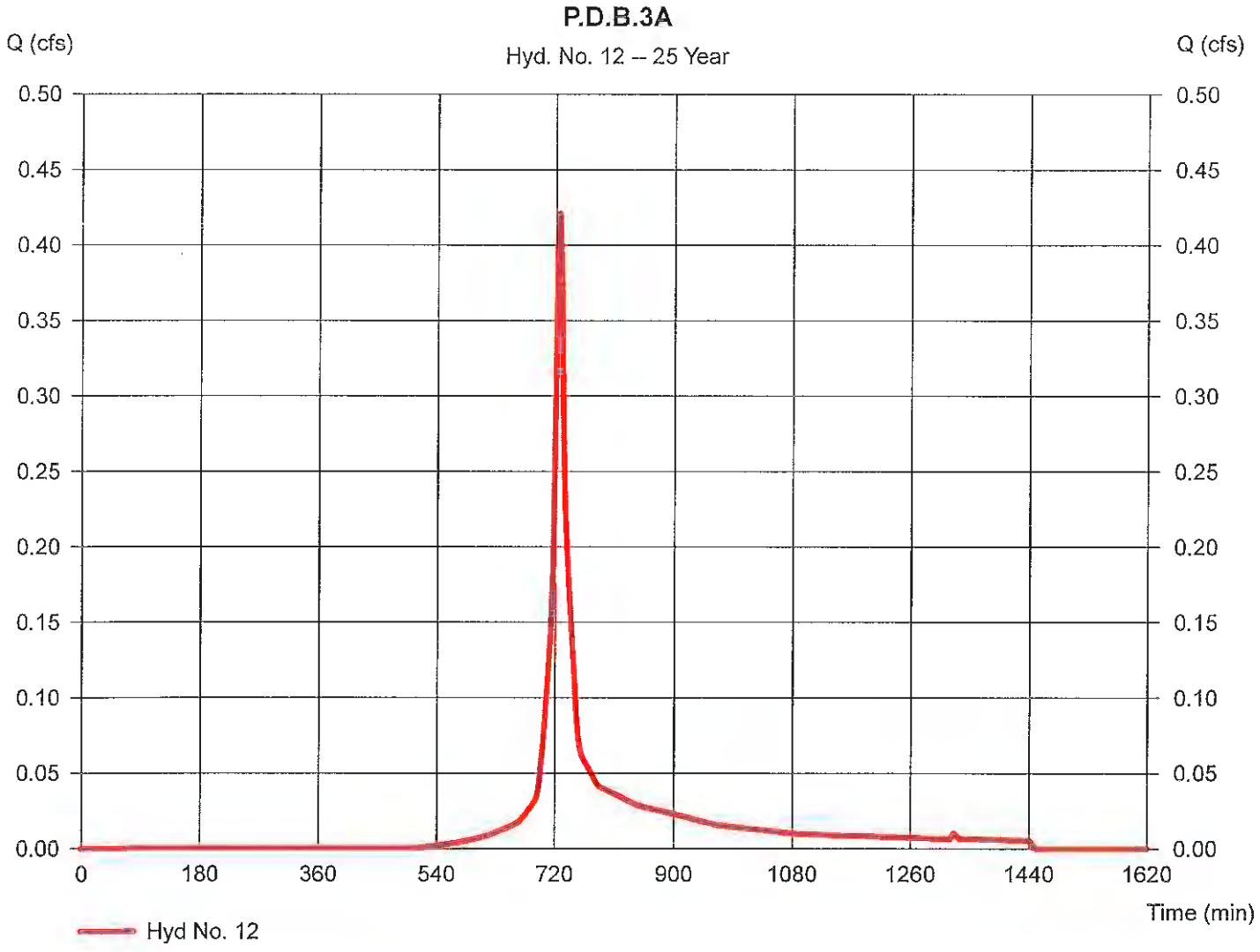


Hydrograph Report

Hyd. No. 12

P.D.B.3A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.421 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,401 cuft
Drainage area	= 0.133 ac	Curve number	= 73.5
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



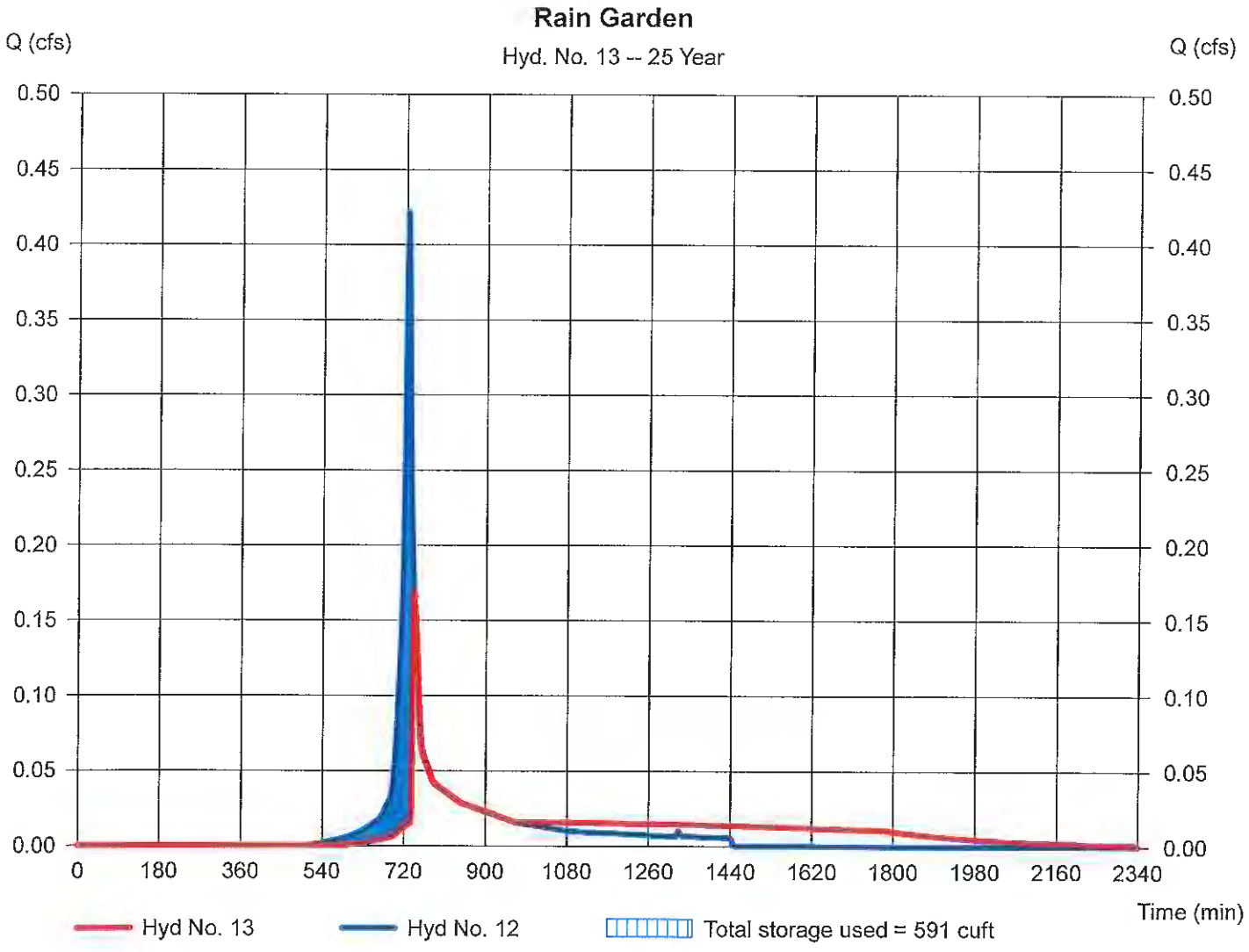
Hydrograph Report

Hyd. No. 13

Rain Garden

Hydrograph type	= Reservoir	Peak discharge	= 0.169 cfs
Storm frequency	= 25 yrs	Time to peak	= 741 min
Time interval	= 3 min	Hyd. volume	= 1,387 cuft
Inflow hyd. No.	= 12 - P.D.B.3A	Max. Elevation	= 164.78 ft
Reservoir name	= Rain Garden	Max. Storage	= 591 cuft

Storage Indication method used. Outflow includes exfiltration.

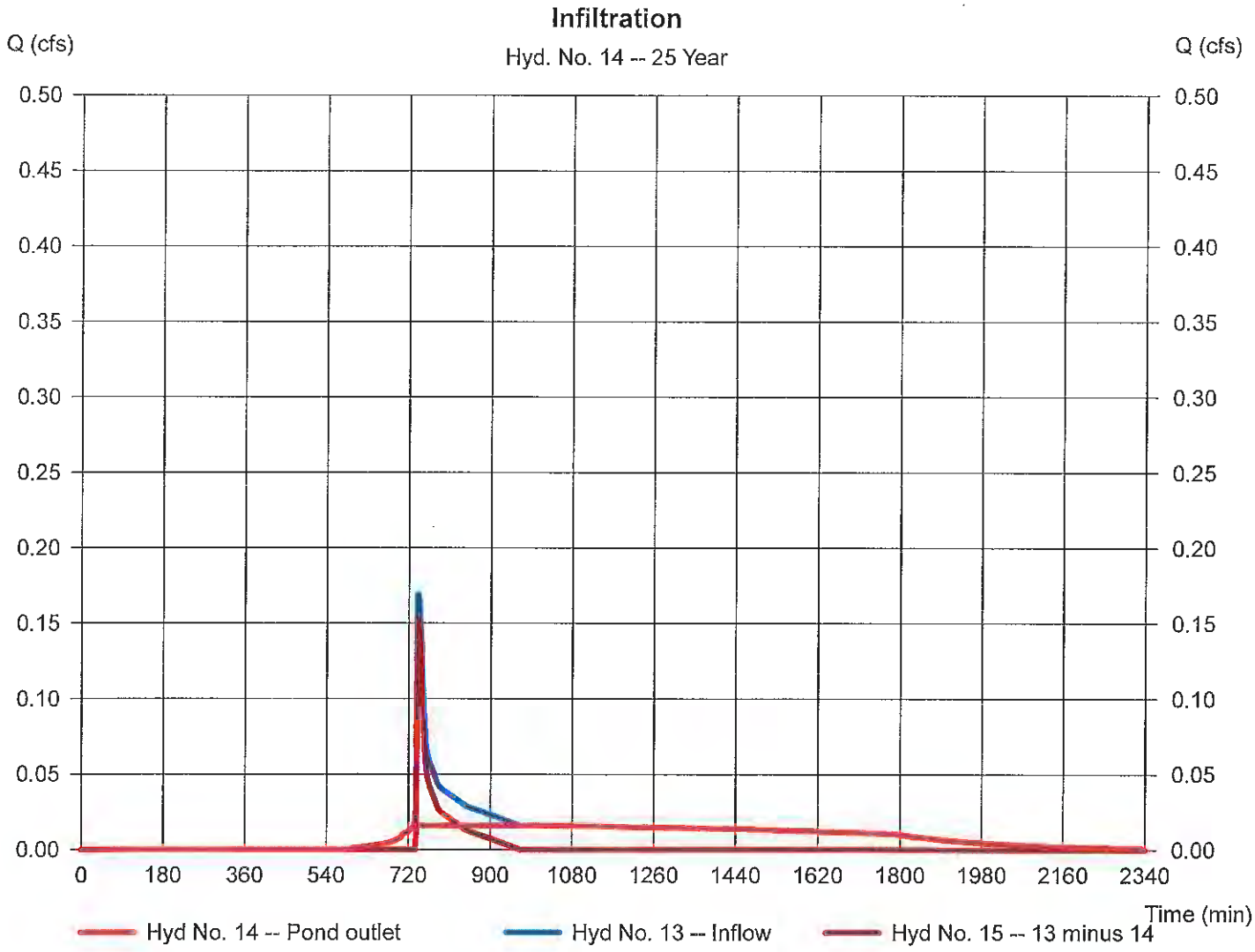


Hydrograph Report

Hyd. No. 14

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.016 cfs
Storm frequency	= 25 yrs	Time to peak	= 741 min
Time interval	= 3 min	Hyd. volume	= 1,075 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 15
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

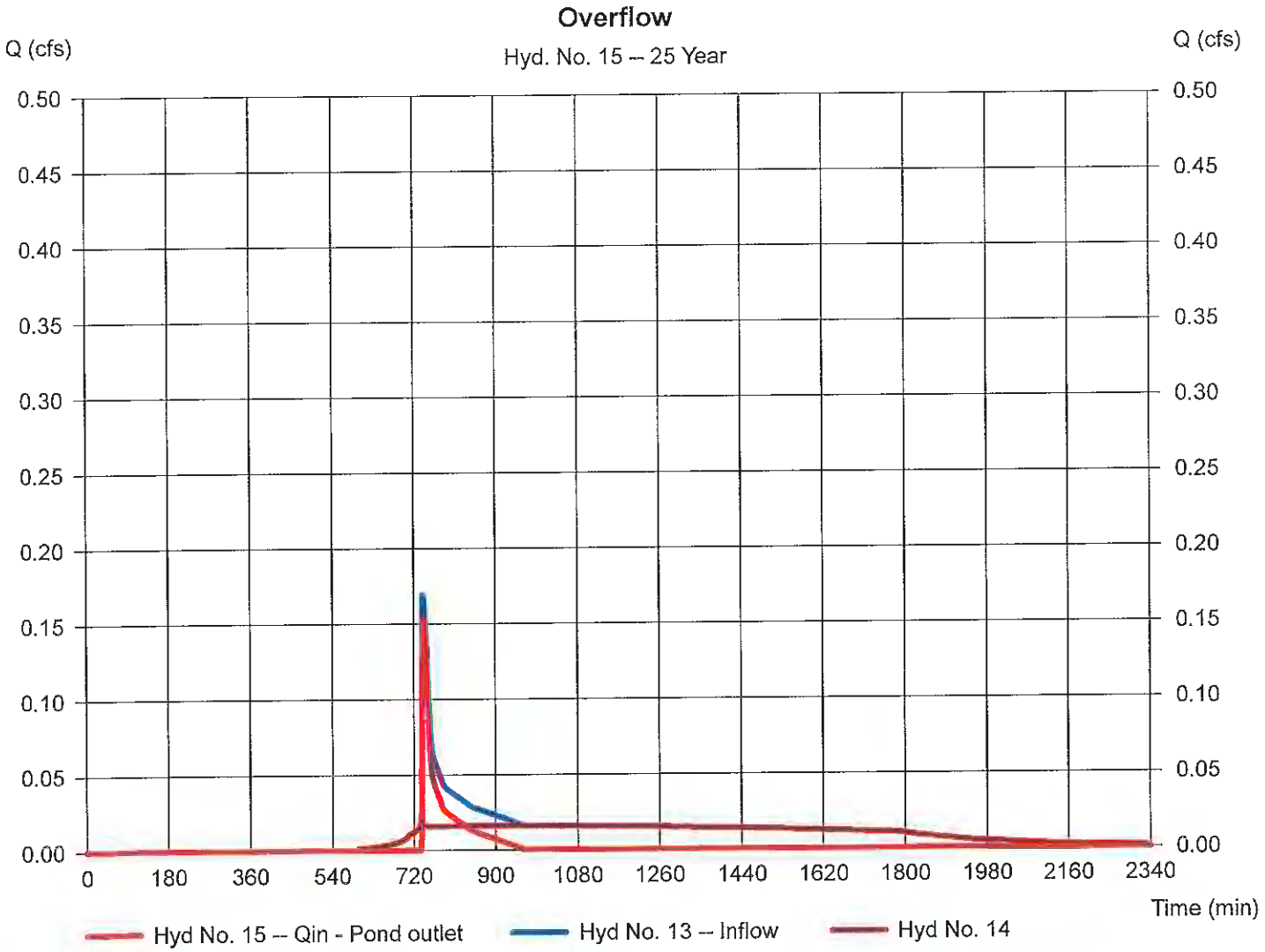


Hydrograph Report

Hyd. No. 15

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.153 cfs
Storm frequency	= 25 yrs	Time to peak	= 741 min
Time interval	= 3 min	Hyd. volume	= 312 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 14
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

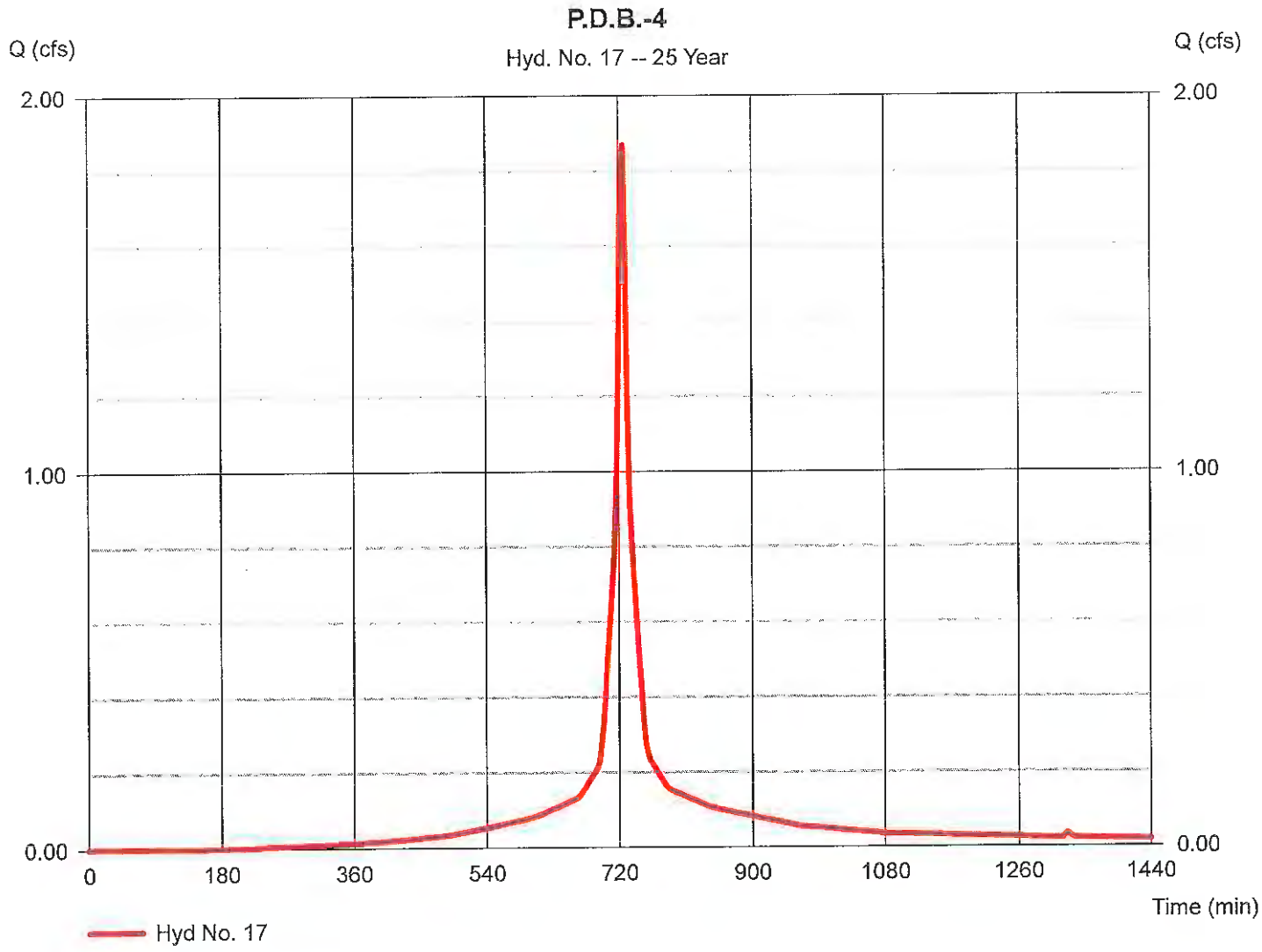


Hydrograph Report

Hyd. No. 17

P.D.B.-4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.869 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 6,652 cuft
Drainage area	= 0.392 ac	Curve number	= 91.7
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.95 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

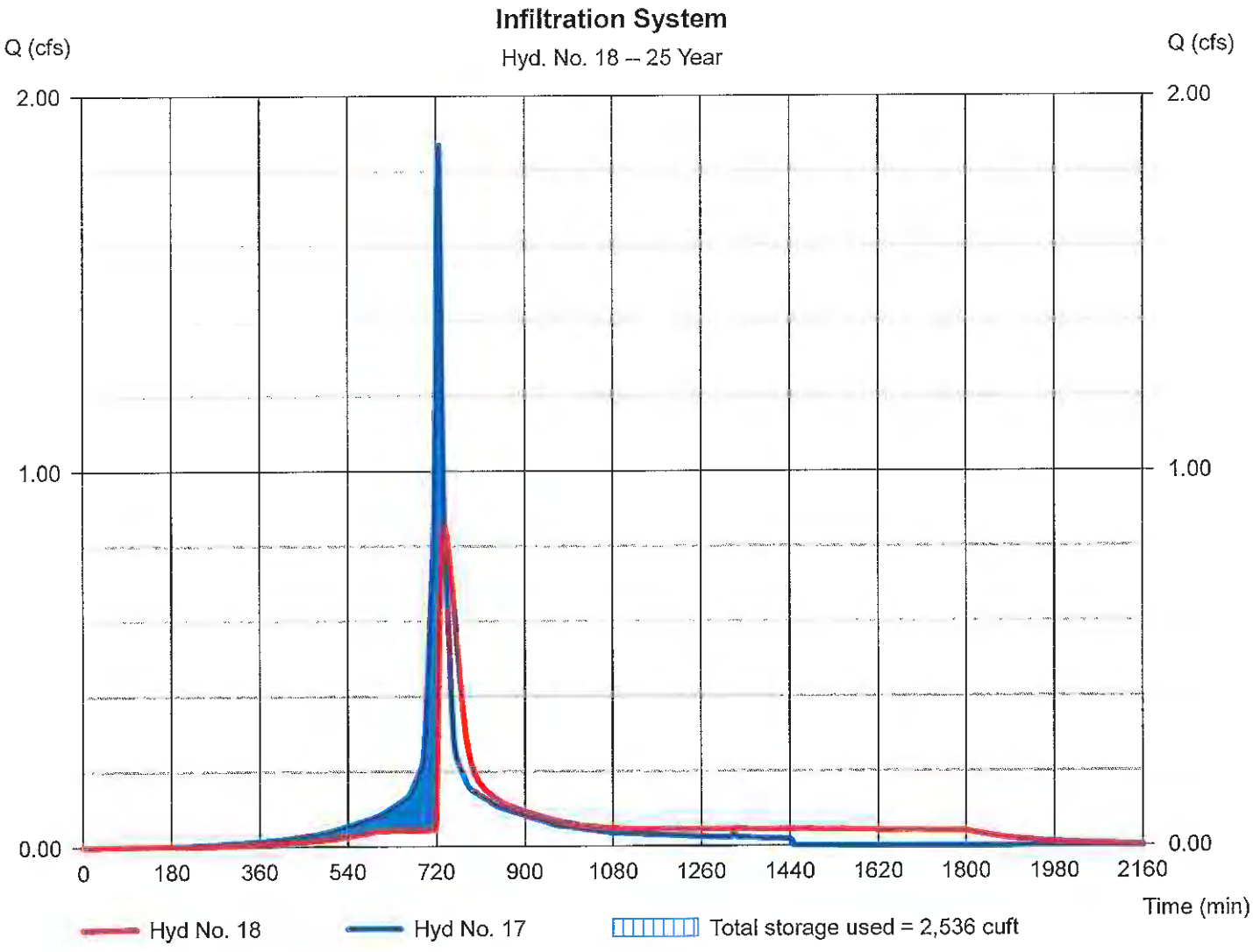
Hydraflow Hydrographs by Intelisolve v9.22 Friday, Jul 6, 2018

Hyd. No. 18

Infiltration System

Hydrograph type	=	Reservoir	Peak discharge	=	0.851 cfs
Storm frequency	=	25 yrs	Time to peak	=	738 min
Time interval	=	3 min	Hyd. volume	=	6,644 cuft
Inflow hyd. No.	=	17 - P.D.B.-4	Max. Elevation	=	164.64 ft
Reservoir name	=	Infiltration System	Max. Storage	=	2,536 cuft

Storage Indication method used. Outflow includes exfiltration.

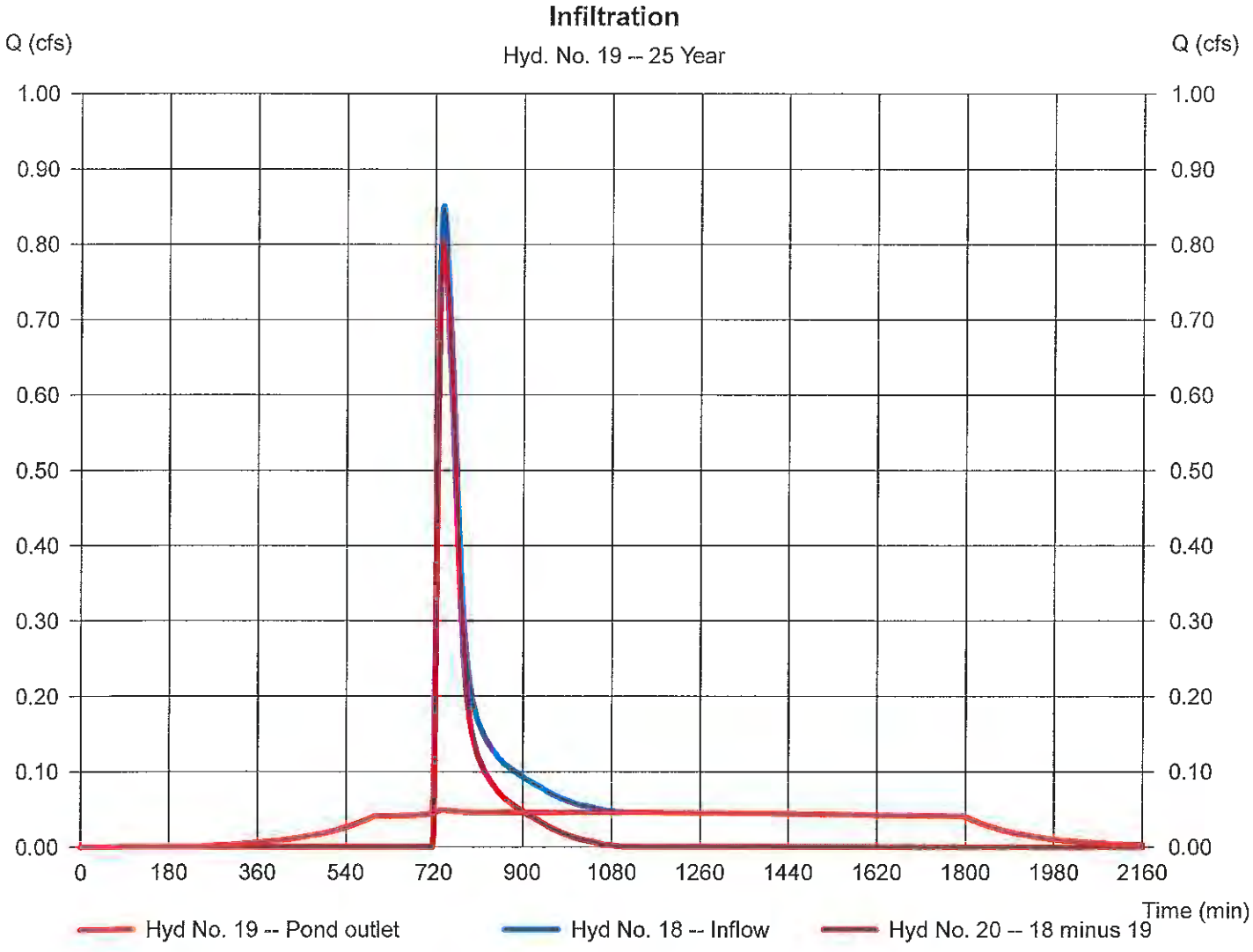


Hydrograph Report

Hyd. No. 19

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.049 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 3 min	Hyd. volume	= 3,767 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 20
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

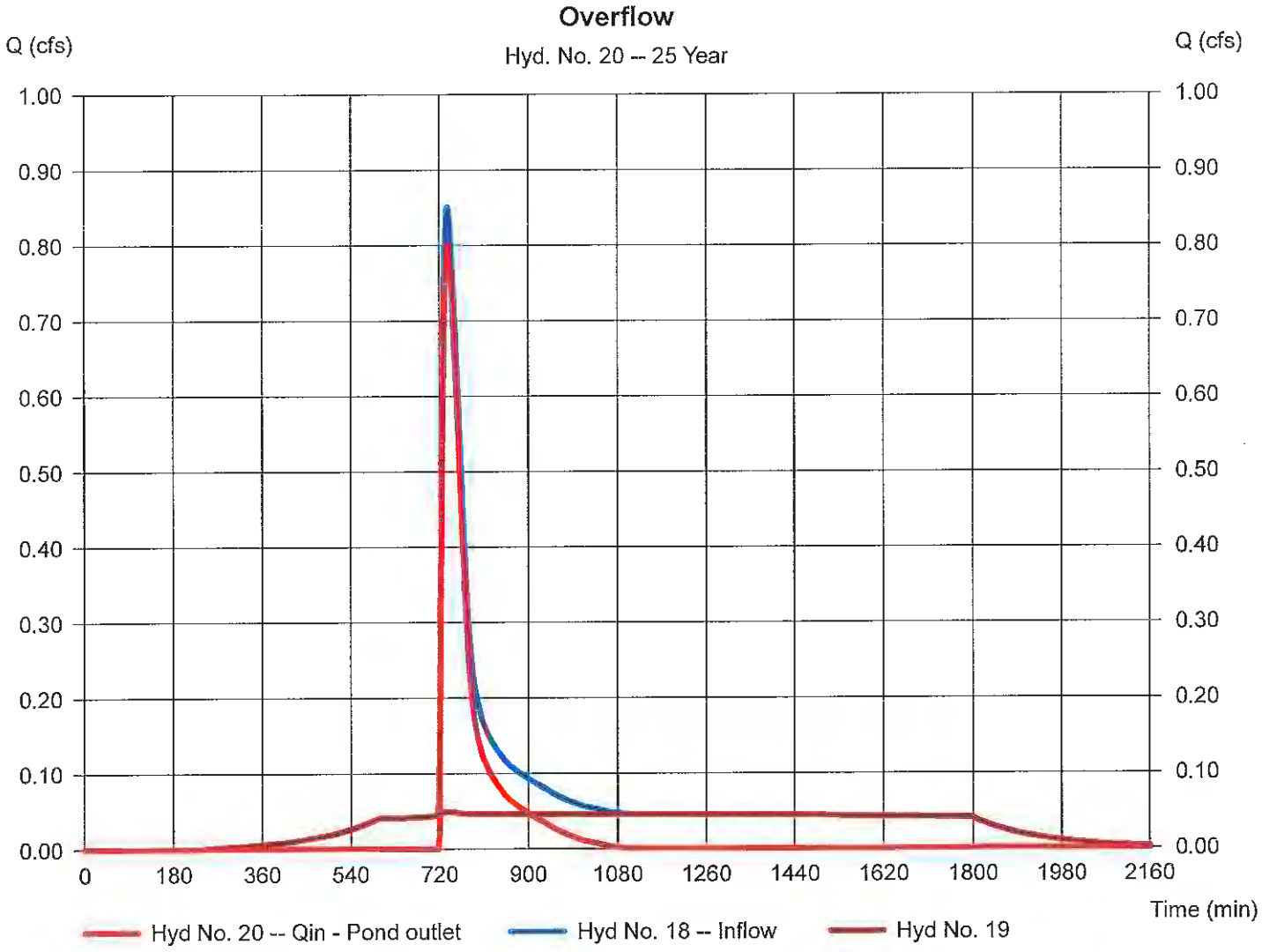


Hydrograph Report

Hyd. No. 20

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.802 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 3 min	Hyd. volume	= 2,878 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 19
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

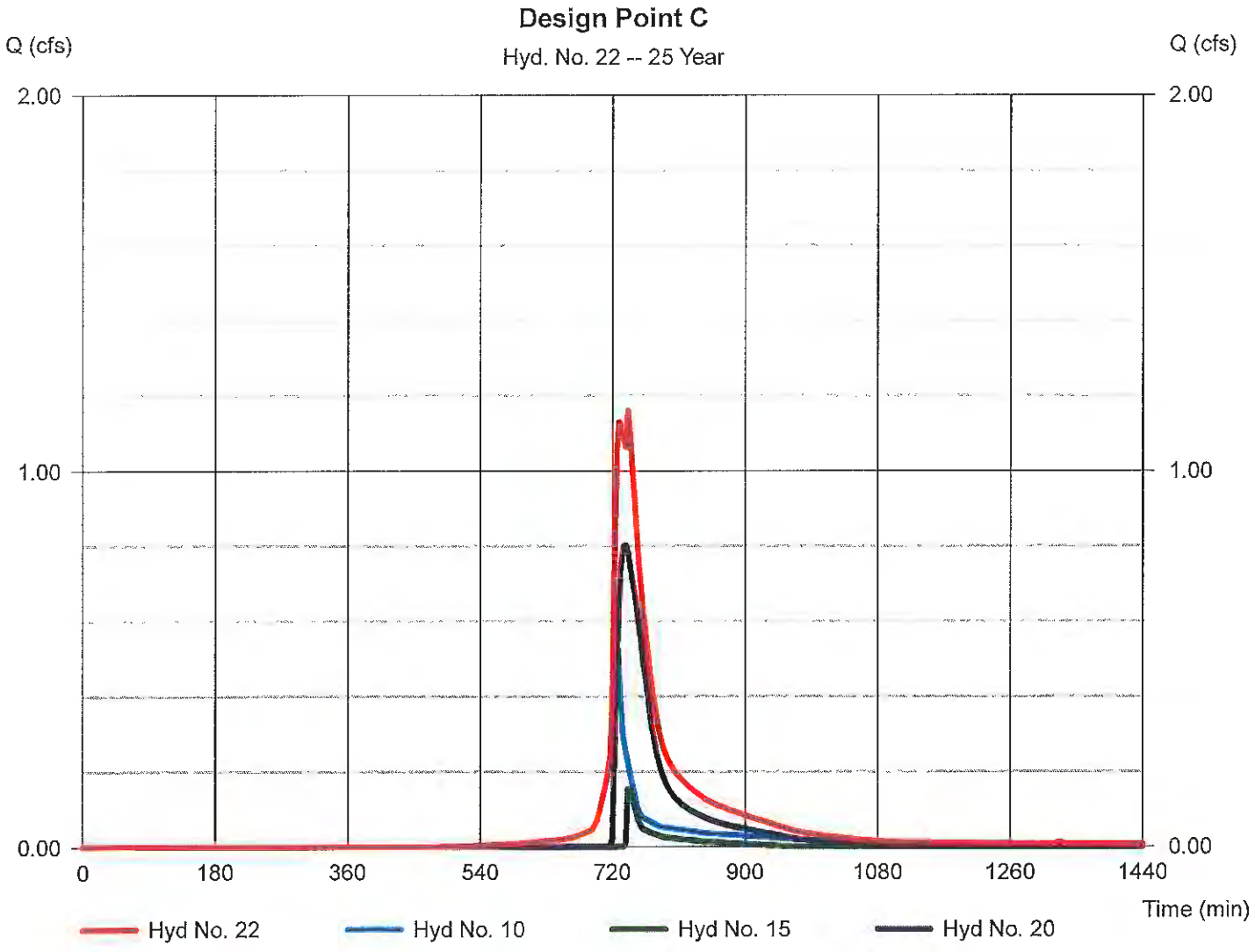


Hydrograph Report

Hyd. No. 22

Design Point C

Hydrograph type	= Combine	Peak discharge	= 1.161 cfs
Storm frequency	= 25 yrs	Time to peak	= 741 min
Time interval	= 3 min	Hyd. volume	= 5,003 cuft
Inflow hyds.	= 10, 15, 20	Contrib. drain. area	= 0.163 ac

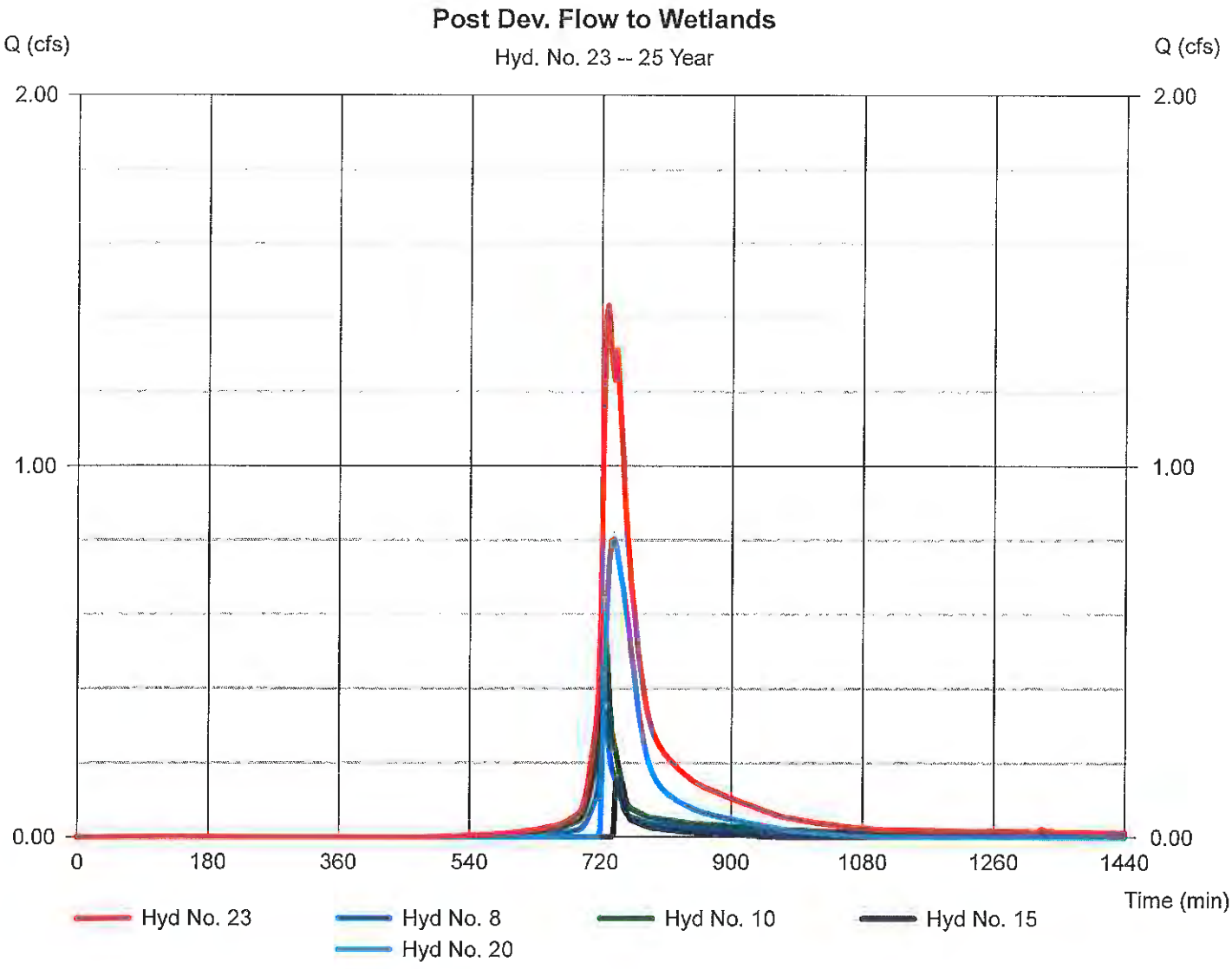


Hydrograph Report

Hyd. No. 23

Post Dev. Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 1.433 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 3 min	Hyd. volume	= 6,148 cuft
Inflow hyds.	= 8, 10, 15, 20	Contrib. drain. area	= 0.301 ac

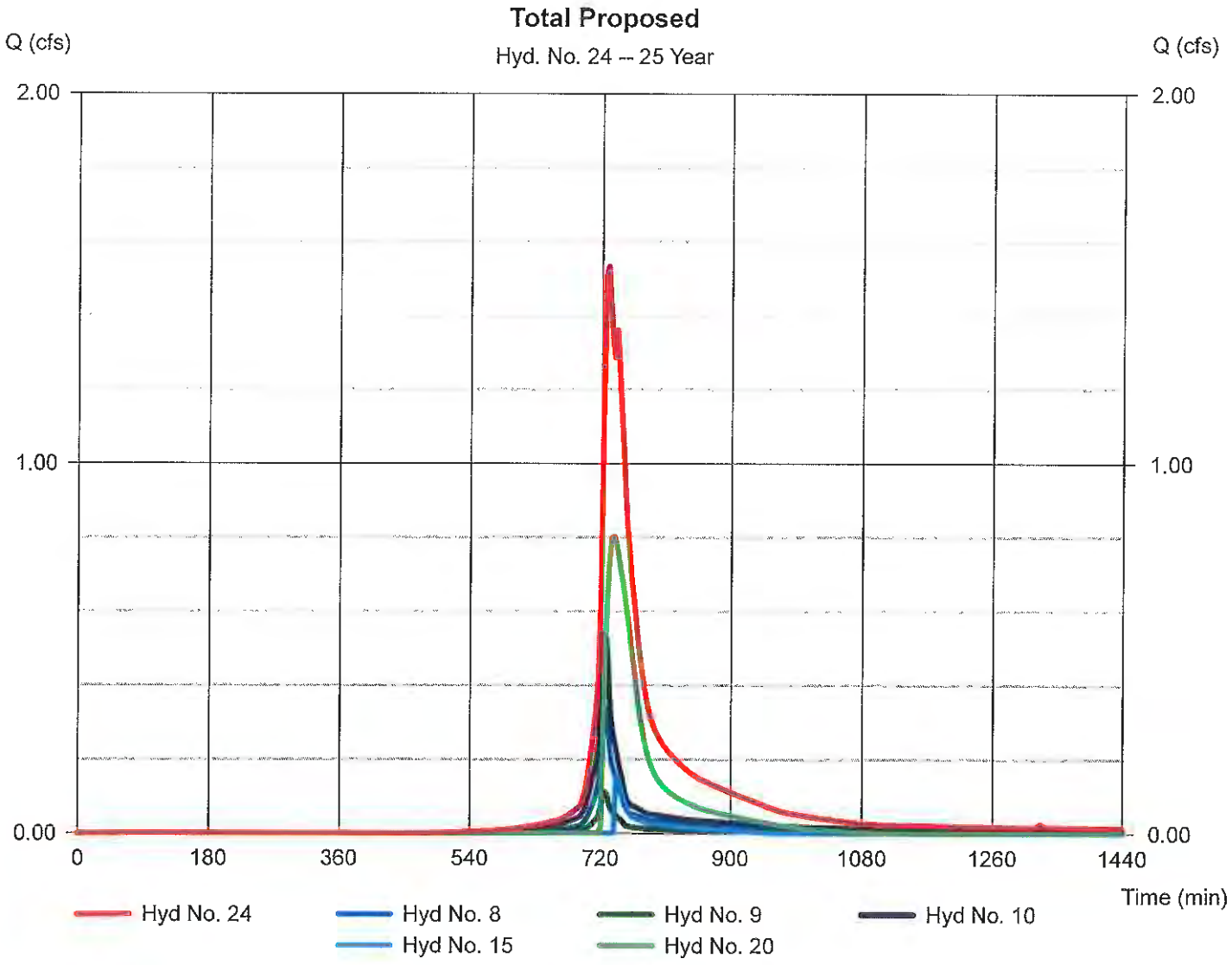


Hydrograph Report

Hyd. No. 24

Total Proposed

Hydrograph type	= Combine	Peak discharge	= 1.533 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 3 min	Hyd. volume	= 6,524 cuft
Inflow hyds.	= 8, 9, 10, 15, 20	Contrib. drain. area	= 0.344 ac



100-Year Storm, Pre and Post-Development

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.22

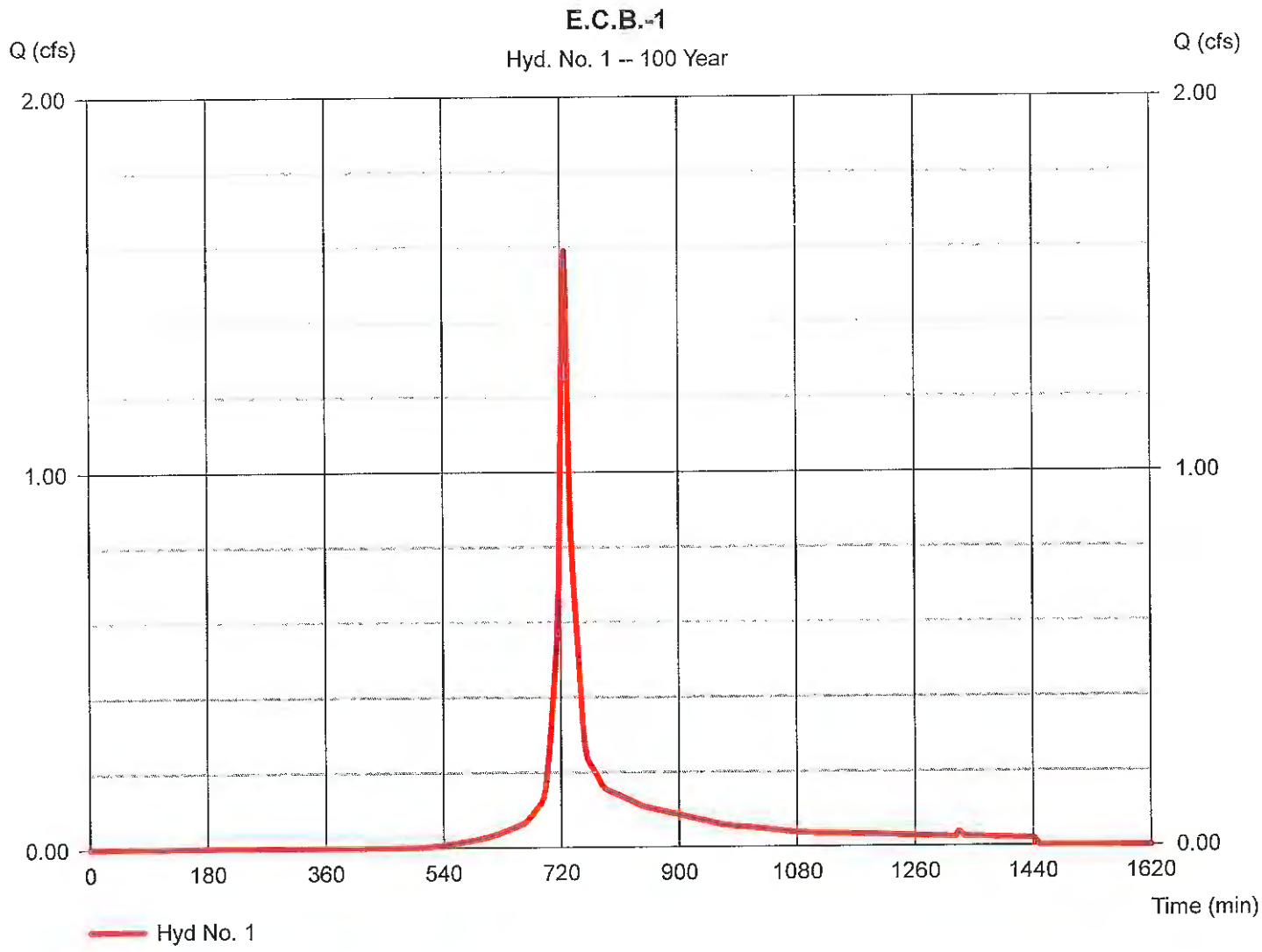
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	1.590	3	726	5,287	----	-------	------	E.C.B.-1
2	SCS Runoff	0.390	3	726	1,319	----	-------	------	E.C.B.-2
3	SCS Runoff	2.179	3	726	7,246	----	-------	------	E.C.B.-3
5	Combine	3.769	3	726	12,534	1, 3,	-------	------	Flow to Wetlands
6	Combine	4.159	3	726	13,853	1, 2, 3,	-------	------	Total Existing
8	SCS Runoff	0.625	3	726	2,079	----	-------	------	P.D.B.-1
9	SCS Runoff	0.203	3	726	674	----	-------	------	P.D.B.-2
10	SCS Runoff	0.907	3	726	3,043	----	-------	------	P.D.B.-3
12	SCS Runoff	0.714	3	726	2,385	----	-------	------	P.D.B.3A
13	Reservoir	0.731	3	726	2,372	12	164.84	633	Rain Garden
14	Diversion1	0.016	3	726	1,231	13	-------	------	Infiltration
15	Diversion2	0.715	3	726	1,141	13	-------	------	Overflow
17	SCS Runoff	2.728	3	726	9,943	----	-------	------	P.D.B.-4
18	Reservoir	1.665	3	732	9,935	17	165.24	3,179	Infiltration System
19	Diversion1	0.051	3	732	4,248	18	-------	------	Infiltration
20	Diversion2	1.614	3	732	5,686	18	-------	------	Overflow
22	Combine	2.989	3	726	9,870	10, 15, 20,	-------	------	Design Point C
23	Combine	3.615	3	726	11,949	8, 10, 15, 20,	-------	------	Post Dev. Flow to Wetlands
24	Combine	3.817	3	726	12,622	8, 9, 10, 15, 20,	-------	------	Total Proposed

Hydrograph Report

Hyd. No. 1

E.C.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.590 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 5,287 cuft
Drainage area	= 0.351 ac	Curve number	= 66.4
Basin Slope	= 5.2 %	Hydraulic length	= 189 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.90 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

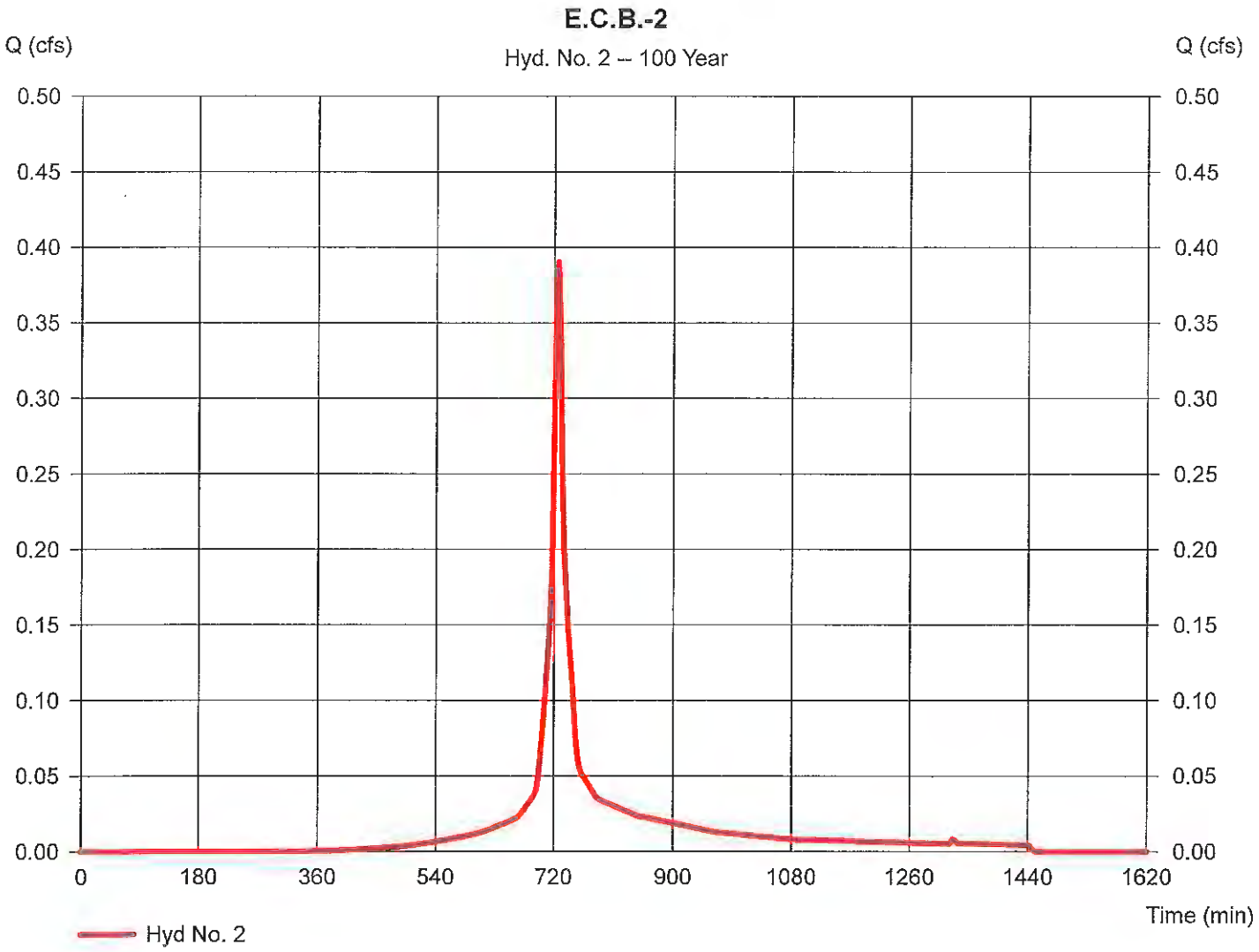


Hydrograph Report

Hyd. No. 2

E.C.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.390 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,319 cuft
Drainage area	= 0.067 ac	Curve number	= 77.8
Basin Slope	= 1.9 %	Hydraulic length	= 68 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

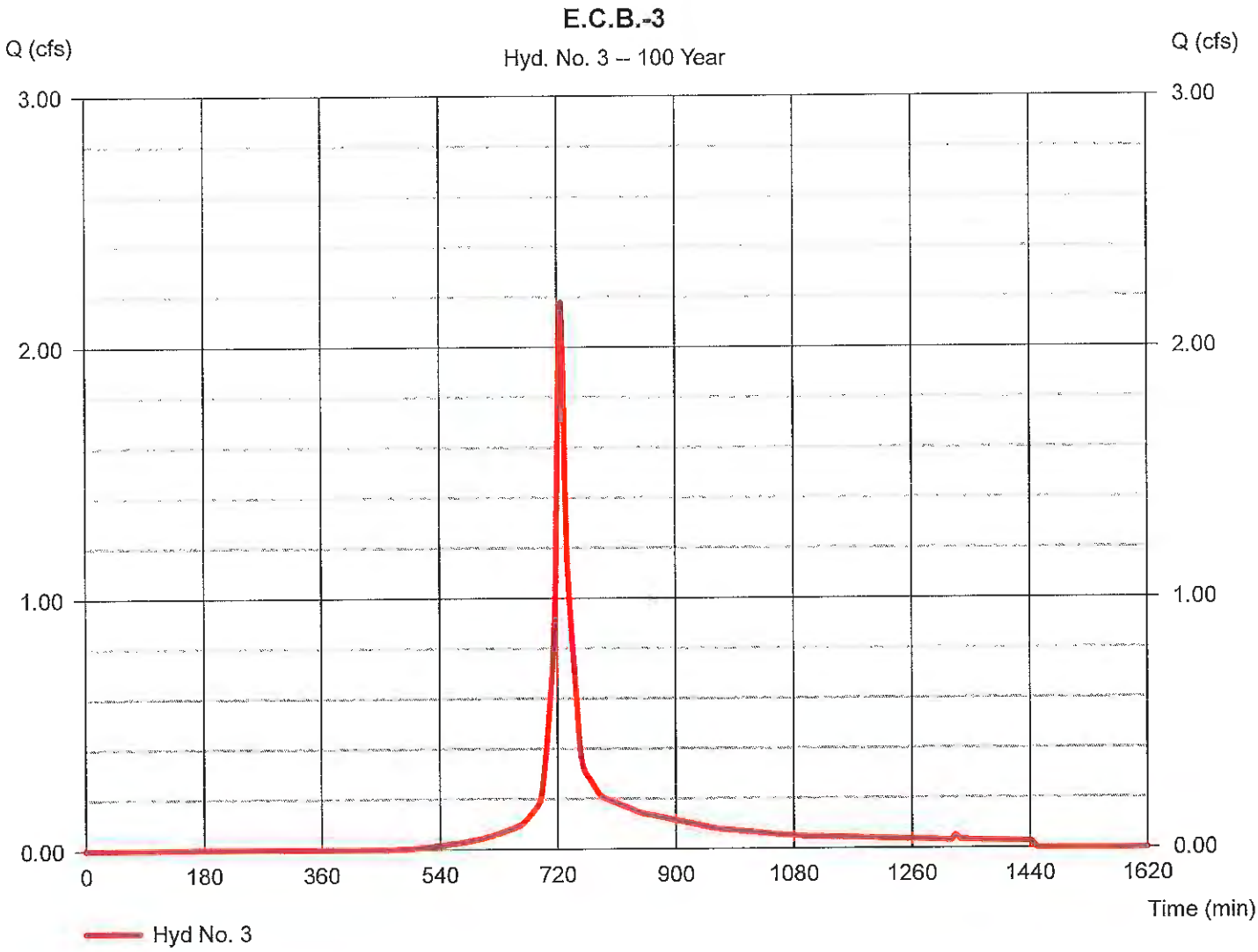


Hydrograph Report

Hyd. No. 3

E.C.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 2.179 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 7,246 cuft
Drainage area	= 0.452 ac	Curve number	= 68.8
Basin Slope	= 4.2 %	Hydraulic length	= 207 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

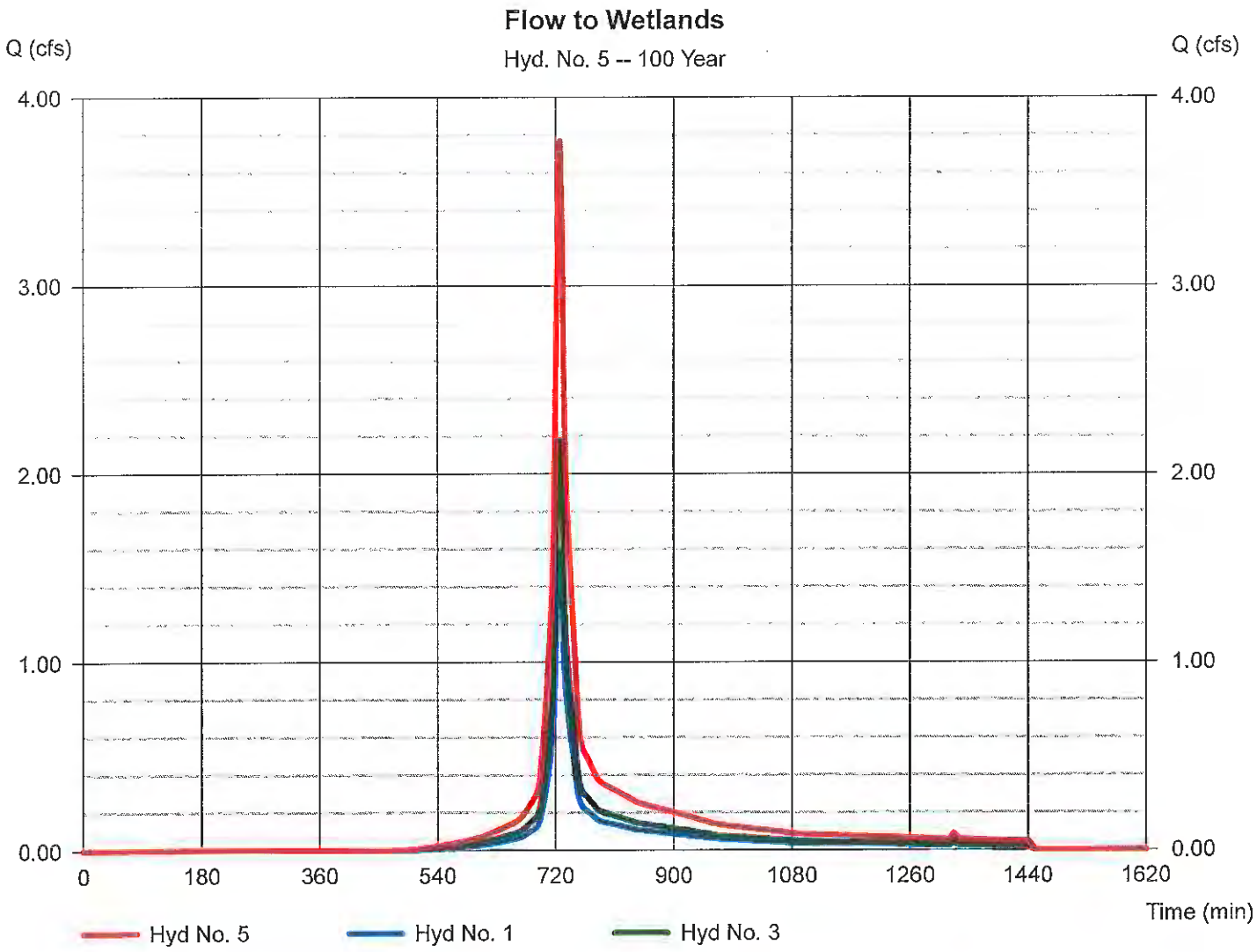


Hydrograph Report

Hyd. No. 5

Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 3.769 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 12,534 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 0.803 ac

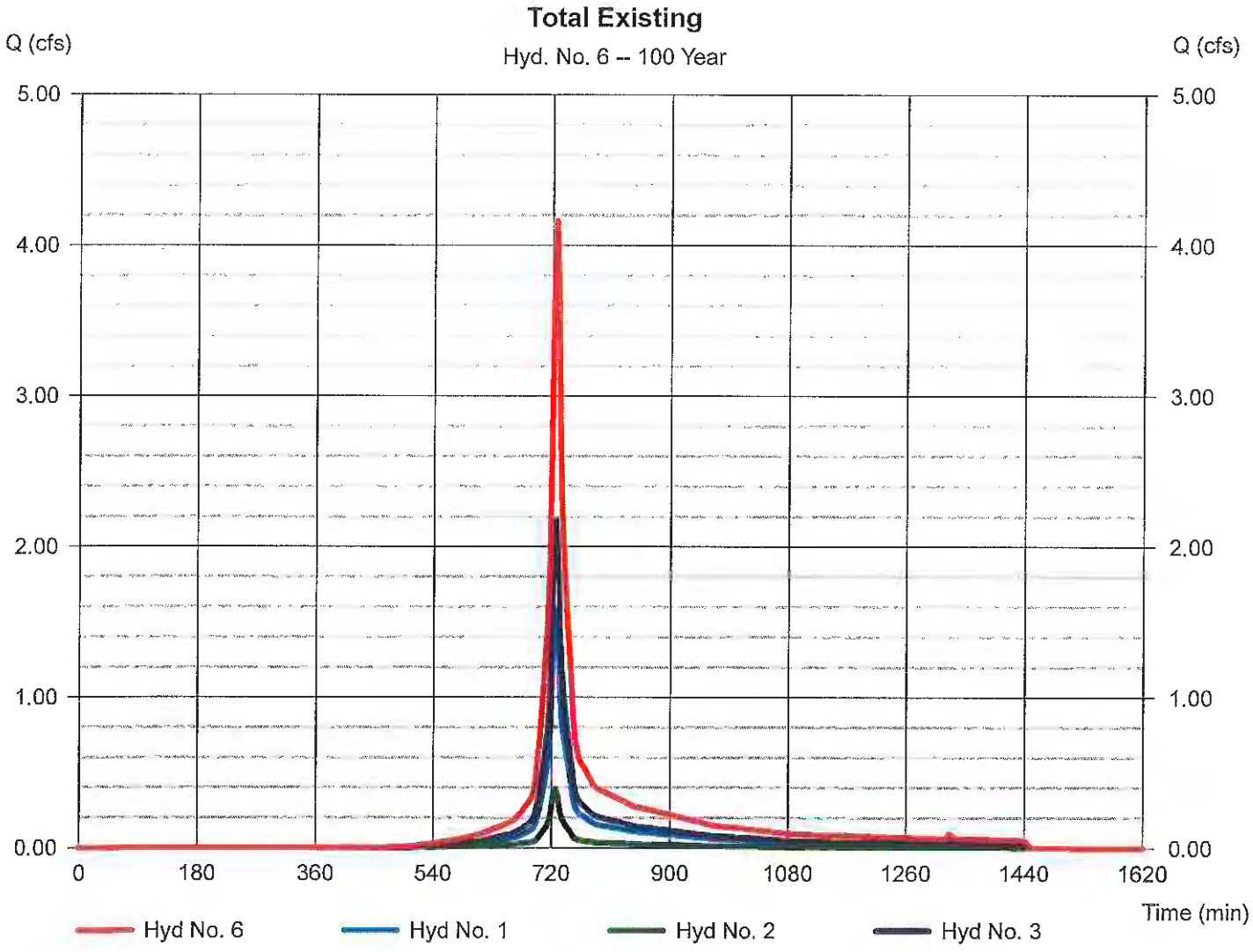


Hydrograph Report

Hyd. No. 6

Total Existing

Hydrograph type	= Combine	Peak discharge	= 4.159 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 13,853 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 0.870 ac

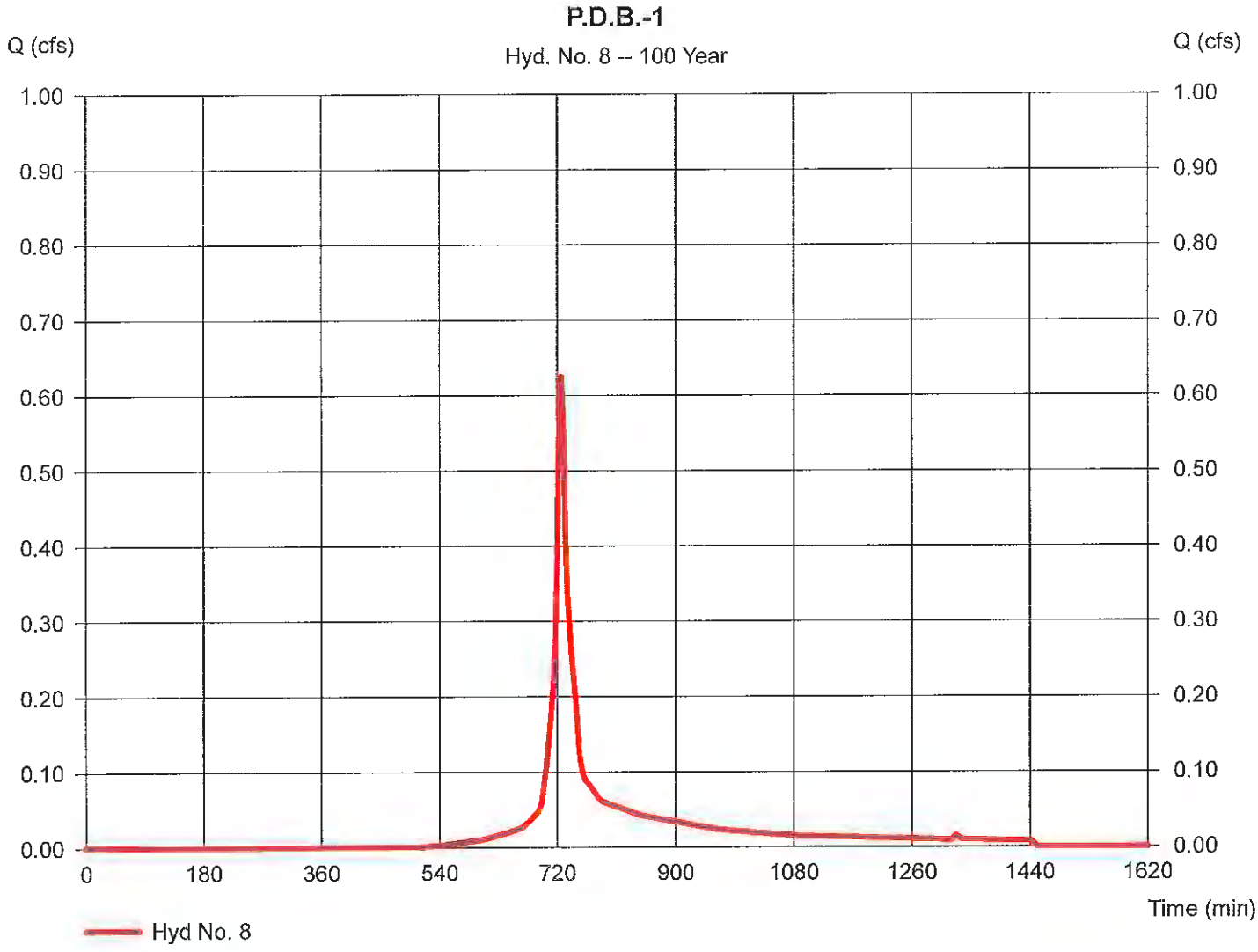


Hydrograph Report

Hyd. No. 8

P.D.B.-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.625 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,079 cuft
Drainage area	= 0.138 ac	Curve number	= 66.4
Basin Slope	= 4.4 %	Hydraulic length	= 222 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

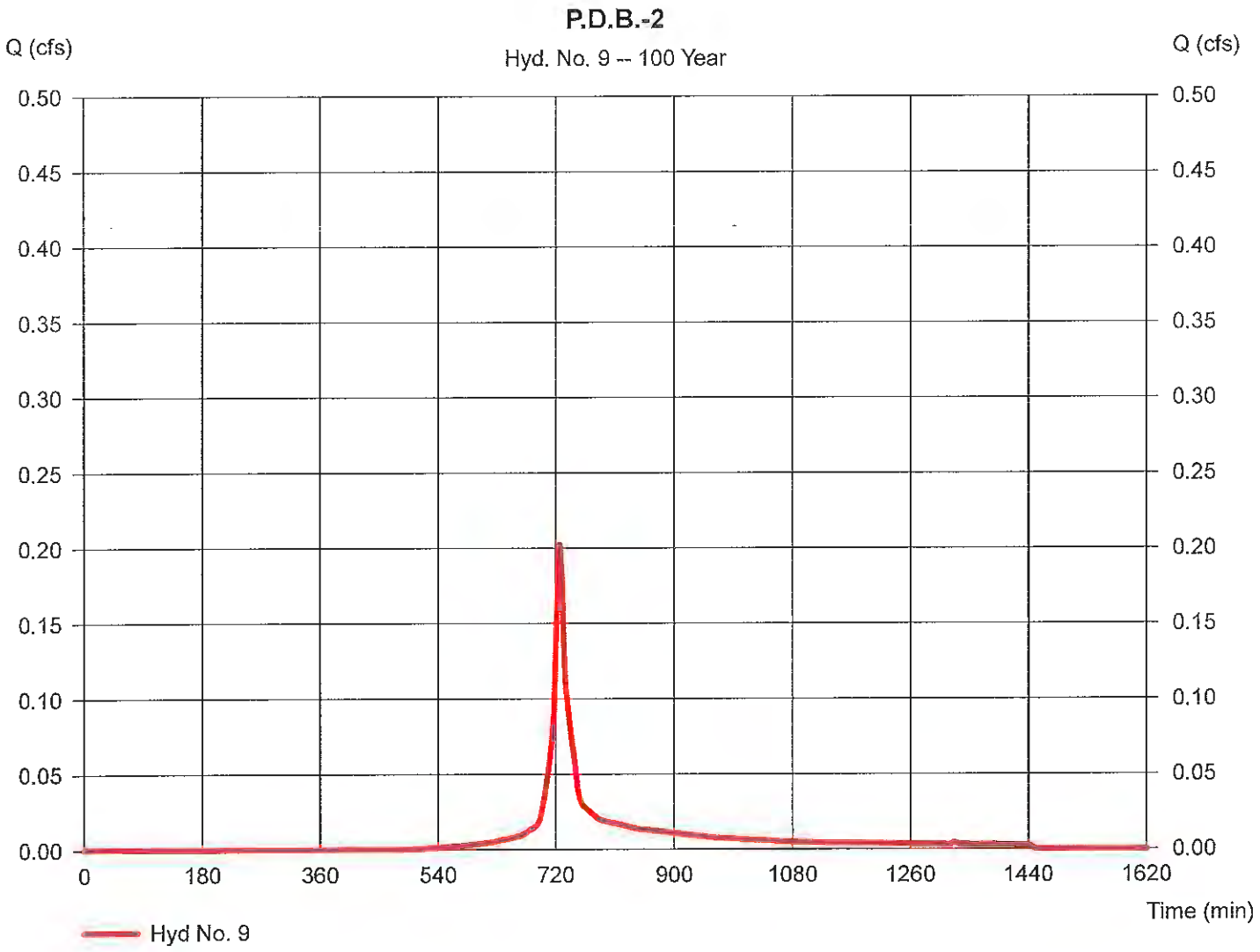


Hydrograph Report

Hyd. No. 9

P.D.B.-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.203 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 674 cuft
Drainage area	= 0.043 ac	Curve number	= 67.9
Basin Slope	= 1.0 %	Hydraulic length	= 49 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.10 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

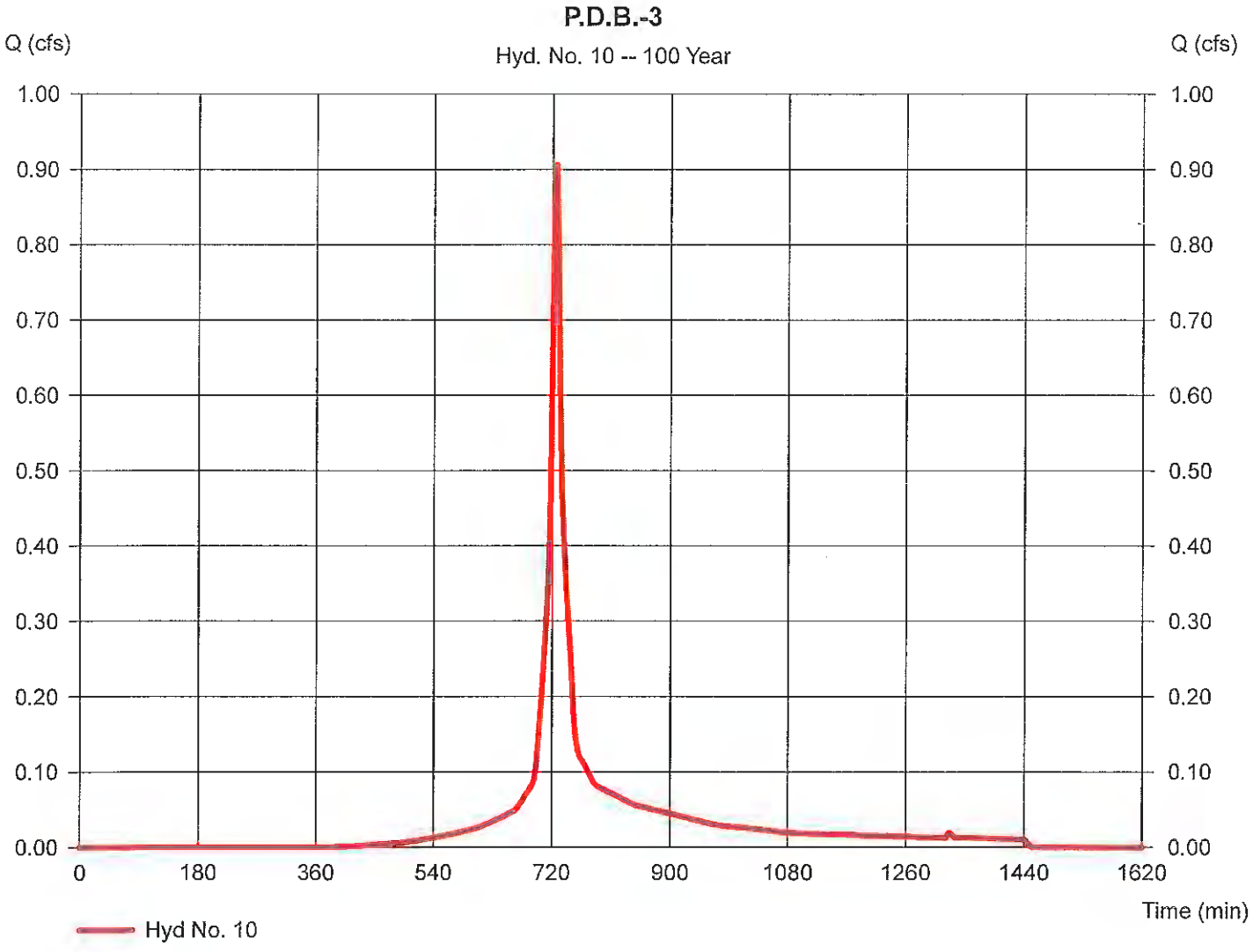


Hydrograph Report

Hyd. No. 10

P.D.B.-3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.907 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 3,043 cuft
Drainage area	= 0.163 ac	Curve number	= 75.3
Basin Slope	= 3.8 %	Hydraulic length	= 196 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

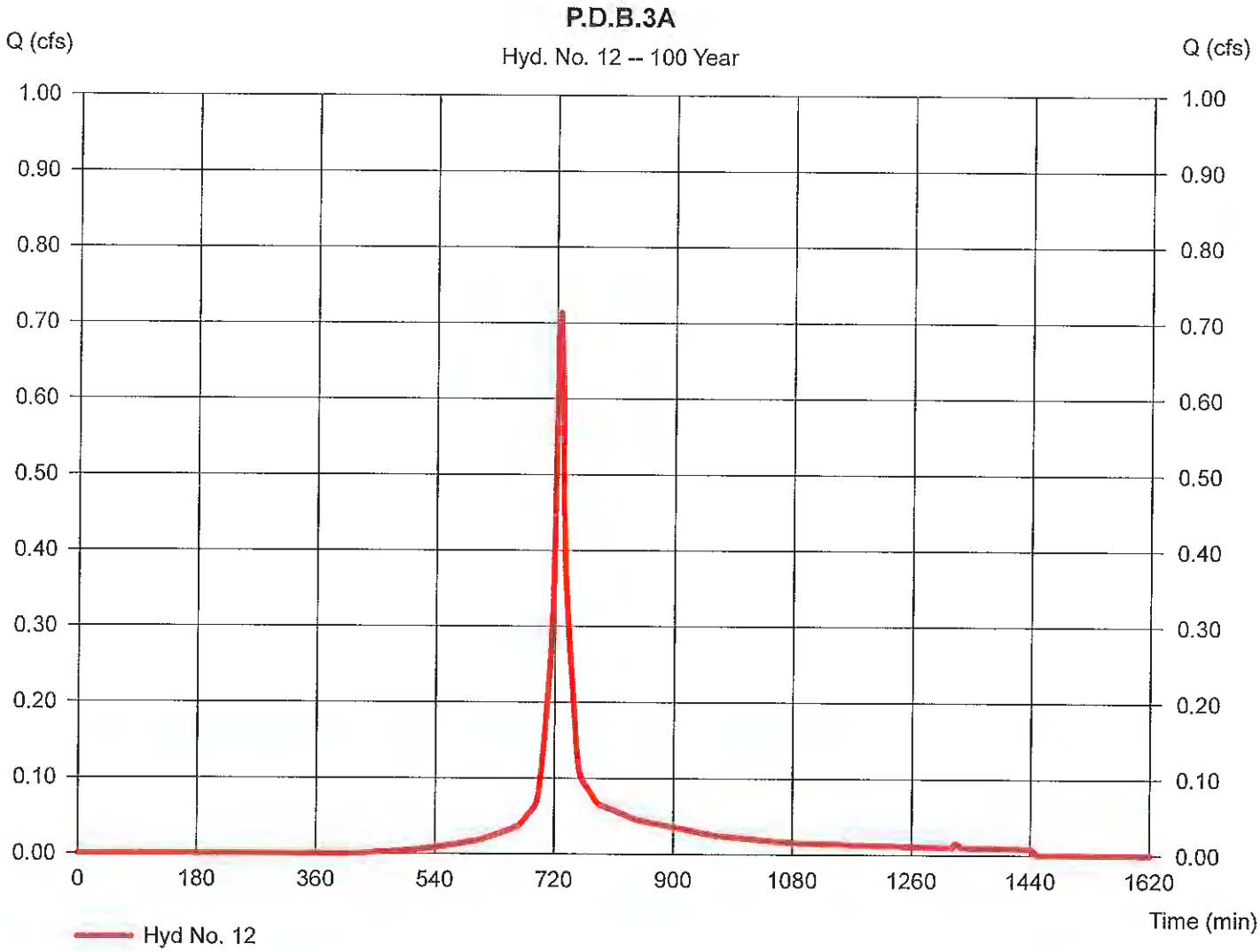


Hydrograph Report

Hyd. No. 12

P.D.B.3A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.714 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,385 cuft
Drainage area	= 0.133 ac	Curve number	= 73.5
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



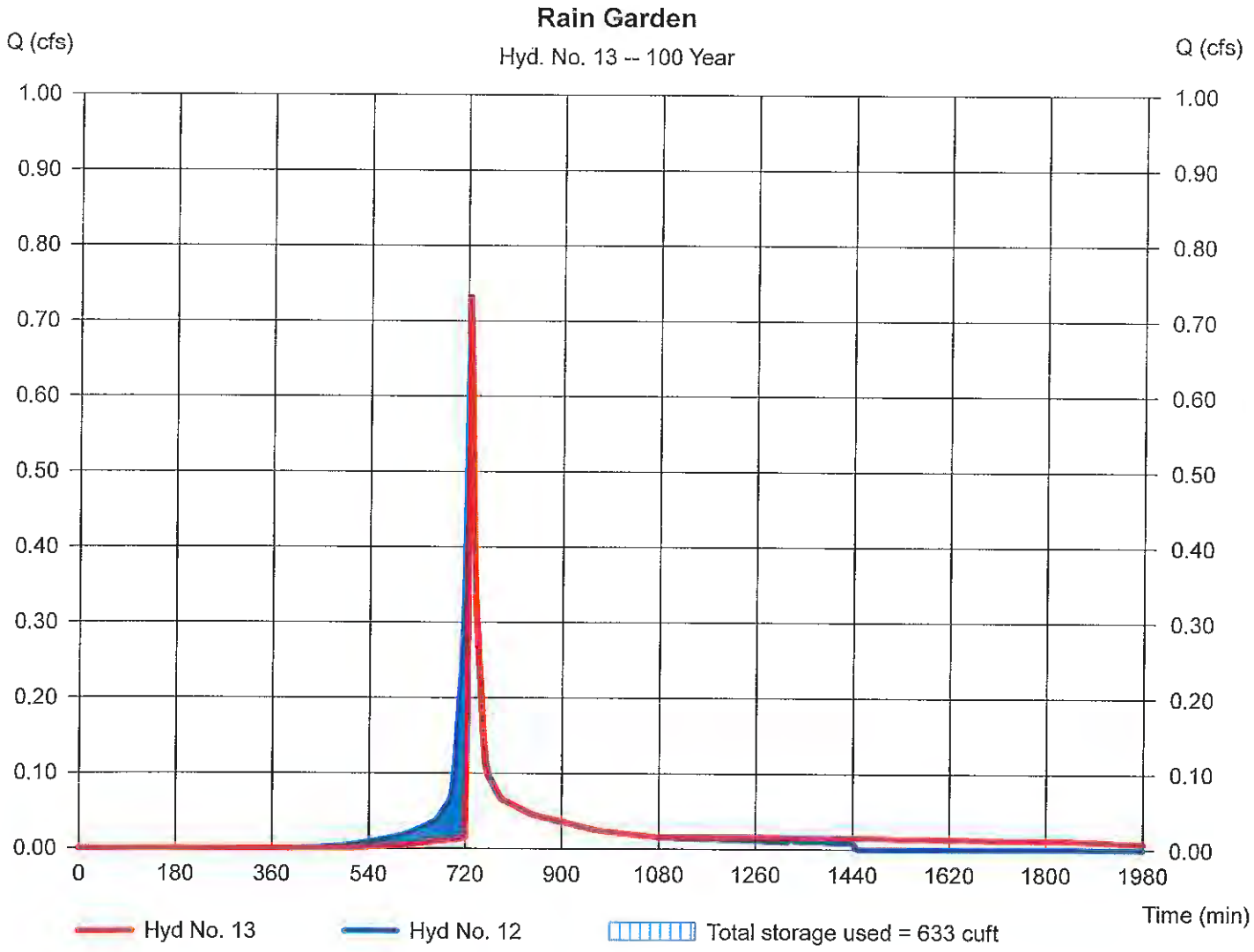
Hydrograph Report

Hyd. No. 13

Rain Garden

Hydrograph type	= Reservoir	Peak discharge	= 0.731 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,372 cuft
Inflow hyd. No.	= 12 - P.D.B.3A	Max. Elevation	= 164.84 ft
Reservoir name	= Rain Garden	Max. Storage	= 633 cuft

Storage Indication method used. Outflow includes exfiltration.

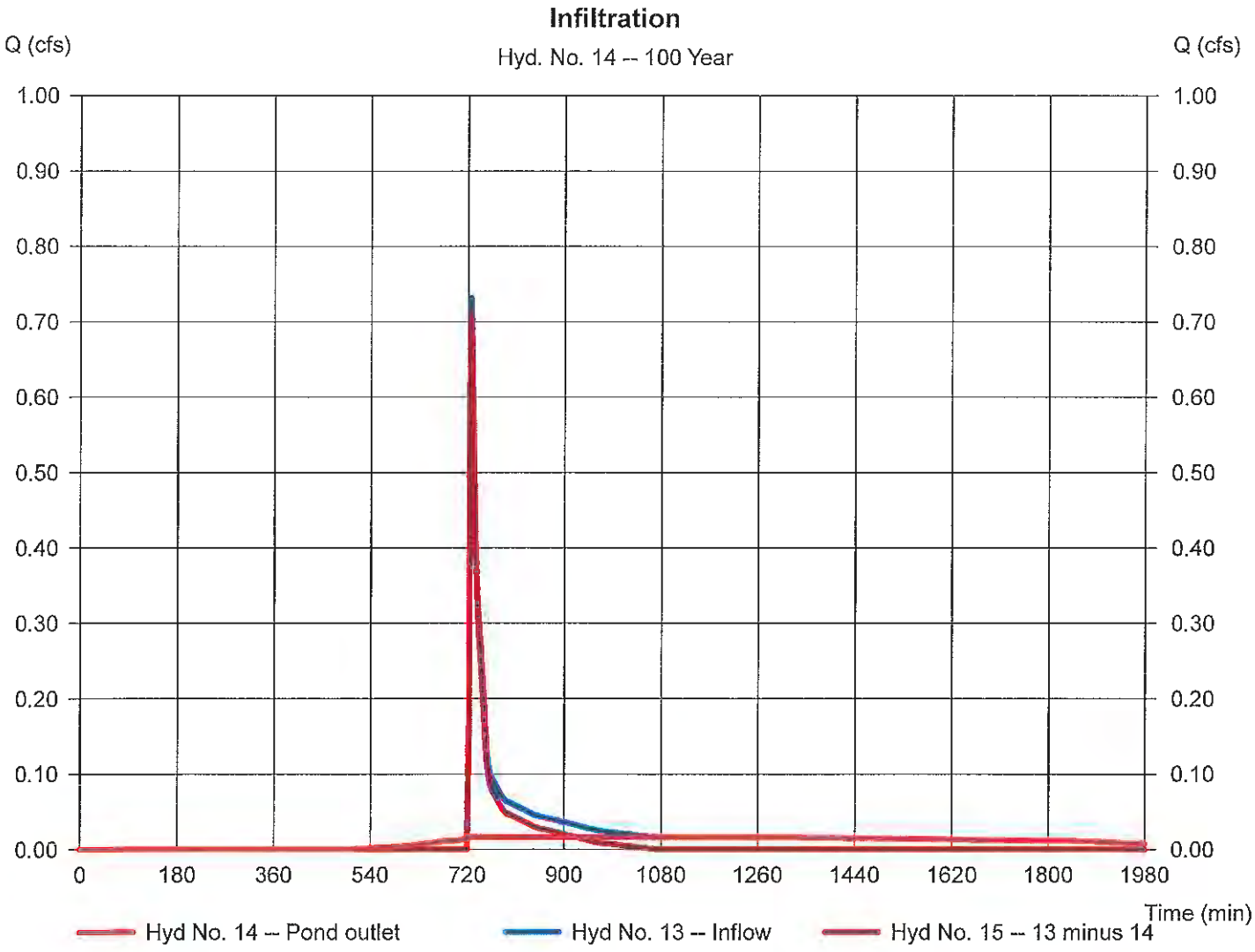


Hydrograph Report

Hyd. No. 14

Infiltration

Hydrograph type	= Diversion1	Peak discharge	= 0.016 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,231 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 15
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration

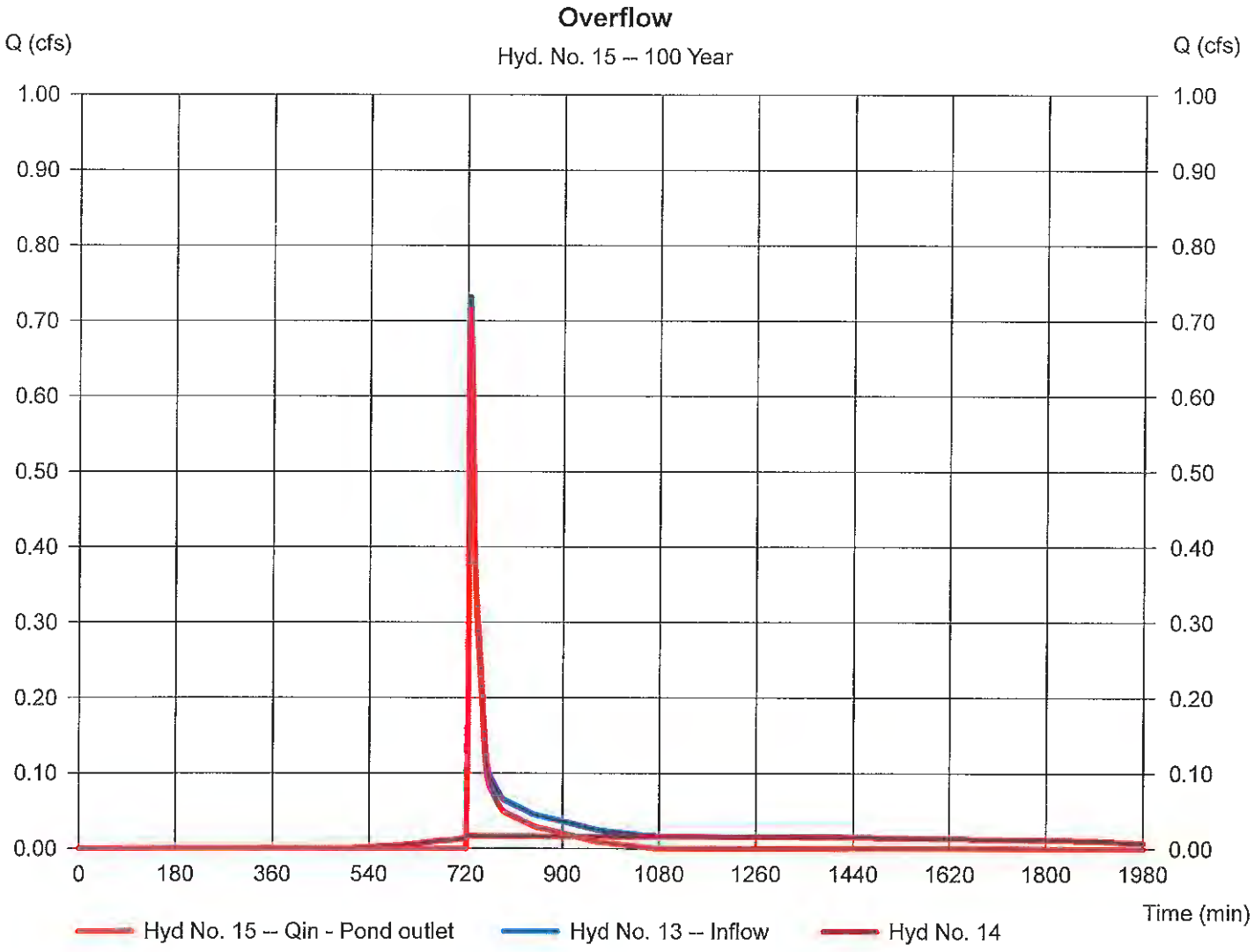


Hydrograph Report

Hyd. No. 15

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 0.715 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,141 cuft
Inflow hydrograph	= 13 - Rain Garden	2nd diverted hyd.	= 14
Diversion method	= Pond - Rain Garden	Pond structure	= Exfiltration



Hydrograph Report

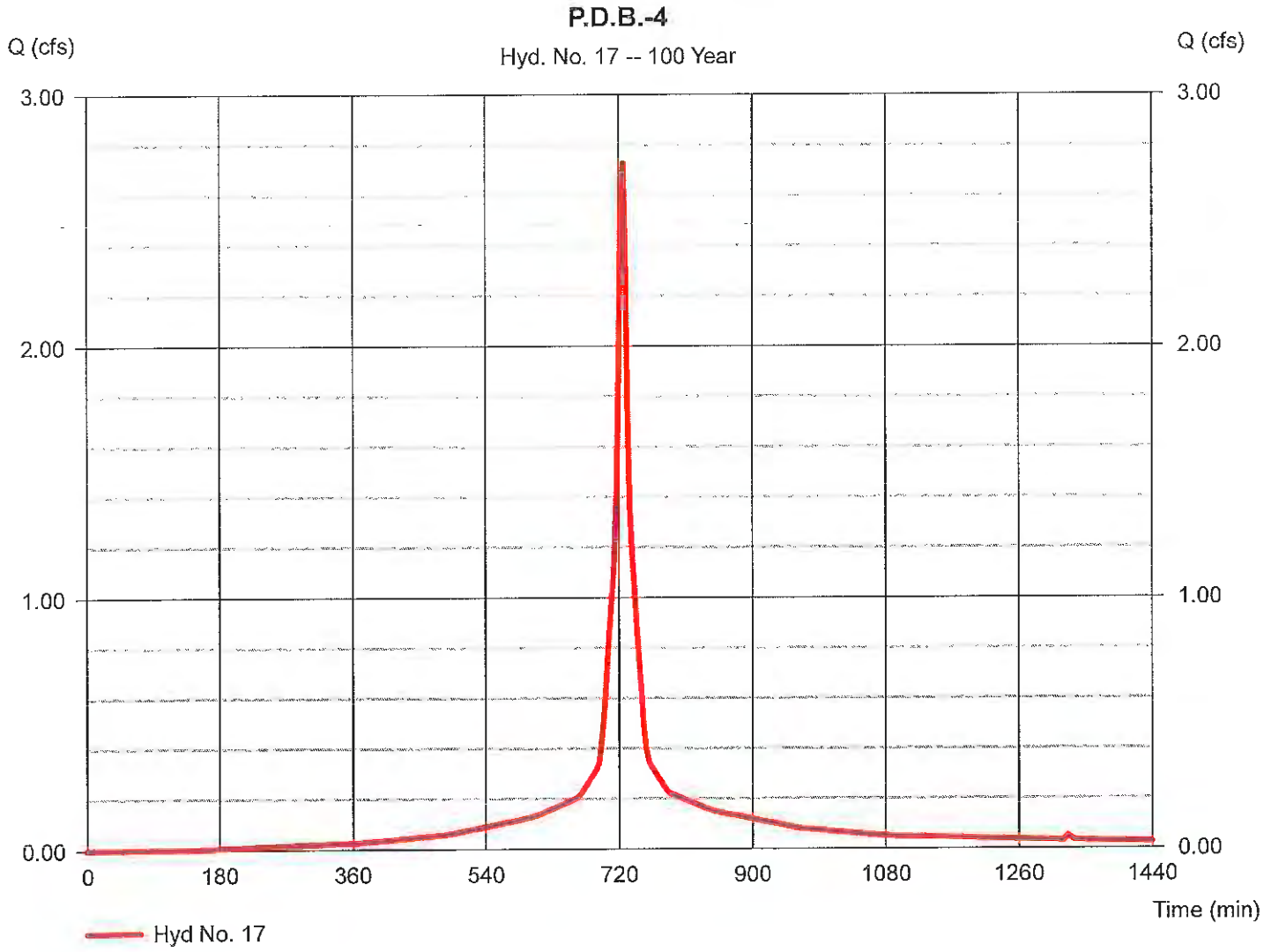
Hydraflow Hydrographs by Intelisolve v9.22

Friday, Jul 6, 2018

Hyd. No. 17

P.D.B.-4

Hydrograph type	= SCS Runoff	Peak discharge	= 2.728 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 9,943 cuft
Drainage area	= 0.392 ac	Curve number	= 91.7
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



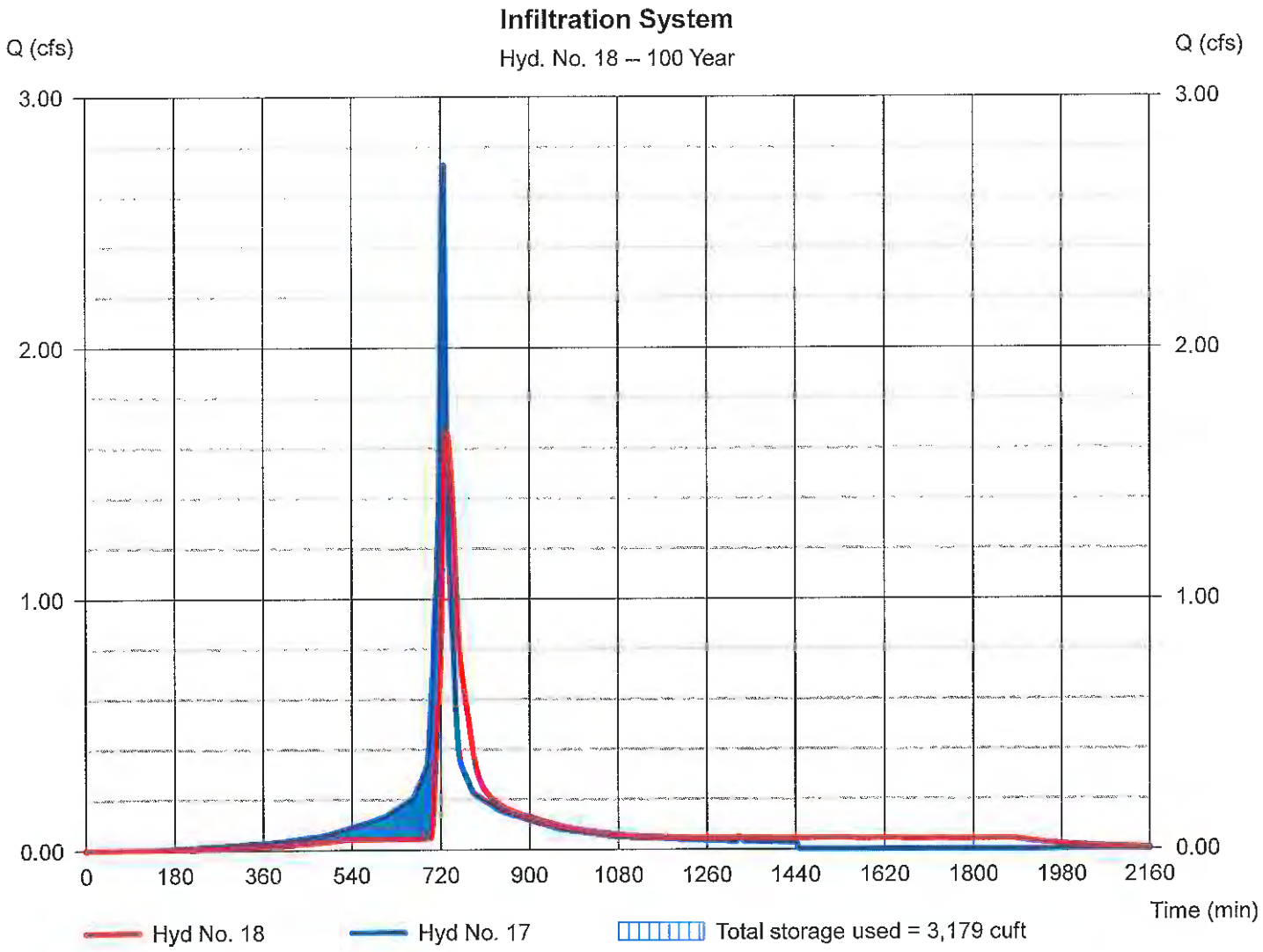
Hydrograph Report

Hyd. No. 18

Infiltration System

Hydrograph type	=	Reservoir	Peak discharge	=	1.665 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	3 min	Hyd. volume	=	9,935 cuft
Inflow hyd. No.	=	17 - P.D.B.-4	Max. Elevation	=	165.24 ft
Reservoir name	=	Infiltration System	Max. Storage	=	3,179 cuft

Storage Indication method used. Outflow includes exfiltration.

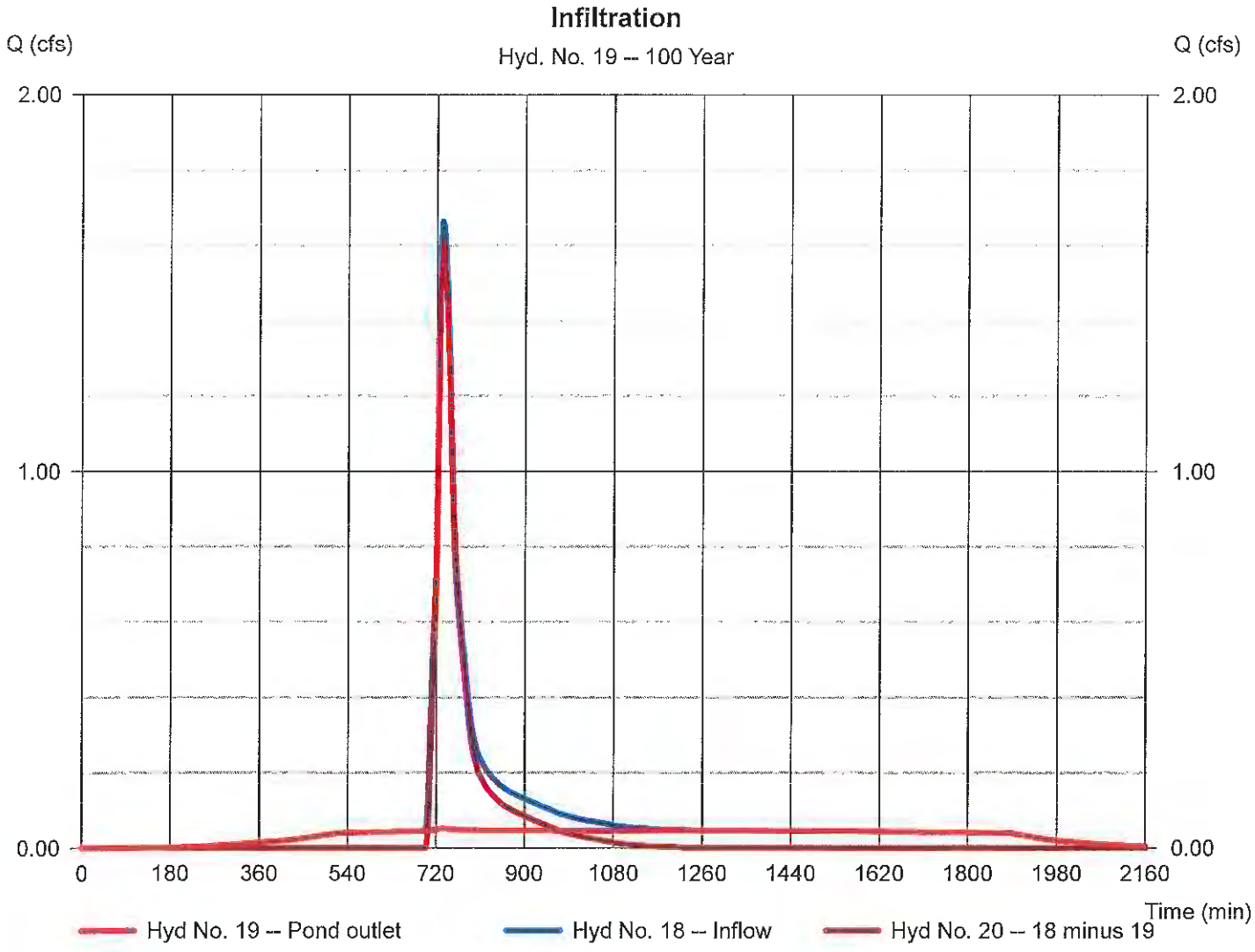


Hydrograph Report

Hyd. No. 19

Infiltration

Hydrograph type	=	Diversion1	Peak discharge	=	0.051 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	3 min	Hyd. volume	=	4,248 cuft
Inflow hydrograph	=	18 - Infiltration System	2nd diverted hyd.	=	20
Diversion method	=	Pond - Infiltration System	Pond structure	=	Exfiltration

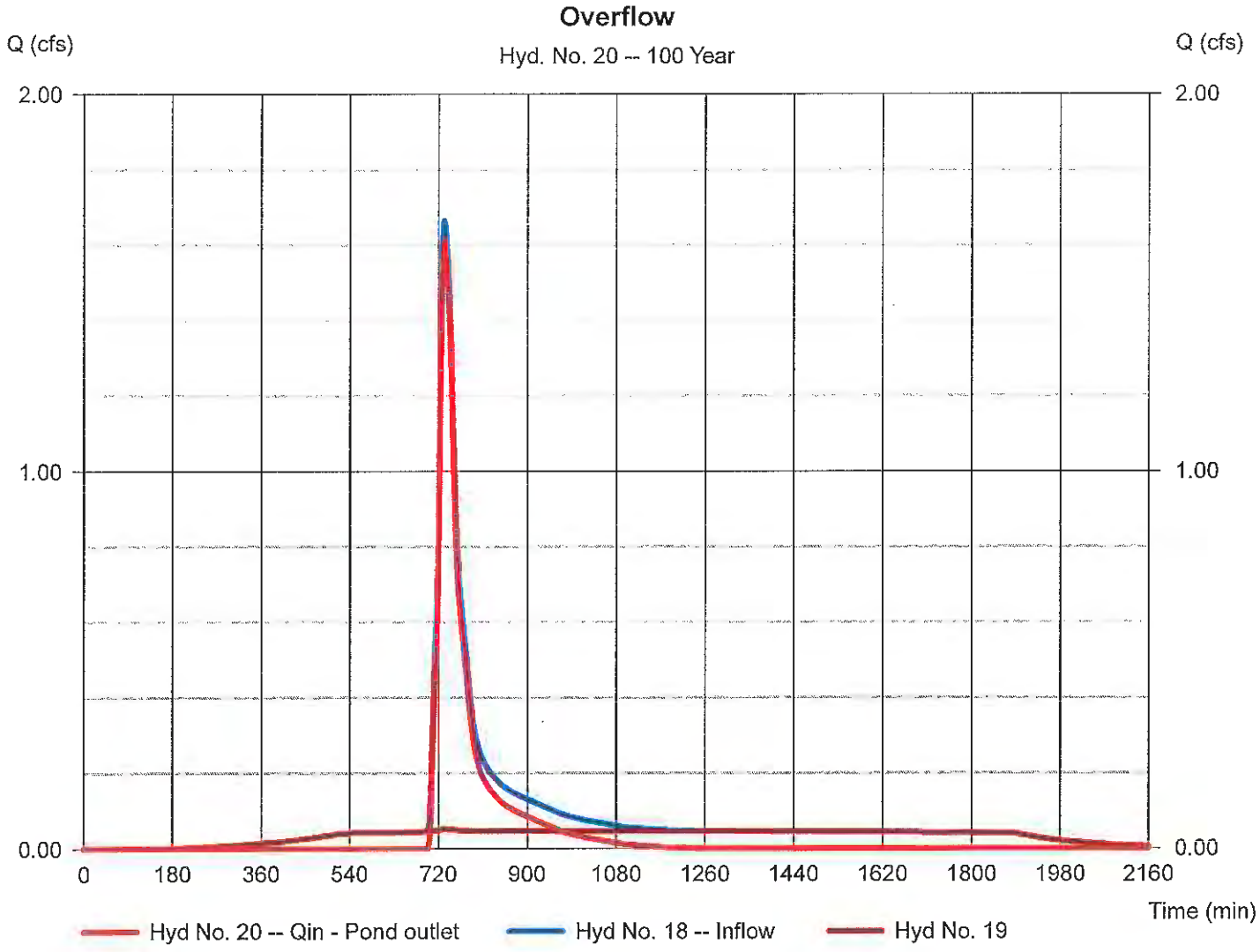


Hydrograph Report

Hyd. No. 20

Overflow

Hydrograph type	= Diversion2	Peak discharge	= 1.614 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 3 min	Hyd. volume	= 5,686 cuft
Inflow hydrograph	= 18 - Infiltration System	2nd diverted hyd.	= 19
Diversion method	= Pond - Infiltration System	Pond structure	= Exfiltration

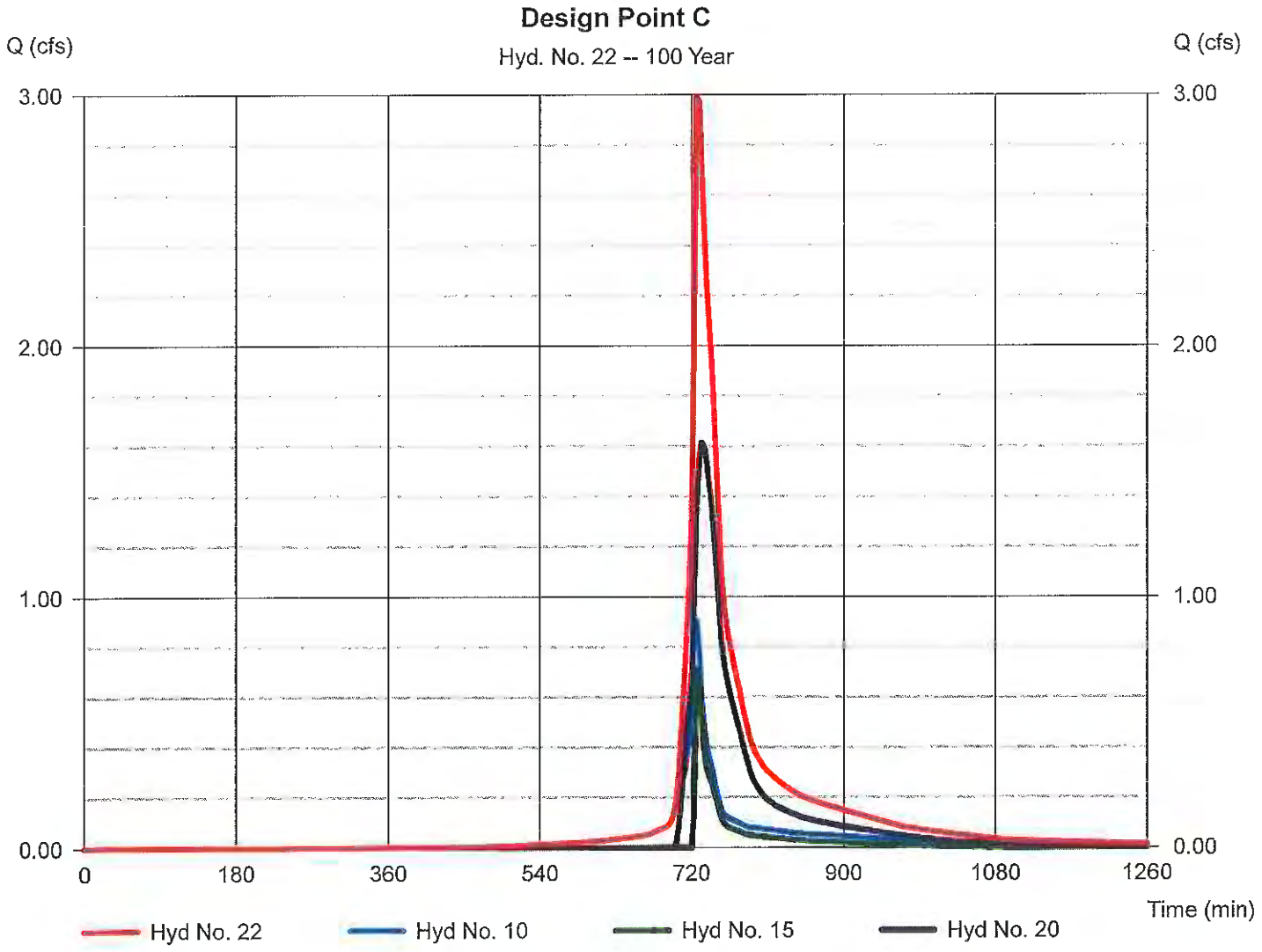


Hydrograph Report

Hyd. No. 22

Design Point C

Hydrograph type	= Combine	Peak discharge	= 2.989 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 9,870 cuft
Inflow hyds.	= 10, 15, 20	Contrib. drain. area	= 0.163 ac

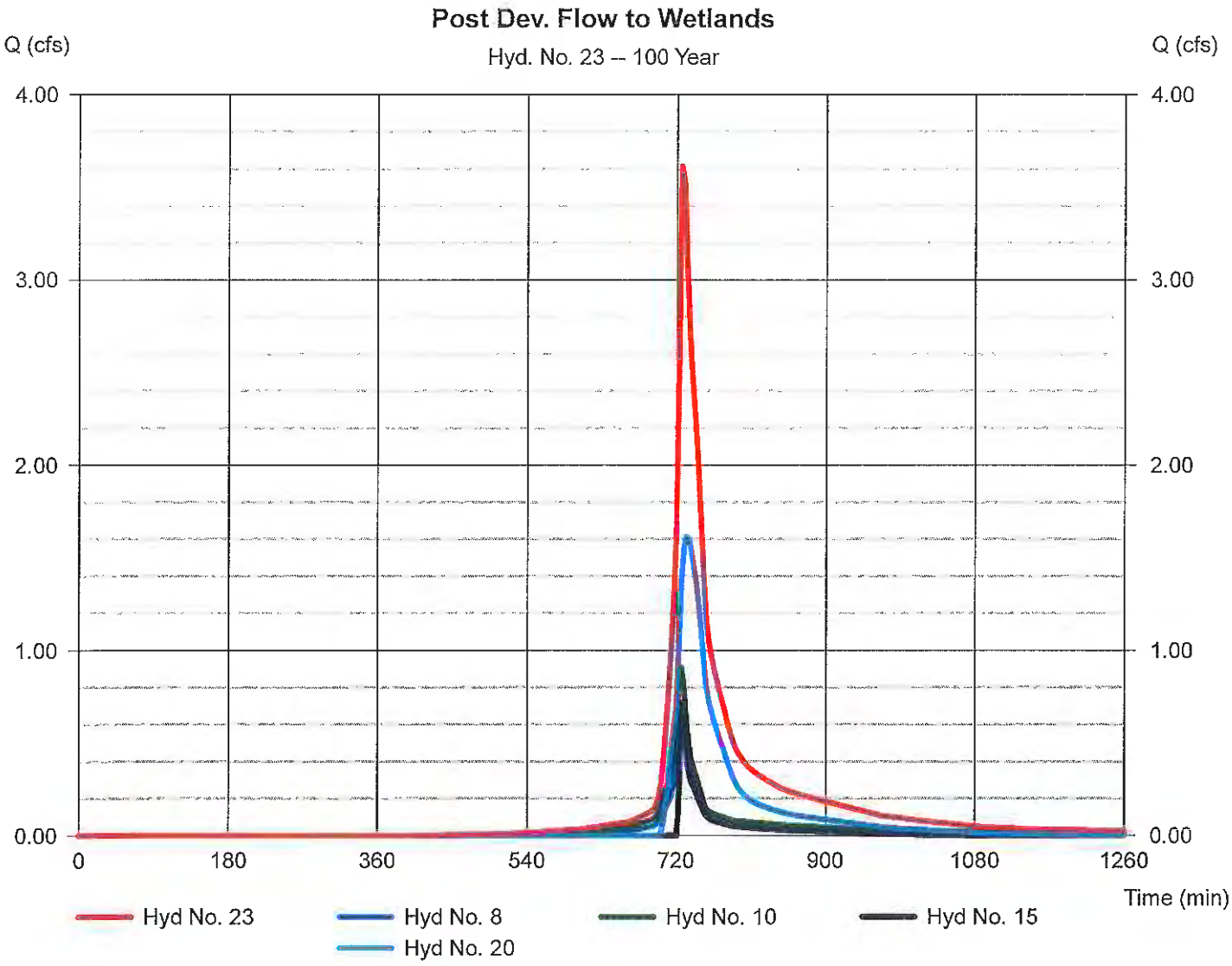


Hydrograph Report

Hyd. No. 23

Post Dev. Flow to Wetlands

Hydrograph type	= Combine	Peak discharge	= 3.615 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 11,949 cuft
Inflow hyds.	= 8, 10, 15, 20	Contrib. drain. area	= 0.301 ac

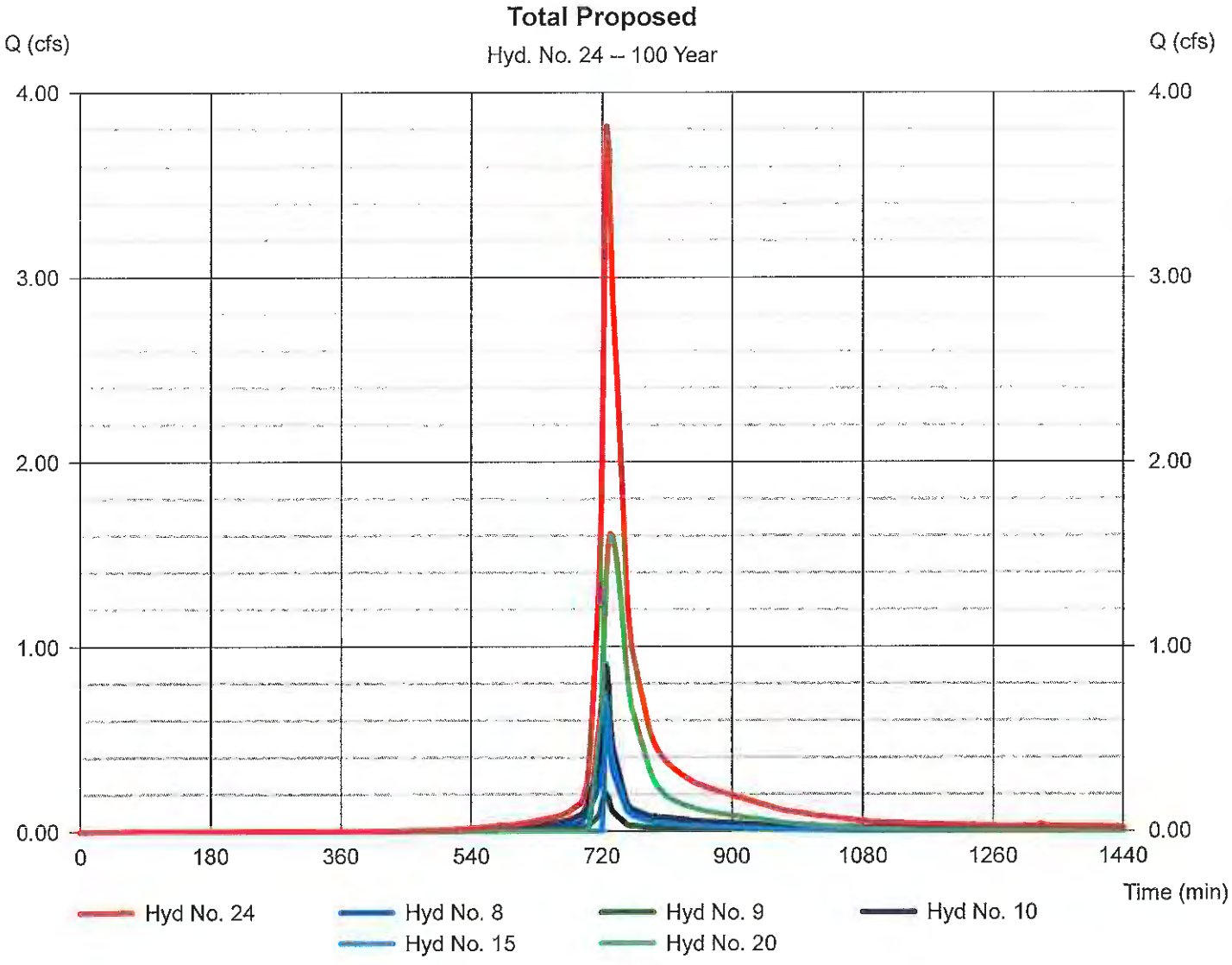


Hydrograph Report

Hyd. No. 24

Total Proposed

Hydrograph type	= Combine	Peak discharge	= 3.817 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 12,622 cuft
Inflow hyds.	= 8, 9, 10, 15, 20	Contrib. drain. area	= 0.344 ac

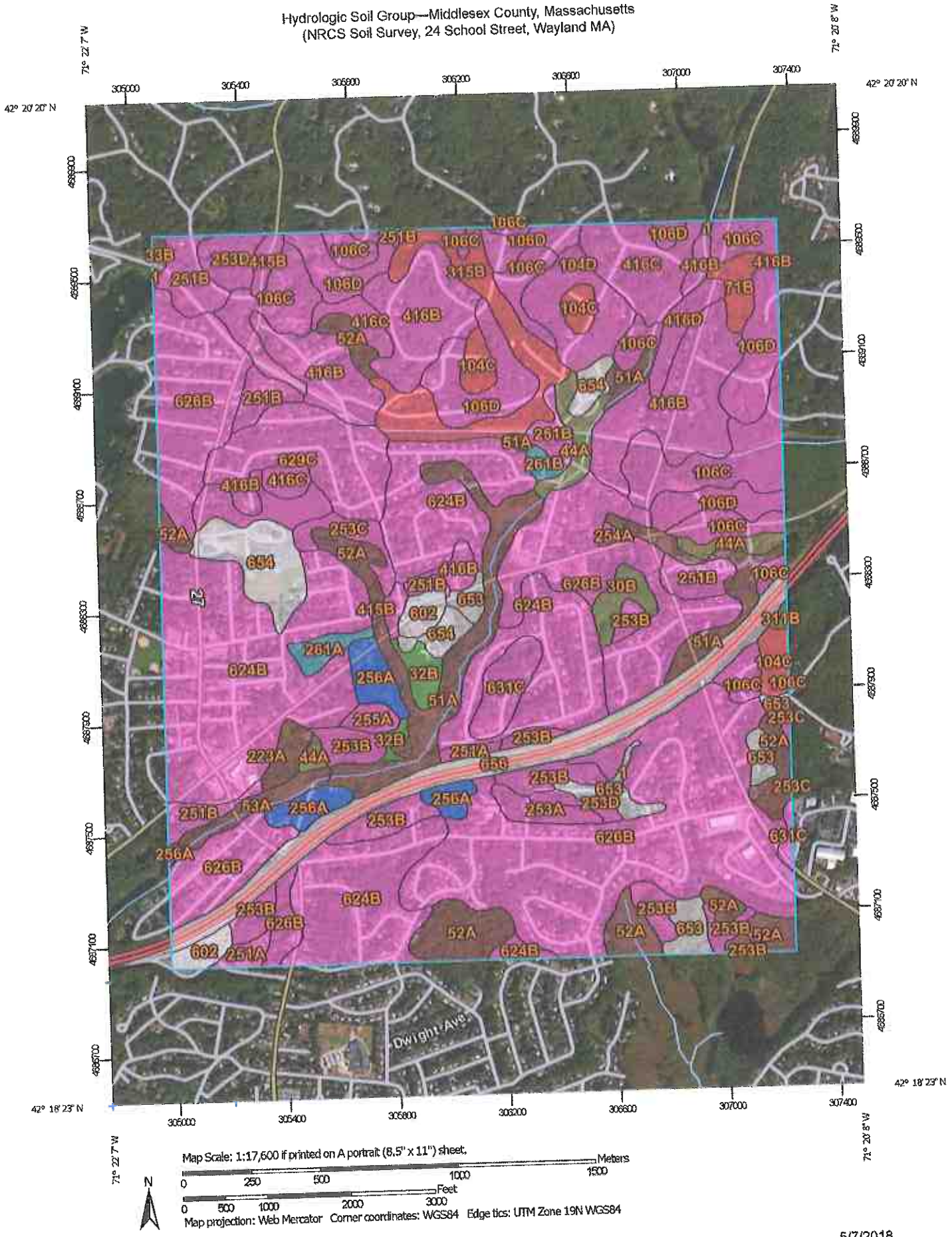


Appendix B:
Stormwater Operation and Maintenance Plan

See Chapter 11 of Stormwater Report for Operation and Maintenance Plan

Appendix C:
NRCS Soil Survey

Hydrologic Soil Group—Middlesex County, Massachusetts
(NRCS Soil Survey, 24 School Street, Wayland MA)



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.

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: Middlesex County, Massachusetts
Survey Area Data: Version 17, Oct 6, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		1.8	0.1%
30B	Raynham silt loam, 0 to 5 percent slopes	C/D	8.0	0.5%
32B	Wareham loamy fine sand, 0 to 5 percent slopes	A/D	8.0	0.5%
33B	Raypol silt loam, 0 to 5 percent slopes	B/D	1.6	0.1%
44A	Birdsall mucky silt loam, 0 to 1 percent slopes	C/D	17.0	1.1%
51A	Swansea muck, 0 to 1 percent slopes	B/D	63.9	4.3%
52A	Freetown muck, 0 to 1 percent slopes	B/D	55.0	3.7%
53A	Freetown muck, ponded, 0 to 1 percent slopes	B/D	8.9	0.6%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	7.8	0.5%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	16.0	1.1%
104D	Hollis-Rock outcrop-Charlton complex, 15 to 25 percent slopes	A	22.5	1.5%
106C	Narragansett-Hollis-Rock outcrop complex, 3 to 15 percent slopes	A	93.7	6.3%
106D	Narragansett-Hollis-Rock outcrop complex, 15 to 25 percent slopes	A	73.0	4.9%
223A	Scio very fine sandy loam, 0 to 3 percent slopes	B/D	6.1	0.4%
251A	Haven silt loam, 0 to 3 percent slopes	A	6.2	0.4%
251B	Haven silt loam, 3 to 8 percent slopes	A	40.8	2.7%
253A	Hinckley loamy sand, 0 to 3 percent slopes	A	7.2	0.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	43.4	2.9%
253C	Hinckley loamy sand, 8 to 15 percent slopes	A	8.8	0.6%
253D	Hinckley loamy sand, 15 to 25 percent slopes	A	13.5	0.9%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	A	1.5	0.1%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	4.2	0.3%
256A	Deerfield loamy sand, 0 to 3 percent slopes	B	21.3	1.4%
261A	Tisbury silt loam, 0 to 3 percent slopes	C	5.7	0.4%
261B	Tisbury silt loam, 3 to 8 percent slopes	C	2.7	0.2%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	1.0	0.1%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	D	37.3	2.5%
415B	Narragansett silt loam, 3 to 8 percent slopes	A	6.7	0.5%
416B	Narragansett silt loam, 3 to 8 percent slopes, very stony	A	116.6	7.9%
416C	Narragansett silt loam, 8 to 15 percent slopes, very stony	A	35.9	2.4%
416D	Narragansett silt loam, 15 to 25 percent slopes, very stony	A	9.0	0.6%
602	Urban land		10.5	0.7%
624B	Haven-Urban land complex, 0 to 8 percent slopes	A	257.7	17.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	307.8	20.7%
629C	Canton-Charlton-Urban land complex, 3 to 15 percent slopes	A	43.0	2.9%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	A	15.2	1.0%
653	Udorthents, sandy		20.5	1.4%
654	Udorthents, loamy		32.7	2.2%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
656	Udorthents-Urban land complex		51.2	3.5%
Totals for Area of Interest			1,483.5	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

DEP has provided this form for use by on-site professionals and local Boards of Health. Other forms may be used, but the information must be substantially the same as provided here. Before using this form, check with your local Board of Health to determine the form they use.

A. Facility Information FB 623

1. Facility Information

Linda C. Knowles & Gary W. Ridge (Prepared for: Chadwich Homes)
Owner Name

24 School Street — Map/Lot Map 52, Lot 189
Street Address

Wayland — MA — 01778
City/Town — State — Zip Code

B. Site Information

1. (Check one) New Construction ☒ Upgrade ☐ Repair ☐

2. Published Soil Survey available? Yes ☒ No ☐ If yes: Online (Year Published) ____ (Publication Scale) ____ (Soil Map Unit)

415B-Narragansett Silt Loam
253C-Hinckley Loamy Sand
Soil Name

____
Soil limitations

3. Surficial Geological Report available? Yes ☐ No ☒ If yes: ____ (Year Published) ____ (Publication Scale) ____ (Map Unit)

____
Geologic Material

____
Landform

4. Flood Rate Insurance Map:

Above the 500 year flood boundary? Yes ☒ No ☐ Within the 100 year flood boundary? Yes ☐ No ☒

Within the 500 year flood boundary? Yes ☐ No ☒ Within a Velocity Zone? Yes ☐ No ☒

5. Wetland Area: National Wetland Inventory Map N/A (Map Unit) ____ (Name)

Wetlands Conservancy Program Map N/A ____

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

6. Current Water Resource Conditions (USGS) Map Unit: July 31, 2014 (Month/Year) Name Range: Above Normal ☐ Normal ☒ Below Normal ☐

7. Other references reviewed: _____

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: DTH-1 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

Ground Elevation at Surface of Hole 165.7'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

Property Line 30 feet Drinking Water Well ____ feet Other Town water

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☒ No ☐

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 70" inches N/A elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: **DTH-1**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	Ap	10yr3/3				Fine Sandy Loam					
10-24	Bw	10yr5/6				Fine Sandy Loam					
24-62	C1	2.5y5/3				Sandy Loam					
62-126	C2	2.5y5/4	@70"	7.5yr5/8	5%	Sandy Loam					C2 horizon is tight

Additional Notes **No refusal**

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-1

1. Method used:

☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 70" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

   b. If yes, at what depth was it observed? Upper boundary: 24" to 62" inches Lower boundary: 62" to 126" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator — Date: 6/8/17

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Bill Murphy
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-2 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 165.9'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

   Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

   Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☒ No ☐

   If Yes: Depth Weeping from Pit 106" Depth Standing Water in Hole None

   Estimated Depth to High Groundwater: 80" (Inches) 159.23' (elevation)

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-2

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-22	Ap	10yr3/3				Fine Sandy Loam					
22-42	Bw	10yr5/6				Fine Sandy Loam					
42-96	C1	2.5y5/3	@80"	7.5yr5/8		Sandy Loam					
96-118	C2	2.5y4/4				Silt Loam					

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH.2

1. Method used:

☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☒	Depth weeping from side of observation hole	A. 106" inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 80" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

b. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 42" to 96" inches Lower boundary: 96" to118" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator

6/8/17
Date

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Bill Murphy
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-3 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

Ground Elevation at Surface of Hole 161.7'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☒ No ☐

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 82" (Inches) 154.87' (elevation)

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-3

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10	Ap	10yr3/3				Fine Sandy Loam					
10-22	Bw	10yr5/6				Fine Sandy Loam					
22-84	C1	2.5y5/3	@82"	7.5yr5/8		Sandy Loam					
84-110	C2	2.5y6/3				Silt Loam					C2 horizon is damp

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-3

1. Method used:

☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 82" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

c. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 22" to 84" inches Lower boundary: 84" to 110" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator — Date: 6/8/17

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Bill Murphy
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-4 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 164.1'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

   Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

   Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

   Estimated Depth to High Groundwater: No mottling to 116" associated w/GW (Inches) N.A. (elevation)

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-4

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-20	Fill										
20-28	Ap	10yr3/3				Fine Sandy Loam					
28-40	Bw	10yr5/6				Fine Sandy Loam					
40-86	C1	2.5y5/4				Sandy Loam					
86-116	C2	2.5y4/4				Sandy Loam					

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-4

1. Method used:
   - ☐ Depth observed standing water in observation hole A. _____ inches B. _____ inches
   - ☐ Depth weeping from side of observation hole A. _____ inches B. _____ inches
   - ☒ Depth to soil redoximorphic features (mottles) A. 116" inches No mottlind to 116" associated w/GW inches
   - ☐ Groundwater adjustment (USGS methodology) A. _____ inches B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

   Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   d. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

   b. If yes, at what depth was it observed? Upper boundary: 40" to 86" inches Lower boundary: 86" to 116" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator

6/8/17
Date

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Bill Murphy
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-5 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 162.6'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

   Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

   Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit 112" Depth Standing Water in Hole None

   Estimated Depth to High Groundwater: 72" Inches N.A. elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-5

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-16	Ap	10yr3/3				Fine Sandy Loam					
16-34	Bw	10yr5/6				Fine Sandy Loam					
34-84	C1	2.5y5/4	@72"	7.5yr5/8		Sandy Loam					
84-118	C2	2.5y4/3				Sandy Loam					
86-116	C2	2.5y4/4				Sandy Loam					

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-5

1. Method used:

		A.	B.
☐	Depth observed standing water in observation hole	_____ inches	_____ inches
☒	Depth weeping from side of observation hole	112" inches	_____ inches
☒	Depth to soil redoximorphic features (mottles)	72" inches	_____ inches
☐	Groundwater adjustment (USGS methodology)	_____ inches	_____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

e. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 34" to 84" inches Lower boundary: 84" to 118" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator

6/21/17
Date

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Bill Murphy
Name of Board of Health Witness

Wayland Board of Health
Board of Health

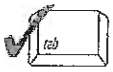
Commonwealth of Massachusetts
City/Town of

Percolation Test

Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)
Owner Name

24 School Street
Street Address or Lot #

Wayland	MA	01778
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	07/31/14 (Date)	a.m. (Time)	07/31/14 (Date)	a.m. (Time)
Observation Hole #	P.T.-1		P.T.-2	
Depth of Perc	60"		68"	
Start Pre-Soak	10:34		10:37	
End Pre-Soak	10:34		10:37	
Time at 12"	10:49		10:52	
Time at 9"	11:02		11:30	
Time at 6"	11:24		12:05	
Time (9"-6")	22 minutes		35 minutes	
Rate (Min./Inch)	8 m.p.i.		13 m.p.i.	
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☒ Test Failed: ☐	

Brian T. Nelson - Soil Evaluator
Test Performed By:

Bill Murphy - Wayland Board of Health
Witnessed By:

Comments:

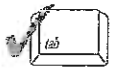
Commonwealth of Massachusetts
City/Town of

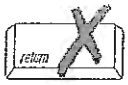
Percolation Test

Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)
Owner Name

24 School Street
Street Address or Lot #

Wayland	MA	01778
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	07/31/14 Date	p.m. Time	Date	Time
Observation Hole #	P.T.-5			
Depth of Perc	60"			
Start Pre-Soak	12:04			
End Pre-Soak	12:04			
Time at 12"	12:19			
Time at 9"				
Time at 6"				
Time (9"-6")				
Rate (Min./Inch)				
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Brian T. Nelson - Soil Evaluator
Test Performed By:

Bill Murphy - Wayland Board of Health
Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

DEP has provided this form for use by on-site professionals and local Boards of Health. Other forms may be used, but the information must be substantially the same as provided here. Before using this form, check with your local Board of Health to determine the form they use.

A. Facility Information FB 623

1. Facility Information

Linda C. Knowles & Gary W. Ridge (Prepared for: Chadwich Homes)
Owner Name

24 School Street
Street Address

Map/Lot Map 52, Lot 189

Wayland
City/Town

MA
State

01778
Zip Code

B. Site Information

1. (Check one) New Construction ☒ Upgrade ☐ Repair ☐

2. Published Soil Survey available? Yes ☒ No ☐ If yes: Online
Year Published

Publication Scale

Soil Map Unit

415B-Narragansett Silt Loam
253C-Hinckley Loamy Sand
Soil Name

Soil limitations

3. Surficial Geological Report available? Yes ☐ No ☒ If yes:
Year Published

Publication Scale

Map Unit

Geologic Material

Landform

4. Flood Rate Insurance Map:

Above the 500 year flood boundary? Yes ☒ No ☐ Within the 100 year flood boundary? Yes ☐ No ☒

Within the 500 year flood boundary? Yes ☐ No ☒ Within a Velocity Zone? Yes ☐ No ☒

5. Wetland Area: National Wetland Inventory Map N/A
Map Unit

Name

Wetlands Conservancy Program Map N/A

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

6. Current Water Resource Conditions (USGS) Map Unit: August 21, 2014 (Month/Year) Range: Name: Above Normal ☐ Normal ☒ Below Normal ☐

7. Other references reviewed: _____

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: DTH-6 August 21, 2014 a.m. Sunny

1. Location

Ground Elevation at Surface of Hole 167.7'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 70" (Inches) 161.87' (elevation)

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: **DTH-6**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-14	Apl	10yr3/3				Fine Sandy Loam					
14-26	Bw	10yr5/6				Fine Sandy Loam					
26-64	C1	10yr5/6				Sandy Loam					
64-122	C2	2.5y5/3	@70"	7.5yr5/8	5%	Sandy Loam					C1 & C2 are

Additional Notes **No refusal**

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-6

1. Method used:

☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 70" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

   b. If yes, at what depth was it observed? Upper boundary: 26" to 64" inches Lower boundary: 64" to 122" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator — Date: 6/8/17

Brian T. Nelson
Typed or Printed Name of Soil Evaluator — *Date of Soil Evaluator Exam: June, 2005

Julia Junghanns
Name of Board of Health Witness — Board of Health: Wayland Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-7 July 31, 2014 a.m. Sunny

1. Location

Ground Elevation at Surface of Hole 166.8'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few Surface Stones 1 to 2 Slope (%)

Grass Vegetation Ground Moraine Landform See Plans Position on landscape (attach sheet)

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: No mottling to 76" associated w/GW Inches N.A. elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-7

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-14	Apl	10yr3/3				Fine Sandy Loam					
14-32	Bw	10yr5/6				Fine Sandy Loam					
32-58	C1	2.5y5/3				Sandy Loam					
58-114	C2	2.5y5/4				Sandy Loam					Lenses of silt loam from 76' down

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-7

1. Method used:

- ☐ Depth observed standing water in observation hole A. _____ inches B. _____ inches
- ☐ Depth weeping from side of observation hole A. _____ inches B. _____ inches
- ☒ Depth to soil redoximorphic features (mottles) A. 76" inches No mottling to 76" associate w/ GW B. _____ inches
- ☐ Groundwater adjustment (USGS methodology) A. _____ inches B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

b. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 32" to 58" inches Lower boundary: 58" to 114" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator — Date: 6/8/17

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Julia Junghanns
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-8 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

Ground Elevation at Surface of Hole 168.2'

Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit None Depth Standing Water in Hole None

Estimated Depth to High Groundwater: 80" Inches 161.53' elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-8

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-26	Fill										
26-40	Bw	10yr5/6				Fine Sandy Loam					
40-78	C1	2.5y5/4				Sandy Loam					
78-108	C2	2.5y5/3	@80"	7.35yr5/8	10%	Loamy Sand					
108-126	C3	2.5y6/3				Silt Loam					
											C3 horizon is damp

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-8

1. Method used:

☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 80" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

c. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 40" to 78" inches Lower boundary: 108" to 126" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator

6/8/06
Date

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Julia Junghanns
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-9 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 163.8'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

   Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

   Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit 88" Depth Standing Water in Hole 108"

   Estimated Depth to High Groundwater: 62" Inches 158.63' elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-9

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-16	Apl	10yr3/3				Fine Sandy Loam					
16-30	Bw	10yr5/6				Fine Sandy Loam					
30-46	Bc	10yr5/4				Sandy Loam					
46-98	C1	2.5y5/3	@62"			Sandy Loam					Soil damp @ 70" C1 has high sand content
98-118	C2	2.5y4/4				Sandy Loam					

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-9

1. Method used:

☒	Depth observed standing water in observation hole	A. 108" inches	B. _____ inches
☒	Depth weeping from side of observation hole	A. 88" inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 62" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

d. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 46" to 98" inches Lower boundary: 98" to 118" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator — Date: 6/8/17

Brian T. Nelson
Typed or Printed Name of Soil Evaluator — *Date of Soil Evaluator Exam: June, 2005

Julia Junghanns
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-10 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 160.75'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

   Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

   Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit 98" Depth Standing Water in Hole 110"

   Estimated Depth to High Groundwater: 68" (Inches) 155.08' (elevation)

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: **DTH-10**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-15	Apl	10yr3/3				Fine Sandy Loam					
15-30	Bw	10yr5/6				Fine Sandy Loam					
30-66	C1	2.5y5/3				Sandy Loam					
66-112	C2	2.5y5/4	@68"	7.5yr5/8	10%	Silt Loam					

Additional Notes **No refusal**

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-10

1. Method used:

☒	Depth observed standing water in observation hole	A. 100" inches	B. _____ inches
☒	Depth weeping from side of observation hole	A. 98" inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 68" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

e. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 30" to 66" inches Lower boundary: 66" to 112" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

[signature]	6/2/17
Signature of Soil Evaluator	Date
Brian T. Nelson	June, 2005
Typed or Printed Name of Soil Evaluator	*Date of Soil Evaluator Exam
Julia Junghanns	Wayland Board of Health
Name of Board of Health Witness	Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-11 July 31, 2014 (Date) a.m. (Time) Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 164.1'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) Few (Surface Stones) 1 to 2 (Slope (%))

   Grass (Vegetation) Ground Moraine (Landform) See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet Drainage Way >50 feet Possible Wet Area >100 feet

   Property Line 30 feet Drinking Water Well ____ Other Town water feet

4. Parent Material: Glacial Till Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit None Depth Standing Water in Hole 125"

   Estimated Depth to High Groundwater: 60" Inches 161.0' elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-11

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-18	Fill										
18-30	Ap	10yr3/3				Fine Sandy Loam					
30-36	Bw	10yr5/6				Fine Sandy Loam					
36-58	C1	2.5y5/3	@60"	7.5yr5/8	5%	Sandy Loam					
58-128	C2	2.5y6/3				Sandy Loam					

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-4

1. Method used:

☒	Depth observed standing water in observation hole	A. 125" inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 60" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

f. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 36" to 58" inches Lower boundary: 58" to 128" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator

6/6/17
Date

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

Julia Junghanns
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (Cont.)

Deep Observation Hole Number: DTH-12 | July 31, 2014 (Date) | a.m. (Time) | Sunny (Weather)

1. Location

   Ground Elevation at Surface of Hole 168.2'

   Location (Identify on Plan) See Sketch

2. Land Use: Residential Home (e.g. woodland, agricultural field, vacant lot, etc.) | Few (Surface Stones) | 1 to 2 (Slope (%))

   Grass (Vegetation) | Ground Moraine (Landform) | See Plans (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Possible Wet Area >100 feet

   Property Line 30 feet | Drinking Water Well ____ | Other Town water feet

4. Parent Material: Glacial Till | Unsuitable Materials Present: Yes ☐ No ☒

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

   If Yes: Depth Weeping from Pit None | Depth Standing Water in Hole None

   Estimated Depth to High Groundwater: 64" inches | 161.0' elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: DTH-12

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-54	Fill										
54-82	C1	2.5y4/4	@64"	7.5yr5/8		Sandy Loam					
82-114	C2	2.5y5/4				Sandy Loam					C2 horizon has lenses of silt loam

Additional Notes No refusal

Commonwealth of Massachusetts
City/Town of
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation – DTH-4

1. Method used:

☐	Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐	Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☒	Depth to soil redoximorphic features (mottles)	A. 64" inches	B. _____ inches
☐	Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

g. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes ☒ No ☐

b. If yes, at what depth was it observed? Upper boundary: 54" to 82" inches Lower boundary: 82" to 114" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator — Date: 6/8/17

Brian T. Nelson
Typed or Printed Name of Soil Evaluator

June, 2005
*Date of Soil Evaluator Exam

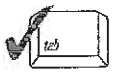
Julia Junghanns
Name of Board of Health Witness

Wayland Board of Health
Board of Health

Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Site Information

Linda C. Knowles & Gary W. Ridge (Prepared for Chadwick Homes)
Owner Name

24 School Street
Street Address or Lot #

Wayland | MA | 01778
City/Town | State | Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	08/21/14 (Date)	p.m. (Time)	08/21/14 (Date)	p.m. (Time)
Observation Hole #	P.T.-5		P.T.-6	
Depth of Perc	54"		60"	
Start Pre-Soak	12:50		12:52	
End Pre-Soak	12:50		12:52	
Time at 12"	1:05		1:07	
Time at 9"	1:22		1:13	
Time at 6"	1:52		1:22	
Time (9"-6")	30 minutes		9 minutes	
Rate (Min./Inch)	10 m.p.i.		3 m.p.i.	
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☒ Test Failed: ☐	

Brian T. Nelson - Soil Evaluator
Test Performed By:

Julia Junghanns - Wayland Board of Health
Witnessed By:

Comments:

CHAPTER 3: CHECKLIST FOR STORMWATER REPORT

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.

[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.

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

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.

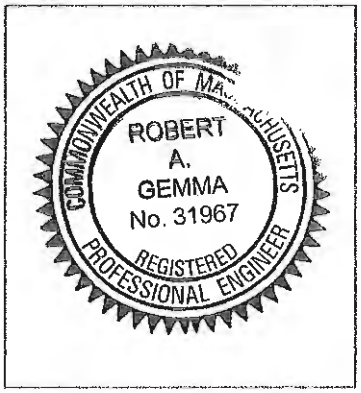
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



7/19/18

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 for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

☐ is within the Zone II or Interim Wellhead Protection Area

☐ is near or to other critical areas

☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☒ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

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.

CHAPTER 4: LID MEASURES

Chapter 4:

The proposed redevelopment project will be utilizing various low impact development (LID) approaches to minimize environmental impacts and these LID measures include stormwater management aspects of the project. Stormwater from the project will be managed by two primary techniques:

1. Stormwater will be managed by the use of a subsurface infiltration system.
2. A rain garden will be used to manage stormwater flow from a portion of the site.

LID measures:

Design of the project has utilized Low Impact Development (LID) techniques to the maximum extent practicable. The following LID approaches have been employed in the design of this project:

Subsurface Infiltration System

A subsurface infiltration system is designed to store and recharge runoff from the majority of the proposed impervious surfaces for the project. The infiltration system has been designed to handle runoff from all storms up through and including the 100-year storm with little overflow. Runoff rates and volumes leaving the project site will be significantly reduced for all storm events.

Rain Garden

A rain garden is designed to store and recharge runoff from the easterly half of the roof of building A and the area between building A and School Street. The rain garden will help to reduce runoff rates and volumes from the project site for all storm events.

CHAPTER 5: STORMWATER MANAGEMENT STANDARDS 1 & 2

Chapter 5:

Standard 1: No New Untreated Discharges

- No New Untreated Discharges will occur in the post-development condition.
- All discharges off site will be treated using both structural and non-structural Best Management Practices (Stormceptor® Units, deep sump catch basins, etc.) to remove TSS and other pollutants.
- Runoff from proposed impervious areas will be collected and recharged using a subsurface infiltration system, thereby decreasing discharge to resource areas from pre-development conditions.
- Supporting calculations specified in Volume 3 are attached with the Hydrologic Analysis, Chapter 1.

Standard 2: Peak Rate Attenuation

- The Hydrologic Analysis provided in Chapter 1 demonstrates that no off-site flooding will be increased in the post-development state during the 100-year 24-hour storm.
- The Hydrologic Analysis provided in Chapter 1, Tables One through Eight, demonstrate that the peak runoff rates will be reduced in the post development state during the 100-year 24-hour storm event. The table shown below shows that peak runoff rates in the post-development condition will be significantly reduced in comparison to the pre-development condition for runoff leaving the project site for all storm events.

Table One: Comparison of Pre and Post-Development Peak Runoff Rates for Total Site

Drainage Basin	2-year storm	10-year storm	25-year storm	100-year storm
Existing	0.59 CFS	1.50 CFS	2.32 CFS	4.16 CFS
Proposed	0.28 CFS	0.80 CFS	1.53 CFS	3.82 CFS
Difference	-0.31 CFS	-0.70 CFS	-0.79 CFS	-0.34 CFS
Difference	-52.5%	-46.7%	-34.1%	-47.0%

CHAPTER 6: STORMWATER MANAGEMENT STANDARD 3

Chapter 6:

Standard 3: Recharge

- **Soil Data is provided in Chapter 2 of Stormwater Report, Chapter 1, and on the Existing Conditions Plan**
- **The required recharge volume calculations:**

  The required Recharge Volume is based on loamy sand with a NRCS Hydrologic Group rating of A and a Target Depth Factor (F) of 0.60-inch. Below is the calculation for the required recharge volume for the entire site:

  Required Recharge Volume
  Rv = (F) x (Impervious Area)
  Rv = (0.60 inch /12) x (20,060 square feet)
  Rv = 1,003 cubic feet.

- The sizing of the infiltration BMP's is based on a "Static Method."
- Runoff from the proposed parking and a portion of roof surfaces on the site are being discharged into the infiltration BMP.
- The recharge BMP's have been sized to infiltrate the required Recharge Volume:

Proposed Infiltration System 1

Basic geometry:	32.0 feet wide by 52.0 feet long
System type:	Shea Leaching Galleys; 240 gallons each Use 84 Galleys; 4-feet long by 4-feet wide by 3-feet high
Infiltration rate:	1.02 inches per hour over 1,664 square foot bed
Exfiltration Capacity:	0.039 c.f.s.

Proposed Rain Garden 1

Basic geometry:	Irregular shaped basin
System type:	Infiltration Basin
Infiltration rate:	1.02 inches per hour over 318 square foot bed
Exfiltration Capacity:	0.008 c.f.s.

Recharge Volumes from Hydrologic Analysis, Chapter 1.

Subsurface Infiltration System 1 and Rain Garden 1

2-Year Recharge Volume = 3,407 cubic feet
10-Year Recharge Volume = 4,399 cubic feet
25-Year Recharge Volume = 4,842 cubic feet
100-Year Recharge Volume = 5,479 cubic feet

Chapter 6: (continued)

- A more detailed analysis of the storage and infiltration capacities for the infiltration system can be found in the Hydrologic Analysis, Chapter 1.
- Below are the calculations showing that the Infiltration BMP's will drain in 72 hours:

Infiltration System 1(Based on Rv)

$$Time_{drawdown} = \frac{(Rv)}{(K) \times (Bottom\ Area)}$$

$$Time_{drawdown} = \frac{(1{,}003\ cubic\ feet)}{(1.02\ inches/hour)(1\ foot/\ 12\ inches) \times (1{,}664\ square\ feet)}$$

$Time_{drawdown}$ = **7.1 hours < 72 hours**

Infiltration System 1(Based on System full))

$$Time_{drawdown} = \frac{(Rv)}{(K) \times (Bottom\ Area)}$$

$$Time_{drawdown} = \frac{(3{,}066\ cubic\ feet)}{(1.02\ inches/hour)(1\ foot/\ 12\ inches) \times (1{,}664\ square\ feet)}$$

$Time_{drawdown}$ = **21.7 hours < 72 hours**

- The bottom of the infiltration system has been designed to have slightly greater than two-feet of separation between the bottom of the infiltration system and the high groundwater mound as determined by mounding analysis.

Rain Garden 1(Based on Rv)

$$Time_{drawdown} = \frac{(Rv)}{(K) \times (Bottom\ Area)}$$

$$Time_{drawdown} = \frac{(1{,}003\ cubic\ feet)}{(1.02\ inches/hour)(1\ foot/\ 12\ inches) \times (318\ square\ feet)}$$

$Time_{drawdown}$ = **37.1 hours < 72 hours**

Rain Garden 1(Based on System full))

$$Time_{drawdown} = \frac{(Rv)}{(K) \times (Bottom\ Area)}$$

$$Time_{drawdown} = \frac{(742\ cubic\ feet)}{(1.02\ inches/hour)(1\ foot/\ 12\ inches) \times (318\ square\ feet)}$$

$Time_{drawdown}$ = **27.5 hours < 72 hours**

CHAPTER 7: LONG-TERM POLLUTION PREVENTION PLAN STORMWATER MANAGEMENT STANDARDS 4-6

Chapter 7:

Long Term Pollution Prevention Plan:

- The Stormwater Pollution Prevention Plan from Chapter 8 and the Operation and Maintenance Plan from Chapter 11 address all necessary aspects of the Long Term Pollution Prevention Plan

Standard 4: Water Quality

- Approximately 95% TSS Removal will be achieved prior to discharging to an infiltration BMP.
- Stormwater Runoff to be treated for Water Quality is based on 0.5-inches of runoff.
    - Requirement for Entire Site
      Amount of Runoff to be treated = (0.5 inch) x (impervious area)
      = (0.5 inch)/(1/12) x (20,060 square feet)
      = **836 cubic feet**
- Below is a sample TSS Removal calculation for a single sub basin on the post-development site:

TSS Treatment Basins 1 and 2

Driveway and parking lot sweeping - **5% (BMP1)**
Deep sump catch basins - **25% (BMP2)**
Stormceptor – **93% (BMP3) (25% Used for Calculations)**
Infiltration Basin – **80% (BMP4)**

Parking Lot Sweeping:
Average Annual Load (1.00) * BMP1 Removal Rate (0.05) = **0.05**
(0.95 of the TSS load remains)

Deep Sump Catch Basin:
TSS load remaining (0.95) * BMP2 Removal Rate (0.25) = **0.24**
(0.71 of the TSS load remains)

Stormceptor 450:
TSS load remaining (0.71) * BMP3 Removal Rate (0.25) = **0.18**
(0.53 of the TSS load remains)

Subsurface Infiltration System:
TSS load remaining (0.53) * BMP3 Removal Rate (0.80) = **0.42**
(0.11 of the TSS load remains)

Final TSS Removal Rate: 1.00 – 0.11= 0.89 **(89% TSS Removal)**

Chapter 7: (continued)

- TSS Removal data for sub basins 1 and 2 are attached hereafter. A weighted post-development TSS Removal was determined to be **91.0%**.

Standard 5: Land Use with Higher Potential Pollutant Loads

- The project does not include land uses with Higher Potential Pollutant Loads.

Standard 6: Critical Areas

- The project does not affect a critical area as defined by the MADEP Stormwater Handbook.

Windsor Place, 24 School Street, Wayland			4-Jul-18
Stormwater Management Calculations, TSS Removal			
Treatment Basin 1	**Basin Area (acres)**	0.153	
BMP List	**Removal Rate (%)**	**TSS Removed (%)**	**TSS Remaining (%)**
Street Sweeping	5	5.0	95.0
Deep Sump Catch Basins	25	23.8	71.3
StormCeptor 450*	25	17.8	53.4
Infiltration System	80	42.8	10.7
		TSS Removal	**89.3**
Treatment Basin 2	**Basin Area (acres)**	0.163	
BMP List	**Removal Rate (%)**	**TSS Removed (%)**	**TSS Remaining (%)**
Street Sweeping	5	5.0	95.0
Deep Sump Catch Basins	25	23.8	71.3
StormCeptor 450*	25	17.8	53.4
Infiltration System	80	42.8	10.7
		TSS Removal	**89.3**
(*) - TSS Removal Rates based on 90% of TSS removal shown on Imbrium Systems Sizing Calculations			
Weighted Average TSS Removal Calculation			
Location	**Area**	**TSS Removal**	**Product**
Treatment Basin 1	0.153	89.3	13.66
Treatment Basin 2	0.163	89.3	14.56
	0.316	**Sum**	**28.22**
		Weighted Average for TSS Removal (%)	**89.3**

CHAPTER 8: CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN (SWPPP)

STORM WATER POLLUTION PREVENTION PLAN

for

Proposed Site ReDevelopment
24 School Street
Wayland, MA 01778

Prepared for: **Windsor Place, LLC**
73 Pelham Island Road
Wayland, MA 01778

Prepared by: **MetroWest Engineering, Inc.**
75 Franklin Street
Framingham, MA 01702
(508) 626-0063

September, 2017

Table of Contents

APPENDIX A: PERMIT REQUIREMENTS

APPENDIX B: EPA NOTICES

Notice of Intent (NOI)

Notice of Termination (NOT)

APPENDIX C: EMERGENCY & INSPECTION INFORMATION

Emergency Contact Sheet

APPENDIX D: BEST MANAGEMENT PRACTICE REQUIREMENTS

Form 1. Emergency Contact Numbers

Town of Wayland Fire Department	
Emergency	911
Business	(508) 358-4747
Town of Wayland Police Department	
Emergency	911
Business	(508) 358-4721
Massachusetts Department of Environmental Protection	
Northeast Regional Office	(978) 694-3200
Town of Wayland Conservation Commission	(508) 358-3669
Town of Wayland Board of Health	(508) 839-3617
National Response Center	1-800-424-8802
US EPA	1-888-372-7341
Windsor Place, LC	1-508-358-6298

Form 1. Emergency Contact Numbers

Town of Wayland Fire Department	
Emergency	911
Business	(508) 358-4747
Town of Wayland Police Department	
Emergency	911
Business	(508) 358-4721
Massachusetts Department of Environmental Protection	
Northeast Regional Office	(978) 694-3200
Town of Wayland Conservation Commission	(508) 358-3669
Town of Wayland Board of Health	(508) 839-3617
National Response Center	1-800-424-8802
US EPA	1-888-372-7341
Windsor Place, LC	1-508-358-6298

A. Project Name and Location

Name:	Proposed Site Redevelopment
Street:	24 School Street, Wayland Massachusetts
Landmark:	Locus has frontage along School Street and East Plain Street
Latitude:	42° - 19' – 22" N
Longitude:	71° - 21' – 22" W

B. Project Owner and Operator

Windsor Place, LLC
73 Pelham Island Road
Wayland, MA 01778

C. Project Engineer

MetroWest Engineering, Inc.
75 Franklin Street
Framingham, MA 01702
(508)-626-0063
Attn: Robert A. Gemma

D. Environmental Consultant

MetroWest Engineering, Inc.
75 Franklin Street
Framingham, MA 01702
(508)-626-0063
Attn: Robert A. Gemma

E. General Contractor

F. CERTIFICATION OF STORMWATER POLLUTION PREVENTION PLAN

Project: Proposed Site Redevelopment, 24 School Street, Wayland MA

This certification must be completed by an authorized signatory of each operator (generally the owner and the General Contractor) before the effective date of the Plan.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____

Name: _____

Title: _____

Company: Windsor Place, LLC

Address: 73 Pelham Island Road, Wayland MA 01778

Telephone: Office: (508) 358-6298

Date: _____

G. CONTRACTOR/SUB-CONTRACTOR CERTIFICATION

Project: Proposed Site Redevelopment, 24 School Street, Wayland MA

This Certification is to be completed by the General Contractor and each Sub-Contractor involved in any on-site activities related to the construction.

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the stormwater discharges associated with industrial activity from the construction site identified as part of this certification.

Signed: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Date: _____

H. SUB-CONTRACTOR NAMES AND ADDRESSES

The following list includes all subcontractors working on the project site at any time. The general contractor and all subcontractors must sign the certification included in Section G., page 3.

Subcontractor:_____

Subcontractor:_____

Subcontractor:_____

Subcontractor:_____

Subcontractor:_____

I. Project Description

The subject property is located on the westerly side of School Street and northerly side of East Plain Street in Wayland, Massachusetts. The site contains approximately 0.87-acres of land that is presently improved with a single-family house, detached garage, barn and supporting utilities. The majority of the site is covered by impervious and lawn areas. Existing topography decreases in approximately 10-feet from northeast to southwest

The project involves the demolition of the existing house, barn and garage followed by the construction of two new townhouse buildings, paved driveway and parking areas, new subsurface sewage disposal system and stormwater management system. Proposed impervious coverage on the property will be approximately 19,507 square feet, an increase of 10,598 from the existing impervious coverage of ,.908 square feet.

Complete sets of site development plans are included as an attachment to this SWPPP.

J. Total Site Area and Disturbed Area

Total site area is 0.87-acres.
Existing impervious area is approximately 0.20-acres
Proposed impervious area is approximately 0.45 acres
Total developed area is approximately 0.80 acres

K. Surrounding Developments

The project is surrounded by single family residential developments to the north and west. Retail and commercial sites are located to the south and east across School Street and Commonwealth Road (Route 30.)

L. Soil Description

According to the NRCS Soil Survey, soils on and around the site belong to either the Hinckley loamy sand (253C) or the Narragansett Silt Loam (415B) soil series and are further classified within hydrologic soil group A and B respectively. Soil testing was performed at the site on July 31, 2014 and August 22, 2014. Twelve test holes, D.T.H.-1 through D.T.H.-12 were excavated and logged at the site. D.T.H. 1 through 3 and 6 through 10 were excavated in the northerly part of the property. C-horizons for these test pits were primarily sandy loam soils ranging in depth from approximately three to ten feet. Redoximorphic features were observed at depths ranging from six to eight-feet and no refusal was encountered. D.T.H.-4, D.T.H. 5 and D.T.H.-11 were excavated in the southerly portion of the site, south of the existing house. These test pits contained C-horizons of sandy loam soils ranging in depth between three and eleven feet. Redoximorphic features were observed at depths of approximately six to seven feet below existing grade and no refusal was encountered.

M. Runoff Coefficient

Existing soils have varying permeability rates therefore runoff will be generated from major storm events. The pre-development runoff coefficient for the site is 0.45 and the post-development runoff coefficient will be 0.61.

N. Site Map and Plans

Complete project site plans are attached to this SWPPP.

O. Receiving Water

No direct discharge will occur into any nearby body of water.

P. Extent of Wetland Resource Areas

Wetland Resource areas are located off the property to the west. All improvements will take place outside the 30-foot No-Alteration zone. Approximately 15,366 square feet of alteration will occur within the 100-foot Wetland Buffer Zone.

Q. Sequence of Major Activities

1. The project is scheduled to begin in April 2018.
2. Construction of the new buildings will begin in June 2018.
3. The site grading will be completed in November 2018.
4. All construction will be complete by April 2019.

R. Construction Sequence

1. **Erosion Control**
   An erosion control barrier consisting of either filter mitt mulch tubes or haybales and silt fence will be placed at the limit of work around the majority of the parcel as needed and in any sensitive areas.

2. **Site Access**
   Site access, for construction equipment, will be made from an access point located off School Street. An erosion control barrier to the work area shall be removed at the start of each workday and replaced at the end of each workday. The erosion control barriers will be in place during periods of inclement weather when so directed by the Environmental Consultant. The barriers will remain in place during all non-work periods until the site has been deemed to be stable by the Environmental Consultant.

3. **Construction Staging**
   A construction staging area will be established on the site in the southwesterly portion of the property. All construction materials, supplies, trailers and offices, portable toilets, and

equipment shall be stored within the limits of the staging area. Construction fence and filter mitt erosion control measures shall demarcate the limits of the staging area.

4. **Site Work**
   Site work, including excavation for the buildings, parking lots, excavation for drainage system, grading as well as other utilities may commence only when the site is stable from erosion and all required control measures are in place and functional. Site work during wet periods should be avoided if possible and limited to only those areas that will not have adverse impacts on wetland resource areas or abutting properties.

S. Pollution Prevention Measures

1. Before, during and after construction, functional erosion and sedimentation controls shall be implemented to prevent the silting of abutting, down-gradient properties and roads. Siltation controls shall be properly maintained and are not to be removed until so approved by the Environmental Engineer. Other controls shall be added as warranted during construction to protect the environmentally sensitive areas. Sufficient extra materials (e.g. siltation fencing and other control materials) shall be stored on site for emergencies.

2. Casting of excavated materials shall be stored away from any sensitive land areas.

3. Any stockpiling of loose materials shall be properly stabilized to prevent erosion and siltation. Preventive controls such as hay bales or jute covering shall be implemented to prevent such an occurrence.

4. There shall be no flooding, ponding, or flood related damage caused by the project or surface run-off emanating from the project on lands of an abutter, nearby or down-gradient properties.

5. All surface discharge shall meet the water quality standards for the Mass. Division of Water Pollution Control for Class "B" Water.

6. Proper landscaping of embankments and run-off areas (that is, the use of grass, vegetation, shrubbery, and crushed stone) shall be implemented before the project is completed.

7. Finish grades shall be no steeper than a slope of 2 horizontal to 1 vertical.

8. There shall be no contaminant migration caused by the project to nearby and down-gradient properties, nearby aquifers, wetlands and nearby wells.

9. The use of salt and sand on paved surfaces shall be kept to an absolute minimum during the winter months.

10. The applicant shall make sufficient provisions to control any unexpected drainage and erosion conditions that may rise during construction that may create damage on abutting properties and

wetland areas. Said control measures are to be implemented at once and the Environmental Engineer shall be notified in writing.

11. During construction flood prevention, erosion, and sedimentation controls shall be in place before the natural ground cover is disturbed. Said controls shall be in place prior to other construction work and shall be monitored and approved by the Environmental Engineer before other work is commenced. They shall be properly maintained and are not to be removed until so approved by the Environmental Engineer.

12. The applicant shall designate a person or persons to inspect and supervise the drainage and erosion controls for the project and the Environmental Engineer shall be notified as to the means to contact said individual or individuals on a 24-hour basis on all working and non-working days of the project. Said means of contact shall include the telephone number of said designated person or persons.

13. There shall be periodic inspection of the fabric fencing and other controls by the applicant's designee to assure their continued effectiveness.

14. The Zoning Board and Town of Wayland Conservation Commission conditions of approval shall be included as part of the contracts and subcontracts and shall be posted in the supervisory office on-site.

15. Any changes in the construction plans must be submitted in writing in advance for approval by the Engineer.

16. Upon completion of this project, the project engineer shall certify that the work completed conforms to the plans as submitted. Certification must include registered engineers stamp. In addition, an as-built plan shall be submitted to the Zoning Board, Conservation Commission and Department of Public Works for approval prior to the issuance of a Certificate of Compliance.

17. Upon completion of the project, the permanent functional erosion, sedimentation, and flood control measures that are installed according to the presented plans and specifications submitted and revised shall be maintained in perpetuity.

18. Upon completion of the project, the contractor shall clean all deep sump catch basins, the Stormceptor treatment tanks, to remove all silt and sediment.

T. Other Control Measures

Off-site Vehicle Tracking. A stabilized construction entrance will be provided to help reduce vehicle tracking of sediments. The paved streets adjacent to the site shall be swept or scraped weekly, or as needed, to remove any excess mud, dirt, or rock tracked from the construction area. A source of fresh water for washing sediment from trucks, especially during periods of wet weather, may be provided in order to minimize the amount of street sweeping and scraping required. Any wash water resulting from this operation will be directed into a sediment trap.

Waste Materials. All trash and construction debris from the site will be hauled to an approved landfill. No construction waste material will be buried on the site. All personnel will receive instructions regarding the correct procedure for waste disposal. Notices describing these practices will be posted in the construction office. The site superintendent will be responsible for seeing that these procedures are followed. Employee waste and other loose materials will be collected so as to prevent the release of floatables during runoff events.

Hazardous Waste. No hazardous waste is expected to be generated or encountered in this project. In the event that hazardous waste is encountered, all hazardous waste materials will be disposed of in the manner specified by local or state regulation or by the manufacturer. The site superintendent will be responsible for seeing that these practices are followed.

Sanitary Waste. Portable sanitary units will be provided for use by all workers throughout the life of the project. A licensed sanitary waste management contractor will regularly collect all sanitary waste from the portable units.

U. Maintenance

To maintain the erosion and sediment controls, the following procedures will be performed:

- **Sediment Capture Devices:** Sediment will be removed from the upstream or upslope side of the filter fabric fences, straw bale barriers, siltation ponds, diversion trenches, or other devices, when the depth of accumulated sediment reaches about one-third the height of the structure or device.

- **Storm Sewer Inlets:** Any sediment in the storm sewer inlets will be removed and disposed of properly.

- **Temporary Controls:** All temporary controls will be maintained until final site stabilization and landscaping is complete, and the Environmental Engineer approves removal.

Sediment that is removed from structural barriers; either will be hauled off the site and disposed of properly or will be used as backfill. Sediment temporarily stockpiled on site will be placed in such areas and in such manner as to minimize erosion of sediments back into the local drainage system. Berms, filter fabric fencing, straw bale barriers, and polyethylene or polypropylene covers are measures that may be utilized in minimizing erosion of stockpiled sediment.

V. Inspection Procedures

Inspections will be conducted by the responsible person(s) at least once every 7 calendar days and within 24 hrs after each storm event producing 0.5 inch of rainfall or greater. Areas that have been reseeded will be inspected regularly after seed germination to ensure complete coverage of exposed areas.

The contractor will designate a qualified person or persons to perform the following inspections:

- **Stabilization Measures:** Disturbed areas and other areas used for storage of materials that are exposed to precipitation will be inspected for evidence of, or the potential for, pollutants entering the drainage system. After a portion of the site is finally stabilized, inspections will be conducted at least once every month throughout the life of the project. Form 1 shows the inspection form to be used for stabilization measures.

- **Structural Controls:** Filter fabric fences, straw bale barriers, and all other erosion and sediment control measures identified in the plan will be inspected regularly for proper positioning, anchoring, and effectiveness in trapping sediments. Sediment will be removed from the upstream or upslope side of the filter fabric. Form 2 shows the inspection form to be used for structural controls.

- **Discharge Points:** Discharge points or locations will be inspected to determine whether erosion control measures are effective in preventing significant amounts of pollutants from entering receiving waters.

- **Construction Entrances:** Locations where vehicles enter or exit the site will be inspected for evidence of off-site sediment tracking.

Form 1 - **INSPECTION REPORT FORM FOR STABILIZATION MEASURES**

INSPECTOR: _____ DATE: _____

Days since last rainfall: _____ Amount of Last Rainfall: _____inches

Area	Date last disturbed	Date of next Disturbance	Stabilized?	Stabilized With	Condition

Stabilization Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 2 - **INSPECTION FORM FOR STRUCTURAL CONTROLS**

INSPECTOR: _____ DATE: _____

Days since last rainfall: _____ Amount of Last Rainfall: _____inches

Location of Control	In place?	Condition	Sediment Depth	Washed out or overtopped?

Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

W. Revisions to the SWPPP

Based on the results of the inspection, the site description and control measures of this pollution prevention plan will be revised as appropriate, but in no case later than 7 calendar days following the inspection. Form 3 shows the form to be used to record necessary changes to the SWPPP.

X. Inspection Report Summary

A report summarizing the scope of each inspection, name(s) and qualifications of personnel making the inspection, date(s) of the inspection, major observations relating to the implementation of the SWPPP, and actions taken to revise the plan will be completed and retained as part of the SWPPP for at least 3 years from the date that the site is finally stabilized. Form 4 shows the form to be used for certification of the inspection report. The report will be signed by one of the following persons:

Owner of the property.

A duly authorized representative of the property owner.

Y. Non-Storm-Water Discharges

It is expected that the following non-storm-water discharges will occur at the site during the construction period:

- **Dewatering discharges:** Water pumped from the construction area during dewatering operations (this may or may not be storm water).
- **Pressure test water:** Water used to pressure-test the potable water system.
- **Disinfectant water:** Water used to disinfect the potable water system.

Dewatering discharges will be done in such a manner as to avoid erosion problems and will pass through a portable sediment tank or temporary siltation pond. No direct discharge to surface waters or wetlands will be permitted.

Form 3 - **REPORT FORM FOR CHANGES IN POLLUTION PREVENTION PLAN**

INSPECTOR:_____ DATE: _____

SUMMARY OF REQUIRED CHANGES:

_____
_____
_____
_____
_____
_____
_____
_____
_____

REASON(S) FOR CHANGES:

_____
_____
_____
_____
_____
_____
_____
_____
_____

INSPECTOR'S SIGNATURE:_____ **DATE:**_____

Form 4 - **INSPECTION CERTIFICATION FORM**

Project: Windsor Place, 24 School Street, Wayland MA

This certification must be completed after each inspection to signify that the inspection has been properly completed and the site has been found to be in compliance with the Storm Water Pollution Prevention Plan.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Date: _____

Z. Significant-Materials Inventory

Significant materials expected to be found at the construction site include:

- Lime (trucked onto the site for soil stabilization purposes)
- Concrete mix (trucked onto the site for construction)
- Steel reinforcing bars and related materials
- Lumber
- Diesel and Gasoline fuel and lubricating oils
- Pre-cast concrete structures
- Ductile iron pipe
- Steel pipe
- Paints
- Fertilizers
- Plastic and p.v.c. pipe
- Earth materials, stone and aggregate
- Asphalt
- Cements and adhesives
- Waterproofing tar
- Block, brick and masonry materials
- Fiberglass and foam insulation
- Propane fuel for space heaters
- Acetylene fuel for welding

This list of significant materials may be reduced or expanded once a contractor has been chosen and the materials to be used have been specified. If fewer or additional materials are required, the SWPPP will be amended to reflect these changes.

AA. Spill Prevention and Response Procedures

Spill prevention and response include good housekeeping as well as specific practices for certain products and established procedures for responding to spills.

Good Housekeeping

The following good housekeeping practices will be followed onsite during the construction project.

- **Minimize materials:** An effort will be made to store only enough material required to do the job.

- **Storage:** All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers in a covered area. If storage in a covered area is not possible, the materials will be covered with polyethylene or polypropylene sheeting to protect them from the elements.

- **Labeling:** Products will be kept in their original containers with the original manufacturer's label affixed to each container.

- **Mixing:** Substances will not be mixed with one another unless this is recommended by the manufacturer.

- **Disposal:** Whenever possible, all of a product will be used prior to disposal of the container. Manufacturer's recommendations for proper use and disposal will be followed.

- **Inspections:** The site superintendent will inspect the site daily to ensure proper use and disposal of materials onsite.

- **Spoil materials:** Any excavated earth that will not be used for fill material and all demolished pavement will be hauled off site immediately and will be disposed of properly.

Product-Specific Practices

- **Petroleum Products.** All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. If petroleum products will be present at the site, they will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.

- **Concrete Trucks.** Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water at the site.

- **Paints.** All containers will be tightly sealed and stored when not required for use. Excess paint will not be poured into the storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.

- **Fertilizers.** Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. The fertilizer will be stored in a covered area, and any partially used bags will be transferred to a sealable plastic bin to avoid spills.

Spill Control and Response Practices

A spill prevention and response team will be designated by the owner or the site superintendent. In addition, the following practices will be followed for spill cleanup:

- **Information:** Manufacturers' recommended methods for spill cleanup will be clearly posted, and site personnel will be made aware of the procedures and location of the information and cleanup supplies.

- **Equipment:** Materials and equipment necessary for spill cleanup will be present on the site at all times. Equipment and materials will include but not be limited to brooms, shovels, rags,

gloves, goggles, absorbent materials (sand, sawdust, etc.) and plastic or metal trash containers specifically designed for this purpose. The materials and equipment necessary for spill cleanup will be dependent upon the nature and quantity of the material stored on site.

- **Response:** All spills will be cleaned up immediately upon discovery.
- **Safety:** The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substances.
- **Reporting:** Spills of toxic of hazardous material (if present on site) will be reported to the appropriate state or local government agency, regardless of the spills size.
- **Record Keeping:** The spill prevention plan will be modified to include measures to prevent this type of spill from recurring as well as improved methods for cleaning up any future spills. A description of each spill, what caused it, and the cleanup measures used will be kept with the plan.

BB. Plan Location and Public Access

The SWPPP is not submitted to the EPA for review unless requested. The SWPPP must be available at the construction site from the date of project initiation to the date of final stabilization. The SWPPP and all reports required by the permit must be retained for at least 3 years front he date on which the site is finally stabilized.

Despite the fact that the SWPPP and associated reports are not necessarily required to be submitted with the Notice of Intent, these documents are considered to be reports according to section 308(b) of the Clean Water Act and therefore are available to the public. The permittee, however, may claim certain parts of the SWPPP as confidential according to regulations in 40 CFR part 2. These regulations state that records that contain trade secrets may be claimed as confidential.

The SWPPP shall also be at the offices of the Environmental Consultant, MetroWest Engineering, Inc (75 Franklin Street, Framingham, MA 01702).

CHAPTER 9: STORMWATER MANAGEMENT STANDARD 7

Chapter 9:

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project will result in an increase of impervious area and, therefore, is considered a mixture of redevelopment and new development.
- The project will fully comply with Stormwater Management Policy.

CHAPTER 10: STORMWATER MANAGEMENT STANDARD 8

Chapter 10:

Standard 8: Construction Period Pollution and Erosion and Sedimentation Control

- The Stormwater Pollution Prevention Plan is included in Chapter 8 of this Stormwater Report.
- The project is covered by a NPDES general construction permit as the project will result in over an acre of disturbance.

CHAPTER 11: OPERATION AND MAINTENANCE PLAN STORMWATER MANAGEMENT STANDARD 9

Revised Stormwater Operation and Maintenance Plan:
Proposed Site Redevelopment
24 School Street, Wayland MA 01778

Prepared for: ***Windsor Place, LLC***
73 Pelham Island Road
Wayland, MA 01778

Prepared by: ***MetroWest Engineering, Inc.***
75 Franklin Street
Framingham, MA 01702
(508) 626-0063

Original Submittal: September 2017
Revised: May 2018

Table of Contents

APPENDIX A: STORMCEPTOR OWNER'S MANUAL

See Chapter 11 in Stormwater Report
For Operation and Maintenace Plan
Proposed Site Redevelopment
24 School Street
Wayland MA 01778

Revised Stormwater Operation and Maintenance Plan

Windsor Place, 24 School Street Wayland
Prepared By: MetroWest Engineering Inc.
Prepared For: Windsor Place, LLC

General

The property is located on the westerly side of School Street and northerly side of East Plain Street in the Town of Wayland, Massachusetts. The subject parcel (Assessors Map 52, Lot 189) has an area of 37,865 square feet (0.87 acres) and is presently improved with a two-story house, detached garage, barn, paved driveway, subsurface sewage disposal system and supporting utilities. The site presently contains approximately 8,908 square feet of impervious area. Existing topography slopes gradually downhill in westerly and southerly directions from the high point located at the northeast corner of the property. The property abuts developed single family residential housing to the north and west with commercial properties on the east side of School Street and southerly side of Commonwealth Road (Route 30.)

The site redevelopment program includes demolition and removal of the existing house, barn, garage, driveway and subsurface sewage disposal system. Demolition will be followed by the construction of two, six-unit townhouse buildings, paved parking areas, a new subsurface sewage disposal system and stormwater management system.

Resource Areas

A Bordering Vegetated Wetland and unnamed Intermittent Stream are located on the land of the westerly abutter. The Intermittent Stream is located approximately 40-feet west of the property and the Bordering Vegetated Wetland is located approximately 30-feet west of the westerly boundary line. The 30-foot No-Alteration Zone crosses approximately 12-feet on to the property at the northwest corner and occupies approximately 391 square feet of land on the property. The 100-foot Wetland Buffer Zone extends approximately 83-feet on to the subject property covering approximately 15,366 square feet of land on the site.

Drainage Approach

The site is currently improved with a single-family house, accessory buildings and paved parking areas and does not have a stormwater management system.

A stormwater management system is designed for the site that will reduce runoff rates and volumes from the project site in the post-development condition. Furthermore, all storm water runoff from paved parking areas will be treated in deep sump drain catch basins and Stormceptor™ manhole units prior to discharge into a subsurface infiltration system.

Maintenance Requirements

The project's stormwater collection and treatment system is designed to collect and treat stormwater so that all discharges from the system are in compliance with all local, state and federal environmental regulations. Periodic routine inspection and maintenance of the system is critical if the system is to continue to meet required performance standards.

Responsible Party

The property owner **shall** be responsible for all maintenance and repair activities throughout the site relating to the grounds, pavement surface, stormwater collection system and subsurface infiltration systems. Contact information for the owner/responsible party is listed below:

Owner/Responsible Party
Windsor Place LLC
73 Pelham Island Road
Wayland, MA 01778

Contact: Chris D'Antonio
Email: Chris@chadwickproperties.com

If ownership of the subject property changes, the new owner shall become the responsible party. This Operation and Maintenance Plan shall run with the land.

The owner/responsible party shall be responsible for the implementation of this Operation and Maintenance Plan and the proper training of employees to ensure compliance with all daily and long term aspects of the plan.

Required Maintenance

Grounds

All slopes shall be inspected and any exposed areas or other locations susceptible to erosion shall be stabilized with mulch, sod, seed, stone or other suitable measures. All litter and trash shall be picked up and removed from all paved, landscaped and wooded areas on a regular basis. All grass clippings, leaves, brush and other natural materials will be transported to an approved composting facility. No clippings or leaves will be deposited in wooded areas or on abutting Properties.

Fertilizers and pesticides shall be applied in accordance with manufacturer's instructions and all applicable local and state regulations. They shall be applied sparingly by trained personnel.

BMP1 - Parking and Driveway Areas

The driveway and parking areas shall be vacuum-swept at least four times per year to remove sediments. One cleaning shall be performed during the mid-winter period of late January to

early February, and another cleaning shall be performed in the spring during April or May. All sediment removed shall be disposed of in accordance with DEP policy and requirements for the disposal of road sediments.

During winter months the use of de-icing compounds shall be kept to a minimum. Untreated sand shall be used to the minimum extent necessary to provide for tire traction. During extreme events sand treated with a non-sodium de-icer may be used.

Extra care shall be taken during the treatment of porous paver patios during winter months. Sand shall be applied sparingly and voids between the pavers shall be manually cleaned or vacuumed four times per year to prevent clogging of joints and voids.

BMP 2 – Deep Sump Catch Basins

All catch basins shall include a deep sump and an MDC type oil/water separation hood. Catch basin sumps shall be cleaned and inspected twice per year, once in the spring and again in the fall. Catch basins shall be cleaned by vacuum truck. Pipe inlets, outlets and MDC hoods shall be inspected at the time of the sump cleaning and shall be immediately repaired as necessary. All sediment removed shall be disposed of in accordance with DEP policy and requirements for the disposal of road sediments.

BMP 3 - Stormceptor Model 450i Treatment Systems

The Stormceptor Model 450i systems shall be cleaned a minimum of once per year. Additionally, the depth of sediment in the sumps of the units shall be measured quarterly. Additional cleaning shall commence when the depth of sediment in the sump reaches 8-inches or when oil is observed in the sump of the unit. A vacuum truck shall remove sediment and oil from the sump and dispose of the sediment in accordance with the current standards and requirements of the MADEP. Refer to the attached maintenance procedures provided by Rinker Industries.

BMP 4 – Subsurface Infiltration System

The subsurface infiltration system shall be inspected twice per year to evaluate sediment accumulation and once per year during a storm event. Routine inspection for sediment accumulation shall consist of the inspection of each chamber where an inlet is located. An inspection port cover is located at each point. Any sediment that has entered into the system at the inlet locations shall be removed and disposed of in accordance with MADEP policy. The floor of the infiltration system inspected by qualified personnel with confined space training and certification. Sediments found within the infiltration system shall be moved with hand tools to a port where a vacuum truck can remove sediment materials. Base stone shall be removed and replaced as needed during the cleaning process.

The system shall also be observed at least once per year during a major storm event. A major storm event shall be defined for this Operation and Maintenance Plan as one in which the 24-hour rainfall volume exceeds one-inch. The inspection shall include removal of an inspection port cover to measure the water depth inside the system. The inspection should take place after at

least one-inch of rainfall has fallen and prior to the end of storm. Following the inspection, the precipitation volume, based upon the nearest reporting weather station, shall be recorded in the inspection log book.

BMP 5 – Rain Garden

The rain garden shall be inspected weekly during routine landscaping activities to remove any accumulated trash, debris or sediment near the drain inlets to the gardens. Rain garden condition and action requirements should be performed by a landscape contractor working closely with the project civil engineer and landscape designer.

The rain garden should be inspected once during the growing season to monitor plant health and vitality. Dead or diseased plants should be removed and replaced with healthy species. The selection of plant species should also be reviewed annually, and poorly performing species should be replaced with more suitable species. This is an on-going process, and species should be evaluated for their tolerance to site soil conditions and drought/saturation suitability, depending on the specific conditions that develop over time within the rain garden.

Pruning, cutting and good horticultural practices should also be practices, consistent with the maintenance and cultivation of any living garden. Invasive species should be removed by hand promptly upon observation.

Soils should be evaluated for pH annually and adjusted if necessary by the application of lime. Nutrient levels may be adjusted by the application of slow release, organic fertilizers. No herbicides or pesticides should be applied within the rain garden.

Snow Removal

There shall be no storage or stockpiling of snow within any wetland resource areas on or abutting the project site. Parking lot de-icing materials shall be stored inside the building or a location that is protected from precipitation and wind. De-icing material shall consist of sand mixed with a non-sodium based de-icing agent. Snow shall be removed from all drain inlets immediately after a snow event to prevent the accumulation of ice in parking lot areas.

Storage and Use of Chemicals

Chemical storage on the site shall be limited and all chemicals stored on site shall be done in accordance with the manufacturer's recommendations and all applicable local and state regulations.

Hazardous Waste

All hazardous waste materials shall be stored and disposed of in accordance with all applicable local and state regulations. In the event of an accident or spill involving and/or other hazardous materials the facilities manager shall contact a hazardous waste removal contractor and immediately notify local and state regulatory agencies.

There shall be no illicit discharges into the stormwater management system.

Waste Storage and Handling

All waste material shall be stored in individual trash carts provided by a solid waste management company licensed in the Town of Wayland and the Commonwealth of Massachusetts. The trash carts shall be emptied on a weekly basis or when full. Loose trash around the site and near the dumpster shall be picked up on a weekly basis.

Recommended Personnel

A commercial contractor should be engaged to perform the periodic cleaning and inspections required for the drainage and infiltration systems. A landscape contractor may perform gutter cleaning.

A professional engineer with expertise in drainage systems, hydrology or similar sciences shall perform an annual inspection of the infiltration system and should evaluate the infiltration system during a major storm event.

Record Keeping

A logbook or other record should be maintained for all inspection, cleaning and maintenance activities. The logs or records shall be provided to the drainage professional engaged to perform the annual inspection of the drainage and infiltration system. An annual report shall be prepared by the drainage professional to summarize inspection and maintenance activities, review the performance of the infiltration system, and provide recommendations for repair or remedial measures required to maintain the performance of the system. The annual report will be submitted to the property owner and operator and kept on site.

Emergency Contacts

In the event of a major drainage system failure, a release of dangerous materials or other unforeseen accident, the following organizations may be contacted:

Town of Wayland Board of Health
(508) 358-3617

Town of Wayland Conservation Commission
(508) 358-3669

Massachusetts Department of Environmental Protection
(978) 694-3200

MetroWest Engineering, Inc. (Design Engineer)
(508) 626-0063

Form 1 - *INSPECTION REPORT FORM FOR STABILIZATION MEASURES*

INSPECTOR: _____ DATE: _____

Days since last rainfall: _____ Amount of Last Rainfall: _____inches

Area	Date last disturbed	Date of next Disturbance	Stabilized?	Stabilized With	Condition

Comments and Stabilization Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 2 - *INSPECTION FORM FOR DRAIN CATCH BASIN D.D.C.B.-2*
Ongoing Maintenance

INSPECTOR: _____
DATE: _____
Days since last rainfall: _____ Amount of Last Rainfall: _____inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 2 - *INSPECTION FORM FOR DRAIN CATCH BASIN D.D.C.B.-3*
Ongoing Maintenance

INSPECTOR: _____
DATE: _____
Days since last rainfall: _____ Amount of Last Rainfall: _____inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 3 - *INSPECTION FORM FOR RAIN GARDEN*
Ongoing Maintenance

INSPECTOR: _____
DATE: _____
Days since last rainfall: _____ Amount of Last Rainfall: _____inches

Location	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 4 - *INSPECTION FORM FOR STORMCEPTOR INLINE UNIT*
StormCeptor STC-450 (D.M.H. 3A) Ongoing Maintenance

INSPECTOR: _____
DATE: _____
Days since last rainfall: _____
Amount of Last Rainfall: _____inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 4 - *INSPECTION FORM FOR STORMCEPTOR INLINE UNIT*
StormCeptor STC-450 (D.M.H 4A) Ongoing Maintenance

INSPECTOR: _____
DATE: _____
Days since last rainfall: _____
Amount of Last Rainfall: _____inches

Structure Number	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

Form 5 - *INSPECTION FORM FOR SUBSURFACE INFILTRATION SYSTEM 1*

Ongoing Maintenance

INSPECTOR: _____
DATE: _____
Days since last rainfall: _____
Amount of Last Rainfall: _____inches

Rim Location	Rim Elev.	Sediment Depth	Condition	Date and Description of Cleaning

Comments and Maintenance Required:

_____
_____
_____
_____
_____
_____
_____
_____

To be performed by:_____ **On or Before:** _____

CHAPTER 12: STORMWATER MANAGEMENT STANDARD 10

Chapter 12:

Standard 10: Prohibition of Illicit Discharges

- The Long Term Pollution Prevention Plan includes the required measures to prevent the illicit discharges.
- All Catch basins and drain inlets shall be labeled with signage to prohibit the release of any illicit substance into the drainage system.
- No floor drains will be connected to the drainage system.
- No washing of vehicles shall be permitted
- All operations and managers of the facility will be provided with training and education concerning the danger of illicit discharges into the drainage system.

Illicit Discharge Certification

I have read Standard 10 of the Massachusetts Stormwater Management Policy regarding Illicit Discharges. I have also studied the Proposed Site Plans and Stormwater Operation and Maintenance Plan and am aware of the components of the Stormwater Management System proposed at the proposed Windsor Place residential development at 24 School Street in Wayland, Massachusetts. I hereby certify that there will be no illicit discharges, as defined by the Policy, from the site through any part of the Stormwater Management System.

_____
Signature

_____
Name and Title Date

NOTES:

1. SUBJECT PARCEL IS SHOWN AS ASSESSORS MAP 52, LOT 189. RECORD TITLE FROM BOOK 69050, PAGE 394.

2. UTILITY LOCATIONS DEPICTED ON THIS PLAN, BOTH ABOVE– AND BELOW–GROUND, ARE BASED UPON DIRECT FIELD OBSERVATIONS MADE BY METROWEST ENGINEERING, INC. PERSONNEL DURING A FIELD SURVEY, RECORD PLAN LOCATIONS, OR DIGSAFE PAINT–INDICATORS. METROWEST ENGINEERING, INC. DOES NOT WARRANT THAT ALL UTILITIES ARE SHOWN OR THAT UTILITIES THAT ARE DEPICTED ARE SHOWN IN THE CORRECT LOCATION, OR WITH THE PROPER MATERIAL DESIGNATION. METROWEST ENGINEERING, INC. DOES NOT WARRANT OR PROVIDE AN EXPRESS OR IMPLIED WARRANTY THAT ALL SUBSURFACE IMPROVEMENTS ARE SHOWN OR ARE SHOWN CORRECTLY, INCLUDING, BUT NOT LIMITED TO, UTILITIES, UNDERGROUND VAULTS, UNDERGROUND TANKS OR CHAMBERS, BUNKERS, DUCT BANKS, AND/OR OTHER MAN–MADE IMPROVEMENTS THAT LIE BENEATH THE GROUND SURFACE AT THE TIME OF THE SURVEY.

3. CONTRACTOR IS SOLELY RESPONSIBLE FOR ESTABLISHING EXISTING LOCATIONS OF ALL SUB–SURFACE UTILITIES AND MAN–MADE IMPROVEMENTS AND FOR THE REQUIREMENTS TO REPLACE, RELOCATE OR REPAIR EXISTING UTILITIES IN THE EVENT OF DAMAGE OCCURRING DURING CONSTRUCTION. MWE IS NOT RESPONSIBLE OR LIABLE FOR DELAYS OR COSTS ASSOCIATED WITH REMOVING/REPLACING/RELOCATING OF EXISTING UTILITIES REGARDLESS OF WHETHER SAID UTILITIES ARE ACCURATELY DEPICTED ON THIS SURVEY.

4. THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY; THE PROPERTY LIES WITHIN ZONE "X" OF THE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NUMBER 25017C0528F, BEARING AN EFFECTIVE DATE OF JULY 7, 2014.

BENCHMARKS

ELEVATIONS SHOWN ON THIS PLAN REFER TO RM 11 (ELEV.=163.84'), A CHISELED SQUARE IN THE NORTH HEADWALL OF THE CULVERT UNDER COMMONWEALTH ROAD FOR SNAKE BROOK N.G.V.D. 1929.)

T.B.M.	DESCRIPTION	ELEVATION
C	DHN SET IN 14" BLACK LOCUST	161.89'
D	DHN SET IN 10" NORWAY MAPLE	168.74'

CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING UTILITY SERVICES IN THE FIELD PRIOR TO CONSTRUCTION (WATER, ELECTRICAL, ETC.) CALL DIG–SAFE BEFORE YOU DIG 811.

ZONING:

RESIDENCE ZONE 20,000 – 120' FRONT

MINIMUM LOT AREA= 20,000[15] S.F.
MINIMUM LOT COVERAGE= 20%
MINIMUM FRONTAGE= 200 FT.
SETBACKS:
FRONT LOT LINE= 30[2] FT.
FRONT ROW CENTER LINE= 55 FT.
SIDE YARD= 15[3] FT.
REAR YARD=30 FT.
MAX. HEIGHT = 35 FT./2½ STORIES

2) IF §198–702 SHALL REQUIRE A GREATER SETBACK OR PERMIT A LESSER SETBACK, THE PROVISIONS OF SAID §198–702 SHALL PREVAIL OVER THIS TABLE.

3) SIDE YARDS SHALL MEET THE REQUIREMENTS OF §§198–702.4 AND 703.2, AND THE REQUIRED MINIMUM SIDE YARD MAY BE REDUCED IN ACCORDANCE WITH PROVISIONS OF §198–703.2

15) MINIMUM FRONT YARD WIDTH SHALL BE CALCULATED IN ACCORDANCE WITH THE REQUIREMENTS OF §198–705.1 OF THE ZONING BYLAW.

EXISTING TREE DESCRIPTION LEGEND

CODE	DESCRIPTION
BL#	BALCK LOCUST
CA#	CRAB APPLE
HM#	HEMLOCK
LI#	LINDEN
NM#	NORWAY MAPLE
NS#	NORWAY SPRUCE
RM#	RED MAPLE
SY#	SYCAMORE

DETAIL
TREE LOCATION
RO14
TREE CODE — TREE DIAMETER

LEGEND

DCB	DRAIN CATCH BASIN
HM	MANHOLE
WG	WATER GATE
GG	GAS GATE
	HYDRANT
U.P.	UTILITY POST
DH	DRILL HOLE
(F)	FOUND
CB	CONCRETE BOUND
SB	STONE BOUND
WF	WETLAND FLAG
E.M.	ELECTRIC METER
G.M.	GAS METER
N/F	NOW OR FORMERLY
200.0	EXISTING SPOT GRADE
----200----	EXISTING GRADING
----------	EXISTING OVERHEAD WIRE

PROPOSED BUILDING HEIGHTS:

BUILDING A:
MAXIMUM RIDGE ELEVATION = 205.3–FEET
PROPOSED GRADE PLANE ELEVATION = 167.6–FEET
MAXIMUM BUILDING HEIGHT = 37.7–FEET

BUILDING B:
MAXIMUM RIDGE ELEVATION = 205.3–FEET
PROPOSED GRADE PLANE ELEVATION = 166.1–FEET
MAXIMUM BUILDING HEIGHT = 39.2–FEET

LOCAL WAIVERS REQUESTED:

ZONING BYLAWS:

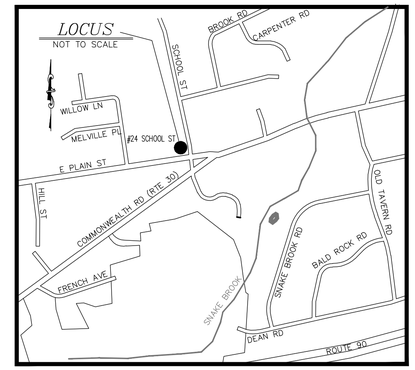
198–501 – SIGN (SPECIAL PERMIT REQUIRED)
198–502 – SIGN (SPECIAL PERMIT REQUIRED FOR TWO SIGNS)
198–504 – EARTH MOVEMENT – 500 CUBIC YARDS MAXIMUM ALLOWED (106 CUBIC YARDS CUT, 4,571 CUBIC YARDS FILL REQUESTED)
198–508 – MULTI–FAMILY USE REQUESTED
198–701 – BUILDING HEIGHT 35' MAXIMUM (37.7–FEET AND 39.2–FEET REQUESTED)
198.701 – BUILDING HEIGHT 2.5 STORIES REQUIRED (3 STORIES REQUESTED)
198.702 – FRONT SETBACK 30–FEET REQUIRED (16.3 AND 23.7–FEET REQUESTED)
198.702 – SIDE SETBACK 15.0 FEET REQUIRED (10.8–FEET REQUESTED FOR BUILDING)
198.702 – SIDE SETBACK 15.0 FEET REQUIRED (1.0–FEET REQUESTED FOR RETAINING WALL)
198.802 – MULTI–FAMILY USE SPECIAL PERMIT REQUIRED (WAIVED)
198.1801 – MULTI–FAMILY USE SPECIAL PERMIT REQUIRED (WAIVED)
198.1802 – MULTI–FAMILY USE SPECIAL PERMIT REQUIRED (WAIVED)

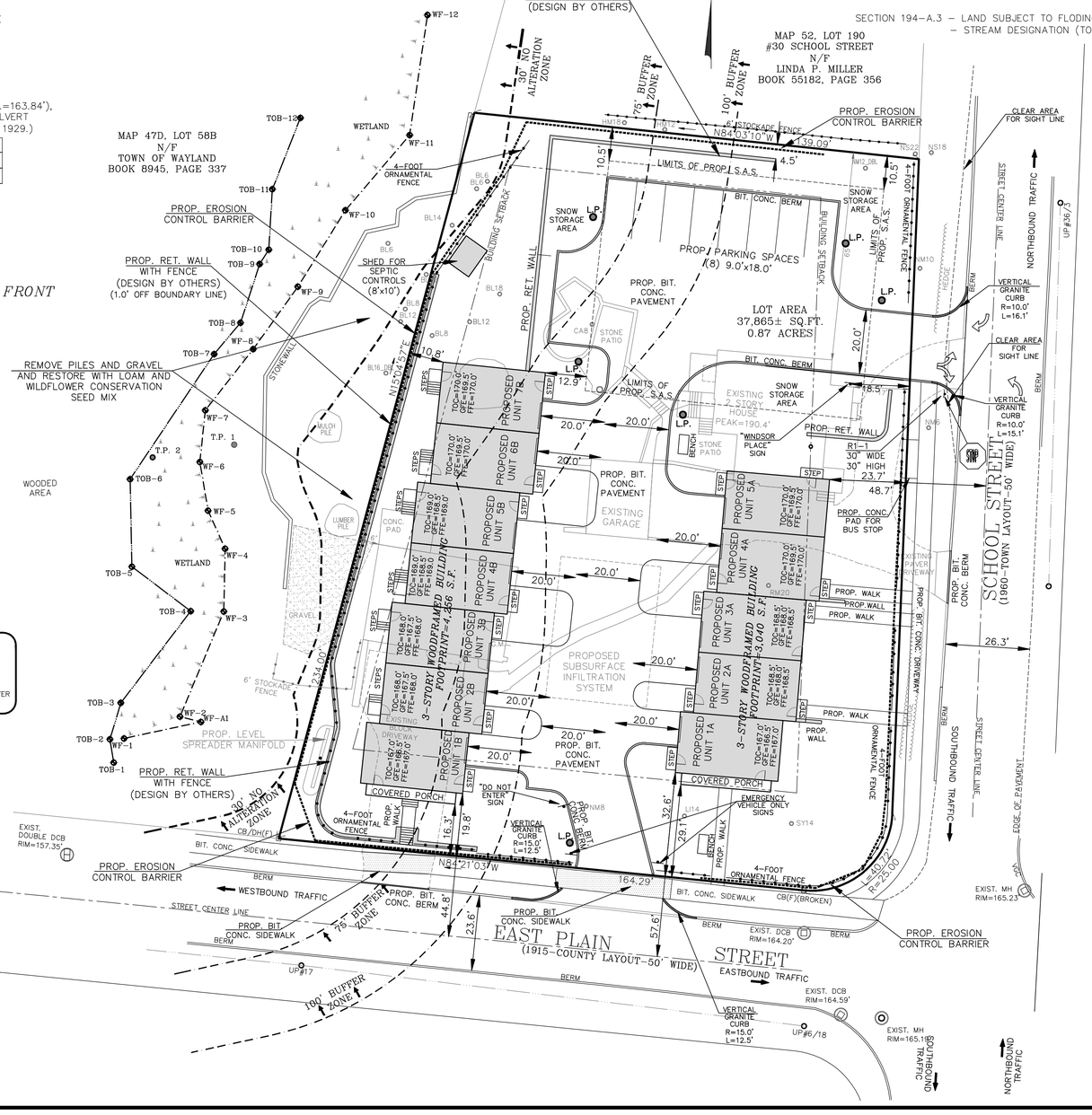
BOARD OF HEALTH REGULATIONS:

II.C.1 – DESIGN FLOW 165 G.P.D. REQUIRED (110 G.P.D REQUESTED)
II.C.5 – DISTANCE BETWEEN PRIMARY TRENCHES 10–FEET REQUIRED (6–FEET REQUESTED)
II.D.1. – OFFSET TO WETLANDS 100–FEET REQUIRED (62.6–FEET REQUESTED)

WETLAND AND WATER RESOURCES BYLAW

SECTION 194–A.3 – LAND SUBJECT TO FLODING (TO THE EXTENT IN EXCESS OF FEMA DESIGNATION)
– STREAM DESIGNATION (TO THE EXTENT) IN EXCESS OF 310 CMR 58.00)





ZONING TABLE

RESIDENCE ZONE, 20,000 SQUARE FEET

	REQUIRED	EXISTING	PROPOSED
AREA	20,000 S.F.	37,865 S.F.	37,865 S.F.
FRONTAGE	120 FEET	204.01 FEET	204.01 FEET
SETBACKS:			
FRONT YARD	30 FEET*	17.5 FEET	19.8 FEET
SIDE YARD	15 FEET	N.A.	N.A.
REAR YARD	30 FEET	6.2 FEET	10.8 FEET
BUILDING COVERAGE	20% MAXIMUM	0.092 (9.2%)	0.199 (19.9%)
LOT COVERAGE	20% MAXIMUM	0.092 (9.2%)	0.199 (19.9%)
IMPERVIOUS AREA	N.A.	8,908 S.F. (23.5%)	19,956 S.F. (52.7%)
BUILDING COVERAGE	7,573 S.F.	3,493 S.F. (9.2%)	7,572 S.F. (19.9%)
OTHER IMPERV. AREA	N.A.	5,415 S.F. (14.3%)	12,384 S.F. (32.7%)
OPEN SPACE	N.A.	28,957 S.F. (76.5%)	17,909 S.F. (47.3%)
BUILDING HEIGHT	35 FEET	28± FEET	35.5 FEET
NUMBER OF STORIES	2.5 STORIES	2 STORIES	3 STORIES
BUILDING TYPE	N.A.	2–STORY W.F.	3–STORY W.F.
FLOOR AREA RATIO	N.A.	0.090 (9.0%±)	0.52 (52.0%±)
NUMBER OF BEDROOMS	N.A.	4 BEDROOMS	26 BEDROOMS
UNITS PER ACRE	N.A.	0.9	13.8
UNITS PER BUILDABLE ACRE	N.A.	0.9	13.9
# PARKING SPACES PER UNIT	N.A.	4	2.5
# PARKING SPACES PER SQUARE FOOT	N.A.	N.A.	0.002
# PARKING SPACES	N.A.	4	30*

* – INCLUDES GARAGE PARKING

REVISIONS:

No.	DATE	REVISION
1	4/20/18	REVISIONS TO BUILDING FOOTPRINTS, GRADING, DRAINAGE SYSTEM SND SEPTIC SYSTEM
2	7/05/18	ADDRESS ZBA, CON. COMM. AND NOVER–ARMSTRONG COMMENTS

FOR METROWEST ENGINEERING, INC. DATE
ROBERT A. GEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046

GRAPHIC SCALE
1 inch = 20 ft.
20 0 0 10 20 40 (FEET) 80
0 4 10 20 (METERS) 30

PROPOSED LAYOUT PLAN
#24 SCHOOL STREET
IN
WAYLAND, MASS
(MIDDLESEX COUNTY)

PREPARED FOR:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:
MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
WAYLAND, MA 01702
TEL.: (508)626–0063
FAX: (508)875–6440

SHEET 1 OF 5		DATE: SEPTEMBER 6, 2017
CALC'D BY: BTN	FIELD BK: 621	CAD FILE: PROP_SITE_3_R10.dwg
DRAFTER: BTN	PROJECT: WY_SCH	DWG FILE: SP090617_R2.dwg

NOTES:

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2. UTILITY LOCATIONS DEPICTED ON THIS PLAN, BOTH ABOVE- AND BELOW-GROUND, ARE BASED UPON DIRECT FIELD OBSERVATIONS MADE BY METROWEST ENGINEERING, INC. PERSONNEL DURING A FIELD SURVEY, RECORD PLAN LOCATIONS, OR DIGSAFE PAINT-INDICATORS. METROWEST ENGINEERING, INC. DOES NOT WARRANT THAT ALL UTILITIES ARE SHOWN OR THAT UTILITIES THAT ARE DEPICTED ARE SHOWN IN THE CORRECT LOCATION, OR WITH THE PROPER MATERIAL DESIGNATION. METROWEST ENGINEERING, INC. DOES NOT WARRANT OR PROVIDE AN EXPRESS OR IMPLIED WARRANTY THAT ALL SUBSURFACE IMPROVEMENTS ARE SHOWN OR ARE SHOWN CORRECTLY, INCLUDING, BUT NOT LIMITED TO, UTILITIES, UNDERGROUND VAULTS, UNDERGROUND TANKS OR CHAMBERS, BUNKERS, DUCT BANKS, AND/OR OTHER MAN-MADE IMPROVEMENTS THAT LIE BENEATH THE GROUND SURFACE AT THE TIME OF THE SURVEY.

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BENCHMARKS

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D	DHN SET IN 10" NORWAY MAPLE	168.74'

CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING UTILITY SERVICES IN THE FIELD PRIOR TO CONSTRUCTION (WATER, ELECTRICAL, ETC.) CALL DIG-SAFE BEFORE YOU DIG 811.

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MINIMUM LOT COVERAGE= 20%
MINIMUM FRONTAGE= 200 FT.
SETBACKS:
FRONT LOT LINE= 30[2] FT.
FRONT ROW CENTER LINE= 55 FT.
SIDE YARD= 15[3] FT.
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MAX. HEIGHT = 35 FT./2½ STORIES

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15) MINIMUM FRONT YARD WIDTH SHALL BE CALCULATED IN ACCORDANCE WITH THE REQUIREMENTS OF §198-705.1 OF THE ZONING BYLAW.

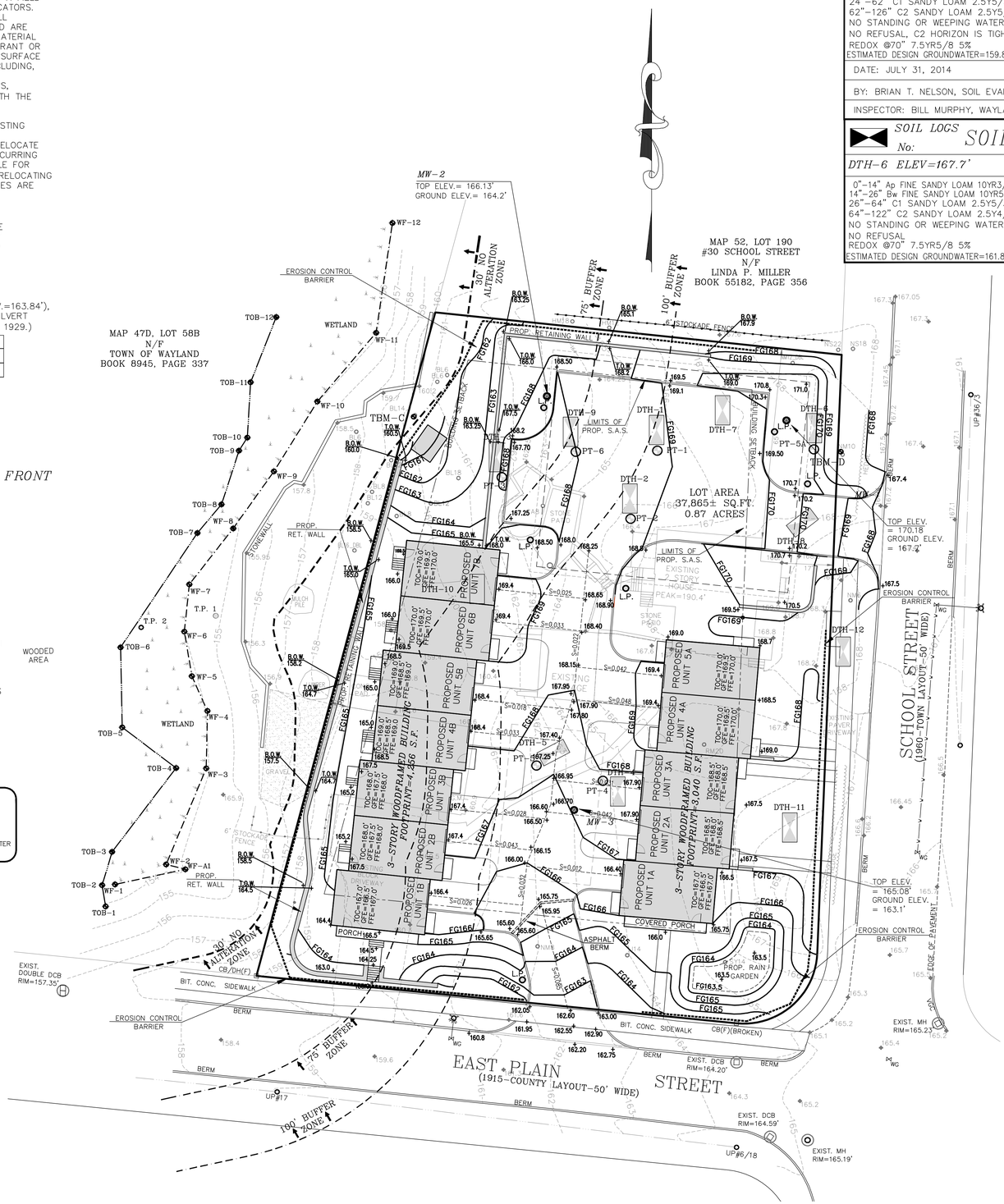
EXISTING TREE DESCRIPTION LEGEND

CODE	DESCRIPTION
BL#	BALCK LOCUST
CA#	CRAB APPLE
HM#	HEMLOCK
LI#	LINDEN
NM#	NORWAY MAPLE
NS#	NORWAY SPRUCE
RM#	RED MAPLE
SY#	SYCAMORE

DETAIL: TREE LOCATION; RO14; TREE CODE; TREE DIAMETER

LEGEND

DCB	DRAIN CATCH BASIN
HM	MANHOLE
⋈WG	WATER GATE
⋈GG	GAS GATE
⊕	HYDRANT
U.P.	UTILITY POST
DH	DRILL HOLE
(F)	FOUND
CB	CONCRETE BOUND
SB	STONE BOUND
WF	WETLAND FLAG
E.M.	ELECTRIC METER
G.M.	GAS METER
N/F	NOW OR FORMERLY
+200.0	EXISTING SPOT GRADE
----200----	EXISTING GRADING
----------	EXISTING OVERHEAD WIRE



SOIL LOGS No: SOIL TEST RESULTS

DTH-1 ELEV=165.7'	DTH-2 ELEV=165.9'	DTH-3 ELEV=161.7'	DTH-4 ELEV=164.1'	DTH-5 ELEV=162.6'
0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-24" Bw FINE SANDY LOAM 10YR5/6 24"-62" C1 SANDY LOAM 2.5Y5/3 62"-126" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER NO REFUSAL, C2 HORIZON IS TIGHT REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=159.87'	0"-22" Ap FINE SANDY LOAM 10YR3/3 22"-42" Bw FINE SANDY LOAM 10YR5/6 42"-96" C1 SANDY LOAM 2.5Y5/3 96"-118" C2 SILT LOAM 2.5Y6/3 WATER WEEPING @106" NO STANDING WATER, NO REFUSAL REDOX @80" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=159.23'	0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-22" Bw FINE SANDY LOAM 10YR5/6 22"-84" C1 SANDY LOAM 2.5Y5/3 84"-110" C2 SILT LOAM 2.5Y6/3 NO STANDING WATER, NO REFUSAL C2 HORIZON IS DAMP REDOX @82" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=154.87'	0"-20" FILL 20"-28" Ap FINE SANDY LOAM 10YR3/3 28"-40" Bw FINE SANDY LOAM 10YR5/6 40"-86" C1 SANDY LOAM 2.5Y5/4 86"-116" C2 SANDY LOAM 2.5Y4/4 NO REFUSAL, NO STANDING OR WEEPING WATER NO REDOX ESTIMATED DESIGN GROUNDWATER=NONE	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-34" Bw FINE SANDY LOAM 10YR5/6 34"-84" C1 SANDY LOAM 2.5Y5/4 84"-118" C2 SANDY LOAM 2.5Y4/3 WEEPING WATER @112" NO REFUSAL REDOX @72" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=156.6'
DATE: JULY 31, 2014				
BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)				
INSPECTOR: BILL MURPHY, WAYLAND BOARD OF HEALTH				

SOIL LOGS No: SOIL TEST RESULTS

DTH-6 ELEV=167.7'	DTH-7 ELEV=166.8'	DTH-8 ELEV=168.2'	DTH-9 ELEV=163.0'	DTH-10 ELEV=160.75'
0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-26" Bw FINE SANDY LOAM 10YR5/6 26"-64" C1 SANDY LOAM 2.5Y5/3 64"-122" C2 SANDY LOAM 2.5Y4/4 NO STANDING OR WEEPING WATER NO REFUSAL REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.87'	0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-32" Bw FINE SANDY LOAM 10YR5/6 32"-58" C1 SANDY LOAM 2.5Y5/3 58"-114" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER LENSES OF SILT LOAM FROM 76" DOWN ESTIMATED DESIGN GROUNDWATER=NONE	0"-26" FILL 26"-40" Bw FINE SANDY LOAM 10YR5/6 40"-78" C1 SANDY LOAM 2.5Y5/4 78"-108" C2 LOAMY SAND 2.5Y5/3 108"-126" C3 SILT LOAM 2.5Y6/3 C3 HORIZON IS DAMP NO REFUSAL REDOX @80" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=161.53'	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-30" Bw FINE SANDY LOAM 10YR5/6 30"-46" Bc SANDY LOAM 2.5Y5/4 46"-98" C1 SANDY LOAM 2.5Y5/3 98"-118" C2 SANDY LOAM 2.5Y4/4 WATER STANDING @108" NO REFUSAL REDOX SEEN @62", NO REFUSAL ESTIMATED DESIGN GROUNDWATER=157.8'	0"-15" Ap FINE SANDY LOAM 10YR3/3 15"-30" Bw FINE SANDY LOAM 10YR5/6 30"-66" C1 LOAMY SAND 2.5Y5/3 66"-112" C2 SILT LOAM 2.5Y5/4 WATER STANDING @100" WATER WEEPING @98" NO REFUSAL REDOX SEEN @68" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=155.08'

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	INSP.
PT-1	60"	8 MPI	07/31/14	B.N.	B.M.
PT-2	68"	13 MPI	07/31/14	B.N.	B.M.
PT-3	50"	10 MPI	07/31/14	B.N.	B.M.
PT-4	55"	MPI	07/31/14	B.N.	B.M.
PT-5	60"	MPI	07/31/14	B.N.	B.M.

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	INSP.
PT-5A	54"	10 MPI	08/21/14	B.N.	J.J.
PT-6	60"	3 MPI	08/21/14	B.N.	J.J.

DTH-11 ELEV=166.0'	DTH-12 ELEV=168.2'
0"-18" FILL 18"-30" Ap FINE SANDY LOAM 10YR3/3 30"-36" Bw FINE SANDY LOAM 10YR5/6 36"-58" C1 SANDY LOAM 2.5Y5/3 58"-128" C2 SANDY LOAM 2.5Y6/3 WATER STANDING @125" NO WEEPING WATER REDOX SEEN @60" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.0'	0"-54" FILL 58"-82" C1 SANDY LOAM 2.5Y4/4 82"-114" C2 SANDY LOAM 2.5Y5/4 C2 HORIZON HAS LENSES OF SILT LOAM NO STANDING OR WEEPING WATER NO REFUSAL REDOX SEEN @64" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=161.0'
DATE: AUGUST 21, 2014	
BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)	
INSPECTOR: JULIA JUNGHANNS, WAYLAND BOARD OF HEALTH	

APPROXIMATE EARTHWORK CALCULATIONS:

TOTAL FILL= 4,571 C.Y.
TOTAL CUT= 106 C.Y.

NET EARTHWORK= 4,465 C.Y. (FILL)

EARTHWORK ACTIVITIES EXEMPTED BY BYLAW

INFILTRATION SYSTEM – 38 CUBIC YARDS (CUT)
GENERAL EARTHWORK – 68 CUBIC YARDS (CUT)
FOUNDATION BUILDING A – 286 CUBIC YARDS (FILL)
FOUNDATION BUILDING B – 1,380 CUBIC YARDS (FILL)
EXISTING HOUSE – 274 CUBIC YARDS (FILL)
DRIVEWAY – 740 CUBIC YARDS (FILL)
PROPOSED SEPTIC SYSTEM – 788 CUBIC YARDS (FILL)

EARTHWORK ACTIVITIES SUBJECT TO BYLAW

GENERAL EARTHWORK – 1,103 CUBIC YARDS (FILL)

FOR METROWEST ENGINEERING, INC. *DATE*
ROBERT A. GEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046

GRAPHIC SCALE
1 inch = 20 ft.
20 0 10 20 40 (FEET) 80
0 4 10 20 (METERS) 30

REVISIONS:

No.	DATE	REVISION
1	4/20/18	REVISIONS TO BUILDING FOOTPRINTS, GRADING, DRAINAGE SYSTEM SND SEPTIC SYSTEM
2	7/05/18	ADDRESS ZBA, CON. COMM. AND NOVER-ARMSTRONG COMMENTS

PROPOSED GRADING PLAN

#24 SCHOOL STREET
IN
WAYLAND, MASS
(MIDDLESEX COUNTY)

PREPARED FOR:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:
MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
WAYLAND, MA 01702
TEL.: (508)626-0063
FAX: (508)875-6440

SHEET 2 OF 5		DATE: SEPTEMBER 6, 2017
CALC'D BY: BTN	FIELD BK: 621	CAD FILE: PROP_SITE_3_R10.dwg
DRAFTER: BTN	PROJECT: WY_SCH	DWG FILE: SP090617_R2.dwg

NOTES:

1. SUBJECT PARCEL IS SHOWN AS ASSESSORS MAP 52, LOT 189. RECORD TITLE FROM BOOK 69050, PAGE 394.

2. UTILITY LOCATIONS DEPICTED ON THIS PLAN, BOTH ABOVE- AND BELOW-GROUND, ARE BASED UPON DIRECT FIELD OBSERVATIONS MADE BY METROWEST ENGINEERING, INC. PERSONNEL DURING A FIELD SURVEY, RECORD PLAN LOCATIONS, OR DIGSAFE PAINT-INDICATORS. METROWEST ENGINEERING, INC. DOES NOT WARRANT THAT ALL UTILITIES ARE SHOWN OR THAT UTILITIES THAT ARE DEPICTED ARE SHOWN IN THE CORRECT LOCATION, OR WITH THE PROPER MATERIAL DESIGNATION. METROWEST ENGINEERING, INC. DOES NOT WARRANT OR PROVIDE AN EXPRESS OR IMPLIED WARRANTY THAT ALL SUBSURFACE IMPROVEMENTS ARE SHOWN OR ARE SHOWN CORRECTLY, INCLUDING, BUT NOT LIMITED TO, UTILITIES, UNDERGROUND VAULTS, UNDERGROUND TANKS OR CHAMBERS, BUNKERS, DUCT BANKS, AND/OR OTHER MAN-MADE IMPROVEMENTS THAT LIE BENEATH THE GROUND SURFACE AT THE TIME OF THE SURVEY.

3. CONTRACTOR IS SOLELY RESPONSIBLE FOR ESTABLISHING EXISTING LOCATIONS OF ALL SUB-SURFACE UTILITIES AND MAN-MADE IMPROVEMENTS AND FOR THE REQUIREMENTS TO REPLACE, RELOCATE OR REPAIR EXISTING UTILITIES IN THE EVENT OF DAMAGE OCCURRING DURING CONSTRUCTION. MWE IS NOT RESPONSIBLE OR LIABLE FOR DELAYS OR COSTS ASSOCIATED WITH REMOVING/REPLACING/RELOCATING OF EXISTING UTILITIES REGARDLESS OF WHETHER SAID UTILITIES ARE ACCURATELY DEPICTED ON THIS SURVEY.

4. THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY; THE PROPERTY LIES WITHIN ZONE "X" OF THE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NUMBER 25017C0528F, BEARING AN EFFECTIVE DATE OF JULY 7, 2014.

BENCHMARKS

ELEVATIONS SHOWN ON THIS PLAN REFER TO RM 11 (ELEV.=163.84'), A CHISELED SQUARE IN THE NORTH HEADWALL OF THE CULVERT UNDER COMMONWEALTH ROAD FOR SNAKE BROOK N.G.V.D. 1929.)

T.B.M.	DESCRIPTION	ELEVATION
C	DHN SET IN 14" BLACK LOCUST	161.89'
D	DHN SET IN 10" NORWAY MAPLE	168.74'

CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING UTILITY SERVICES IN THE FIELD PRIOR TO CONSTRUCTION (WATER, ELECTRICAL, ETC.) CALL DIG-SAFE BEFORE YOU DIG 811.

ZONING:

RESIDENCE ZONE 20,000 – 120' FRONT

MINIMUM LOT AREA= 20,000[15] S.F.
MINIMUM LOT COVERAGE= 20%
MINIMUM FRONTAGE= 200 FT.
SETBACKS:
FRONT LOT LINE= 30[2] FT.
FRONT ROW CENTER LINE= 55 FT.
SIDE YARD= 15[3] FT.
REAR YARD=30 FT.
MAX. HEIGHT = 35 FT./2½ STORIES

2) IF §198-702 SHALL REQUIRE A GREATER SETBACK OR PERMIT A LESSER SETBACK, THE PROVISIONS OF SAID §198-702 SHALL PREVAIL OVER THIS TABLE.

3) SIDE YARDS SHALL MEET THE REQUIREMENTS OF §§198-702.4 AND 703.2, AND THE REQUIRED MINIMUM SIDE YARD MAY BE REDUCED IN ACCORDANCE WITH PROVISIONS OF §198-703.2

15) MINIMUM FRONT YARD WIDTH SHALL BE CALCULATED IN ACCORDANCE WITH THE REQUIREMENTS OF §198-705.1 OF THE ZONING BYLAW.

EXISTING TREE DESCRIPTION LEGEND

CODE	DESCRIPTION
BL#	BALCK LOCUST
CA#	CRAB APPLE
HM#	HEMLOCK
LI#	LINDEN
NM#	NORWAY MAPLE
NS#	NORWAY SPRUCE
RM#	RED MAPLE
SY#	SYCAMORE

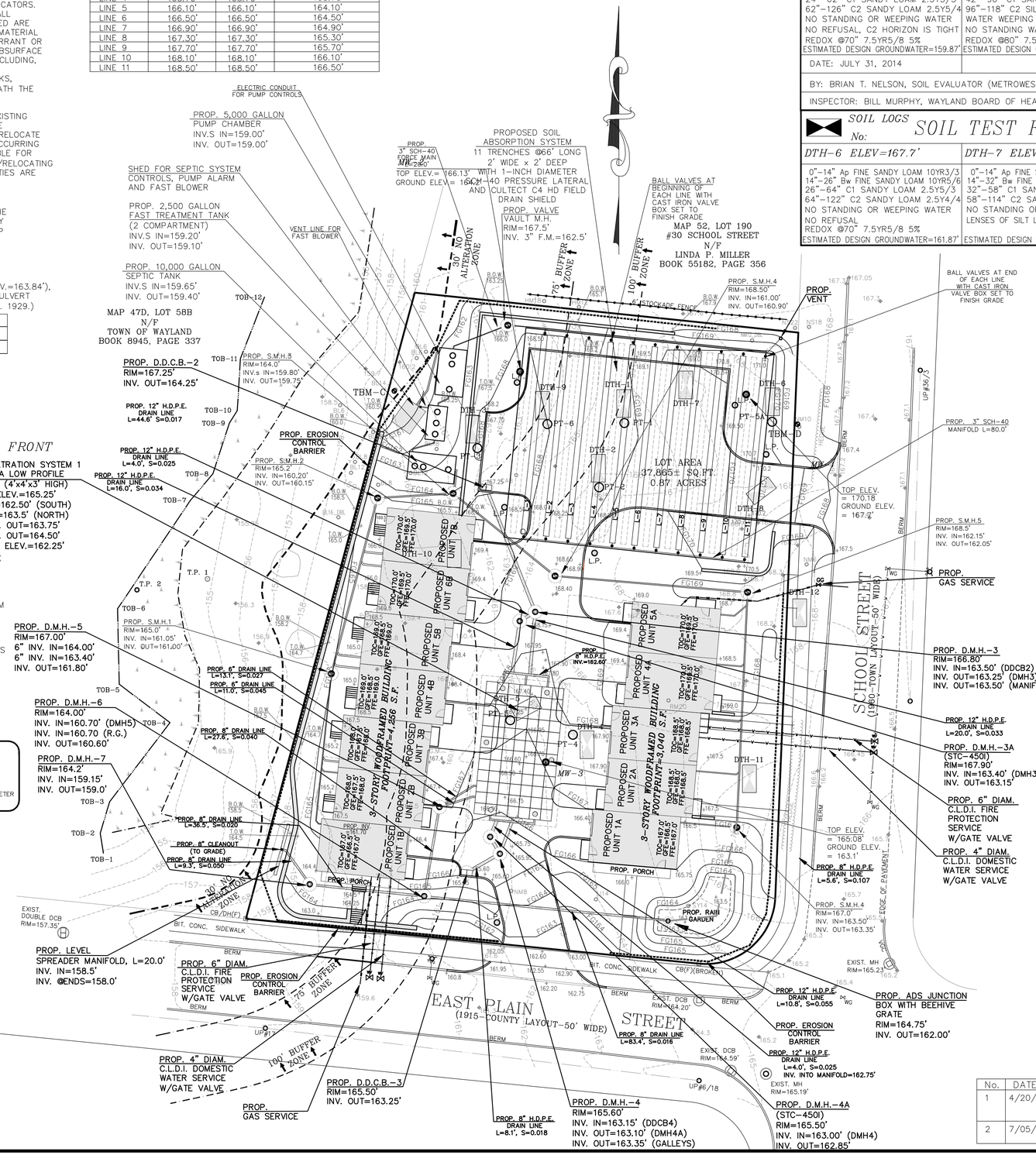
DETAIL: TREE LOCATION R01 TREE CODE TREE DIAMETER

LEGEND

DCB	DRAIN CATCH BASIN
HM	MANHOLE
WG	WATER GATE
GG	GAS GATE
	HYDRANT
U.P.	UTILITY POST
DH	DRILL HOLE
(F)	FOUND
CB	CONCRETE BOUND
SB	STONE BOUND
WF	WETLAND FLAG
E.M.	ELECTRIC METER
G.M.	GAS METER
N/F	NOW OR FORMERLY
+200.0	EXISTING SPOT GRADE
----200----	EXISTING GRADING
----------	EXISTING OVERHEAD WIRE

PROPOSED SOIL ABSORPTION SYSTEM ELEVATIONS

LOCATION	BEG. LINE	END LINE	BOTTOM OF TRENCH
LINE 1	164.50'	164.50'	162.50'
LINE 2	164.90'	164.90'	162.90'
LINE 3	165.30'	165.30'	163.30'
LINE 4	165.70'	165.70'	163.70'
LINE 5	166.10'	166.10'	164.10'
LINE 6	166.50'	166.50'	164.50'
LINE 7	166.90'	166.90'	164.90'
LINE 8	167.30'	167.30'	165.30'
LINE 9	167.70'	167.70'	165.70'
LINE 10	168.10'	168.10'	166.10'
LINE 11	168.50'	168.50'	166.50'



SOIL LOGS No: SOIL TEST RESULTS

DTH-1 ELEV=165.7'	DTH-2 ELEV=165.9'	DTH-3 ELEV=161.7'	DTH-4 ELEV=164.1'	DTH-5 ELEV=162.6'
0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-24" Bw FINE SANDY LOAM 10YR5/6 24"-62" C1 SANDY LOAM 2.5Y5/3 62"-126" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER NO REFUSAL, C2 HORIZON IS TIGHT REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=159.87'	0"-22" Ap FINE SANDY LOAM 10YR3/3 22"-42" Bw FINE SANDY LOAM 10YR5/6 42"-96" C1 SANDY LOAM 2.5Y5/3 96"-118" C2 SILT LOAM 2.5Y6/3 WATER WEEPING @106" NO STANDING WATER, NO REFUSAL REDOX @80" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=159.23'	0"-10" Ap FINE SANDY LOAM 10YR3/3 10"-22" Bw FINE SANDY LOAM 10YR5/6 22"-84" C1 SANDY LOAM 2.5Y5/3 84"-110" C2 SILT LOAM 2.5Y6/3 NO STANDING WATER, NO REFUSAL C2 HORIZON IS DAMP REDOX @82" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=154.87'	0"-20" FILL 20"-28" Ap FINE SANDY LOAM 10YR3/3 28"-40" Bw FINE SANDY LOAM 10YR5/6 40"-86" C1 SANDY LOAM 2.5Y5/4 86"-116" C2 SANDY LOAM 2.5Y4/4 NO REFUSAL, NO STANDING OR WEEPING WATER NO REDOX ESTIMATED DESIGN GROUNDWATER=NONE	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-34" Bw FINE SANDY LOAM 10YR5/6 34"-84" C1 SANDY LOAM 2.5Y5/4 84"-118" C2 SANDY LOAM 2.5Y4/3 WEEPING WATER @112" NO REFUSAL REDOX @72" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=156.6'

DATE: JULY 31, 2014

BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)

INSPECTOR: BILL MURPHY, WAYLAND BOARD OF HEALTH

SOIL LOGS No: SOIL TEST RESULTS

DTH-6 ELEV=167.7'	DTH-7 ELEV=166.8'	DTH-8 ELEV=168.2'	DTH-9 ELEV=163.0'	DTH-10 ELEV=160.75'
0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-26" Bw FINE SANDY LOAM 10YR5/6 26"-64" C1 SANDY LOAM 2.5Y5/3 64"-122" C2 SANDY LOAM 2.5Y4/4 NO STANDING OR WEEPING WATER NO REFUSAL REDOX @70" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.87'	0"-14" Ap FINE SANDY LOAM 10YR3/3 14"-32" Bw FINE SANDY LOAM 10YR5/6 32"-58" C1 SANDY LOAM 2.5Y5/3 58"-114" C2 SANDY LOAM 2.5Y5/4 NO STANDING OR WEEPING WATER LENSES OF SILT LOAM FROM 76" DOWN ESTIMATED DESIGN GROUNDWATER=NONE	0"-26" FILL 26"-40" Bw FINE SANDY LOAM 10YR5/6 40"-78" C1 SANDY LOAM 2.5Y5/4 78"-108" C2 LOAMY SAND 2.5Y5/3 108"-126" C3 SILT LOAM 2.5Y6/3 C3 HORIZON IS DAMP NO REFUSAL REDOX @80" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=161.53'	0"-16" Ap FINE SANDY LOAM 10YR3/3 16"-30" Bw FINE SANDY LOAM 10YR5/6 30"-46" Bc SANDY LOAM 2.5Y5/4 46"-98" C1 SANDY LOAM 2.5Y5/3 98"-118" C2 SANDY LOAM 2.5Y4/4 WATER STANDING @108" NO REFUSAL REDOX SEEN @62", NO REFUSAL ESTIMATED DESIGN GROUNDWATER=157.8'	0"-15" Ap FINE SANDY LOAM 10YR3/3 15"-30" Bw FINE SANDY LOAM 10YR5/6 30"-66" C1 LOAMY SAND 2.5Y5/3 66"-112" C2 SILT LOAM 2.5Y5/4 WATER STANDING @100" WATER WEEPING @98" NO REFUSAL REDOX SEEN @68" 7.5YR5/8 10% ESTIMATED DESIGN GROUNDWATER=155.08'

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	INSP.
PT-1	60"	8 MPI	07/31/14	B.N.	B.M.
PT-2	68"	13 MPI	07/31/14	B.N.	B.M.
PT-3	50"	10 MPI	07/31/14	B.N.	B.M.
PT-4	55"	MPI	07/31/14	B.N.	B.M.
PT-5	60"	MPI	07/31/14	B.N.	B.M.

DATE: AUGUST 21, 2014

BY: BRIAN T. NELSON, SOIL EVALUATOR (METROWEST ENGINEERING, INC.)

INSPECTOR: JULIA JUNGHANNS, WAYLAND BOARD OF HEALTH

PERCOLATION

NO.	DEPTH	RATE	DATE	BY	INSP.
PT-5A	54"	10 MPI	08/21/14	B.N.	J.J.
PT-6	60"	3 MPI	08/21/14	B.N.	J.J.

DTH-11 ELEV=166.0'	DTH-12 ELEV=168.2'
0"-18" FILL 18"-30" Ap FINE SANDY LOAM 10YR3/3 30"-36" Bw FINE SANDY LOAM 10YR5/6 36"-58" C1 SANDY LOAM 2.5Y5/3 58"-128" C2 SANDY LOAM 2.5Y6/3 WATER STANDING @125" NO WEEPING WATER REDOX SEEN @60" 7.5YR5/8 5% ESTIMATED DESIGN GROUNDWATER=161.0'	0"-54" FILL 58"-82" C1 SANDY LOAM 2.5Y4/4 82"-114" C2 SANDY LOAM 2.5Y5/4 C2 HORIZON HAS LENSES OF SILT LOAM NO STANDING OR WEEPING WATER NO REFUSAL REDOX SEEN @64" 7.5YR5/8 ESTIMATED DESIGN GROUNDWATER=161.0'

REVISIONS:

No.	DATE	REVISION
1	4/20/18	REVISIONS TO BUILDING FOOTPRINTS, GRADING, DRAINAGE SYSTEM SND SEPTIC SYSTEM
2	7/05/18	ADDRESS ZBA, CON. COMM. AND NOVER-ARMSTRONG COMMENTS

FOR METROWEST ENGINEERING, INC. *DATE*
ROBERT A. GEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046

GRAPHIC SCALE
1 inch = 20 ft.
20 0 10 20 40 (FEET) 80
0 4 10 20 (METERS) 30

PROPOSED SITE PLAN
#24 SCHOOL STREET
IN
WAYLAND, MASS
(MIDDLESEX COUNTY)

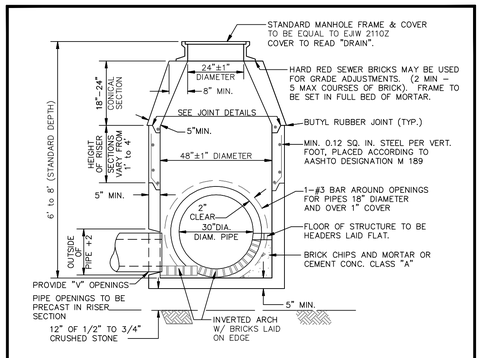
PREPARED FOR:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:
MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
WAYLAND, MA 01702
TEL.: (508)626-0063
FAX: (508)875-6440

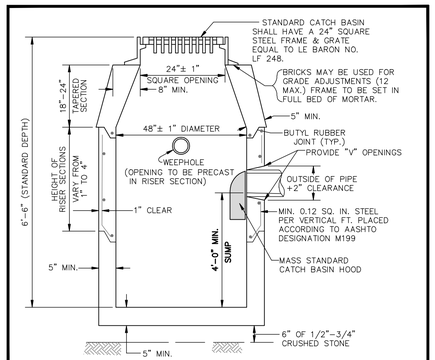
SHEET 3 OF 5		DATE: SEPTEMBER 6, 2017
CALC'D BY: BTN	FIELD BK: 621	CAD FILE: PROP_SITE_3_R10.dwg
DRAFTER: BTN	PROJECT: WY_SCH	DWG FILE: SP090617_R2.dwg

PRECAST CONCRETE DRAIN MANHOLE
NOT TO SCALE



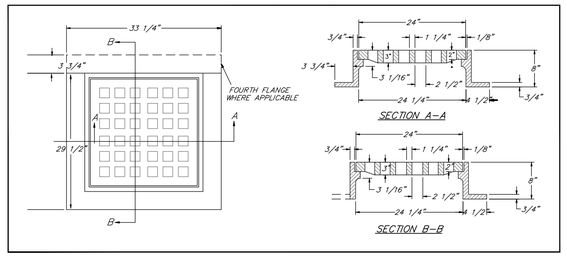
NOTES:
1. ALL DRAINS AND STORM DRAIN MANHOLES SHALL CONFORM TO TOWN OF WAYLAND STANDARDS
2. ALL INLET AND OUTLET PIPES SHALL BE FITTED WITH WATER TIGHT, SYNTHETIC RUBBER BOOTS

PRECAST CONCRETE CATCH BASIN
NOT TO SCALE

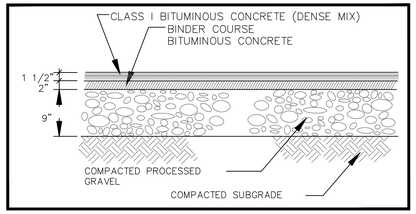


NOTE: NO BELL ENDS IN CATCH BASIN. ALL INLET AND OUTLET PIPES SHALL BE FITTED WITH WATER TIGHT, SYNTHETIC RUBBER BOOTS

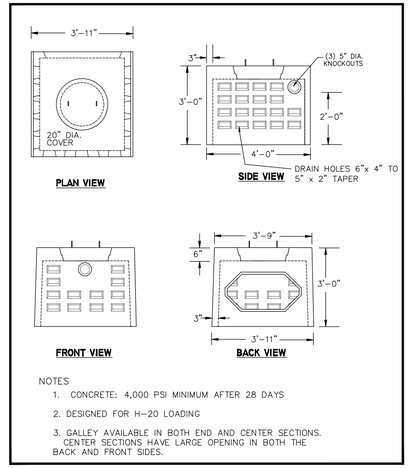
SQUARE CATCH BASIN FRAME & GRATE
NOT TO SCALE



BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE

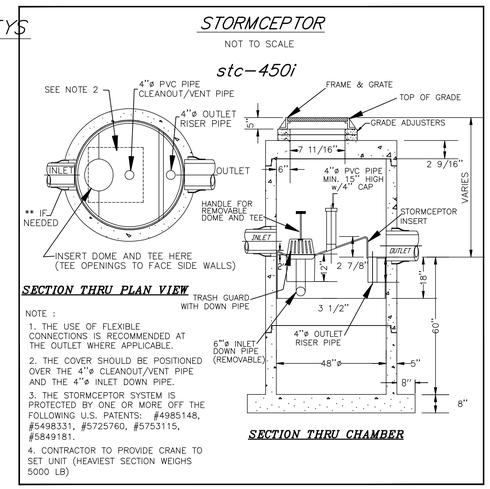


DRAINAGE INFILTRATION LEACHING GALLEYS
NOT TO SCALE



NOTES
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS
2. DESIGNED FOR H–20 LOADING
3. GALLEY AVAILABLE IN BOTH END AND CENTER SECTIONS. CENTER SECTIONS HAVE LARGE OPENING IN BOTH THE BACK AND FRONT SIDES.

STORMCEPTOR
NOT TO SCALE

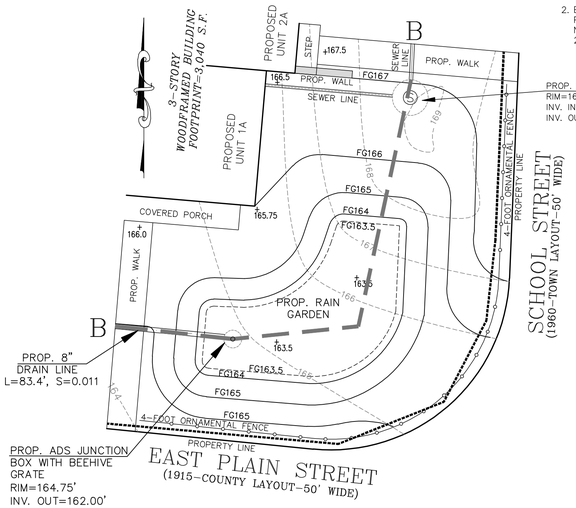


SECTION THRU PLAN VIEW

NOTE :
1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE 4"ø CLEANOUT/VENT PIPE AND THE 4"ø INLET DOWN PIPE.
3. THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OFF THE FOLLOWING U.S. PATENTS: #4985148, #5498331, #5725760, #5753115, #5849181.
4. CONTRACTOR TO PROVIDE CRANE TO SET UNIT (HEAVIEST SECTION WEIGHS 5000 LB)

SECTION THRU CHAMBER

PROPOSED RAIN GARDEN
NOT TO SCALE



NOTE:
1. PLANTING MIX FOR RAIN GARDENS SHALL BE TESTED PRIOR TO INSTALLATION OF PLANTS AND/OR SEEDING. A COMPREHENSIVE SOIL TEST WILL BE PERFORMED BY A QUALIFIED LABORATORY FOR pH, ORGANIC MATTER, P, K, Mg, Ca, S, B, Cu, Fe, Mn, Zn, Na, AVAILABLE NITROGEN, SOLUABLE SALT AND LEAD SCAN. LABORATORY REPORT SHALL INCLUDE RECOMMENDATIONS FOR ADDITIVES
2. BASINS SHALL BE HYDRO–SPRAYED WITH A BLEND OF PROFILE PROGANICS, APPLIED AT A RATE OF 5,000 POUNDS PER ACRE, AND NEW ENGLAND CONSERVATION WILDLIFE MIX, APPLIED AT A RATE OF 25 POUNDS PER ACRE.

PLANTING SCHEDULE

ZONE 1 – ELEVATION 163.5' TO 164.0'

HERBACEOUS

SPECIES	QUANTITY	SIZE
SWITCHGRASS (PANICUM VIRGATUM)	40	1 GALLON
LURID SEDGE (CAREX LURIDA)	40	1 GALLON
BLUE FLAG IRIS (IRIS VERSICOLOR)	40	1 GALLON
CARDINAL FLOWER (LOBELIA CARDINALIS)	40	1 GALLON
NEW ENGLAND ASTER (ASTER NOVAE–ANGLIAE)	40	1 GALLON
BEARD TONGUE (PENSTEMON)	40	1 GALLON
BEE BALM (MONARDA)	40	1 GALLON
IRONWEED (VERNONIA NOVEBORACENSIS)	40	1 GALLON
BROOM SEDGE (ANDROPOGON VIRGINICUS)	40	1 GALLON

ZONE 2 – ELEVATION 164.0' TO 165.0'

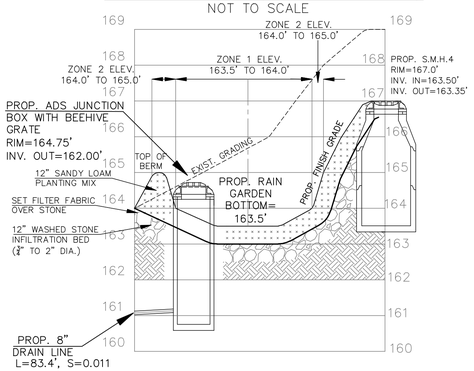
SHRUBS

SYMBOL	SPECIES	QUANTITY	SIZE
SC	ELDERBERRY (SAMBUCUS CANADENSIS)	2	6' HIGH
VC	HIGHBUSH BLUEBERRY (VACCINIUM CORYMBOSUM)	2	6' HIGH
CS	RED OSIER DOGWOOD (CORNUS SERICEA)	2	6' HIGH

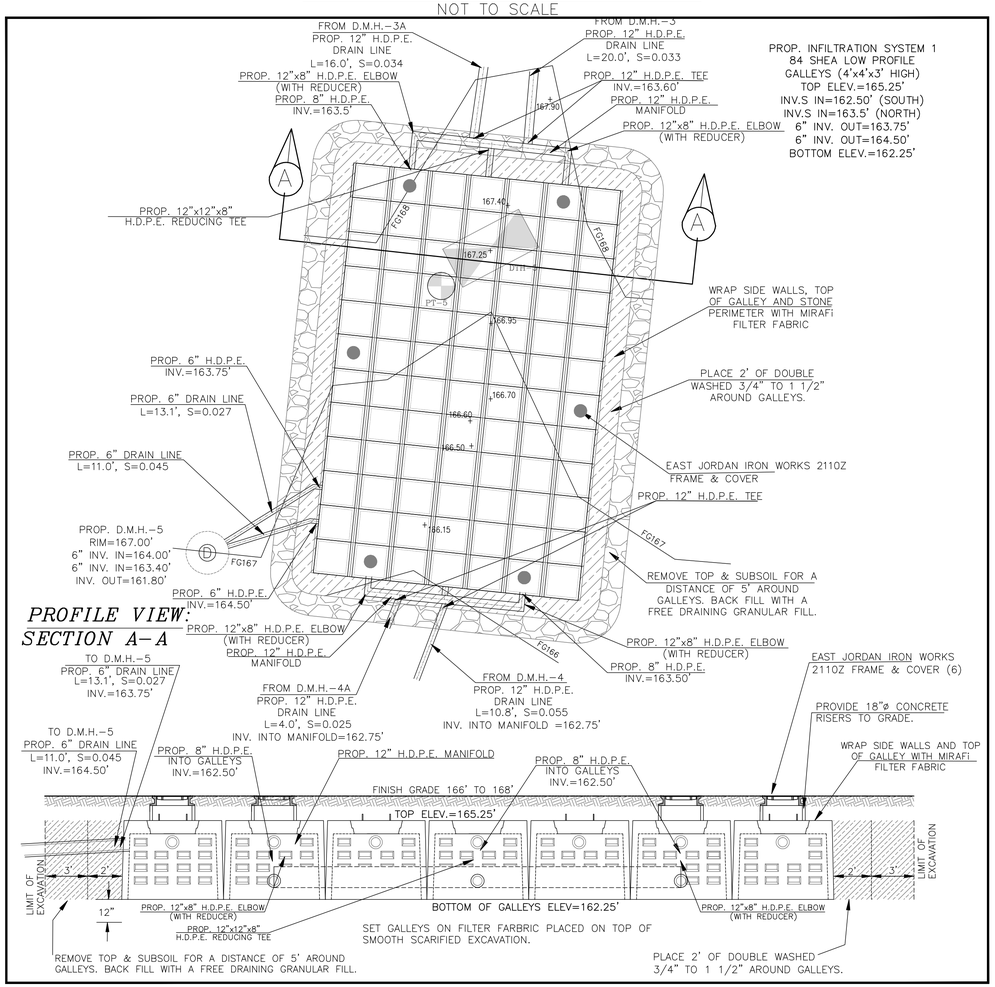
HERBACEOUS

SPECIES	QUANTITY	SIZE
NEW ENGLAND ASTER (ASTER NOVAE–ANGLIAE)	15	1 GALLON
MARSH BLAZINGSTAR (LIATRIS SPICATA)	15	1 GALLON
WILD BERGAMOT (MONARDA FISTULOSA)	15	1 GALLON
JOE–PYE WEED (EUPATORIUM MACULATUM)	15	1 GALLON
SWITCHGRASS (PANICUM VIRCATUM)	15	1 GALLON
BIG BLUESTEM (ANDROPOGON GERARDII)	15	1 GALLON
BLACK EYED SUSAN (RUDBECKIA HIRTA)	15	1 GALLON
INDIAN GRASS (SORGHASTRUM NUTANS)	15	1 GALLON

PROFILE B–B (RAIN GARDEN)
NOT TO SCALE



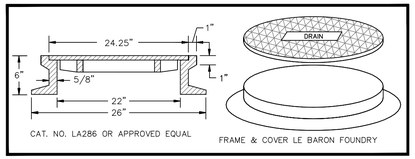
PROPOSED INFILTRATION SYSTEM 1
NOT TO SCALE



PROP. INFILTRATION SYSTEM 1
84 SHEA LOW PROFILE GALLEYS (4'x4'x3' HIGH)
TOP ELEV.=165.25'
INV.S IN=162.50' (SOUTH)
INV.S IN=163.5' (NORTH)
6" INV. OUT=163.75'
6" INV. OUT=164.50'
BOTTOM ELEV.=162.25'

PROFILE VIEW: SECTION A–A

STANDARD DRAIN MANHOLE FRAME & COVER
NOT TO SCALE



REVISIONS:

No.	DATE	REVISION
1	4/20/18	REVISIONS TO BUILDING FOOTPRINTS, GRADING, DRAINAGE SYSTEM SND SEPTIC SYSTEM
2	7/05/18	ADDRESS ZBA, CON. COMM. AND NOVER–ARMSTRONG COMMENTS

FOR METROWEST ENGINEERING, INC. DATE
ROBERT A. GEMMA, P.E.(CIVIL) # 31967
P.L.S. # 37046

PROPOSED DETAILS PLAN

#24 SCHOOL STREET
IN
WAYLAND, MASS
(MIDDLESEX COUNTY)

PREPARED FOR:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:

MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
WAYLAND, MA 01702
TEL.: (508)626–0063
FAX: (508)875–6440

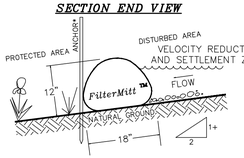
SHEET 4 OF 5		DATE: SEPTEMBER 6, 2017
CALC'D BY: BTN	FIELD BK: 621	CAD FILE: PROP_SITE_3_R10.dwg
DRAFTER: BTN	PROJECT: WY_SCH	DWG FILE: SP090617_R2.dwg

EROSION CONTROL BARRIER

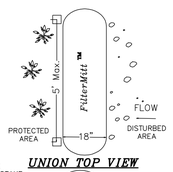
NOT TO SCALE

FilterMitt™ **by Groundscapes Express, Inc.**
2:1 SLOPES OR GREATER

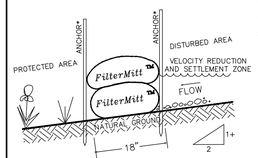
SECTION END VIEW



SECTION TOP VIEW

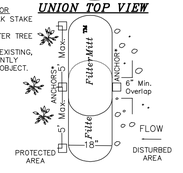


UNION END VIEW



UNION TOP VIEW

*ANCHOR
1"x1"x36" OAK STAKE
OR
2" OR GREATER TREE
OR
OTHER PRE-EXISTING, EQUIVALENTLY ANCHORED OBJECT.



USE 18-INCH DIAMETER FILTER MITT.

***FilterMitt*™ COMPONENTS:**
OUTSIDE CASING: 100% organic hessian.
FILLER INGREDIENT: *FiberRoot Mulch*™
- A blend of coarse and fine compost and shredded wood.
- Particle sizes: 100% passing a 3" screen; 90–100% passing a 1" screen; 70–100% passing a 0.75" screen; 30–75% passing a 0.25" screen.
- Weight: Approx. 850 lbs./cu.yd. (Ave. 30 lbs./l.f.)

For more information visit:
www.groundscapesexpress.com
or contact us at:
Groundscapes Express, Inc.
P.O. Box 737
Wrentham, MA 02093
(508) 384–7140

***FilterMitt*™ INSTALLATION:**
With the newest technology and equipment, sections can be constructed on site in lengths from 1' to 100'.

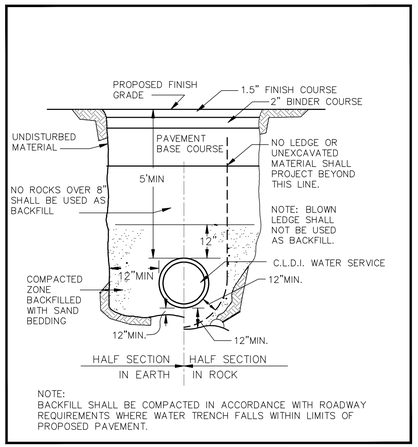
Sections can also be delivered to the site in lengths from 1' to 8'.

The flexibility of *FilterMitt*™ allows it to conform to any contour or terrain while holding a slightly oval shape at 12" high by 18" wide.

Where section ends meet, there shall be an overlap of 6" or greater. Both sides shall be anchored (oak stakes, trees, etc.) to stabilize the union. Additional anchors shall also be placed at 5' intervals (max.) on the downslope or protected side to prevent movement.

WATER MAIN TRENCH DETAIL

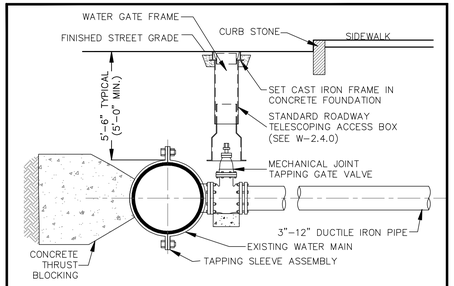
NOT TO SCALE



NOTE:
BACKFILL SHALL BE COMPACTED IN ACCORDANCE WITH ROADWAY REQUIREMENTS WHERE WATER TRENCH FALLS WITHIN LIMITS OF PROPOSED PAVEMENT.

TYPICAL DOMESTIC AND FIRE SERVICE CONNECTION

NOT TO SCALE

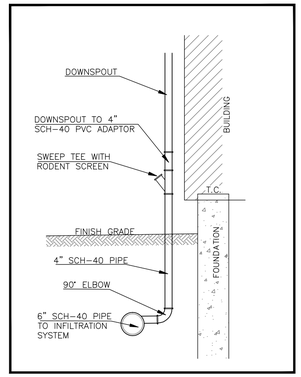


NOTES:

1. MAXIMUM TAPPING SLEEVE SHALL NOT BE GREATER THAN ½ DIAMETER OF CONNECTING MAIN.
2. MEGA LUG RESTRAINTS ON ALL MECHANICAL JOINTS.
3. SEPARATE DOMESTIC AND FIRE SERVICES SHALL BE INSTALLED FROM THE BUILDING SERVICED TO THE PUBLIC WATER MAIN.
4. THE PROPERTY OWNER IS RESPONSIBLE FOR MAINTENANCE OF THE FIRE SERVICE FROM THE BUILDING SERVICED TO THE PUBLIC WATER MAIN

DOWNSPOUT DETAIL

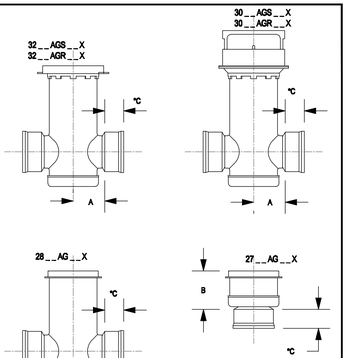
NOT TO SCALE



P.V.C. JUNCTION BOX

NOT TO SCALE

BODY SIZE	ADAPTER SIZE	A	B
8"	4"	6.50	7.00
8"	6"	6.50	8.50
8"	8"	6.75	7.25
10"	4"	7.25	8.75
10"	6"	7.25	8.75
10"	8"	7.75	8.50
10"	10"	7.75	7.75
12"	4"	8.25	10.25
12"	6"	8.25	11.00
12"	8"	8.75	11.00
12"	10"	8.75	11.00
12"	12"	8.25	8.00
15"	4"	8.66	13.25
15"	6"	8.66	12.75
15"	8"	10.15	12.25
15"	10"	10.15	13.00
15"	12"	10.65	12.75
15"	15"	10.65	7.00
18"	4"	11.35	14.00
18"	6"	11.35	14.00
18"	8"	11.85	14.00
18"	10"	11.85	14.00
18"	12"	12.35	14.00
18"	15"	12.35	13.50
18"	18"	12.85	8.25
24"	4"	14.40	18.00
24"	6"	14.40	16.00
24"	8"	14.90	16.00
24"	10"	14.90	16.00
24"	12"	15.40	16.00
24"	15"	15.40	15.00
24"	18"	15.90	15.00
24"	24"	16.80	10.25
30"	4"	18.00	18.00
30"	6"	18.00	16.00
30"	8"	18.00	15.75
30"	10"	18.50	18.00
30"	12"	19.00	15.00
30"	15"	19.00	17.00
30"	18"	19.00	17.75
30"	24"	20.00	14.00
30"	30"	27.00	9.00



DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
°C - SEE DRAWING NO. 7005-119-276 FOR ADS N-12 & NAYOCOR DUAL WALL BELL INFORMATION & DRAWING NO. 7005-119-364 FOR N-12 HP BELL INFORMATION

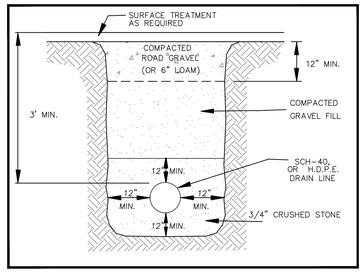
Nyloplast
2120 VERONA AVE
DUPONT, GA 30818
PHN (706) 933-5443
FAX (706) 933-5490
www.nyloplast-us.com

TITLE
8 IN - 36 IN BODY TO ADAPTER DIMENSIONS

DWG NO. 7005-119-085 REV E

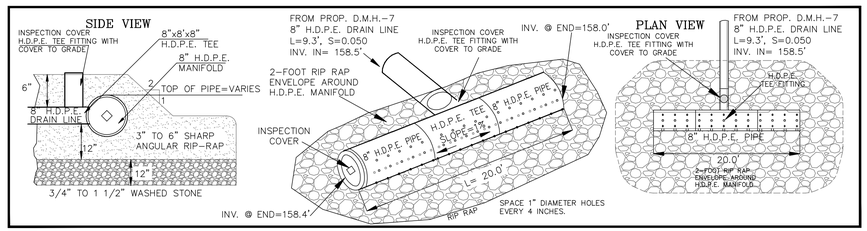
TYPICAL DRAIN LINE TRENCH

NOT TO SCALE



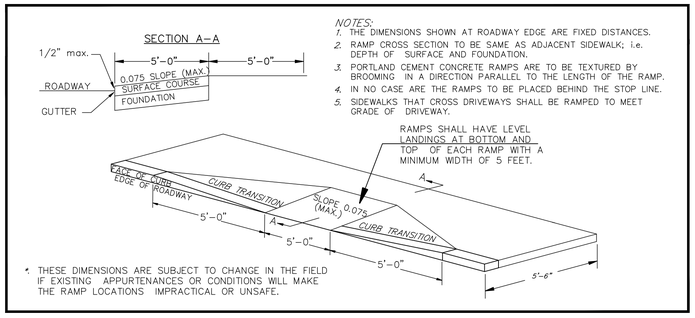
LEVEL SPREADER FLOW MANIFOLD DETAIL

NOT TO SCALE



CONCRETE RAMP DETAIL

NOT TO SCALE

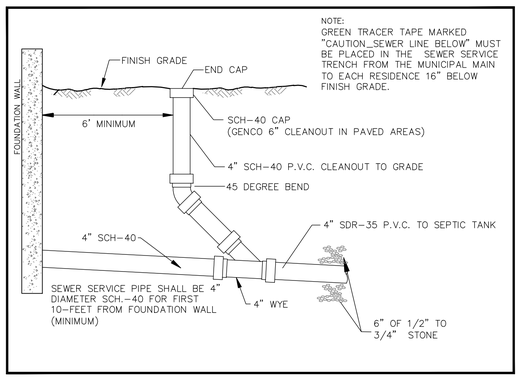


NOTES:
1. THE DIMENSIONS SHOWN AT ROADWAY EDGE ARE FIXED DISTANCES.
2. RAMP CROSS SECTION TO BE SAME AS ADJACENT SIDEWALK; i.e. DEPTH OF SURFACE AND FOUNDATION.
3. PORTLAND CEMENT CONCRETE RAMPS ARE TO BE TEXTURED BY BROOMING IN A DIRECTION PARALLEL TO THE LENGTH OF THE RAMP.
4. IN NO CASE ARE THE RAMPS TO BE PLACED BEHIND THE STOP LINE.
5. SIDEWALKS THAT CROSS DRIVEWAYS SHALL BE RAMPED TO MEET GRADE OF DRIVEWAY.

*. THESE DIMENSIONS ARE SUBJECT TO CHANGE IN THE FIELD IF EXISTING APPURTENANCES OR CONDITIONS WILL MAKE THE RAMP LOCATIONS IMPRACTICAL OR UNSAFE.

TYPICAL SEWER SERVICE CONNECTION

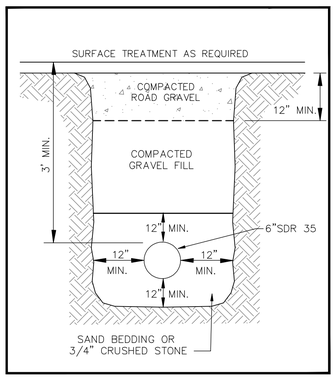
NOT TO SCALE



NOTE:
GREEN TRACER TAPE MARKED "CAUTION_SEWER LINE BELOW" MUST BE PLACED IN THE SEWER SERVICE TRENCH FROM THE MUNICIPAL MAIN TO EACH RESIDENCE 16" BELOW FINISH GRADE.

TYPICAL SEWER TRENCH

NOT TO SCALE



H.D.P.E. DRAIN PIPE MATERIALS AND INSTALLATION

1.) ALL PIPE SHALL CONFORM TO MASSDOT SECTION M5.03.10.
2.) PIPE SHALL BE SMOOTH INTERIOR WALL AND CORRUGATED EXTERIOR WALL AND SHALL BE BELL AND SPIGOT CONNECTION.
3.) PIPE SHALL COMPLY WITH REQUIREMENTS AND MARKINGS FOUND IN AASHTO DESIGNATIONS M252 AND M294.
4.) ALL PIPE SHALL SUPPORT AN HS–20 LIVE LOAD WITH A MAXIMUM DEFLECTION OF 5% OF THE PIPE DIAMETER.
5.) ALL PIPE AND FITTINGS SHALL BE MADE FROM VIRGIN POLYETHYLENE COMPOUNDS WHICH CONFORM TO CURRENT AASHTO CLASSIFICATIONS AND ALSO AS DEFINED IN ASTM D3530.
6.) PIPES SHALL BE CAREFULLY LAID TO LINES AND GRADES AS SHOWN ON DESIGN PLANS.
7.) PIPE BEDDING MATERIAL SHALL BE PLACED TO A DEPTH OF NO LESS THAN SIX–INCHES BELOW THE INVERT OF THE PIPE.
8.) TRENCHES FOR DRAIN LINES SHALL PROVIDE MINIMUM OF TWELVE–INCHES (12") OF HORIZONTAL CLEARANCE FROM SIDES OF PIPE TO EDGE OF TRENCH.
9.) INSTALLATION OF H.D.P.E. PIPE SHALL BE IN ACCORDANCE WITH ASTM D2321 AND AS RECOMMENDED BY THE MANUFACTURER.
10.) WATER TIGHT JOINTS SHALL BE USED ON ALL PIPES IN ACCORDANCE WITH ASTM D3212. PIPE JOINTS SHALL BE BELL AND SPIGOT WITH ELASTOMERIC RUBBER GASKETS MEETING OR EXCEEDING ASTM F477.
11.) PIPE BEDDING MATERIAL OR 3/4" CRUSHED STONE SHALL BE CAREFULLY BACKFILLED AND COMPACTED AROUND PIPE TO A DEPTH OF TWELVE–INCHES ABOVE THE TOP OF PIPE.
12.) MATERIAL FOR BACKFILLING THE REMAINDER OF THE TRENCH, PAVEMENT AND PAVEMENT BASE MATERIAL EXCLUDED, SHALL BE BACKFILLED AND COMPACTED IN TWELVE–INCH LIFTS WITH SUITABLE MATERIAL WITH NO STONES GREATER THAN FOUR–INCHES IN DIAMETER. MATERIAL SHOULD BE FREE OF ORGANICS AND DEBRIS.
13.) TRENCH SHALL BE FINISHED WITH SIX–INCHES (6") OF LOAM AND SEED IN NON PAVED AREAS AND PREPARED IN ACCORDANCE WITH PAVEMENT STRUCTURE IN PAVED AREAS.

SUBSURFACE INFILTRATION SYSTEM MATERIALS AND INSTALLATION

1.) ALL MATERIALS ASSOCIATED SHALL BE IN ACCORDANCE WITH THE DESIGN PLANS AND THE TOWN OF WAYLAND DEPARTMENT OF PUBLIC WORKS CONSTRUCTION STANDARDS.
2.) SUBSURFACE LEACHING CHAMBERS SHALL BE SHEA DW–SDW GALLEYS OR APPROVED EQUAL.
3.) FILTER FABRIC SHALL BE MIRAFI 140N (TENCATE INDUSTRIES) OR APPROVED EQUAL.
4.) ACCESS MANHOLES SHALL BE REQUIRED AT LOCATIONS SPECIFIED ON DESIGN PLANS.
5.) ACCESS MANHOLES SHALL CONSIST OF EAST JORDAN IRON WORKS 2111Z/2111A, HEAVY DUTY FRAME AND COVER AND SHALL MEET OR EXCEED HS–20 LOADING REQUIREMENTS.
6.) ACCESS MANHOLES SHALL BE ADJUSTED TO FINISH GRADE WITH PRECAST CONCRETE RISERS AND/OR LAYERS OF BRICK AND MORTAR.
7.) EXCAVATION FOR PRECAST LEACHING CHAMBERS SHALL BE DONE CAREFULLY TO AVOID SMEARING AND COMPACTION OF BOTTOM AND EXCAVATION SIDEWALLS.
8.) ANY UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH FREE DRAINING MATERIAL, INCLUDING BUT NOT LIMITED TO TITLE V SAND.
9.) ALL PRECAST LEACHING CHAMBERS SHALL BE PLACED ON A TWELVE–INCH (12") DEEP LAYER OF COMPACTED 3/4" TO 1 1/2" DOUBLE WASHED CRUSHED STONE.
10.) PRECAST LEACHING CHAMBERS SHALL BE CAREFULLY PLACED AT THE SAME ELEVATION IN ROWS AND BUTTED TOGETHER SO NO VOIDS EXIST BETWEEN UNITS.
11.) AREAS BETWEEN ROWS OF PRECAST LEACHING CHAMBERS SHALL BE FILLED WITH 3/4" TO 1 1/2" DOUBLE WASHED STONE.
12.) ALL PIPES SHALL BE SECURELY MORTARED IN PLACE TO PROVIDE WATER TIGHT CONNECTIONS.
13.) FILTER FABRIC SHALL BE INSTALLED AROUND THE SIDES, AND ON TOPO OF THE PRECAST LEACHING CHAMBERS.
14.) CONTRACTOR SHALL OVERLAP ROWS OF FILTER FABRIC ONE–HALF FOOT (0.5') AND CAREFULLY BACKFILL AROUND AND ON TOP OF THE LEACHING CHAMBERS TO AVOID SHIFTING OR TEARING FILTER FABRIC.
15.) INSTALL AND COMPACT 3/4" TO 1 1/2" DOUBLE WASHED STONE IN TWELVE–INCH (12") LIFTS FOR A DISTANCE OF TWO–FEET (2') AROUND THE PERIMETER OF LEACHING CHAMBERS.

DRAINAGE MATERIALS NOTES:

PRECAST CONCRETE DRAIN MANHOLE MATERIALS AND INSTALLATION

1.) ALL MATERIALS ASSOCIATED SHALL BE IN ACCORDANCE WITH THE DESIGN PLANS, THE TOWN OF WAYLAND DEPARTMENT OF PUBLIC WORKS CONSTRUCTION STANDARDS.
2.) STORMCEPTOR UNITS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
3.)FILTER FABRIC SHALL BE MIRAFI 140N (TENCATE INDUSTRIES) OR APPROVED EQUAL.
4.) MANHOLES SHALL BE CONSTRUCTION OF REINFORCED PRECAST CONCRETE BASE SECTION, BARREL SECTION AND DOME SECTION MEETING THE REQUIREMENTS OF ASTM C78 AND AASHTO M199. CONCRETE SHALL HAVE A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 4,000 P.S.I.
5.) IN CASES WHERE VERTICAL TOLERANCE DOES NOT PERMIT A CONE TOP SECTION, A PRECAST CONCRETE FLAT SECTION MAY BE USED.
6.) MANHOLES SHALL MEET OR EXCEED HS–20 LOADING REQUIREMENTS.
7.) MANHOLES SHALL HAVE A MINIMUM OPENING OF 26–INCHES AND A MINIMUM INSIDE DIAMETER OF FOUR–FEET (4').
7.) MANHOLES SHALL HAVE TONGUE AND GROOVE JOINTS BETWEEN SECTIONS THAT ARE MORTARED OR SEALED WITH BUTYL RUBBER SEALANTS.
8.) PIPE INLETS AND OUTLETS SHALL BE SEALED WITH MORTAR OR RUBBER SEALANTS OR BOOT TYPE CONNECTIONS.
9.) DRAIN MANHOLES SHALL BE PLACED ON A LAYER OF COMPACTED, LEVEL, BEDDING MATERIAL NOT LESS THAN SIX–INCHES IN HEIGHT.
10.) MANHOLE SECTIONS SHALL BE CAREFULLY PLACED SO THAT ALL SECTIONS ARE LEVEL AND PLUMB.
11.) EXCAVATION AROUND THE MANHOLE STRUCTURES SHALL BE BACKFILLED AND COMPACTED IN TWELVE–INCH (12") LIFTS WITH SUITABLE MATERIALS.
12.) ROAD BASE MATERIAL AND PAVEMENT MATERIALS SHALL BE INSTALLED AROUND STRUCTURES IN ACCORDANCE WITH BASE AND PAVEMENT PREPARATION INSTRUCTIONS.
13.) MANHOLE ACCESS FRAME AND COVER SHALL CONSIST OF EAST JORDAN IRONWORKS 2111A/2111Z FRAME AND COVER.
14.) FRAME AND COVER SHALL BE ADJUSTED TO FINISH GRADE USING LAYERS OF MORTAR AND BRICK.
15.) FRAME AND COVERS SHALL MEET ASTM A888 ANDMADE FROM CLASS 20, GREY CAST IRON.

PRECAST CONCRETE DRAIN CATCH BASIN MATERIALS AND INSTALLATION

1.) ALL MATERIALS ASSOCIATED SHALL BE IN ACCORDANCE WITH THE DESIGN PLANS, THE TOWN OF WAYLAND DEPARTMENT OF PUBLIC WORKS CONSTRUCTION STANDARDS.
2.) ALL CATCH BASINS SHALL HAVE A SUMP OF AT LEAST FOUR–FEET (48–INCHES) BELOW THE INVERT OF THE OUTLET PIPE AND SHALL HAVE A HOOD ON OUTLET PIPES.
3.) CATCH BASIN HOODS SHALL EXTEND AT LEAST ONE–FOOT BELOW THE INVERT OF THE OUTLET PIPE.
4.) CATCH BASINS SHALL BE CONSTRUCTED OF REINFORCED PRECAST CONCRETE BASE SECTION, BARREL SECTION AND DOME SECTION MEETING THE REQUIREMENTS OF ASTM C78 AND AASHTO M199. CONCRETE SHALL HAVE A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 4,000 P.S.I.
5.) IN CASES WHERE VERTICAL TOLERANCE DOES NOT PERMIT A CONE TOP SECTION, A PRECAST CONCRETE FLAT SECTION MAY BE USED.
6.) CATCH BASINS SHALL MEET OR EXCEED HS–20 LOADING REQUIREMENTS.
7.) CATCH BASINS SHALL HAVE A MINIMUM OPENING OF 26–INCHES AND A MINIMUM INSIDE DIAMETER OF FOUR–FEET (4').
7.) CATCH BASINS SHALL HAVE TONGUE AND GROOVE JOINTS BETWEEN SECTIONS THAT ARE MORTARED OR SEALED WITH BUTYL RUBBER SEALANTS.
8.) PIPE INLETS AND OUTLETS SHALL BE SEALED WITH MORTAR OR RUBBER SEALANTS OR BOOT TYPE CONNECTIONS.
9.) DRAIN MANHOLES SHALL BE PLACED ON A LAYER OF COMPACTED, LEVEL, BEDDING MATERIAL NOT LESS THAN SIX–INCHES IN HEIGHT.
10.) CATCH BASIN SECTIONS SHALL BE CAREFULLY PLACED SO THAT ALL SECTIONS ARE LEVEL AND PLUMB.
11.) EXCAVATION AROUND THE MANHOLE STRUCTURED SHALL BE BACKFILLED AND COMPACTED IN TWELVE–INCH (12") LIFTS WITH SUITABLE MATERIALS.
12.) ROAD BASE MATERIAL AND PAVEMENT MATERIALS SHALL BE INSTALLED AROUND STRUCTURES IN ACCORDANCE WITH BASE AND PAVEMENT PREPARATION INSTRUCTIONS.
13.) MANHOLE ACCESS FRAME AND COVER SHALL CONSIST OF EAST JORDAN IRONWORKS 5523A/5524Z FRAME AND 5520 M5 COVER.
14.) FRAME AND COVER SHALL BE ADJUSTED TO FINISH GRADE USING LAYERS OF MORTAR AND BRICK.

REVISIONS:

No.	DATE	REVISION
1	4/20/18	REVISIONS TO BUILDING FOOTPRINTS, GRADING, DRAINAGE SYSTEM SND SEPTIC SYSTEM
2	7/05/18	ADDRESS ZBA, CON. COMM. AND NOVER–ARMSTRONG COMMENTS

FOR METROWEST ENGINEERING, INC. *DATE*
ROBERT A. GEMMA, P.E.(CIVIL) # 31967

PROPOSED DETAILS PLAN

#24 SCHOOL STREET
IN
WAYLAND, MASS
(MIDDLESEX COUNTY)

PREPARED FOR:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

PROPERTY OF:
WINDSOR PLACE LLC
73 PELHAM ISLAND ROAD
WAYLAND, MA 01778

ENGINEERS & SURVEYORS:
MWE
METROWEST ENGINEERING, INC.
75 FRANKLIN STREET
WAYLAND, MA 01702
TEL.: (508)626–0063
FAX: (508)875–6440

SHEET 5 OF 5		DATE: SEPTMEBER 6, 2017
CALC'D BY: BTN	FIELD BK: 621	CAD FILE: PROP_SITE_3_R10.dwg
DRAFTER: BTN	PROJECT: WY_SCH	DWG FILE: SP090617_R2.dwg