SAINT PATRICK ACADEMY

Site Improvement Plans

315 Banfield Road
Portsmouth, New Hampshire
Assessor's Parcel 266 - 5

Plan Issued Date:

January 29 , 2020 — Planning Board Approval

Applicant:

315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801
(603) 436-0739

Owner:

HOPE FOR TOMORROW
HOPE FOR
TOMORROW FOUNDATION
1950 LAFAYETTE ROAD, 2nd FLOOR
PORTSMOUTH, N.H. 03801
(603) 969-3100

Architect:

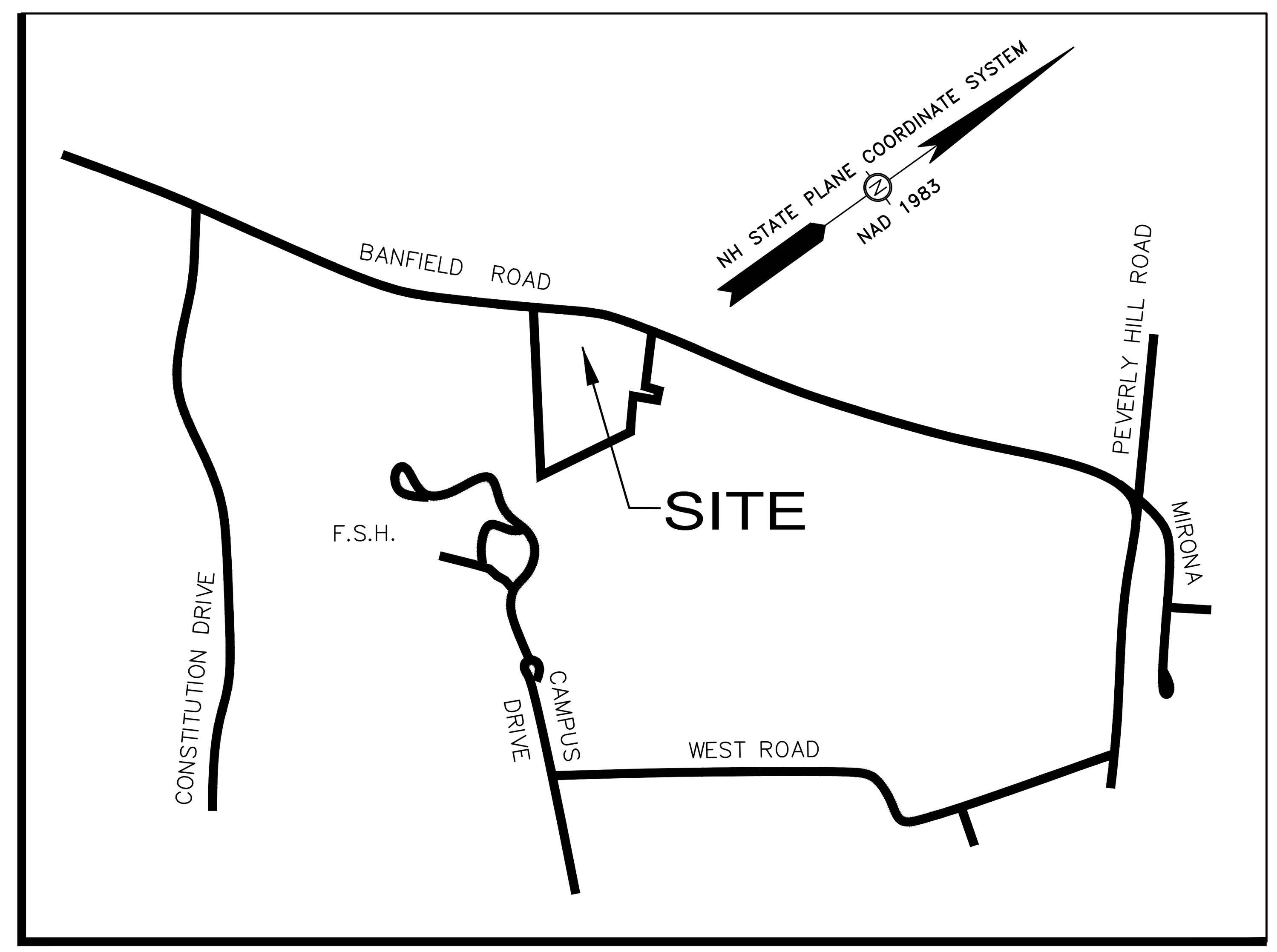
OAK POINT ASSOCIATES
85 MIDDLE STREET
PORTSMOUTH, N.H. 03801
603.431.4849

Civil Engineer:

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

Surveyor:

James Verra and Associates, Inc.
LAND SURVEYORS
101 SHATTUCK WAY - SUITE 8
NEWINGTON, N.H. 03801- 7876
603-436-3557



Locus Map
Scale: Not to Scale

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Permit Summary

NHDES Alteration of Terrain Permit AoT-1252, Approved May 9, 2017 - To be Amended

NHDES Discharge Permit D2017-0512, Approved June 6, 2017 - To be Amended

EPA SWPPP / NOI To be filed by Contractor a minimum of 14-days prior to Commencing Construction

Zoning Relief - Variance Granted on September 27, 2016 - Section 10.440.3.21 to allow a Primary or Secondary School in a district where the use is not permitted.

Zoning Relief - Variance Granted on March 21, 2017 - Section 10.1113.20 to allow off-street parking spaces to be located between a principal building and a street.

City of Portsmouth Conditional Use Permit - Approved on March 16, 2017

City of Portsmouth Site Plan Review Approval - Approved on March 16, 2017

4801DETAILS.DWG

P4801

SAINT PATRICK ACADEMY
AS-BUILT SITE PLAN

315 BANFIELD ROAD, PORTSMOUTH
ROCKINGHAM COUNTY, N.H.
ASSESSOR'S PARCEL 266-5

GENERAL NOTES:

1) THIS PLAN AND ALL WORK ASSOCIATED WITH IT WAS PERFORMED BY SGC ENGINEERING, LLC PURSUANT TO A PROFESSIONAL SERVICES CONTRACT BETWEEN NORTH AND SOUTH CONSTRUCTION SERVICES AND SGC ENGINEERING LLC, DATED JUNE 28, 2017.

2) THE LOCUS PARCEL IS DEPICTED AS LOT 5 ON ASSESSORS MAP 266. CURRENT OWNER: HOPE FOR TOMORROW FOUNDATION, 1 STONERIDGE DR, RYE, NH 03870. REFERENCE DEED: FOUNDATION OF SEACOAST HEALTH TO HOPE FOR TOMORROW FOUNDATION, DATED DECEMBER 16, 2016, RECORDED ROCKINGHAM COUNTY, N.H. REGISTRY OF DEEDS: DEED BOOK 5783, PAGE 602.

3) THE BEARINGS SHOWN HEREON ARE REFERENCED TO MAP REFERENCE 1 AND ARE BASED ON N.H. STATE PLANE COORDINATE SYSTEM NAD 1983.

4) ABUTTING PROPERTY OWNER INFORMATION REFERENCED HEREON WAS TAKEN FROM THE PORTSMOUTH, N.H. ASSESSOR'S DATA AS OF THE DATE OF THIS SURVEY.

5) THE SOLE PURPOSE OF THIS PLAN IS PREPARATION OF AN AS-BUILT SITE PLAN PER MAP REFERENCE 2, SHEET C-1: SITE NOTE 16. PROPERTY LINES SHOWN HEREON PER LOCUS DEED AND MAP REFERENCE 1, NO BOUNDARY RETRACEMENT SURVEY HAS BEEN PERFORMED BY SGC ENGINEERING, LLC.

6) UG ELECTRIC AND GAS SHOWN APPROXIMATE LOCATION PER SKETCH BY CONTRACTOR. NO SUBSURFACE INVESTIGATION HAS BEEN PERFORMED BY SGC ENGINEERING, LLC. DIG-SAFE SHOULD BE CONTACTED PRIOR TO COMMENCING ANY EXCAVATION. (888-344-7233).

7) THIS PLAN IS THE RESULT OF A FIELD SURVEY CONDUCTED BY SGC ENGINEERING, LLC BETWEEN JULY 2017 AND SEPTEMBER 04, 2018.

8) PER CONTRACT CONDITIONS NO MONUMENTS WERE SET.

9) VERTICAL DATUM IS BASED ON MAP REFERENCE 1 AND PROVIDED PROJECT SITE BENCHMARKS.

10) EASEMENTS: A 20' WIDE UTILITY EASEMENT TO PSNH AS DETAILED IN RCRD BK-PG: 5884-209. OTHER KNOWN EASEMENTS AS SHOWN ON PLAN. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY OTHER APPARENT VISIBLE USES OF THE LAND, HOWEVER THIS DOES NOT WARRANT THAT NO OTHER EASEMENTS EXIST.

11) THE LOCUS PARCEL IS LOCATED IN THE INDUSTRIAL ZONE. SETBACKS: FRONT-70'; SIDE-50'; REAR-50'.

MAP REFERENCES:

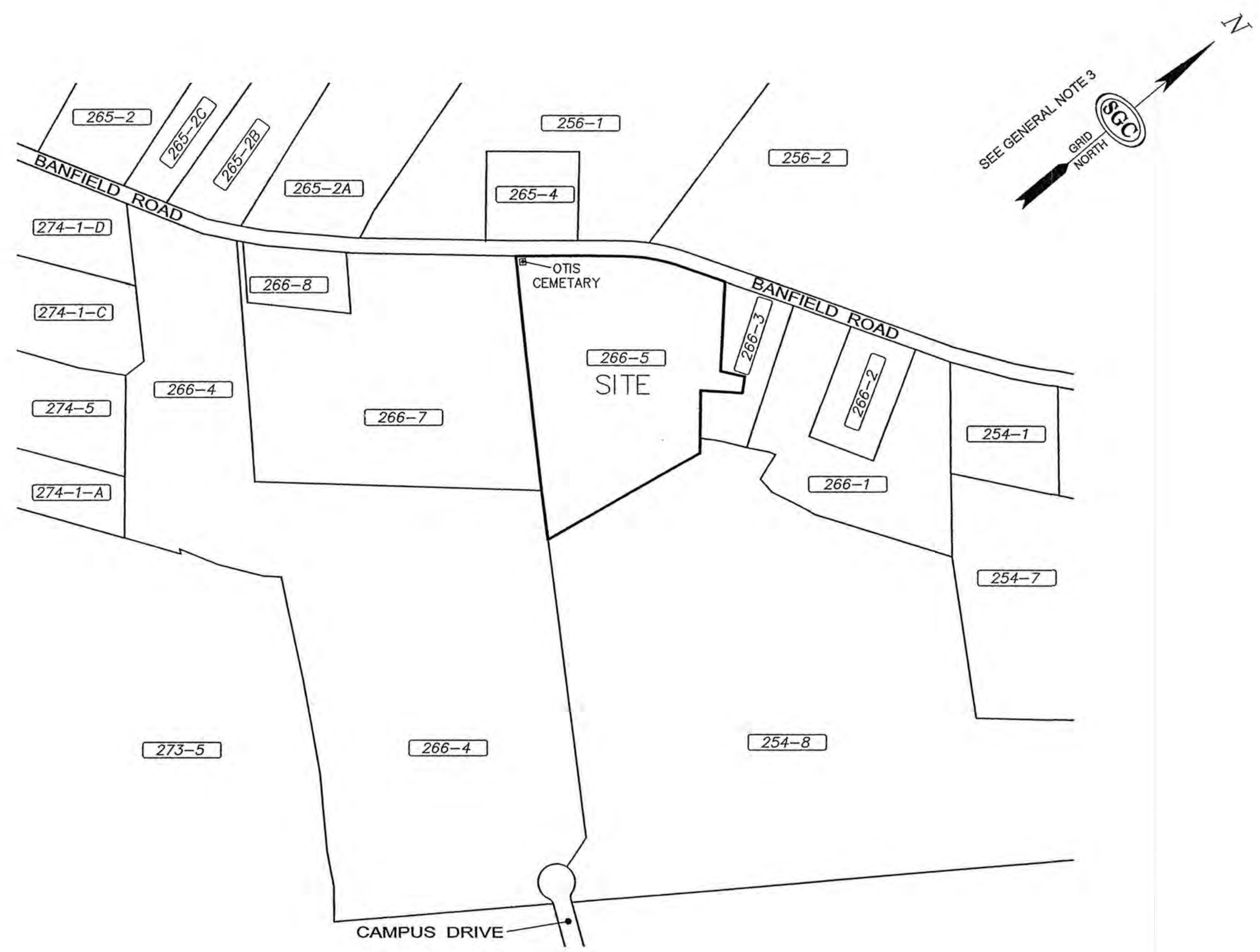
1) A PLAN ENTITLED "LOT LINE REVISION PLAN, CAMPUS DRIVE, BANFIELD & PEVERLY HILL ROADS, PORTSMOUTH, NEW HAMPSHIRE, ASSESSOR'S PARCELS 254-8, 266-4, 266-5, 266-6 FOR CITY OF PORTSMOUTH, N.H. & FOUNDATION FOR SEACOAST HEALTH", DATED 10/24/2016, PREPARED BY JAMES VERRA AND ASSOCIATES, INC., RECORDED AT THE ROCKINGHAM COUNTY, N.H. REGISTRY OF DEEDS AS PLAN NUMBER D-39897.

2) A PLAN ENTITLED "PROJECT: SAINT PATRICK ACADEMY, 315 BANFIELD ROAD, PORTSMOUTH, NEW HAMPSHIRE, ASSESSOR'S PARCEL 266-5", ISSUE DATE MAY 17, 2017, PREPARED BY ALTUS ENGINEERING, INC., RECORDED AT THE ROCKINGHAM COUNTY, N.H. REGISTRY OF DEEDS AS PLAN NUMBER D-40212.

SHEET INDEX:

LEGEND:

- LOCUS BOUNDARY LINE
- ADJACENT LOT LINE
- ADJACENT R.O.W. LINE
- EASEMENT LINE
- SETBACK LINE
- EDGE OF CONCRETE
- CURBING
- BUILDING
- EDGE OF TRAIL
- EDGE OF STONE
- RIP RAP
- SANITARY SEWER LINE — S —
- STORM DRAIN LINE — D —
- WATER LINE — W —
- ELECTRIC LINE — E —
- PIPE
- REBAR
- SQUARE CATCH BASIN
- ROUND CATCH BASIN
- SEWER MANHOLE
- FLARED END SECTION
- SPIKE
- WOOD HUB W/TACK
- FLAG POLE
- LIGHT POST



LOCUS MAP:
(NOT TO SCALE)

CERTIFICATION:

I HEREWITH CERTIFY THAT THIS PLAT IS THE RESULT OF AN ACTUAL FIELD SURVEY MADE ON THE GROUND PER THE STANDARDS OF PRACTICE FOR AN AS-BUILT SURVEY: CATEGORY 3, CONDITION 1, PURSUANT TO THE N.H CODE OF ADMINISTRATIVE RULES - BOARD OF LICENSURE FOR LAND SURVEYORS. THE SURVEY HAS A MAXIMUM ERROR OF CLOSURE OF ONE PART IN FIFTEEN THOUSAND (1:15,000).

9/6/2018 [signature]
DATE DAVID G. MOTT, LLS 951

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 951 DAVID G. MOTT SIGNATURE

SEAL

REVISIONS:

NO.	DATE	
1	09/06/2018	APPROVED FOR REVIEW

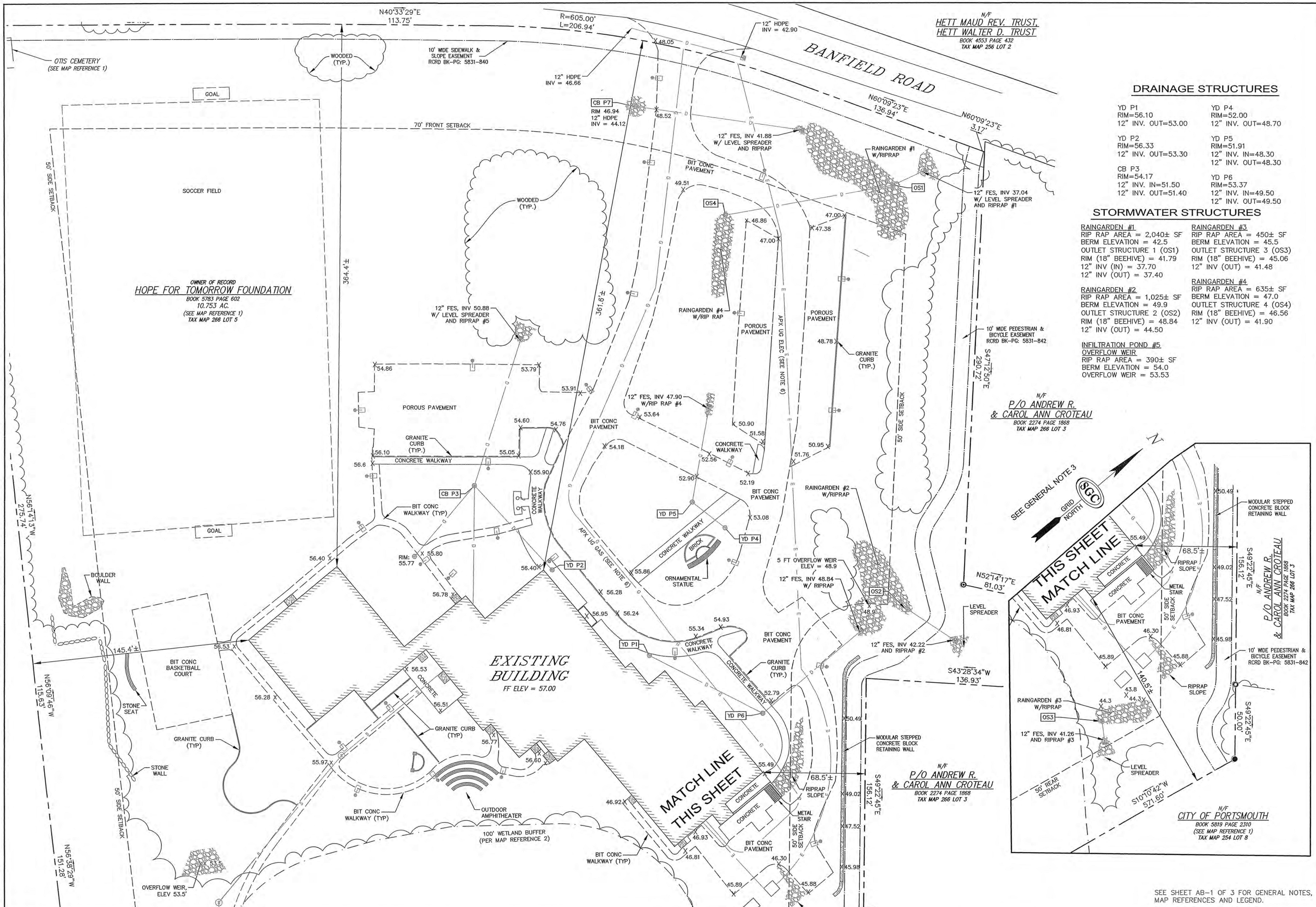
STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 951 DAVID G. MOTT SIGNATURE

SGC
SGC ENGINEERING, LLC
• Civil Design & Survey Engineering
• Environmental & Regulatory Permitting
• Electrical Power Systems Engineering
SERVING OUR CLIENTS IN THE U.S.A. & CANADA
501 County Road, Westbrook, Maine 04092, Tel: 207-347-8100, Fax: 207-347-8101
40 Harlow Street, Suite 2, Bangor, Maine 04401, Tel: 207-217-6769, Fax: 207-217-6018
115 Water Street, Hallowell, Maine 04347, Tel: 207-370-0590
34 North Street, Suite 5, Presque Isle, Maine 04769, Tel: 207-540-1412

DATE: 09-06-2018 SCALE: NA | CALC: MCC DRAWN: DGM | PROJECT: 1460001 DWG: 1460001_AS-BUILT | SHEET 1 OF 3

AS-BUILT SITE PLAN
TAX MAP 266 LOT 5
SAINT PATRICK ACADEMY
315 BANFIELD ROAD, PORTSMOUTH
ROCKINGHAM COUNTY, N.H.
PREPARED FOR:
NORTH & SOUTH CONSTRUCTION SERVICES
55 CALEF HIGHWAY, SUITE 2, BARRINGTON, N.H. 03825

SHEET NUMBER:
AB-1 of 3



DRAINAGE STRUCTURES

YD P1
RIM=56.10
12" INV. OUT=53.00

YD P2
RIM=56.33
12" INV. OUT=53.30

CB P3
RIM=54.17
12" INV. IN=51.50
12" INV. OUT=51.40

YD P4
RIM=52.00
12" INV. OUT=48.70

YD P5
RIM=51.91
12" INV. IN=48.30
12" INV. OUT=48.30

YD P6
RIM=53.37
12" INV. IN=49.50
12" INV. OUT=49.50

STORMWATER STRUCTURES

RAINGARDEN #1
RIP RAP AREA = 2,040± SF
BERM ELEVATION = 42.5
OUTLET STRUCTURE 1 (OS1)
RIM (18" BEEHIVE) = 41.79
12" INV (IN) = 37.70
12" INV (OUT) = 37.40

RAINGARDEN #2
RIP RAP AREA = 1,025± SF
BERM ELEVATION = 49.9
OUTLET STRUCTURE 2 (OS2)
RIM (18" BEEHIVE) = 48.84
12" INV (OUT) = 44.50

INFILTRATION POND #5
OVERFLOW WEIR
RIP RAP AREA = 390± SF
BERM ELEVATION = 54.0
OVERFLOW WEIR = 53.53

RAINGARDEN #3
RIP RAP AREA = 450± SF
BERM ELEVATION = 45.5
OUTLET STRUCTURE 3 (OS3)
RIM (18" BEEHIVE) = 45.06
12" INV (OUT) = 41.48

RAINGARDEN #4
RIP RAP AREA = 635± SF
BERM ELEVATION = 47.0
OUTLET STRUCTURE 4 (OS4)
RIM (18" BEEHIVE) = 46.56
12" INV (OUT) = 41.90

SEE SHEET AB-1 OF 3 FOR GENERAL NOTES, MAP REFERENCES AND LEGEND.

REVISIONS:

NO.	DATE	
1	09/06/2018	APPROVED FOR REVIEW

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 951 DAVID G. MOTT SIGNATURE

SGC ENGINEERING, LLC
• Civil Design & Survey Engineering
• Environmental & Regulatory Permitting
• Electrical Power Systems Engineering

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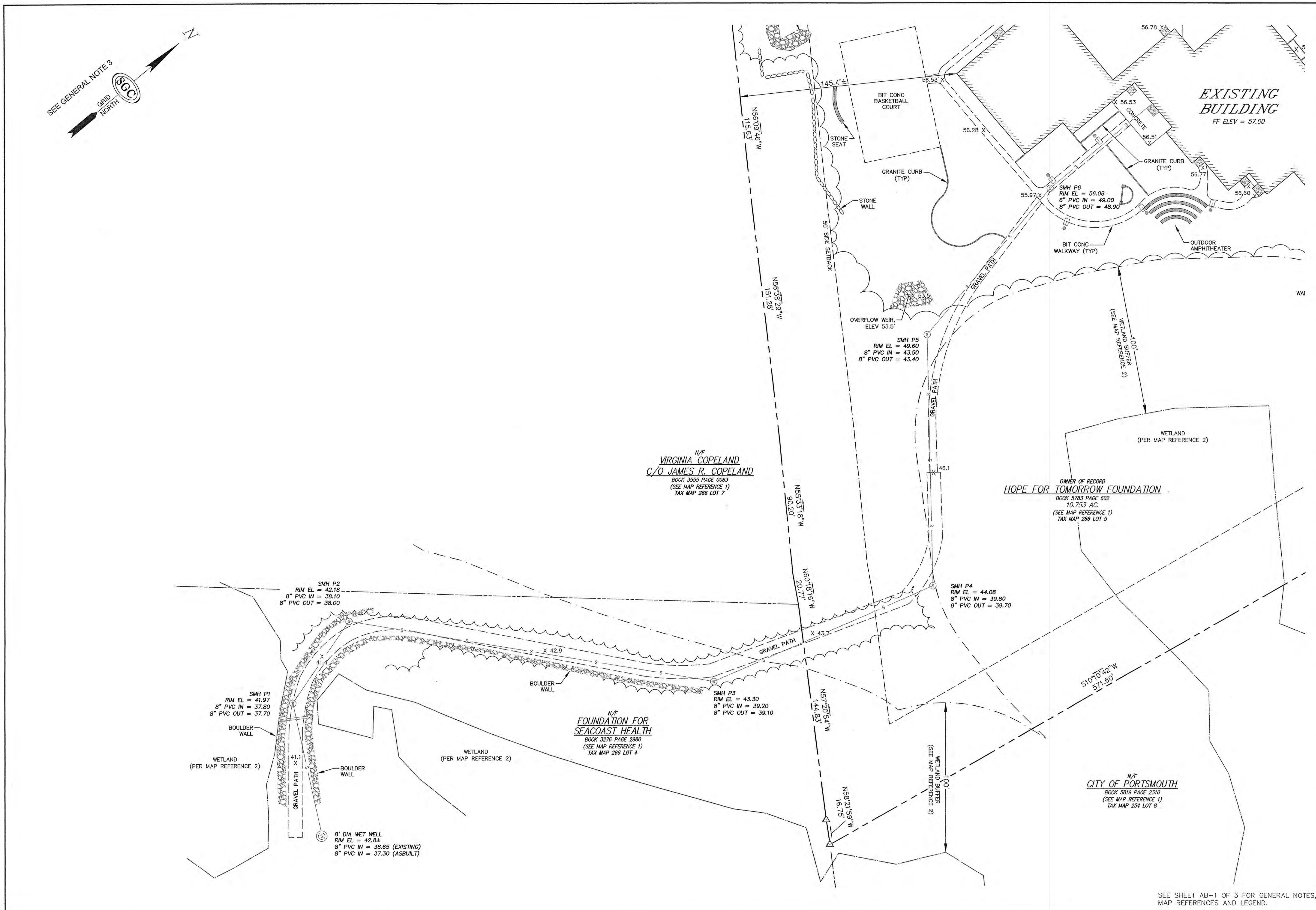
40 Harlow Street, Suite 2, Bangor, Maine 04401, Tel: 207-217-6769, Fax: 207-217-6018
115 Water Street, Hallowell, Maine 04347, Tel: 207-370-0580
34 North Street, Suite 5, Presque Isle, Maine 04769, Tel: 207-540-1412

DATE: 09-06-2018 | CALC: MCC | PROJECT: 1460001 | SHEET 2 OF 3
SCALE: 1" = 30' | DRAWN: DGM | DWG: 1460001_AS-BUILT

AS-BUILT SITE PLAN
TAX MAP 266 LOT 5
SAINT PATRICK ACADEMY
315 BANFIELD ROAD, PORTSMOUTH
ROCKINGHAM COUNTY, N.H.
PREPARED FOR:
NORTH & SOUTH CONSTRUCTION SERVICES
55 CALEF HIGHWAY, SUITE 2, BARRINGTON, N.H. 03825

SHEET NUMBER:
AB-2 of 3



SEE SHEET AB-1 OF 3 FOR GENERAL NOTES, MAP REFERENCES AND LEGEND.

REVISIONS:

NO.	DATE	
1	08/06/2018	APPROVED FOR REVIEW

STATE OF NEW HAMPSHIRE
LICENSED LAND SURVEYOR
DAVID G. MOTT
No. 951

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DATE: 09-06-2018 | SCALE: 1" = 30' | CALC: MCC | DRAWN: DGM | PROJECT: 1460001 | DWG: 1460001_AS-BUILT | SHEET 3 OF 3

AS-BUILT SITE - SEWER PLAN
TAX MAP 266 LOT 5
SAINT PATRICK ACADEMY
315 BANFIELD ROAD, PORTSMOUTH, ROCKINGHAM COUNTY, N.H.

PREPARED FOR:
NORTH & SOUTH CONSTRUCTION SERVICES
55 CALEF HIGHWAY, SUITE 2, BARRINGTON, N.H. 03825

SHEET NUMBER:
AB-3 of 3

GRADING & DRAINAGE NOTES

1. UNLESS OTHERWISE AGREED IN WRITING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING TEMPORARY BENCHMARKS (TBMS) AND PERFORMING ALL CONSTRUCTION SURVEY LAYOUT.
2. THE CONTRACTOR SHALL READ AND FOLLOW ALL RECOMMENDATIONS IN THE PROJECT'S GEOTECHNICAL REPORT.
3. DEWATERING ACTIVITIES SHALL BE DONE IN ACCORDANCE WITH EPA AND NHDES REGULATIONS.
4. PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES FOR FOUNDATIONS, PAVEMENT AREAS, UTILITY TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL. IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER, EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATIONS. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.
5. IF SUITABLE, EXCAVATED MATERIALS SHALL BE PLACED AS FILL WITHIN UPLAND AREAS ONLY AND SHALL NOT BE PLACED WITHIN WETLANDS. PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION.
6. ALL DRAINAGE PIPE SHALL BE ADS N-12 OR EQUAL APPROVED BY THE ENGINEER.
7. ALL CATCH BASIN AND MANHOLE RIMS IN PAVED AREAS SHALL BE SET FLUSH WITH OR NO LESS THAN 0.1' BELOW FINISH GRADE. UNLESS OTHERWISE SPECIFIED, ANY RIM ABOVE SURROUNDING FINISH GRADE SHALL NOT BE ACCEPTED.
8. ALL CATCH BASINS SHALL BE PRECAST, H-20 LOADING AND BE EQUIPPED WITH 4' (MIN.) SEDIMENTATION SUMPS AND GREASE HOODS (SEE DETAILS).
9. ALL SPOT GRADES ARE AT FINISH GRADE AND BOTTOM OF CURB WHERE APPLICABLE.
10. UNLESS OTHERWISE SPECIFIED, ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE A MINIMUM OF SIX (6") INCHES OF LOAM, LIMESTONE, FERTILIZER, SEED, AND HAY MULCH USING APPROPRIATE SOIL STABILIZATION TECHNIQUES. SEE DETAILS FOR ADDITIONAL INFORMATION.
11. IN ORDER TO PROVIDE VISUAL CLARITY ON THE PLANS, DRAINAGE AND OTHER UTILITY STRUCTURES MAY NOT BE DRAWN TO SCALE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SIZING AND LOCATION OF ALL STRUCTURES AND IS DIRECTED TO RESOLVE ANY POTENTIAL DISCREPANCY WITH THE ENGINEER PRIOR TO CONSTRUCTION.
12. FOR CLARITY, PROPOSED CONTOURS ARE DRAWN AT 1' INTERVALS.
13. UNLESS OTHERWISE SPECIFIED AND IF FEASIBLE, RETAINING WALL AND BUILDING PERIMETER DRAINS SHALL BE DIRECTED TO THE NEAREST DRAINAGE STRUCTURE. IF DEEMED APPROPRIATE, CONTRACTOR SHALL PROVIDE ADDITIONAL UNDERDRAIN AT THE DIRECTION OF THE ENGINEER.

UTILITY NOTES

1. ALL ROAD/LANE CLOSURES OR OTHER TRAFFIC INTERRUPTIONS ON CITY ROADS SHALL BE COORDINATED WITH THE PORTSMOUTH POLICE DEPARTMENT & PORTSMOUTH DPW.
2. ALL WATER MAIN INSTALLATIONS AND SERVICE CONNECTIONS SHALL CONFORM TO PORTSMOUTH WATER DEPARTMENT STANDARDS. WATER MAIN SHALL BE WRAPPED WITH A WATER TIGHT POLYETHYLENE WRAPPING. ALL JOINTS SHALL HAVE THREE (3) WEDGES PER JOINT.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR POSTING OF ALL BONDS AND PAYMENT OF ALL TAP, TIE-IN AND CONNECTION FEES.
4. FIRE ALARM PANEL SHALL MONITORED THROUGH A THIRD-PARTY SECURITY COMPANY. CONTRACTOR SHALL COORDINATE ALL PANEL LOCATIONS AND INTERCONNECTIONS WITH FIRE DEPARTMENT.
5. THE OWNER HAS PROVIDED THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS WITH AN EASEMENT TO ALLOW UNLIMITED ACCESS TO THE SITE FOR THE PURPOSE OF MAINTAINING/CONTROLLING DOMESTIC WATER SUPPLY. IN THE EVENT OF NON-PAYMENT, THE CITY OF PORTSMOUTH WILL HAVE THE RIGHT TO SHUT OFF THE DOMESTIC WATER SUPPLY CURB STOP. ADDITIONALLY, THE CITY HAS THE RIGHT TO COME ONTO THE SITE TO DO LEAK TESTING.
6. THE APPLICANT SHALL HAVE A SITE SURVEY CONDUCTED BY A RADIO COMMUNICATIONS CARRIER APPROVED BY THE CITY'S COMMUNICATION DIVISION. THE RADIO COMMUNICATIONS CARRIER MUST BE FAMILIAR AND CONVERSANT WITH THE POLICE AND RADIO CONFIGURATION. IF THE SITE SURVEY INDICATES IT IS NECESSARY TO INSTALL A SIGNAL REPEATER EITHER ON OR NEAR THE PROPOSED PROJECT, THOSE COSTS SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. THE APPLICANT SHALL BE REQUIRED TO PAY FOR THE SITE SURVEY WHETHER OR NOT THE SURVEY INDICATES A REPEATER IS NECESSARY. THE OWNER SHALL COORDINATE WITH THE SUPERVISOR OF RADIO COMMUNICATIONS FOR THE CITY. THE SURVEY SHALL BE COMPLETED AND THE REPEATER, IF DETERMINED IT IS REQUIRED, SHALL BE INSTALLED PRIOR TO THE ISSUANCE OF CERTIFICATE OF OCCUPANCY.
7. SEWER EASEMENT LANGUAGE TO BE REVIEWED BY THE CITY PRIOR TO RECORDING AT THE REGISTRY OF DEEDS.
8. SOLAR PANEL INSTALLATION SHALL COMPLY WITH PROVISIONS IN FPA 1, 2012, SECTION 11.12
9. ALL TRENCHING, PIPE LAYING AND BACKFILLING SHALL CONFORM TO FEDERAL OSHA AND CITY REGULATIONS.
10. SITEWORK CONTRACTOR SHALL COORDINATE ALL WORK WITH MECHANICAL DRAWINGS.
11. SEE ARCHITECTURAL/MECHANICAL DRAWINGS FOR EXACT LOCATIONS & ELEVATIONS OF UTILITY CONNECTIONS AT BUILDINGS. COORDINATE ALL WORK WITHIN FIVE (5) FEET OF BUILDINGS WITH BUILDING CONTRACTOR AND ARCHITECTURAL/MECHANICAL DRAWINGS. ALL CONFLICTS AND DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY AND PRIOR TO COMMENCING RELATED WORK.
12. FINAL UTILITY LOCATIONS TO BE COORDINATED BETWEEN THE CONTRACTOR, ALL APPROPRIATE UTILITY COMPANIES AND THE ARCHITECT.
13. CONTRACTOR SHALL COORDINATE ALL TELECOMMUNICATIONS INSTALLATIONS WITH FAIRPOINT COMMUNICATIONS. CONTACT: JOE CONSIDINE @ 603-427-5525
14. CONTRACTOR SHALL COORDINATE ALL CABLE INSTALLATIONS WITH COMCAST. CONTACT: MIKE COLLINS @ 603-679-5695, EXT. 1037
15. CONTRACTOR SHALL COORDINATE ALL NATURAL GAS DISCONNECTIONS/INSTALLATIONS WITH UNITIL CORPORATION. CONTACT: DAVID BEAULIEU @ 603-294-5144
16. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATIONS WITH EVERSOURCE. ALL ELECTRIC CONDUIT INSTALLATION SHALL BE INSPECTED BY EVERSOURCE PRIOR TO BACKFILL, 48-HOUR MINIMUM NOTICE REQUIRED. CONTACT: NICK KOSKO @ 603-332-4227 EXT. 5555334
17. TRANSFORMER SHALL BE PAD MOUNTED. COORDINATE WITH ARCHITECT & EVERSOURCE.
18. DETECTABLE WARNING TAPE SHALL BE PLACED OVER THE ENTIRE LENGTH OF ALL BURIED UTILITIES, COLORS PER THE RESPECTVE UTILITY PROVIDERS.
19. SITE WORK CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRENCHING, BEDDING, BACKFILL & COMPACTION FOR ALL ELECTRIC, TELECOMMUNICATIONS & GAS TRENCHING AS WELL AS COORDINATION W/INSPECTIONS & CONDUIT INSTALLATION.
20. WHERE WATER LINES CROSS OR RUN ADJACENT TO OR WITHIN 5' OF STORM DRAIN PIPES OR DRAINAGE STRUCTURES, 2" THICK CLOSED CELL RIGID BOARD INSULATION SHALL BE INSTALLED FOR FROST PROTECTION.

RECORDING OF THIS PLAN SHEET WAS A REQUIREMENT OF THE PORTSMOUTH PLANNING BOARD AS PART OF THEIR APPROVAL.

FOR JAMES VERRA & ASSOCIATES, INC.

DATE

GENERAL NOTES:

1. THE INTENT OF THIS PLAN SET IS TO PROVIDE THE NECESSARY INFORMATION FOR THE REVIEW & PERMITTING A NEW PRIVATE GYMNASIUM ON THE EXISTING SCHOOL CAMPUS ON BANFIELD ROAD. THESE PLANS PROVIDE DETAILED INFORMATION FOR THE SITE LAYOUT, GRADING, UTILITIES, STORMWATER MANAGEMENT, AND LANDSCAPE IMPROVEMENTS.
2. DO NOT BEGIN CONSTRUCTION UNTIL ALL STATE, LOCAL AND FEDERAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED. THE LANDOWNER (CITY OF PORTSMOUTH) AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH LOCAL, STATE AND FEDERAL WETLAND PERMITTING REQUIREMENTS INCLUDING PROTECTION OF NATURAL RESOURCES AND THEIR BUFFERS. CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH ALL THE PERMIT CONDITIONS AND REQUIREMENTS.
3. CONTRACTOR SHALL CALL DIG SAFE AT 1 (800) DIG-SAFE AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO COMMENCING CONSTRUCTION.
4. CONTRACTOR SHALL NOTIFY CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
5. CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY SEDIMENT AND EROSION CONTROL ITEMS TO PREVENT SEDIMENT FROM CONSTRUCTION ACTIVITIES FROM LEAVING THE SITE. CONTROLS SHALL BE INSPECTED ON A REGULAR BASIS AND AFTER ALL RAIN EVENTS OF 0.25 INCHES OR GREATER. ANY DEFICIENCIES IN THE CONTROLS SHALL BE ADDRESSED IMMEDIATELY AND BROUGHT TO THE ATTENTION OF THE OWNER. ALL STORMS DRAINS WITHIN OR ADJACENT TO THE WORK AREA, WITH THE POTENTIAL TO RECEIVE RUNOFF FROM EXPOSED CONSTRUCTION AREAS, SHALL RECEIVE STORM DRAIN INLET PROTECTION.
6. CONTRACTOR SHALL PREVENT TRACKING OF DIRT ONTO ANY PUBLIC OR PRIVATE ROADWAYS. IF TRACKING OF DIRT FROM CONSTRUCTION VEHICLES IS PRESENT ON THE OPEN STREETS, CONTRACTOR WILL BE REQUIRED TO SWEEP THE ROADWAY AT NO ADDITIONAL EXPENSE TO THE OWNER.
7. SEE SHEET D-1 FOR EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.

LEGEND

	DESCRIPTION
	PROP. BUILDING
	PROP. DRAIN STRUCTURE
	PROP. DRAIN LINE
	PROP. UNDERDRAIN
PE	PROP. ELECTRICAL
VGC/SGC	PROP. EDGE OF PAVEMENT/VGC/SGC
	PROP. FENCE
14	FINISH GRADE
PG	PROP. GAS
	PROP. RET. WALL
	PROP. SEWER MANHOLE
	PROP. SETBACK LINE
PS	PROP. SEWER LINE
	PROP. SILT FENCE
	PROP. SIGN
75.5 X	PROP. SPOT GRADE
	PROP. GRAVEL PATH
	PROP. CONCRETE
	PROP. POROUS PAVEMENT
PE	PROP. TELECOMMUNICATION
SGC	PROP. SLOPED GRANITE CURB
VGC	PROP. VERTICAL GRANITE CURB
WV	PROP. WATER STRUCTURE
PW	PROP. WATERLINE
	PROPERTY LINE
	TREE LINE
	PROP. TREE LINE
	WETLANDS/FLAGS
	TEMPORARY EROSION CONTROL STONE CHECK DAM
	TEMPORARY EROSION CONTROL SILT FENCE BARRIER
NIC	NOT IN CONTRACT

CITY OF PORTSMOUTH, PLANNING BOARD

CHAIRMAN DATE

DEMOLITION NOTES

1. CONTRACTOR SHALL SAFELY SECURE THE SITE WITH SECURITY FENCING. FENCING SHALL BE LOCKED DURING NON-WORK HOURS.
2. CONTRACTOR SHALL PRESERVE AND PROTECT ALL EXISTING UTILITIES SCHEDULED TO REMAIN.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TIMELY NOTIFICATION OF ALL PARTIES, CORPORATIONS, COMPANIES, INDIVIDUALS AND STATE AND LOCAL AUTHORITIES OWNING AND/OR HAVING JURISDICTION OVER ANY UTILITIES RUNNING TO, THROUGH OR ACROSS AREAS TO BE DISTURBED BY DEMOLITION AND/OR CONSTRUCTION ACTIVITIES WHETHER OR NOT SAID UTILITIES ARE SUBJECT TO DEMOLITION, RELOCATION, MODIFICATION AND/OR CONSTRUCTION.
4. ALL UTILITY DISCONNECTIONS/DEMOLITIONS/RELOCATIONS TO BE COORDINATED BETWEEN THE CONTRACTOR, ALL APPROPRIATE UTILITY COMPANIES AND THE PORTSMOUTH DEPARTMENT OF PUBLIC WORKS. UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELATED EXCAVATION, TRENCHING AND BACKFILLING.
5. ALL STRUCTURES, CURBING, CONCRETE, PAVEMENT AND SUBBASE MATERIALS SHALL BE REMOVED FROM PROPOSED LANDSCAPE AREAS AND REPLACED WITH LOAM MATERIALS SUITABLE FOR LANDSCAPE AND/OR STORMWATER MANAGEMENT PURPOSES AND MEETING THE PROJECT SPECIFICATIONS.
6. WHERE SPECIFIED TO REMAIN, MANHOLE RIMS, CATCH BASIN GRATES, VALVE COVERS, HANDHOLES, MONITORING WELLS, ETC. SHALL BE ADJUSTED TO FINISH GRADE.
7. NO BURNING SHALL BE PERMITTED PER LOCAL REGULATIONS.
8. HAZARDOUS MATERIALS ENCOUNTERED DURING DEMOLITION AND CONSTRUCTION ACTIVITIES SHALL BE ABATED IN STRICT ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL REGULATIONS.
9. IN AREAS WHERE CONSTRUCTION IS TO BE ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG THE PROPERTY LINE IN ALL AREAS WHERE SILT FENCING IS NOT OTHERWISE REQUIRED.
10. SEE EROSION CONTROL PLANS FOR EROSION CONTROL REQUIREMENTS TO BE IN PLACE PRIOR TO START OF DEMOLITION ACTIVITIES, INCLUDING, BUT NOT LIMITED TO; SILT FENCING, STABILIZED CONSTRUCTION SITE EXITS, AND STORM DRAIN INLET PROTECTION.
11. ALL DEMOLISHED MATERIALS OR MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS SPECIFIED.
12. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BE LEGALLY DISPOSED IN ACCORDANCE WITH ALL LOCAL, STATE, & FEDERAL REGULATIONS AND CODES.

DATUM NOTE

HORIZONTAL DATUM: NAD 1983 (1986 CONTROL ADJUSTMENT)

PRIMARY BM: CONTROL POINT "INDU"

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

STATE OF NEW HAMPSHIRE
ERIC D. WEINRIEB
No. 7634
LICENSED
PROFESSIONAL ENGINEER

12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB

APPROVED BY: EDW

DRAWING FILE: 4801.2 GN.DWG

SCALE: NOT TO SCALE

OWNER:

HOPE FOR TOMORROW FOUNDATION

PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL

APPLICANT:

SAINT PATRICK ACADEMY

125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:

SAINT PATRICK ACADEMY GYMNASIUM

315 BANFIELD ROAD
PORTSMOUTH, N.H.

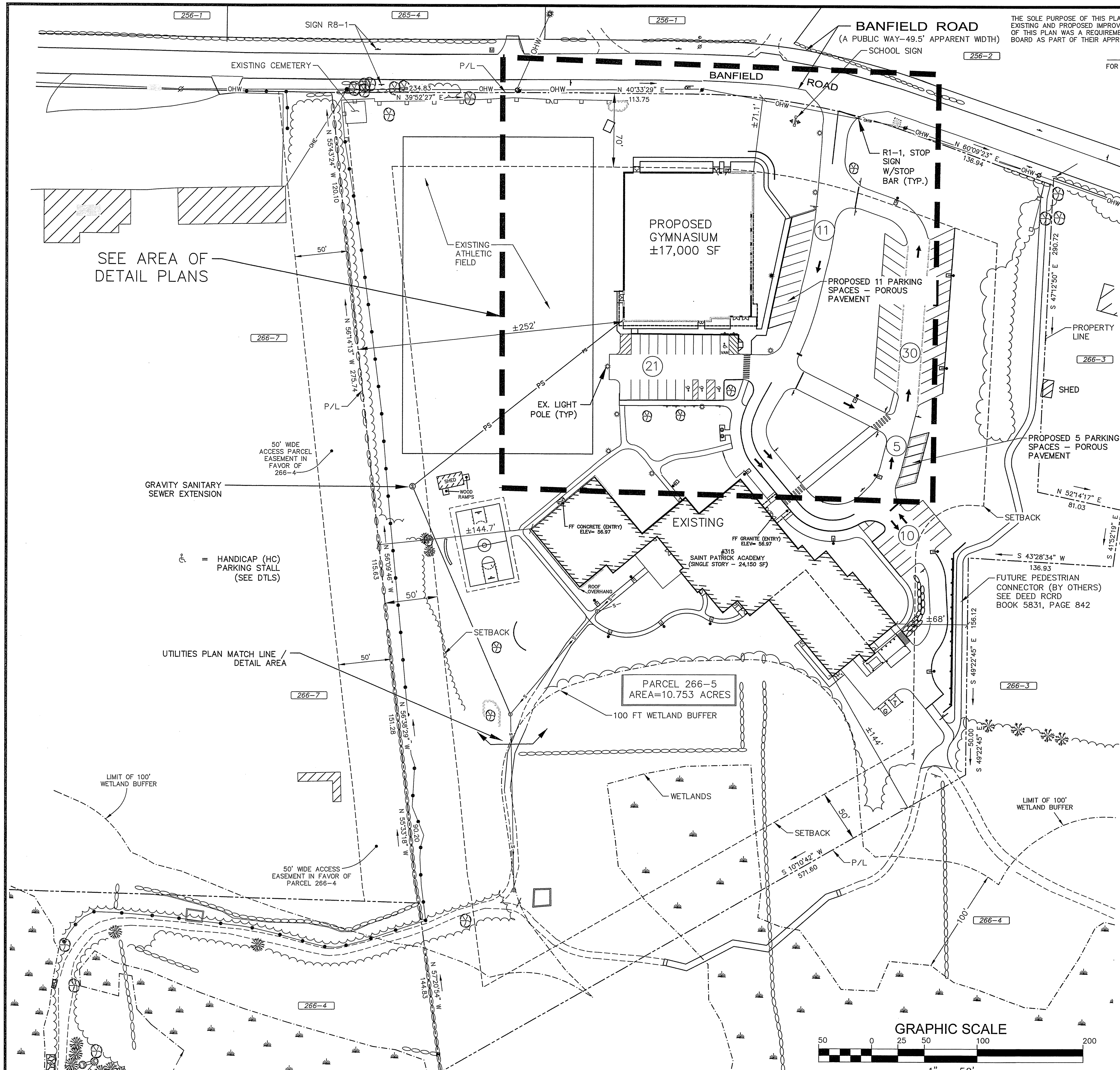
ASSESSOR'S PARCEL 266-5

TITLE:

GENERAL NOTES & LEGEND

SHEET NUMBER:

GN-1



THE SOLE PURPOSE OF THIS PLAN IS TO DEPICT THE LOCATION OF EXISTING AND PROPOSED IMPROVEMENTS ON THE SITE. RECORDING OF THIS PLAN WAS A REQUIREMENT OF THE PORTSMOUTH PLANNING BOARD AS PART OF THEIR APPROVAL.

FOR JAMES VERRA & ASSOCIATES, INC.

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN *DATE*

SITE NOTES

1. ON SEPTEMBER 30, 2016 THE PORTSMOUTH BOARD OF ADJUSTMENT GRANTED THE FOLLOWING:
   * A VARIANCE FROM SECTIONS 10.440 and 10.335 OF THE PORTSMOUTH ZONING ORDINANCE TO ALLOW A LAWFUL NONCONFORMING USE TO BE CHANGED TO ANOTHER NONCONFORMING USE;
   * A VARIANCE FROM SECTION 10.440.3.21 TO ALLOW A PRIMARY OR SECONDARY SCHOOL IN A DISTRICT WHERE THE USE IS NOT PERMITTED.

   ON MARCH 21, 2017 THE PORTSMOUTH BOARD OF ADJUSTMENT GRANTED THE FOLLOWING:
   * A VARIANCE FROM SECTION 10.1113.20 TO ALLOW OFF-STREET PARKING SPACES TO BE LOCATED BETWEEN A PRINCIPAL BUILDING AND A STREET.
2. ALL BONDS AND FEES SHALL BE PAID/POSTED PRIOR TO INITIATING CONSTRUCTION.
3. ALL CONDITIONS OF THIS APPROVAL SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
4. ALL CONSTRUCTION SHALL MEET THE MINIMUM CONSTRUCTION STANDARDS OF THE CITY OF PORTSMOUTH & NHDOT'S STANDARD SPECIFICATIONS FOR ROAD & BRIDGE, LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL GOVERN.

   CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAWCUT LINE WITH RS-1 IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.

   THE CONTRACTOR SHALL VERIFY ALL BENCHMARKS AND TOPOGRAPHY IN THE FIELD PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PRIOR TO CONSTRUCTION. ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER FOR RESOLUTION.
8. AREA OF DISTURBANCE IS OVER 43,560 SF, COVERAGE UNDER EPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT REQUIRED (NOI TO BE PREPARED AND SUBMITTED BY CONTRACTOR, SWPPP AND INSPECTIONS TO BE PREPARED AND PERFORMED BY CONTRACTOR). AMENDMENT TO EXISTING NHDES ALTERATION OF TERRAIN PERMIT IS REQUIRED.
9. SNOW SHALL BE STORED AT THE EDGE OF PAVEMENT, IN UPLAND AREAS SHOWN THEREON, AND IN AREAS A MINIMUM OF 100-FEET FROM THE WETLANDS. NO SNOW STORAGE SHALL BE PROVIDED WITHIN 25' OF THE LANDSCAPED ISLAND BETWEEN THE DRIVEWAY ENTRANCE THAT WOULD RESTRICT SITE VEHICULAR AND PEDESTRIAN SIGHT DISTANCE. IF ADEQUATE ON-SITE SNOW STORAGE IS NOT AVAILABLE, THE SNOW SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED.
10. PAVEMENT MARKINGS SHALL BE CONSTRUCTED USING WHITE, YELLOW, OR BLUE TRAFFIC PAINT (WHERE SPECIFIED) MEETING THE REQUIREMENTS OF AASHTO M248, TYPE F OR EQUAL. PAINTED ISLANDS AND LOADING ZONES SHALL BE 4"-WIDE DIAGONAL WHITE LINES 3'-0" O.C. BORDERED BY 4"-WIDE WHITE LINES. PARKING STALLS SHALL BE SEPARATED BY 4"-WIDE WHITE LINES. SEE DETAILS FOR HANDICAP SYMBOLS, SIGNS AND SIGN DETAILS. PAVEMENT MARKINGS SHALL BE INSTALLED AT LEAST 14-DAYS AFTER INSTALLATION OF WEARING COURSE PAVEMENT. CONTRACTOR SHALL APPLY TWO (2) COATS OF ALL PAVEMENT MARKINGS.
11. PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC DEVICES," "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AND THE AMERICANS WITH DISABILITIES ACT (ADA), LATEST EDITIONS.
12. UNLESS OTHERWISE NOTED, ALL NEW CURBING SHALL BE VERTICAL GRANITE WITH A MINIMUM RADIUS OF 4'.
13. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY AND ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF BOTH THE ARCHITECT AND CIVIL ENGINEER FOR RESOLUTION.
14. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
15. THE SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
16. SITEWORK CONTRACTOR SHALL PREPARE A LICENSED LAND SURVEYOR (LLS) STAMPED AS-BUILT SITE PLAN & PROVIDE A DIGITAL (CAD FORMAT) COPY FOR THE CITY'S G.I.S. DATA BASE.

ZONING REQUIREMENTS:

PARCEL IS LOCATED IN THE INDUSTRIAL (I) ZONE

ZONING DIMENSIONS	REQUIRED	PROVIDED
MINIMUM LOT SIZE:	87,120 SF (2.0 ACRES)	468,400 SF (10.75 ACRES)
MINIMUM FRONTAGE:	200'	695.6'
MINIMUM SETBACKS:		
FRONT YARD:	70'	±71'
SIDE YARD:	50'	±68'
REAR YARD:	50'	±144'
MINIMUM LOT DEPTH	100'	587'
MINIMUM OPEN SPACE:	20%	±77%
MAXIMUM STRUCTURE COVERAGE:	50%	8.85%
MAX. LENGTH OF BUILDING:	160'	±281.2'
MAX. HEIGHT OF BUILDING:	70'	<70'

EXISTING BUILDING FOOTPRINT:	±24,150 SF
EXISTING SHED:	±290 SF
PROPOSED BUILDING:	±17,000 SF
TOTAL BUILDING AREA:	±41,440 SF

PARKING REQUIREMENTS
ORIGINAL APPROVAL 72 SPACES ALLOWED 60 SPACES PROVIDED
PARKING REQUIRED – PARKING DEMAND ANALYSIS
PARKING PROVIDED 77 SPACES

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
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STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER

1/29/20

ISSUED FOR: PLANNING BOARD APPROVAL

ISSUE DATE: JANUARY 29, 2020

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	CDB	12/23/19
1	TAC COMMENTS	EDW	01/29/20

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801.2-SITE.DWG

SCALE:
22" x 34" – 1" = 50'
11" x 17" – 1" = 100'

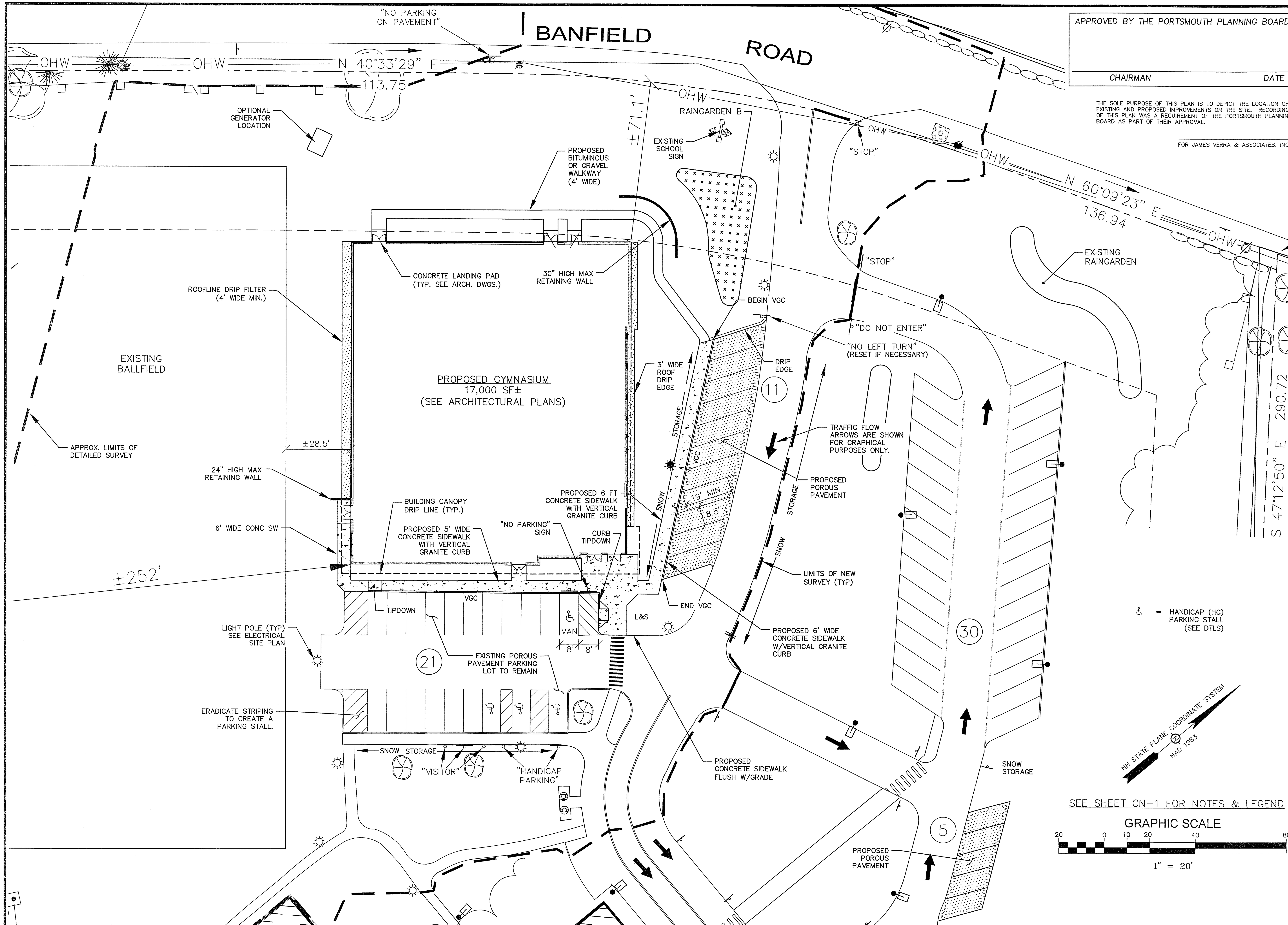
OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL
266-5

APPLICANT:
SAINT PATRICK ACADEMY
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
GYMNASIUM PROJECT
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL
266-5

TITLE:
OVERALL SITE PLAN

SHEET NUMBER:
C-1



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APPROVED BY: EDW

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SCALE:

22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

OWNER:

HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL
266-5

APPLICANT:

SAINT PATRICK ACADEMY
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

PROJECT:

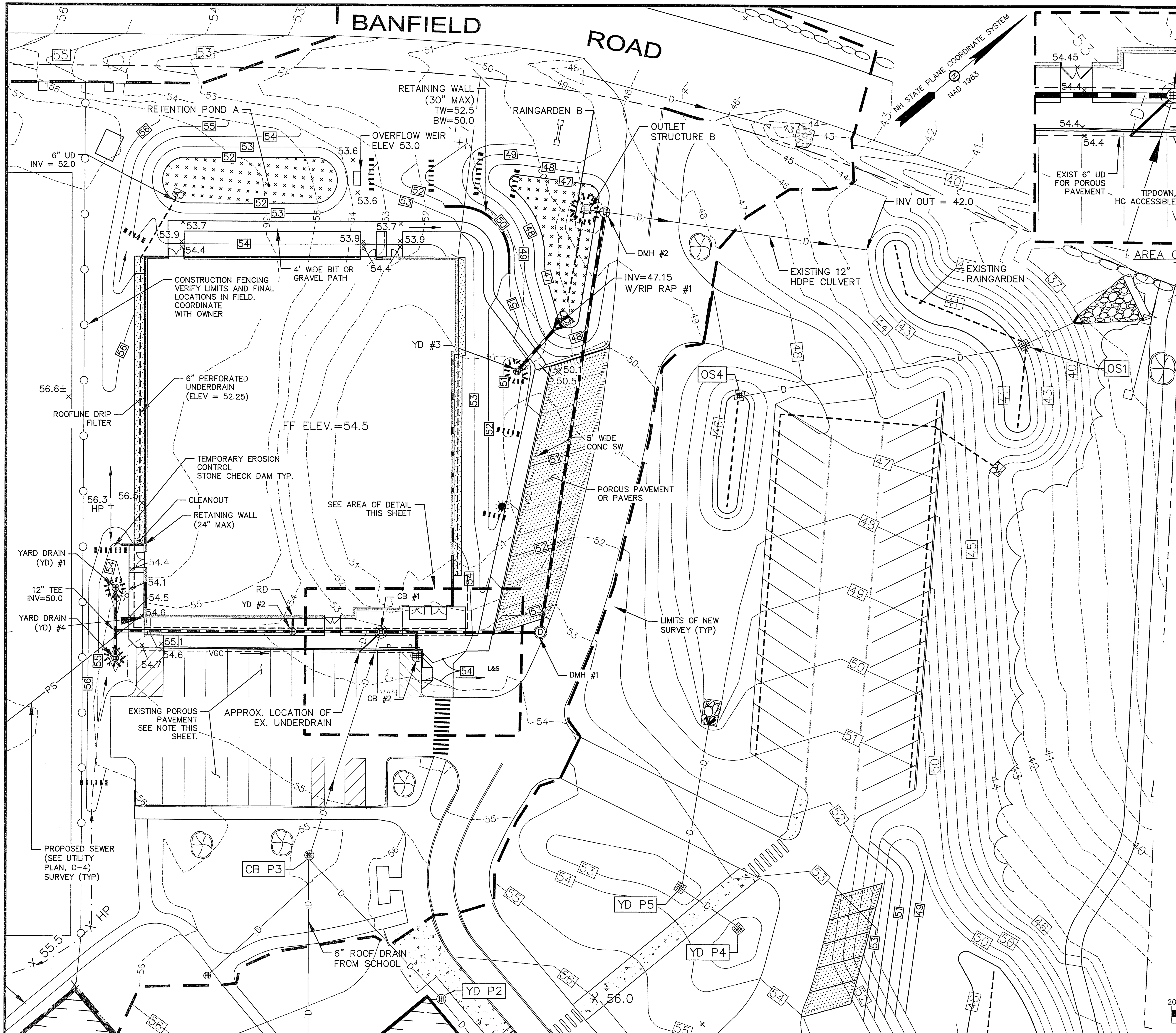
SAINT PATRICK ACADEMY
GYMNASIUM PROJECT
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL
266-5

TITLE:

SITE PLAN

SHEET NUMBER:

C-2



DRAINAGE STRUCTURES

YD #1
RIM=53.60
12" INV. OUT=50.1

YD #2
RIM=53.45
12" INV. IN=49.65 (YD1)
8" INV. IN =46.65 (RD)
12" INV. OUT= 49.55

YD #3
RIM=50.35
12" INV. OUT=47.35

YD #4
RIM=53.8
12" INV. OUT=50.2

CB #1
RIM=54.30
12" INV. IN=49.40 (YD2)
INV. IN = ±49.4 (6" UNDERDRAIN –CONFIRM IN FIELD)
12" INV. IN =51.2± (P3) (CONFIRM IN FIELD)
12" INV. OUT= 49.30

CB #2
RIM=53.70
12" INV. OUT=49.30

DMH #1
RIM=53.4
12" INV. IN=48.9 (CB1)
12" INV. OUT= 48.80

DMH #2
RIM=48.6
12" INV. IN =44.15 (OSB)
12" INV. IN =44.20 (DMH2)
12" INV. OUT=44.10

STORMWATER PRACTICES

STORMWATER POND A
BOTTOM AREA = 1160 SF
BOTTOM ELEV = 52.0
BERM ELEVATION = 53.7
5 FT OVERFLOW WEIR =53.0

RAINGARDEN B
BOTTOM AREA = 1100 SF
BOTTOM ELEV = 47.00
BERM ELEVATION = 48.5

OUTLET STRUCTURE B (OS-B)
RIM (18" BEEHIVE) = 47.75
6" UD (IN)= 44.25
12" INV (OUT) = 44.25

RIP RAP

ALL RIP RAP AREAS SHALL HAVE 6" MED STONE SIZE & DEPTH OF STONE = 14 INCHES

RIP RAP #1
BEG WIDTH = 3 FT
END WIDTH = 7 FT
LENGTH = 5 FT
D50 = 6"
DEPTH = 14"

NOTE

CONTRACTOR SHALL PRESERVE & PROTECT ALL EXISTING POROUS PAVEMENT SURFACES DURING CONSTRUCTION.
POROUS PAVEMENT SHALL NOT BE USED TO STORE EQUIPMENT, MATERIALS OR CONSTRUCTION RELATED VEHICLES.
CONTRACTOR SHALL MAKE PROVISIONS TO MINIMIZE THE TRANSPORT OF WIND BLOWN SEDIMENT. THE CONTRACTOR SHALL VACUUM SWEEP ALL PAVED SURFACES AT THE END OF THE SITEWORK ACTIVITIES.

SEE SHEET GN-1 FOR NOTES & LEGEND

GRAPHIC SCALE

20 0 10 20 40 80

1" = 20'

P4801

ENGINEER:

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133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No.7634 LICENSED PROFESSIONAL ENGINEER

ISSUED FOR:
PLANNING BOARD APPROVAL

ISSUE DATE:
JANUARY 29, 2020

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19
1	TAC COMMENTS	EDW	01/29/20

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801.2-SITE.DWG

SCALE:
22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

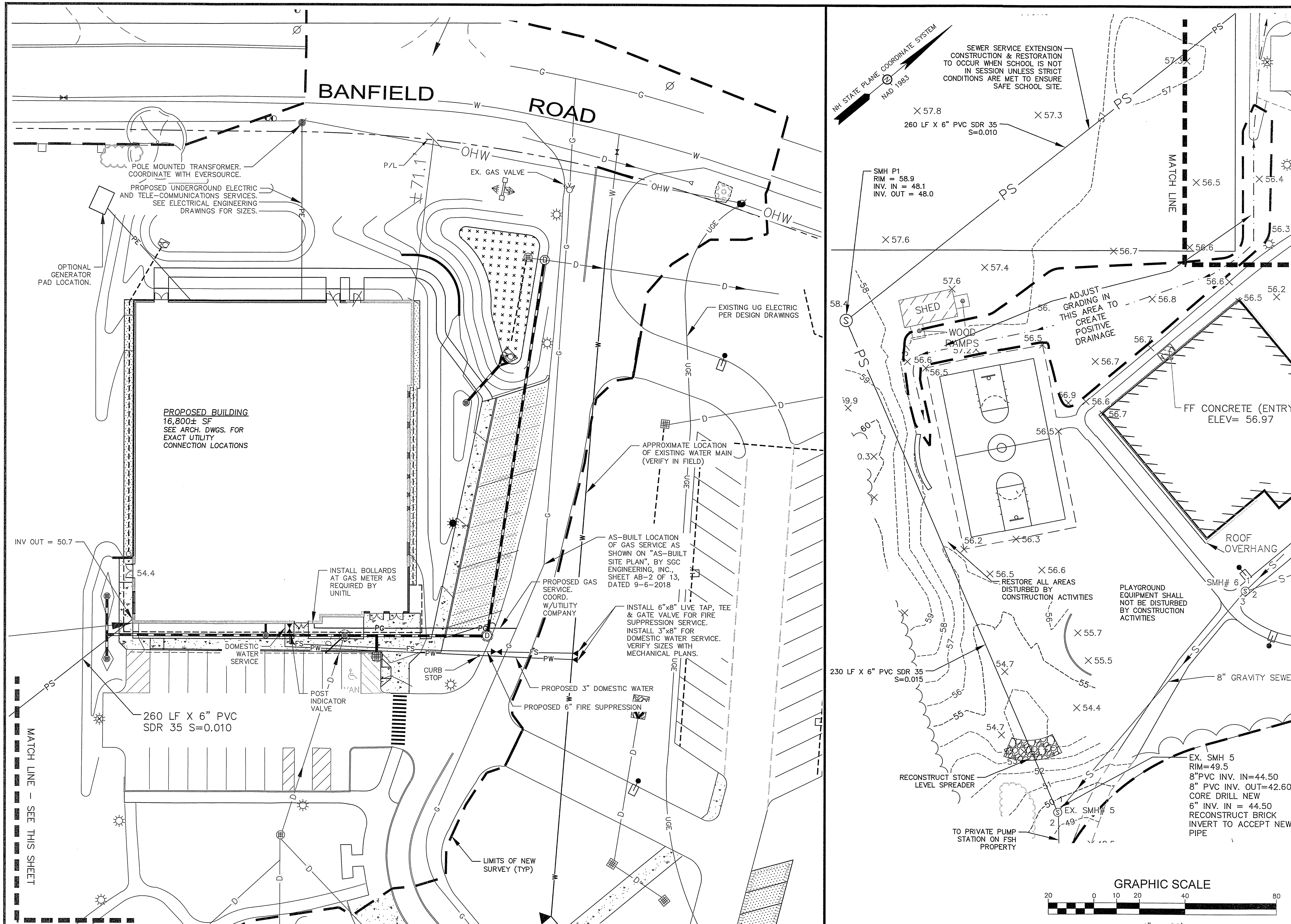
OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL
266-5

APPLICANT:
SAINT PATRICK ACADEMY
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
GYMNASIUM PROJECT
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL
266-5

TITLE:
GRADING & DRAINAGE PLAN

SHEET NUMBER:
C-3



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STATE OF NEW HAMPSHIRE
ERIC D. WEINRIEB
No. 7634
LICENSED PROFESSIONAL ENGINEER

1/29/20

ISSUED FOR: PLANNING BOARD APPROVAL

ISSUE DATE: JANUARY 29, 2020

REVISIONS

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1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:
SAINT PATRICK ACADEMY
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
GYMNASIUM PROJECT
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:
UTILITIES PLAN

SHEET NUMBER:
C-4

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRMAN DATE

GENERAL NOTES:

1. SEE CIVIL SHEETS FOR HARDSCAPE, STORMWATER MANAGEMENT, AND GRADING.
2. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
3. ALL REQUIRED PLANT MATERIALS SHALL BE TENDED AND MAINTAINED IN A HEALTHY GROWING CONDITION, REPLACED WHEN NECESSARY, AND KEPT FREE OF REFUSE AND DEBRIS. ALL REQUIRED FENCES AND WALLS SHALL BE MAINTAINED IN GOOD REPAIR.
4. THE PROPERTY OWNER SHALL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD AND DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE, AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.
5. SEE SHEET L-501 FOR PLANT LIST AND PLANTING DETAILS.

LEGEND

DECIDUOUS TREE (CANOPY).

UNDERSTORY TREE.

SHRUBS.

PERENNIAL/ORNAMENTAL GRASSES.

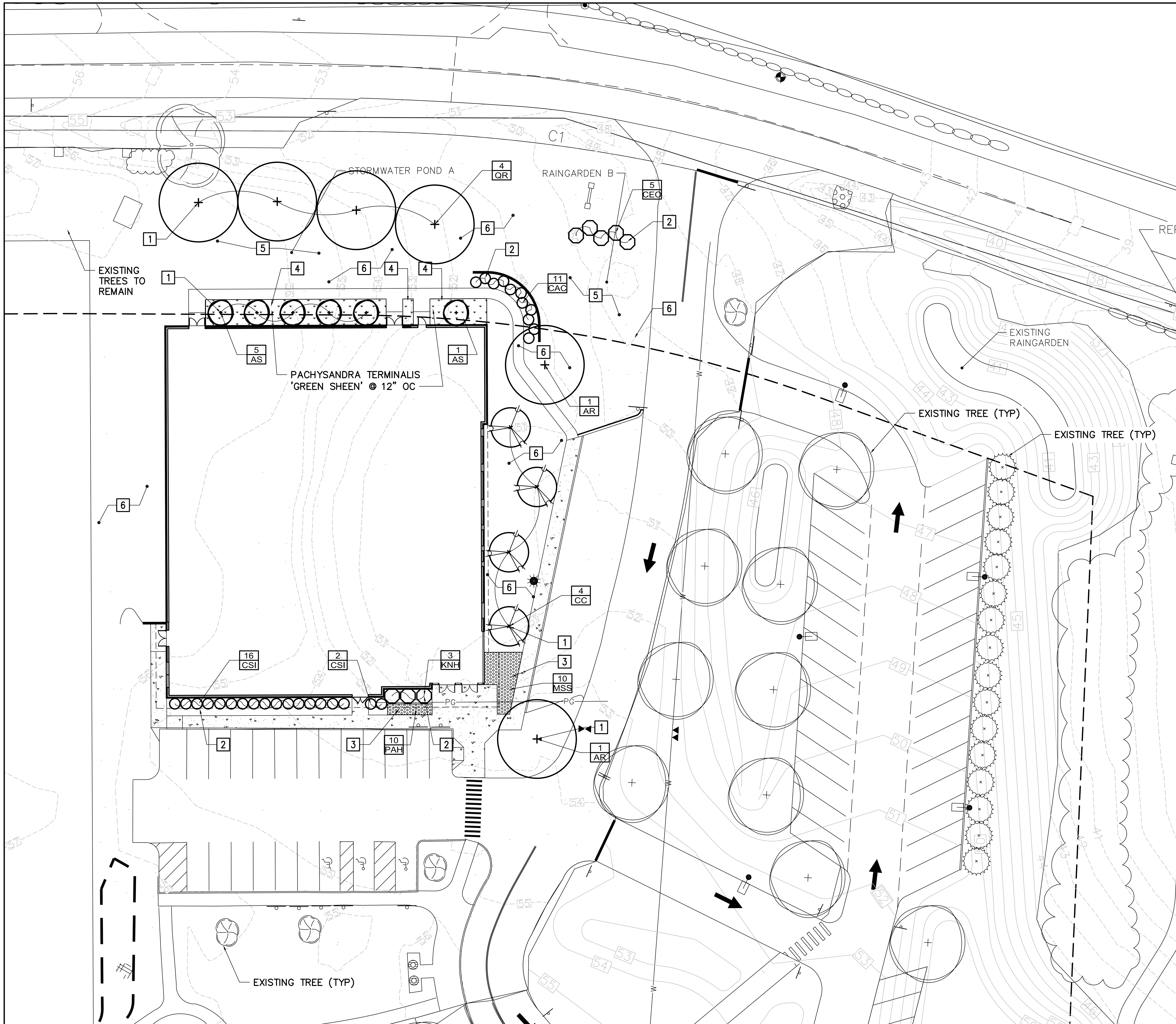
GROUND COVER.

RAINGARDEN SEED MIX.

5 CEO — PLANT OR TREE QUANTITY, SEE PLANT LIST ON SHEET L-501; PLANT OR TREE SYMBOL, SEE PLANT LIST ON SHEET L-501

KEYNOTES (THIS SHEET ONLY)

1. TREE PLANTING. 1/L-501, 2/L-501, 3/L-501
2. SHRUB PLANTING. 4/L-501
3. PERENNIAL/ORNAMENTAL GRASS PLANTING. 4/L-501
4. GROUND COVER PLANTING. 4/L-501
5. RAINGARDEN SEED MIX.
6. TURFGRASS SEED MIX.



1 LANDSCAPE PLAN
LS101 SCALE: 1"=20'-0"

NORTH

GRAPHIC SCALE
20' 10' 0 20' 40'
1"=20'
CHECK GRAPHIC SCALE BEFORE USING

28 Jan, 2020 – 3:58pm
C:\Dfile\21902.15–LS101.dwg

OAK POINT ASSOCIATES
ARCHITECTURE ■ ENGINEERING ■ PLANNING
85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870 www.oakpoint.com

50% SUBMISSION 01-31-20

DESIGNED BY: ATD
DRAWN BY: ATD
CHECKED BY: RSH
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

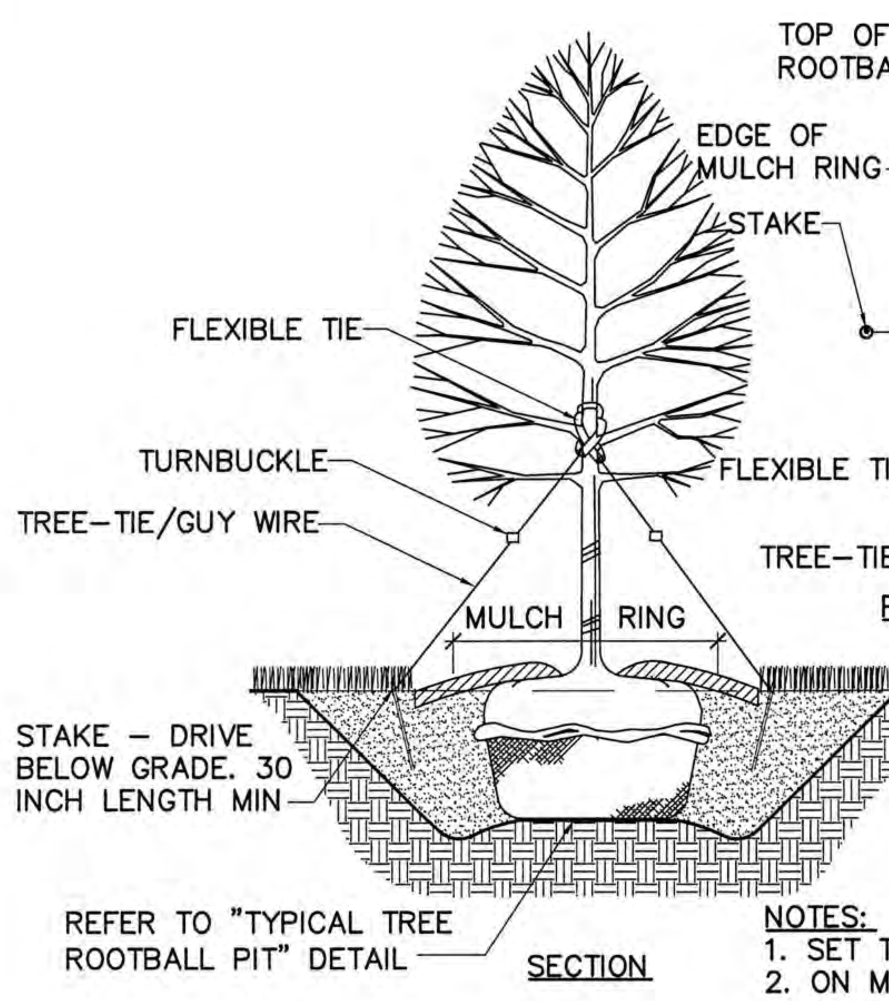
LANDSCAPE PLAN

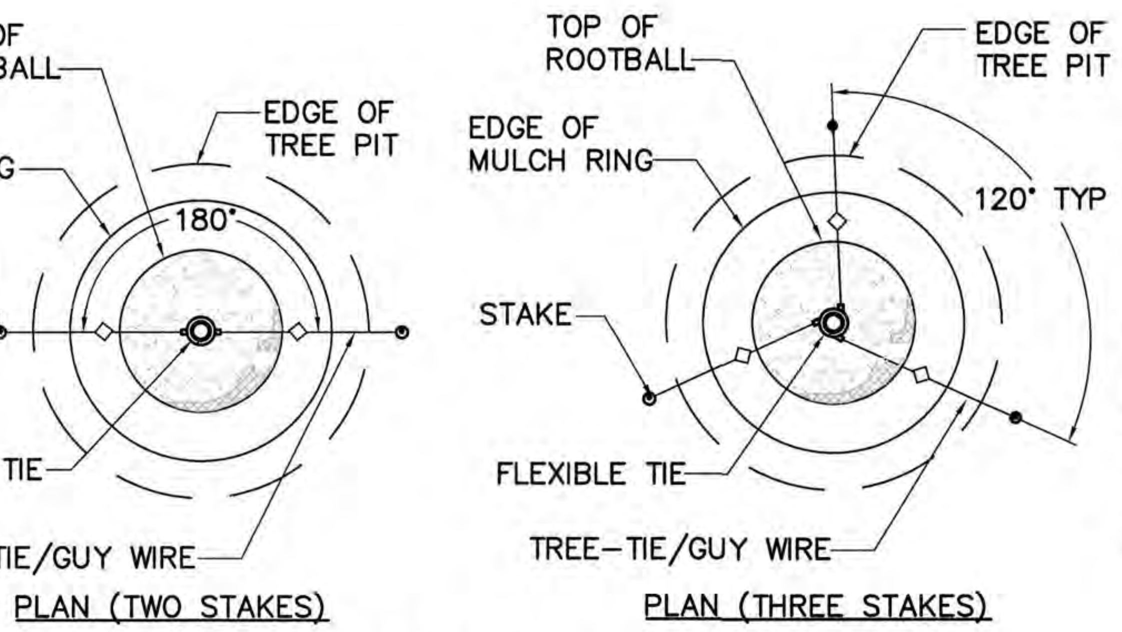
SCALE: AS NOTED

DATE: 01-31-20

DWG.: LS101

SHEET: OF





STAKING REQUIREMENTS

HEIGHT	CAL	STAKES	WIRE TYPE
≤12'	≤2 1/2"	2	TIE WIRE
12'-14'	2 1/2"-4"	3	TIE WIRE
>14'	3"- 6"	3	GUY CABLE
>14'	>6"	3	GUY/TURNBUCKLE

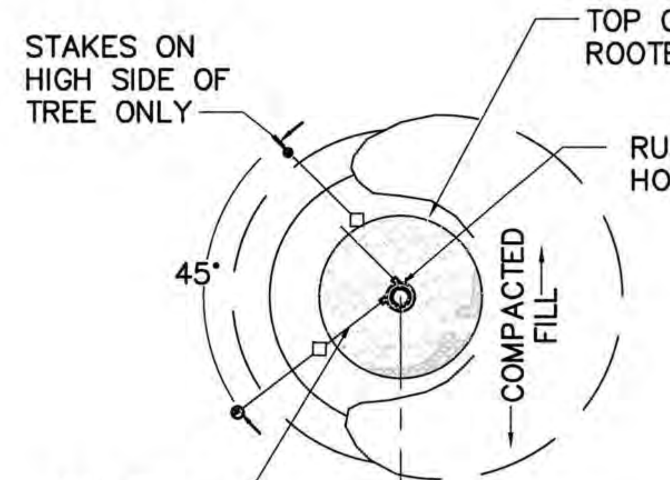
NOTES:
1. SET TREE PLUMB PRIOR TO STAKING.
2. ON MULTI–STEM TREES, ATTACH GUYS TO THE LARGEST TRUNK.
3. ON EVERGREEN TREES, ATTACH GUYS 1/2 WAY UP HEIGHT OF TREE.
4. REMOVE STAKING AND GUYING AFTER ONE YEAR.

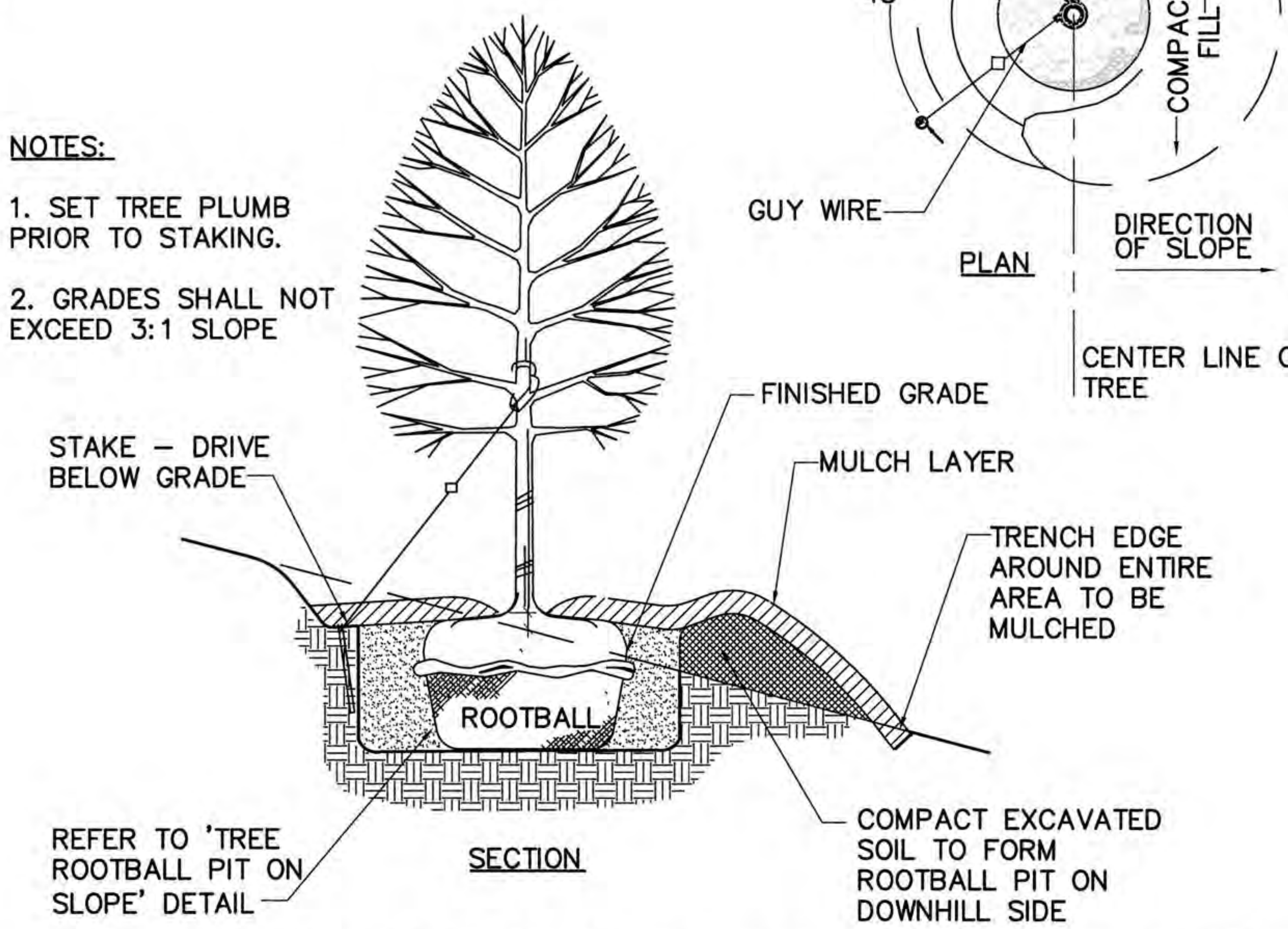
1 TREE STAKING AND GUYING
L–501 NOT TO SCALE
LS101

NOTES:

1. SET TREE PLUMB PRIOR TO STAKING.

2. GRADES SHALL NOT EXCEED 3:1 SLOPE

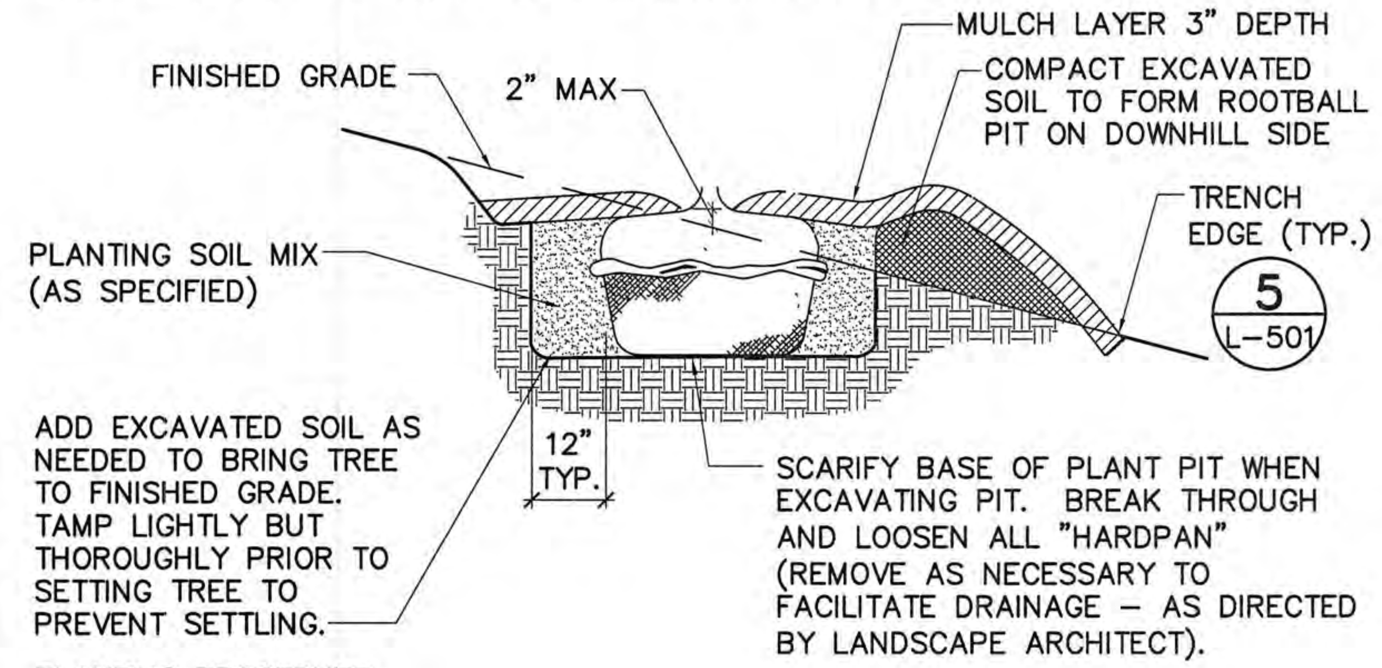




2 TREE ON SLOPE: STAKING AND GUYING
L–501 NOT TO SCALE
LS101

GENERAL NOTES:

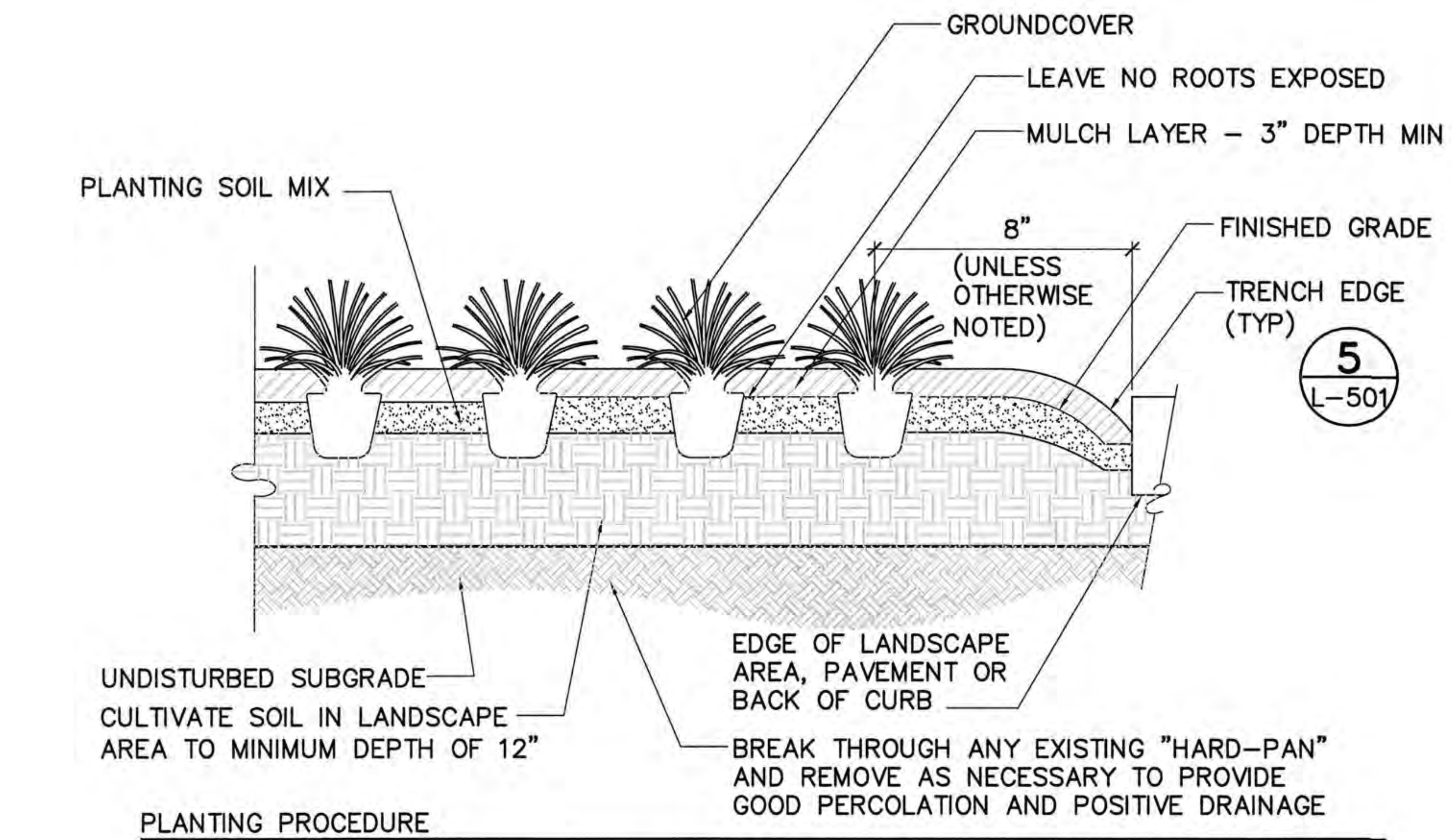
1. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING.
2. IMMEDIATELY SOAK WITH WATER.
3. DO NOT BREAK ROOTBALL.
4. SET ROOTBALL AT GRADE OR MAX. 2" ABOVE GRADE.
5. IF ROOTBALL IS IN WIRE CAGE, BEND CAGE BACK FROM TOP 1/4 OF BALL.
6. KEEP MULCH 1"–2" AWAY FROM TRUNK AT BASE OF TREE.



PLANTING PROCEDURE:

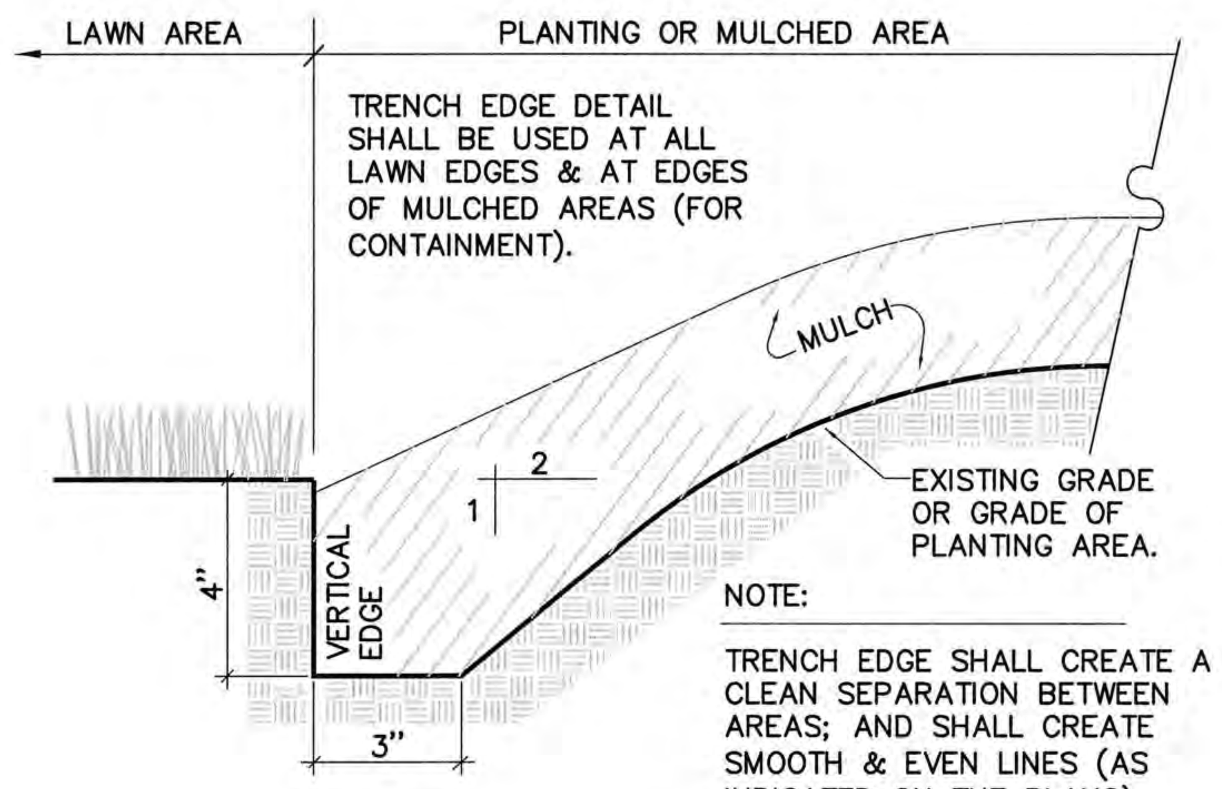
1. EXCAVATE ROOTBALL PIT.
2. ADD EXCAVATED SOIL AND TAMP.
3. SET TREE SUCH THAT TOP OF ROOTBALL IS FLUSH WITH OR NO HIGHER THAN 2" ABOVE FINISHED GRADE.
4. BACKFILL W/ SOIL MIX AND WATER IN.
5. COMPLETE BACKFILLING, CONSTRUCT TRENCH EDGE & ADD SPECIFIED MULCH.
6. STAKE AND/OR GUY SECURELY.

3 TREE ROOTBALL ON SLOPE
L–501 NOT TO SCALE
LS101



PLANTING PROCEDURE
1. LAY OUT BED AND OUTLINE WITH TRENCH EDGE. PLACE SOIL FROM EDGE WITHIN BED.
2. ROTOTILL BED TO 12" DEPTH. SPREAD 3" MIN. LAYER OF PLANTING SOIL MIX OVER BED. ROTOTILL SOIL MIX INTO TOP OF BED. INSTALL PLANTS AND MULCH. WATER THOROUGHLY.

4 SHRUB, PERENNIAL AND ORNAMENTAL GRASS PLANTING
L–501 NOT TO SCALE
LS101



NOTE:

TRENCH EDGE SHALL CREATE A CLEAN SEPARATION BETWEEN AREAS; AND SHALL CREATE SMOOTH & EVEN LINES (AS INDICATED ON THE PLANS).

5 TRENCH EDGE: SECTION
L–501 NOT TO SCALE
L–501

PLANT LIST:

	SYMB	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SIZE AT MATURITY
TREES						
	AR	2	ACER RUBRUM 'RED SUNSET'	RED MAPLE	2.5"–3" CAL.	40'
	AS	7	ACER SACCHARUM 'NEWTON SENTRY'	COLUMNAR FORM SUGAR MAPLE	2.5"–3" CAL.	40'
	CC	4	CERCIS CANADENSIS	EASTERN REDBUD	10'–12' HT	25'
	QR	4	QUERCUS RUBRA	RED OAK	2.5"–3" CAL.	50'
SHRUBS						
	CEO	5	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	2 GAL.	8'
	CAC	11	CLETHRA ALNIFOLIA 'COMPACTA'	COMPACT SUMMERSWEET	18"–24" HT	4'
	CSI	16	CORNUS SERICEA 'ISANTI'	COMPACT RED–TWIG DOGWOOD	2 GAL.	4'
	KNH	3	KALMIA LATIFOLIA 'NATHAN HALE'	MOUNTAIN LAUREL	18"–24" HT	4'
PERENNIALS/ORNAMENTAL GRASSES						
	PAH	10	PENNISETUM ALUPECUROIDES 'HAMELN'	DWARF FOUNTAIN GRASS	1 GAL	24"
	MSS	10	MISCANTHUS SINENSUS 'STRICTUS'	PORCUPINE GRASS	1 GAL.	5'
GROUNDCOVER						
	PTG	500	PACHYSANDRA TERMINALIS 'GREEN SHEEN'	JAPANESE PACHYSANDRA	1 QT.	8"

20 Dec, 2019 – 4:18pm
Z:\21902.15\21902.15–L501.dwg

OAK POINT ASSOCIATES
ARCHITECTURE • ENGINEERING • PLANNING
85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870 www.oakpoint.com

ISSUED FOR PLANNING BOARD APPROVAL NOT FOR CONSTRUCITON

DESIGNED BY: ATD
DRAWN BY: ATD
CHECKED BY: RSH
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

LANDSCAPE DETAILS AND PLANT LIST

SCALE: AS NOTED

DATE: 12-23-19

DWG.: L-501

SHEET: OF

SEDIMENT AND EROSION CONTROL NOTES

PROJECT NAME AND LOCATION

Owner:

HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD, 2ND FLOOR
PORTSMOUTH, NEW HAMPSHIRE 03801

LATITUDE: 043° 02' 31" N
LONGITUDE: 070° 47' 15" W

DESCRIPTION

The project consists of the construction of a gymnasium on the existing school campus with parking areas and access, site grading, storm drainage improvements, underground utilities installation, landscaping and associated site improvements.

DISTURBED AREA

The total area to be disturbed on the parcel and for the building, driveway, parking area, drainage, and utility construction is approximately 55,000 SF± (1.3 acres±). The combined disturbed area exceeds 43,560 SF (1 acre), thus a SWPPP will be required for compliance with the USEPA–NPDES Construction General Permit.

NPDES CONSTRUCTION GENERAL PERMIT

Contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP) is accordance with federal storm water permit requirements (see "Developing Your Stormwater Pollution Prevention Plan", EPA 833–R–060–4). The SWPPP must be prepared in a format acceptable to the Owner and three (3) copies provided to the Municipality at least fourteen (14) days prior to initiating construction. Contractor is responsible for all cost associated with preparation and implementation of SWPPP including any temporary erosion control measures (whether indicated or not on these drawings) as required for the contractor's sequence of activities.

The Contractor and Owner shall each file a Notice of Intent (NOI) with the U.S.E.P.A. under the NPDES Construction General Permit. (U.S.E.P.A., 1200 Pennsylvania Avenue NW, Washington, DC 20460) All work shall be in accordance with NPDES General Permit: NHG07000, including NOI requirements, effluent limitations, standards and management for construction. The Contractor shall be responsible for obtaining a USEPA Construction Dewatering Permit, if required.

SEQUENCE OF MAJOR ACTIVITIES

1. Prepare SWPPP and file NPDES Notice of Intent, prior to any construction activities (Required).
2. Hold a pre–construction meeting with City & stake holders.
3. Install temporary erosion control measures, including silt fences and stabilized construction exit/entrance.
4. Protect specified trees (see plans).
5. Clear and Grub vegetated areas per plan; Strip and stockpile loam. Stockpiles shall be temporarily stabilized with hay bales, mulch and surrounded by a hay bale or silt fence barrier until material is removed and final grading is complete. Remove debris.
6. Construct swales and utility infrastructure. Rough grade lot to prepare for site development. Stabilize swales prior to directing flow to them.
7. Loam and seed disturbed areas.
8. Construct building. Construct bituminous concrete pavement & driveway access.
9. Construct raingardens & landscaping.
10. When all construction activity is complete and site is stabilized, remove all hay bales, storm check dams (if applicable), silt fences and temporary structures and sediment that has been trapped by these devices.
11. File a Notice of Termination (N.O.T.) with U.S.E.P.A. (Required)

NAME OF RECEIVING WATER

The majority of the site drainage travels overland to an Unnamed Wetland and eventually to the Sagamore Creek Watershed.

TEMPORARY EROSION & SEDIMENT CONTROL AND STABILIZATION PRACTICES

All work shall be in accordance with state and local permits. Work shall conform to the practices described in the "New Hampshire Stormwater Manual, Volumes 1 – 3", issued December 2008, as amended. As indicated in the sequence of Major Activities, the silt fences shall be installed prior to commencing any clearing or grading of the site. Structural controls shall be installed concurrently with the applicable activity. Once construction activity ceases permanently in an area, silt fences and any earth/dikes will be removed once permanent measures are established.

During construction, runoff will be diverted around the site with stabilized channels where possible. Sheet runoff from the site shall be filtered through hay bale barriers, stone check dams, and silt fences. All storm drain inlets shall be provided with hay bale filters or stone check dams. Stone rip rap shall be provided at the outlets of drain pipes and culverts where shown on the drawings.

Stabilize all ditches, swales, stormwater ponds, level spreaders and their contributing areas prior to directing flow to them.

Temporary and permanent vegetation and mulching is an integral component of the erosion and sedimentation control plan. All areas shall be inspected and maintained until vegetative cover is established. These control measures are essential to erosion prevention and also reduce costly rework of graded and shaped areas.

Temporary vegetation shall be maintained in these areas until permanent seeding is applied. Additionally, erosion and sediment control measures shall be maintained until permanent vegetation is established.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

A. GENERAL

These are general inspection and maintenance practices that shall be used to implement the plan:

1. The smallest practical portion of the site shall be denuded at one time, but in no case shall it exceed 5 acres at one time.
2. All control measures shall be inspected at least once each week and following any storm event of 0.25 inches or greater.
3. All measures shall be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours.
4. Built–up sediment shall be removed from silt fence or other barriers when it has reached one–third the height of the fence or bale, or when "bulges" occur.
5. All diversion dikes shall be inspected and any breaches promptly repaired.
6. Temporary seeding and planting shall be inspected for bare spots, washouts, and unhealthy growth.
7. The owner's authorized engineer shall inspect the site on a periodic basis to review compliance with the Plans.
8. All roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.
9. All cut and fill slopes shall be seeded/loamed within 72 hours of achieving finished grade.
10. An area shall be considered stable if one of the following has occurred:
    a. Base coarse gravels have been installed in areas to be paved;
    b. A minimum of 85% vegetated growth as been established;
    c. A minimum of 3 inches of non–erosive material such as stone of riprap has been installed;
    – or –
    d. Erosion control blankets have been properly installed.
11. The length of time of exposure of area disturbed during construction shall not exceed 45 days.

B. MULCHING

Mulch shall be used on highly erodible soils, on critically eroding areas, on areas where conservation of moisture will facilitate plant establishment, and where shown on the plans.

1. Timing – In order for mulch to be effective, it must be in place prior to major storm events. There are two (2) types of standards which shall be used to assure this:
    a. Apply mulch prior to any storm event. This is applicable when working within 100 feet of wetlands. It will be necessary to closely monitor weather predictions, usually by contacting the National Weather Service in Concord, to have adequate warning of significant storms.
    b. Required Mulching within a specified time period. The time period can range from 21 to 28 days of inactivity on a area, the length of time varying with site conditions. Professional judgment shall be used to evaluate the interaction of site conditions (soil erodibility, season of year, extent of disturbance, proximity to sensitive resources, etc.) and the potential impact of erosion on adjacent areas to choose an appropriate time restriction.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (CON'T)

2. Guidelines for Winter Mulch Application –

Type	Rate per 1,000 s.f.	Use and Comments
Hay or Straw	70 to 90 lbs.	Must be dry and free from mold. May be used with plantings.
Wood Chips or Bark Mulch	460 to 920 lbs.	Used mostly with trees and shrub plantings.
Jute and Fibrous Matting (Erosion Blanket	As per manufacturer Specifications	Used in slope areas, water courses and other Control areas.
Crushed Stone 1/4" to 1–1/2" dia.	Spread more than 1/2" thick	Effective in controlling wind and water erosion.
Erosion Control Mix	2" thick (min)	* The organic matter content is between 80 and 100%, dry weight basis. * Particle size by weight is 100% passing a 6" screen and a minimum of 70 %, maximum of 85%, passing a 0.75" screen. * The organic portion needs to be fibrous and elongated. * Large portions of silts, clays or fine sands are not acceptable in the mix. * Soluble salts content is less than 4.0 mmhos/cm. * The pH should fall between 5.0 and 8.0.

3. Maintenance – All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. If less than 90% of the soil surface is covered by mulch, additional mulch shall be immediately applied.

C. TEMPORARY GRASS COVER

1. Seedbed Preparation –
Apply fertilizer at the rate of 600 pounds per acre of 10–10–10. Apply limestone (equivalent to 50 percent calcium plus magnesium oxide) at a rate of three (3) tons per acre.

2. Seeding –
    a. Utilize annual rye grass at a rate of 40 lbs/acre.
    b. Where the soil has been compacted by construction operations, loosen soil to a depth of two (2) inches before applying fertilizer, lime and seed.
    c. Apply seed uniformly by hand, cyclone seeder, or hydroseeder (slurry including seed and fertilizer). Hydroseedings, which include mulch, may be left on soil surface. Seeding rates must be increased 10% when hydroseeding.

3. Maintenance –
Temporary seedings shall be periodically inspected. At a minimum, 95% of the soil surface should be covered by vegetation. If any evidence of erosion or sedimentation is apparent, repairs shall be made and other temporary measures used in the interim (mulch, filter barriers, check dams, etc.).

D. FILTERS

1. Tubular Sediment Barrier
    a. See detail.
    b. Install per manufacturer's requirements.

2. Silt Fence (if used)
    a. Synthetic filter fabric shall be a pervious sheet of propylene, nylon, polyester or ethylene yarn and shall be certified by the manufacturer or supplier as conforming to the following requirements:

Physical Property	Test	Requirements
Filtering Efficiency	VTM–51	75% minimum
Tensile Strength at 20% Maximum Elongation*	VTM–52	Extra Strength 50 lb/lin in (min) Standard Strength 30 lb/lin in (min)
Flow Rate	VTM–51	0.3 gal/sf/min (min)

* Requirements reduced by 50 percent after six (6) months of installation.

Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizer to provide a minimum of six (6) months of expected usable construction life at a temperature range of 0 degrees F to 120° F.

b. Posts shall be spaced a maximum of ten (10) feet apart at the barrier location or as recommended by the manufacturer and driven securely into the ground (minimum of 16 inches).

c. A trench shall be excavated approximately six (6) inches wide and eight (8) inches deep along the line of posts and upslope from the barrier.

d. When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least one (1) inch long, tie wires or hog rings. The wire shall extend no more than 36 inches above the original ground surfaces.

e. The "standard strength" filter fabric shall be stapled or wired to the fence, and eight (8) inches of the fabric shall be extended into the trench. The fabric shall not extend more than 36 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.

f. When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions of item (g) applying.

g. The trench shall be backfilled and the soil compacted over the filter fabric.

h. Silt fences shall be removed when they have served their useful purpose but not before the upslope areas has been permanently stabilized.

3. Sequence of Installation –
Sediment barriers shall be installed prior to any soil disturbance of the contributing upslope drainage area.

4. Maintenance –
a. Silt fence barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. They shall be repaired if there are any signs of erosion or sedimentation below them. Any required repairs shall be made immediately. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water, the sediment barriers shall be replaced with a temporary stone check dam.

b. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still is necessary, the fabric shall be replaced promptly.

c. Sediment deposits must be removed when deposits reach approximately one–third (1/3) the height of the barrier.

d. Any sediment deposits remaining in place after the silt fence or other barrier is no longer required shall be removed. The area shall be prepared and seeded.

e. Additional stone may have to be added to the construction entrance, rock barrier and riprap lined swales, etc., periodically to maintain proper function of the erosion control structure.

E. PERMANENT SEEDING –

1. Bedding – stones larger than $1\frac{1}{2}$", trash, roots, and other debris that will interfere with seeding and future maintenance of the area should be removed. Where feasible, the soil should be tilled to a depth of 5" to prepare a seedbed and mix fertilizer into the soil.

2. Fertilizer – lime and fertilizer should be applied evenly over the area prior to or at the time of seeding and incorporated into the soil. Kinds and amounts of lime and fertilizer should be based on an evaluation of soil tests. When a soil test is not available, the following minimum amounts should be applied:

    Agricultural Limestone @ 100 lbs. per 1,000 s.f.
    10–20–20 fertilizer @ 12 lbs. per 1,000 s.f.

3. Seed Mixture (See Landscape Drawings for additional information):

3.1. Lawn seed mix shall be a fresh, clean new seed crop. The Contractor shall furnish a dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.
3.2. Seed mixture shall consist of
    a. 1/3 Kentucky blue,
    b. 1/3 perennial rye, and
    c. 1/3 fine fescue.
3.1. Turf type tall fescue is unacceptable.

4. Sodding – sodding is done where it is desirable to rapidly establish cover on a disturbed area. Sodding an area may be substituted for permanent seeding procedures anywhere on site. Bed preparation, fertilizing, and placement of sod shall be performed according to the S.C.S. Handbook. Sodding is recommended for steep sloped areas, areas immediately adjacent to sensitive water courses, easily erodible soils (fine sand/silt), etc.

WINTER CONSTRUCTION NOTES

1. All proposed vegetated areas which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and elsewhere seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events;

2. All ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions; and

3. After November 15th, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT Item 304.3.

WINTER CONSTRUCTION NOTES

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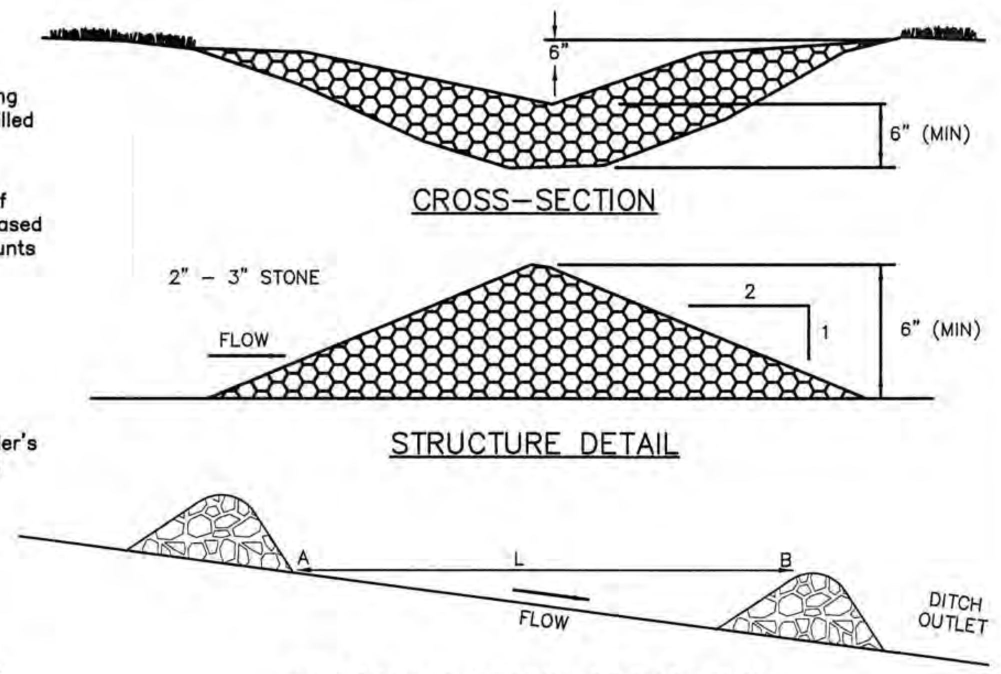
3. After November 15th, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT Item 304.3.

Long Term Inspection & Maintenance Schedule

	Spring	Fall or Yearly	After Major Storm	Every 2-5 Years
Vegetated Areas				
Inspect all slopes and embankments	x		x	
Replant bare areas or areas with sparse growth	x		x	
Armor areas with rill erosion with an appropriate lining or divert the erosive flows to on-site areas able to withstand concentrated flows.	x		x	
Stormwater Channels				
Inspect ditches, swales and other open stormwater channels	x	x	x	
Remove any obstructions and accumulated sediments or debris	x	x		
Control vegetated growth and woody vegetation		x		
Repair any erosion of the ditch lining		x		
Mow vegetated ditches		x		
Remove woody vegetation growing through riprap		x		
Repair any slumping side slopes		x		
Replace riprap where underlying filter fabric or underdrain gravel is exposed or where stones have been dislodged		x		
Culverts				
Remove accumulated sediments and debris at inlet, outlet and within the conduit	x	x	x	
Repair any erosion damage at the culvert's inlet and outlet	x	x	x	
Remove woody vegetation growing through riprap		x		
Roadways and Parking Surfaces				
Remove accumulated winter sand along roadways	x			
Sweep pavement to remove sediment	x			
Grade road shoulders and remove excess sand either manually or by a front-end loader	x			
Grade gravel roads and gravel shoulders and paths	x			
Clean out sediment contained in water bars or open-top culverts	x			
Ensure that stormwater is not impeded by accumulations of material or false ditches in the roadway shoulder	x			
Runoff Infiltration Facilities				
Remove dead vegetation and any accumulated sediment (normally at the entrance to the garden) to allow for new growth	x			
Weed; add additional hardwood mulch to suppress weeds	x	x		
Mow turf three (3) times a growing season				
Aerate area with deep tines, if water ponds on the surface for more than 24 hours during the first year or for a length of 72 hours		x		
Vegetative Swale				
Mow grass swales monthly				
Inspect swale following significant rainfall event	x	x	x	
Control vegetated growth and woody vegetation	x	x		
Repair any erosion of the ditch	x	x		
Remove debris and liter as necessary				



SPACING BETWEEN STRUCTURES

1. L = DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION
2. CHECK DAM SHALL BE CONSTRUCTED OF 2" TO 3" STONE WITH COMPLETE COVERAGE OF DITCH OR SWALE TO INSURE THAT THE CENTER OF THE STRUCTURE IS LOWER THAN THE EDGES.

MAINTENANCE

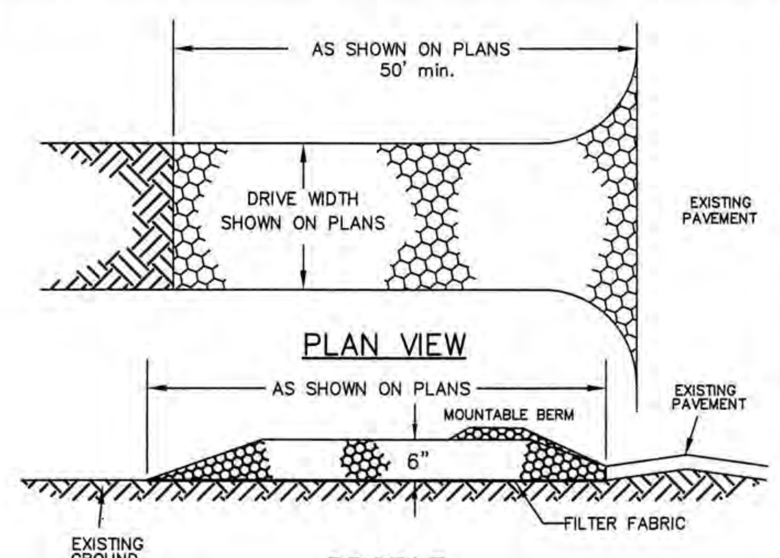
TEMPORARY GRADE STABILIZATION STRUCTURES SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED STORMS. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY. PARTICULAR ATTENTION SHOULD BE GIVEN TO END RUN AND EROSION AT THE DOWNSTREAM TOE OF THE STRUCTURE. WHEN THE STRUCTURES ARE REMOVED, THE DISTURBED PORTION SHOULD BE BROUGHT TO THE EXISTING CHANNEL GRADE AND THE AREAS PREPARED, SEEDED, AND MULCHED. WHILE THIS PRACTICE IS NOT INTENDED TO BE USED PRIMARILY FOR SEDIMENT TRAPPING, SOME SEDIMENT WILL ACCUMULATE BEHIND THE STRUCTURES, SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE.

CONSTRUCTION SPECIFICATIONS

1. STRUCTURES SHALL BE INSTALLED ACCORDING TO THE DIMENSIONS SHOWN ON THE PLANS AT THE APPROPRIATE SPACING.
2. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER SO THAT EROSION AND AIR AND WATER POLLUTION WILL BE MINIMIZED.
3. SEEDING, FERTILIZING, AND MULCHING SHALL CONFORM TO THE RECOMMENDATIONS IN THE APPROPRIATE VEGETATIVE BMP.
4. STRUCTURES SHALL BE REMOVED FROM THE CHANNEL WHEN THEIR USEFUL LIFE HAS BEEN COMPLETED.

STONE CHECK DAM

NOT TO SCALE



PROFILE

STONE GRADATION TABLE

SIEVE SIZE	% PASSING BY WEIGHT
2 inch	100
1 1/2 inch	90–100
1 inch	20–55
3/4 inch	0–15
3/8 inch	0–5

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE – NHDOT STANDARD STONE SIZE #4 – SECTION 703 OF NHDOT STANDARD.
2. LENGTH – DETAILED ON PLANS (50 FOOT MINIMUM).
3. THICKNESS – SIX (6) INCHES (MINIMUM).
4. WIDTH – FULL DRIVE WIDTH UNLESS OTHERWISE SPECIFIED.
5. FILTER FABRIC – MIRAFI 600X OR EQUAL APPROVED BY ENGINEER.
6. SURFACE WATER CONTROL – ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WHEELS SHALL BE CLEANED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AT ALL ENTRANCES TO PUBLIC RIGHTS–OF–WAY, AT LOCATIONS SHOWN ON THE PLANS, AND/OR WHERE AS DIRECTED BY THE ENGINEER.

STABILIZED CONSTRUCTION EXIT

NOT TO SCALE

NOTE:
ALL FACILITIES SHOULD BE INSPECTED ON AN ANNUAL BASIS AT A MINIMUM. IN ADDITION, ALL FACILITIES SHOULD BE INSPECTED AFTER A SIGNIFICANT PRECIPITATION EVENT TO ENSURE THE FACILITY IS DRAINING APPROPRIATELY AND TO IDENTIFY ANY DAMAGE THAT OCCURRED AS A RESULT OF THE INCREASED RUNOFF. FOR THE PURPOSE OF THIS STORMWATER MANAGEMENT PROGRAM, A SIGNIFICANT RAINFALL EVENT IS CONSIDERED AN EVENT OF THREE (3) INCHES IN A 24–HOUR PERIOD OR 0.5 INCHES IN A ONE–HOUR PERIOD. IT IS ANTICIPATED THAT A SHORT, INTENSE EVENT IS LIKELY TO HAVE A HIGHER POTENTIAL OF EROSION FOR THIS SITE THAN A LONGER, HIGH VOLUME EVENT.

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

STATE OF NEW HAMPSHIRE
ERIC D. WEINRIEB
No. 7634
LICENSED PROFESSIONAL ENGINEER

12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801.2 DETAILS.DWG

SCALE:
22" x 34" – NOT TO SCALE
11" x 17" – NOT TO SCALE

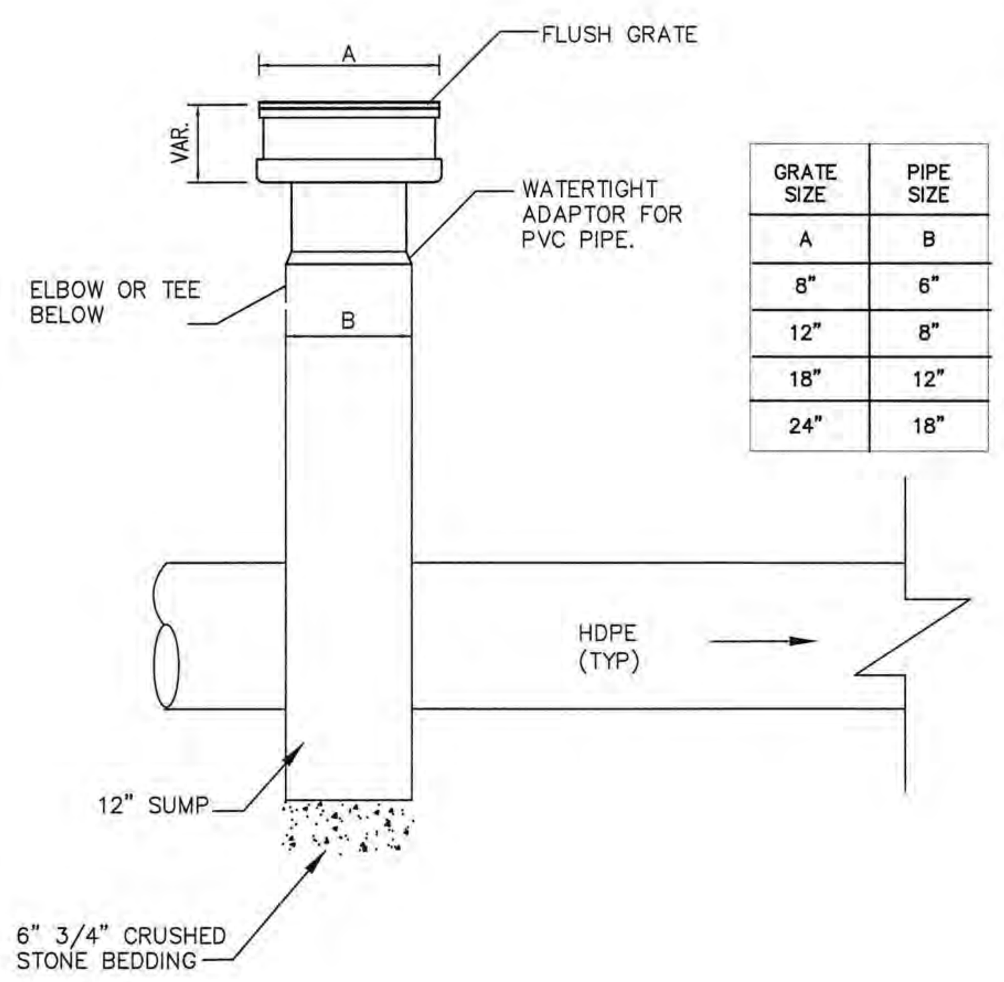
OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266–5

APPLICANT:
SAINT PATRICK ACADEMY
125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266–5

TITLE:
EROSION CONTROL NOTES & DETAILS

SHEET NUMBER:
D-1

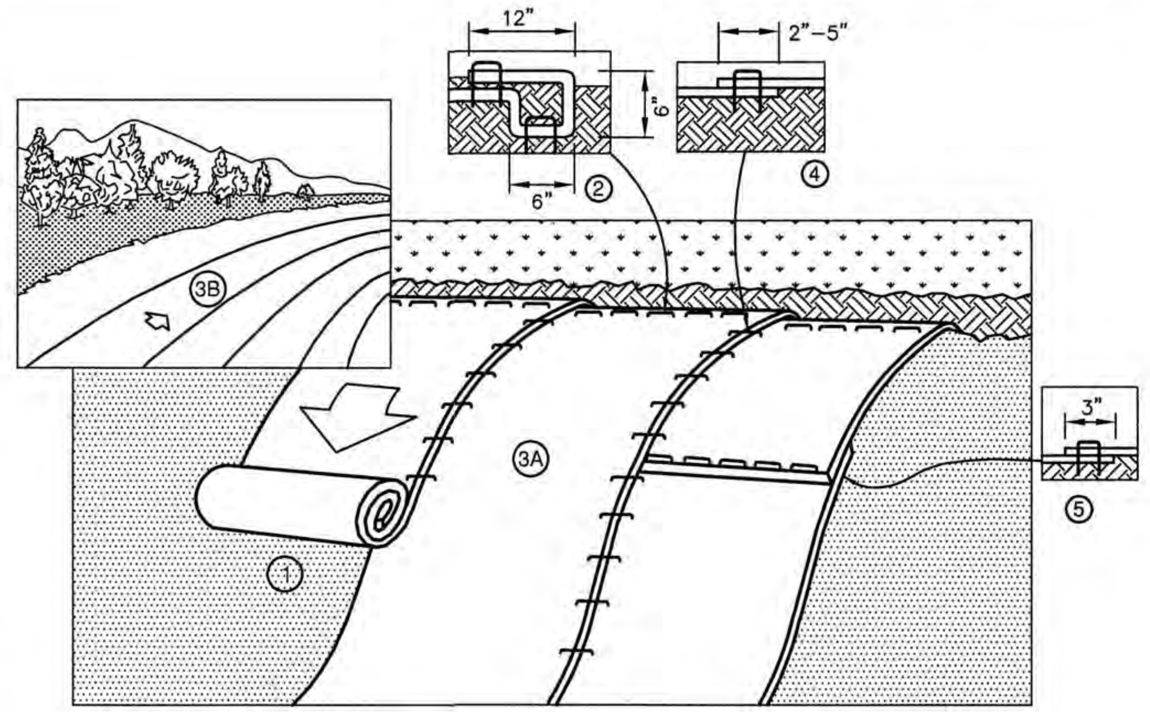


GRATE SIZE	PIPE SIZE
A	B
8"	6"
12"	8"
18"	12"
24"	18"

YARD DRAIN NOTES:

1. INLINE DRAIN TO BE PVC DIAMETER AS SPECIFIED AND AS MANUFACTURED BY ADS 1-800-821-6710 OR APPROVED EQUAL.
2. THE CONTRACTOR SHALL INSTALL THE INLINE DRAIN AS PER THE MANUFACTURER'S RECOMMENDATIONS AND AS SHOWN ON THE DRAWINGS.

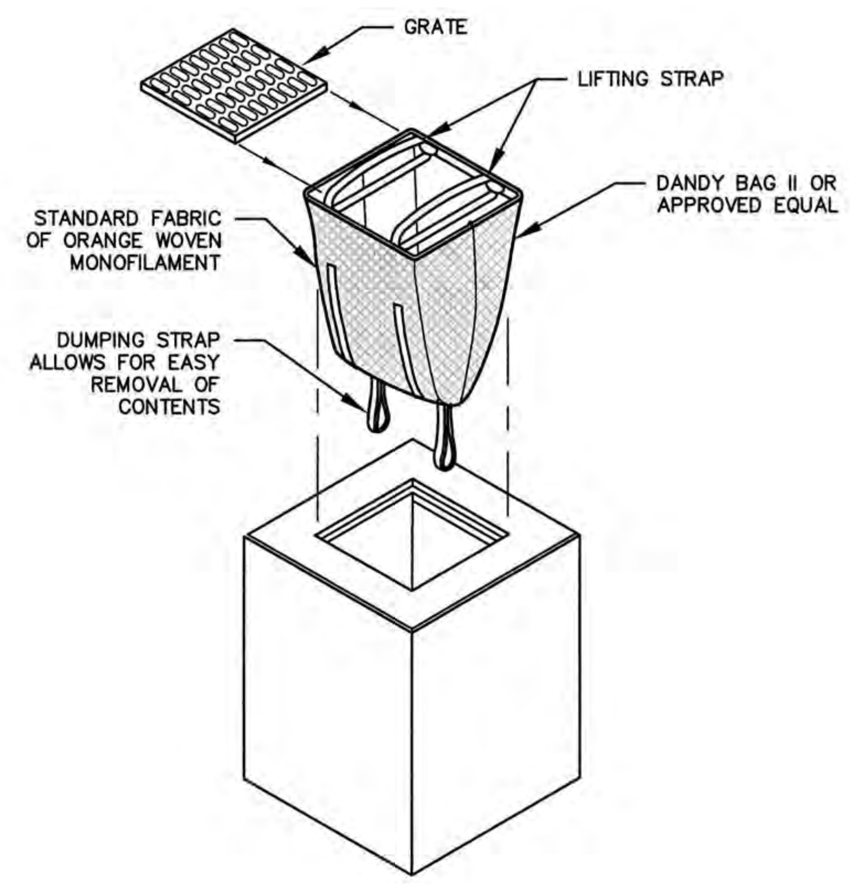
YARD DRAIN AND GRATE NOT TO SCALE



NOTES

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH. NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL BLANKET - SLOPE NOT TO SCALE



INSTALLATION AND MAINTENANCE:

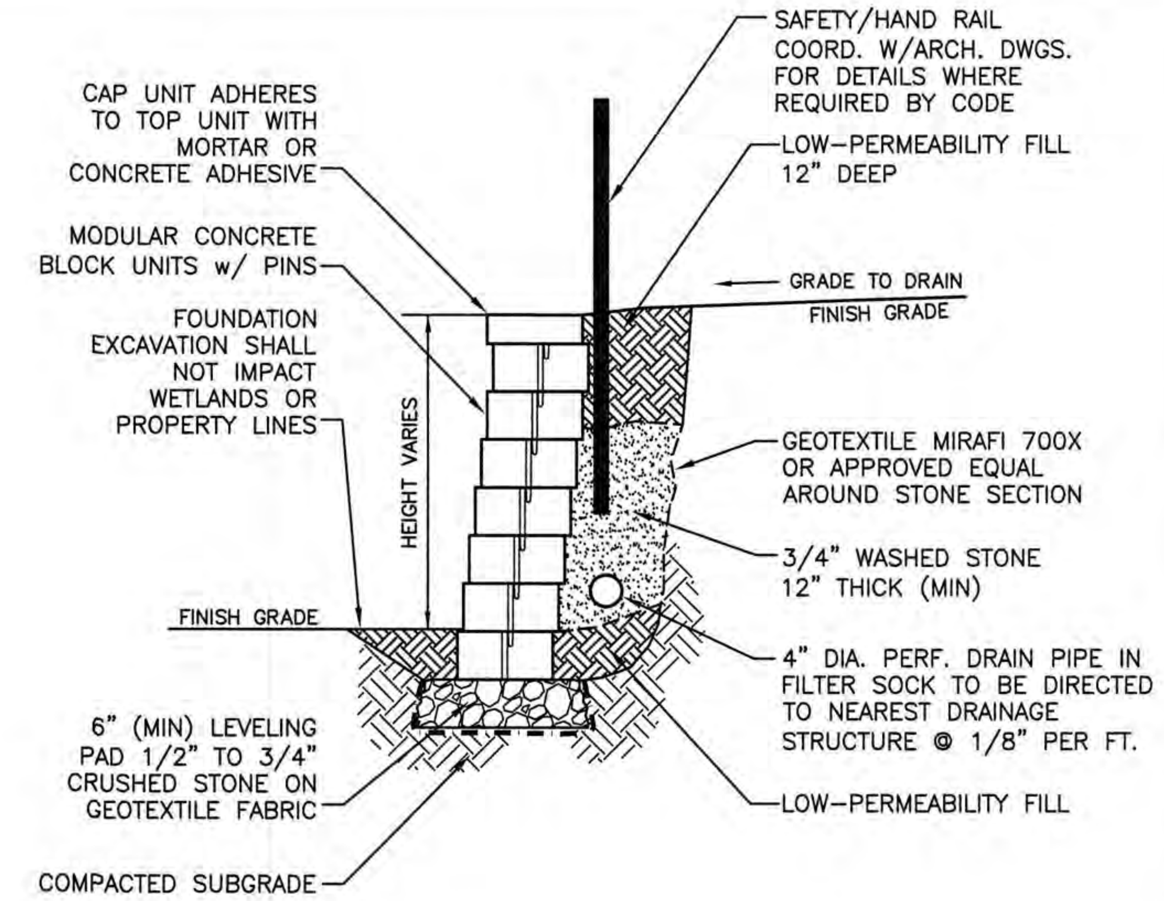
INSTALLATION: REMOVE THE GRATE FROM CATCH BASIN. IF USING OPTIONAL OIL ABSORBENTS; PLACE ABSORBENT PILLOW IN UNIT. STAND GRATE ON END. MOVE THE TOP LIFTING STRAPS OUT OF THE WAY AND PLACE THE GRATE INTO CATCH BASIN INSERT SO THE GRATE IS BELOW THE TOP STRAPS AND ABOVE THE LOWER STRAPS. HOLDING THE LIFTING DEVICES, INSERT THE GRATE INTO THE INLET.

MAINTENANCE: REMOVE ALL ACCUMULATED SEDIMENT AND DEBRIS FROM VICINITY OF THE UNIT AFTER EACH STORM EVENT. AFTER EACH STORM EVENT AND AT REGULAR INTERVALS, LOOK INTO THE CATCH BASIN INSERT. IF THE CONTAINMENT AREA IS MORE THAN 1/3 FULL OF SEDIMENT, THE UNIT MUST BE EMPTIED. TO EMPTY THE UNIT, LIFT THE UNIT OUT OF THE INLET USING THE LIFTING STRAPS AND REMOVE THE GRATE. IF USING OPTIONAL ABSORBENTS; REPLACE ABSORBENT WHEN NEAR SATURATION.

UNACCEPTABLE INLET PROTECTION METHOD:

A SIMPLE SHEET OF GEOTEXTILE UNDER THE GRATE IS NOT ACCEPTABLE.

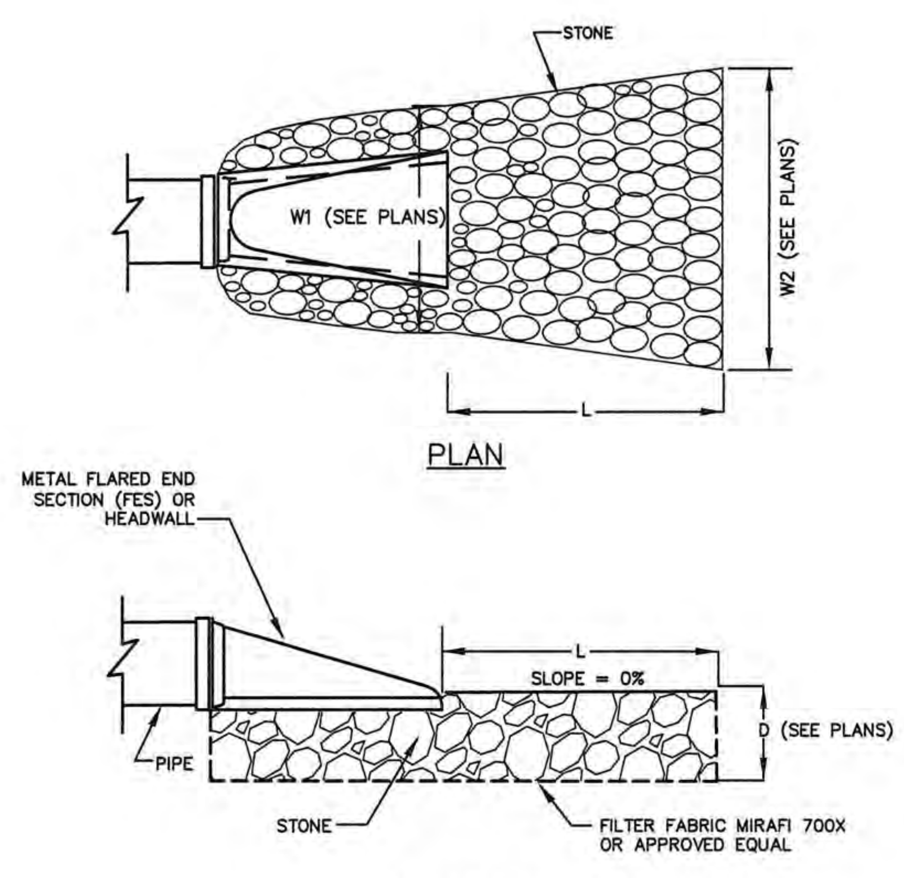
STORM DRAIN INLET PROTECTION NOT TO SCALE



NOTES:

1. TYPICAL MODULAR BLOCK SHALL BE PRECAST CONCRETE MEASURING APPROXIMATELY 16"x12"x6". OTHER BLOCK SIZES MAY BE APPROVED BY THE ENGINEER UPON REQUEST. CAP UNITS SHALL BE PER THE STANDARDS OF THE SELECTED MANUFACTURER.
2. BLOCK MANUFACTURER SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
3. WALL SHALL BE INSTALLED PER THE REQUIREMENTS OF THE MANUFACTURER.
4. WALL HEIGHT SHALL NOT EXCEED 4' WITHOUT DESIGN DRAWINGS STAMPED BY A PROFESSIONAL STRUCTURAL ENGINEER.
5. LOCKING PINS MAY OR MAY NOT BE REQUIRED BASED ON THE WALL MANUFACTURER APPROVED BY THE ENGINEER.
6. WALL SHALL BE EMBEDDED BELOW EXISTING GRADE THE DEPTH OF AT LEAST ONE BLOCK UNLESS OTHERWISE SPECIFIED BY THE WALL MANUFACTURER.
7. WALL BATTER SHALL BE PER THE MANUFACTURER'S SPECIFICATIONS.
8. BLOCK FINISH SHALL BE AT THE DISCRETION OF THE OWNER.
9. MODULAR BLOCK RETAINING WALL SHALL BE DIAMOND PRO WALL SYSTEM BY ANCHOR WALL SYSTEMS (OR APPROVED EQUAL). VERIFY WITH OWNER & ARCHITECT.
10. OWNER MAY SUBSTITUTE OTHER MATERIAL FOR WALL WITH PRIOR APPROVAL FROM ARCHITECT. POSSIBLE MATERIALS MAY BE SALVAGED FROM FORMER ST PATRICKS SCHOOL ON AUSTIN STREET.

MODULAR BLOCK RETAINING WALL NOT TO SCALE



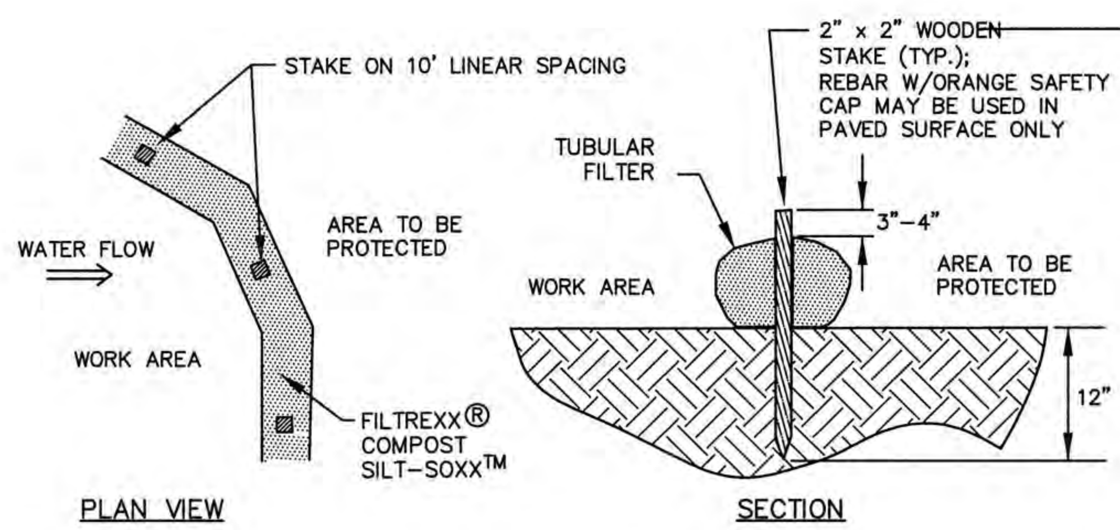
MAINTENANCE

THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIPRAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIPRAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIPRAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

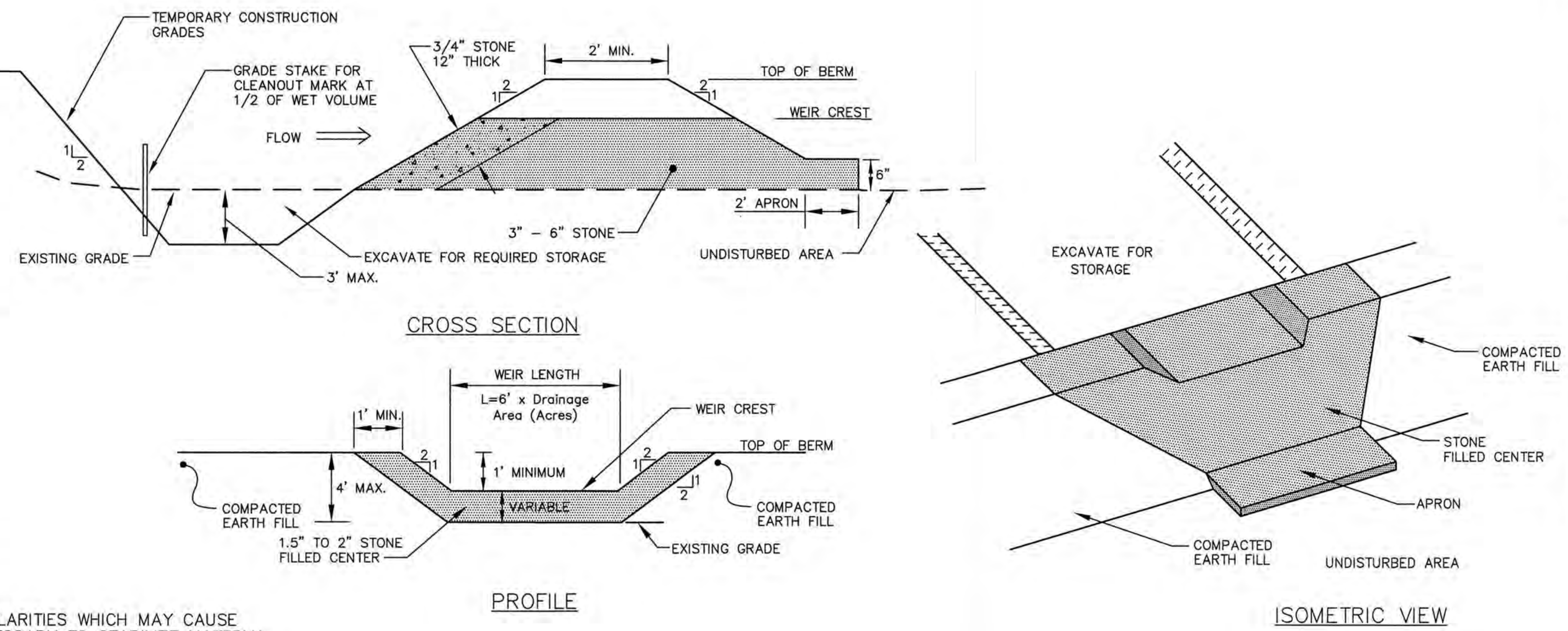
RIPRAP OUTLET PROTECTION NOT TO SCALE



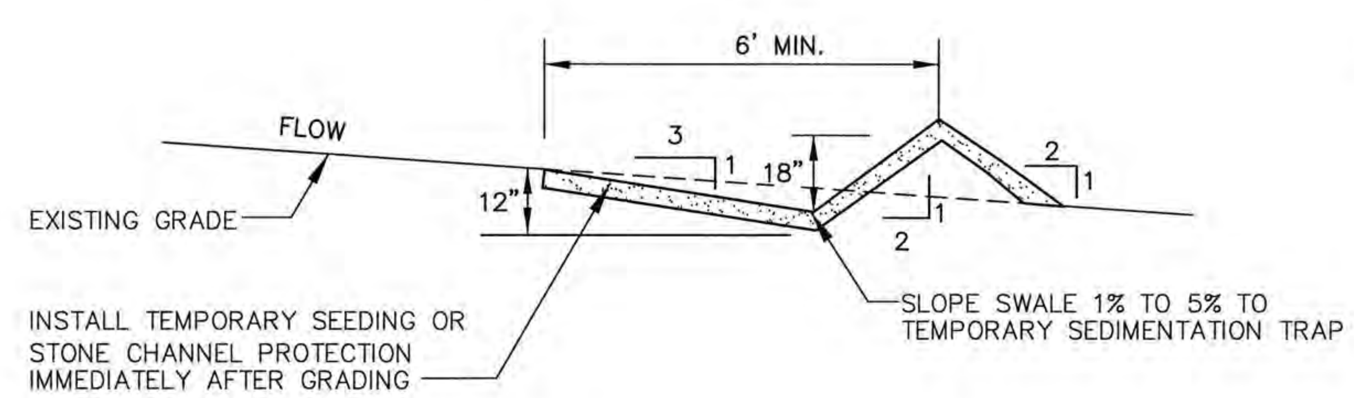
NOTES:

1. SILTSOXX OR APPROVED EQUAL SHALL BE USED FOR TUBULAR SEDIMENT BARRIERS.
2. ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS.
3. COMPOST/SOIL/ROCK/SEED FILL MATERIAL SHALL BE ADJUSTED AS NECESSARY TO MEET THE REQUIREMENTS OF THE SPECIFIC APPLICATION.
4. ALL SEDIMENT TRAPPED BY BARRIER SHALL BE DISPOSED OF PROPERLY.

TUBULAR SEDIMENT BARRIER DETAIL NOT TO SCALE



SWALE SHALL BE FREE OF IRREGULARITIES WHICH MAY CAUSE PONDING. COMPACT FILLS AS NECESSARY TO STABILIZE MATERIAL.



TEMPORARY DIVERSION SWALE NOT TO SCALE

MAINTENANCE

1. SEDIMENT SHALL BE REMOVED AND THE TRAP SHALL BE RESTORED TO ITS ORIGINAL CAPACITY WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN STORAGE VOLUME. SEDIMENT REMOVED SHALL BE DISPOSED OF SO THAT IT DOES NOT CAUSE A SEDIMENT PROBLEM AT ANOTHER LOCATION.
2. THE STRUCTURE SHALL BE CHECKED BI-WEEKLY AND AFTER EVERY MAJOR STORM TO INSURE THAT IT IS WORKING PROPERLY AND IS NOT DAMAGED. DAMAGE TO THE STRUCTURE SHALL BE REPAIRED IMMEDIATELY.
3. 3/4" STONE SHALL BE CHECKED DURING INSPECTION AND REPLACED WHEN THE OPENINGS IN THE STONE HAVE BECOME CLOGGED.
4. WHEN THE DRAINAGE AREA FLOWING INTO THE BASIN HAS BEEN FULLY STABILIZED, THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA VEGETATED USING LOAM AND SEED WITH MULCH (OR SOD IF NECESSARY) WITHIN 72 HOURS OF THE REMOVAL OF THE BASIN.

TEMPORARY SEDIMENT TRAP (TST) OUTLET NOT TO SCALE

P4801

ENGINEER:

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(603) 433-2335 www.ALTUS-ENG.com

STATE OF NEW HAMPSHIRE
ERIC D. WEINRIEB
No. 7634
LICENSED
PROFESSIONAL ENGINEER
12/23/19

ISSUED FOR:

TAC

ISSUE DATE:

DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB

APPROVED BY: EDW

DRAWING FILE: 4801.2 DETAILS.DWG

SCALE:

22" x 34" - NOT TO SCALE
11" x 17" - NOT TO SCALE

OWNER:

HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:

SAINT PATRICK ACADEMY

125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:

SAINT PATRICK ACADEMY GYMNASIUM

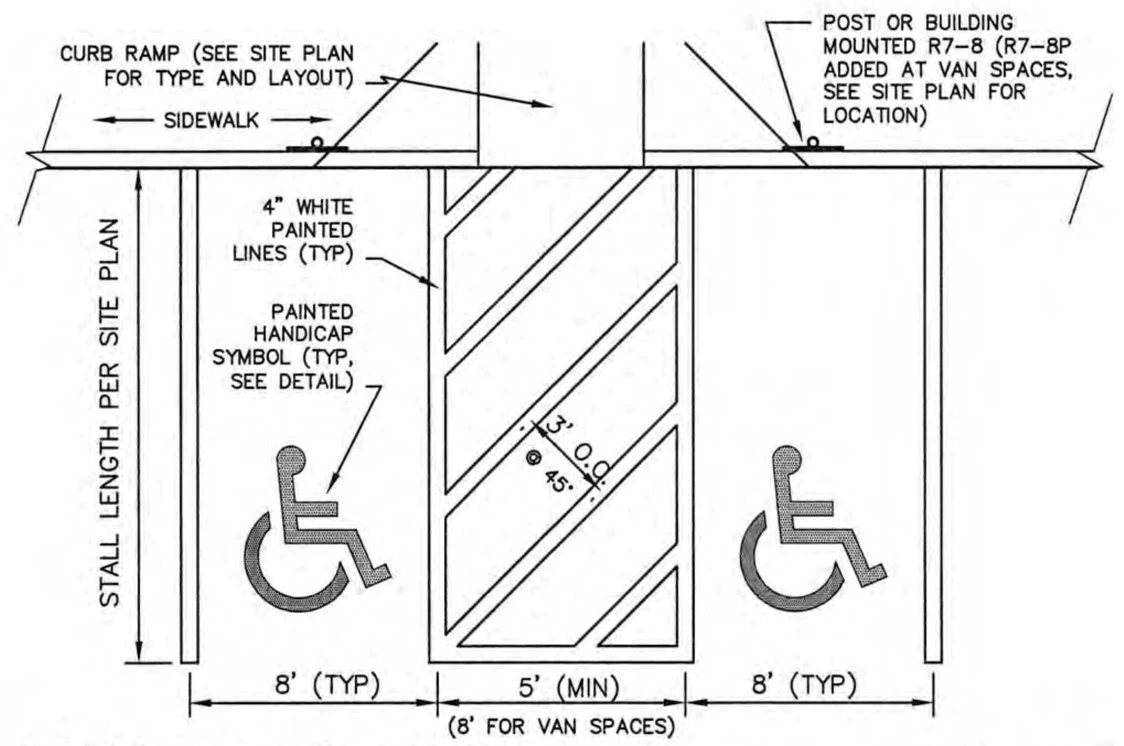
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:

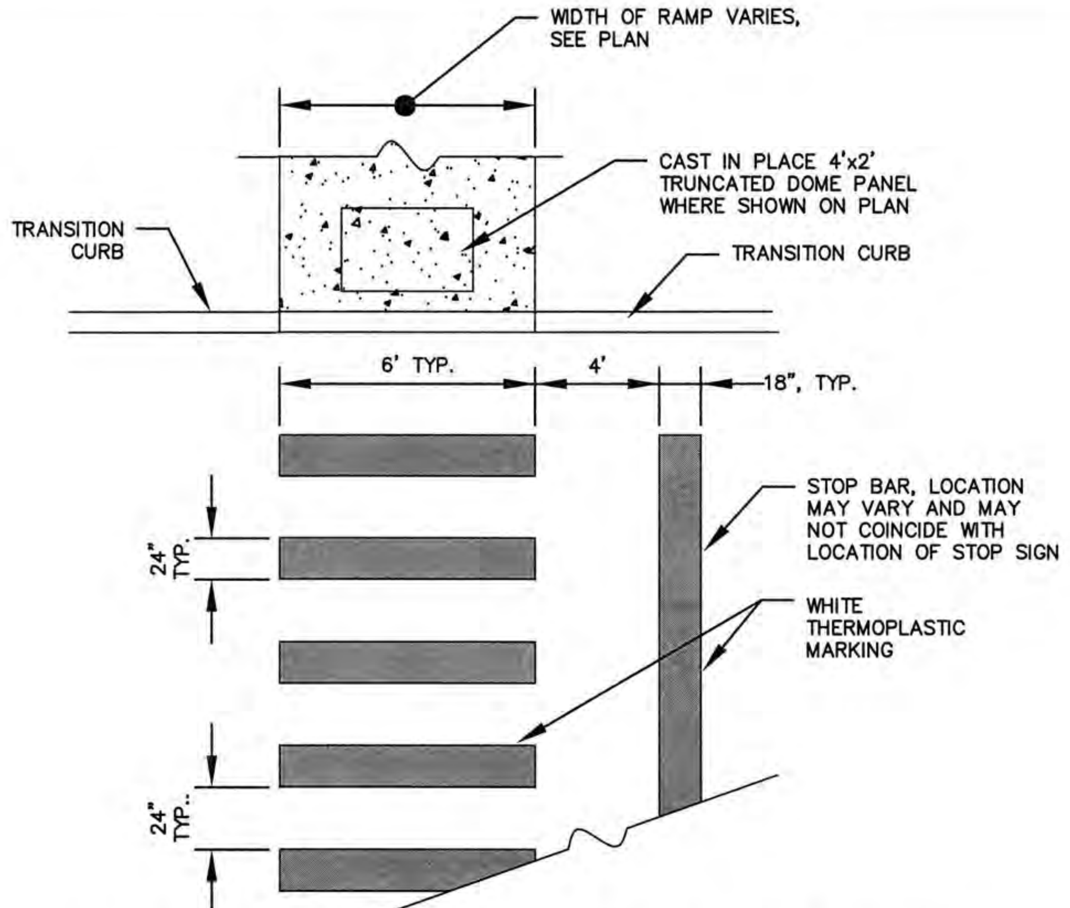
DETAIL SHEET

SHEET NUMBER:

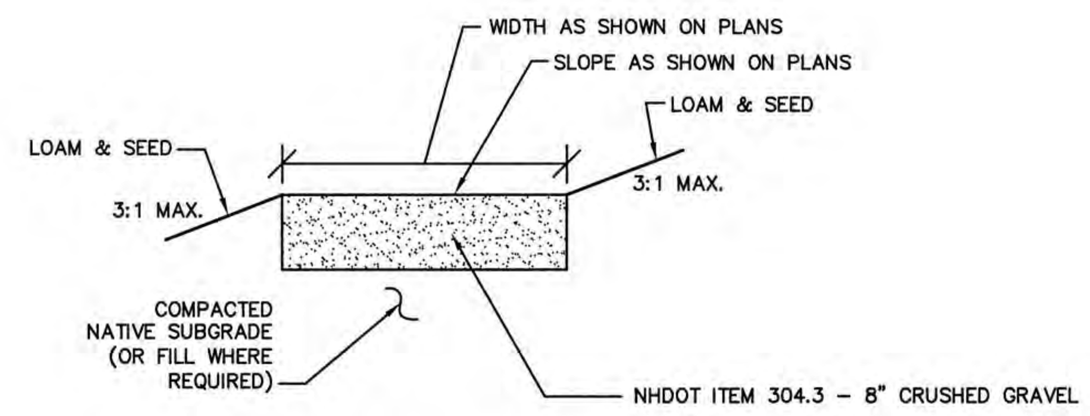
D-2



PARKING STALL LAYOUT NOT TO SCALE

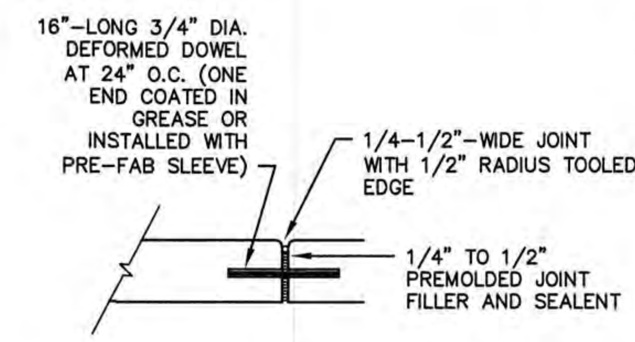


CROSSWALK TYPE B DETAIL NOT TO SCALE

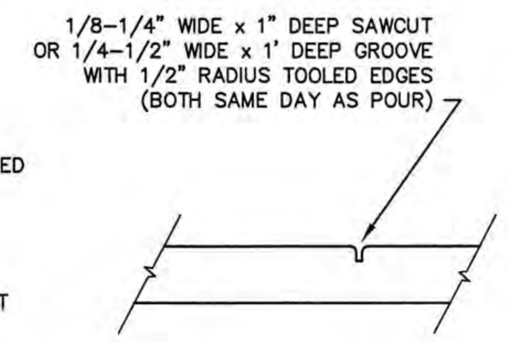


NOTE: SUBGRADE AREA TO BE PROOF ROLLED PER GEOTECHNICAL REPORT RECOMMENDATIONS.

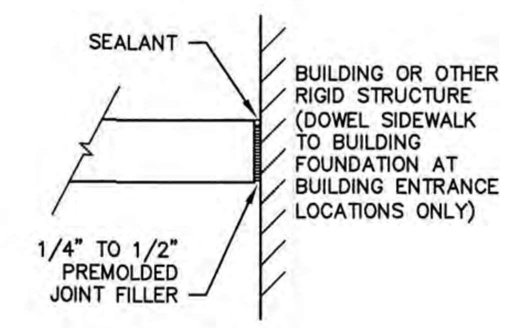
GRAVEL PATH CROSS SECTION NOT TO SCALE



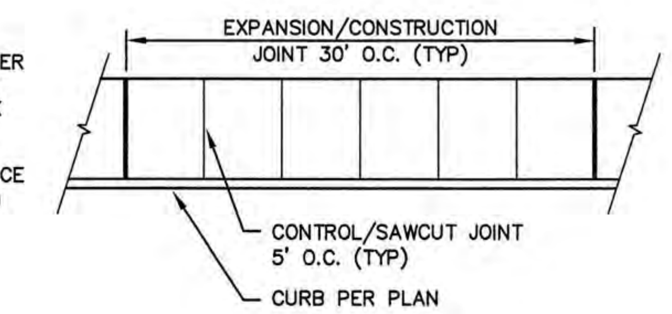
EXPANSION/CONSTRUCTION JOINT



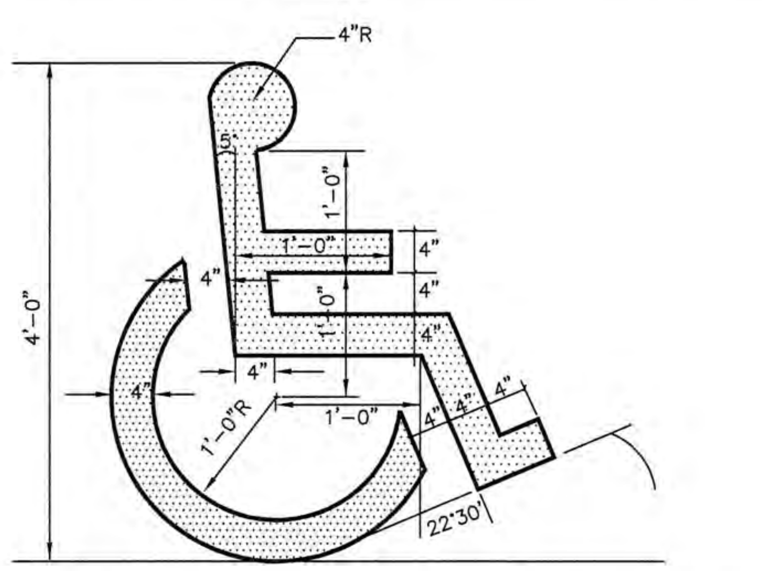
CONTROL/SAWCUT JOINT



ISOLATION JOINT



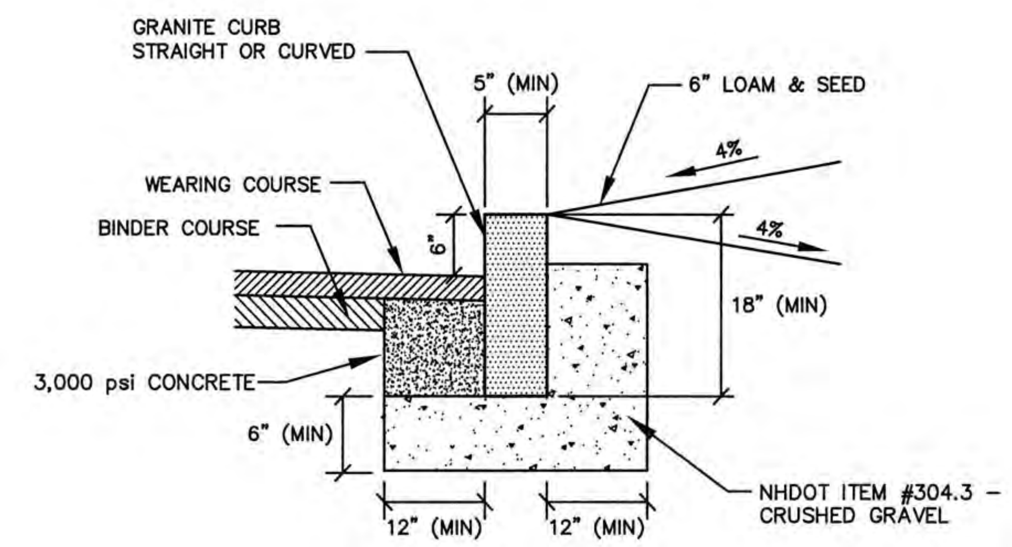
PLAN



NOTES

1. SYMBOL TO BE PAINTED IN ALL HANDICAPPED ACCESSIBLE SPACES IN WHITE PAINT (BLUE-PAINTED SQUARE BACKGROUND OPTIONAL).

PAINTED ADA SYMBOL NOT TO SCALE

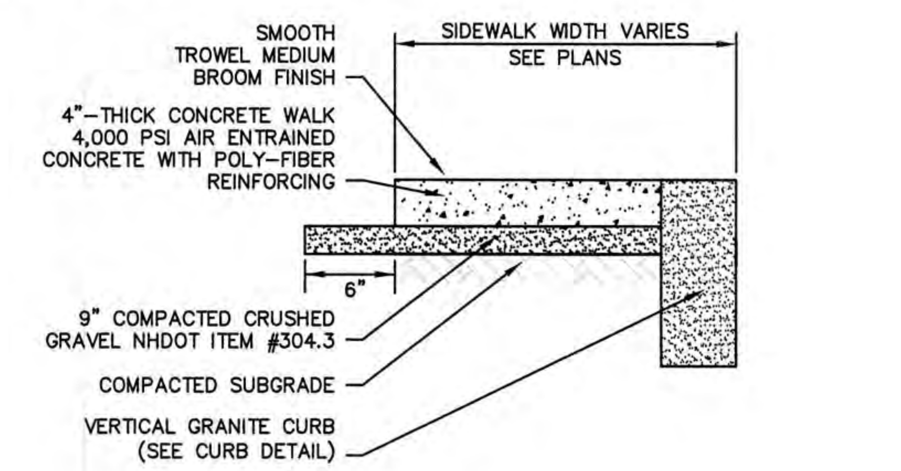


NOTES

1. SEE PLANS FOR CURB LOCATION.
2. SEE PLANS FOR PAVEMENT CROSS SECTION.
3. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
4. MINIMUM LENGTH OF CURB STONES = 4'.
5. MAXIMUM LENGTH OF CURB STONES = 10'.
6. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES – SEE CHART.
7. CURB ENDS TO ROUNDED AND BATTERED FACES TO BE CUT WHEN CALL FOR ON THE PLANS.
8. CURB SHALL BE INSTALLED PRIOR TO PLACEMENT OF TOP PAVEMENT COURSE.
9. JOINTS BETWEEN CURB STONES SHALL BE MORTARED.

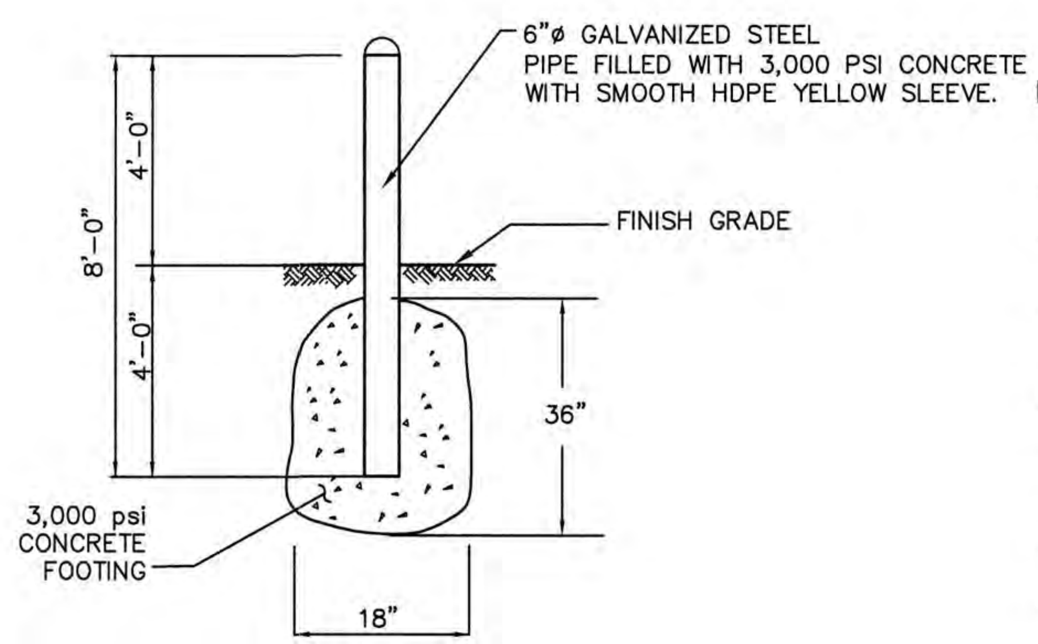
RADIUS	MAX. LENGTH
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
OVER 60'	10'

VERTICAL GRANITE CURB NOT TO SCALE

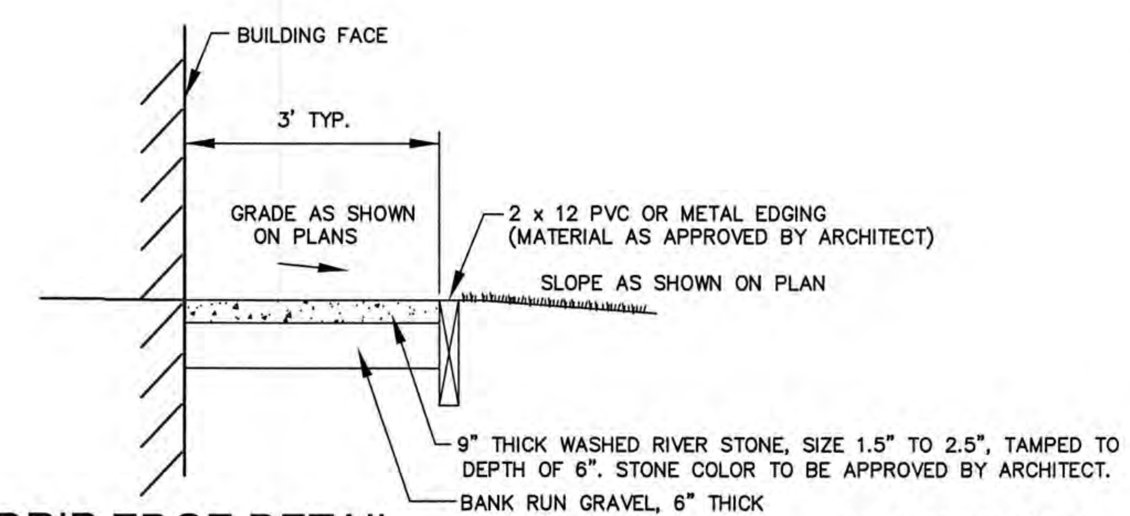


SECTION

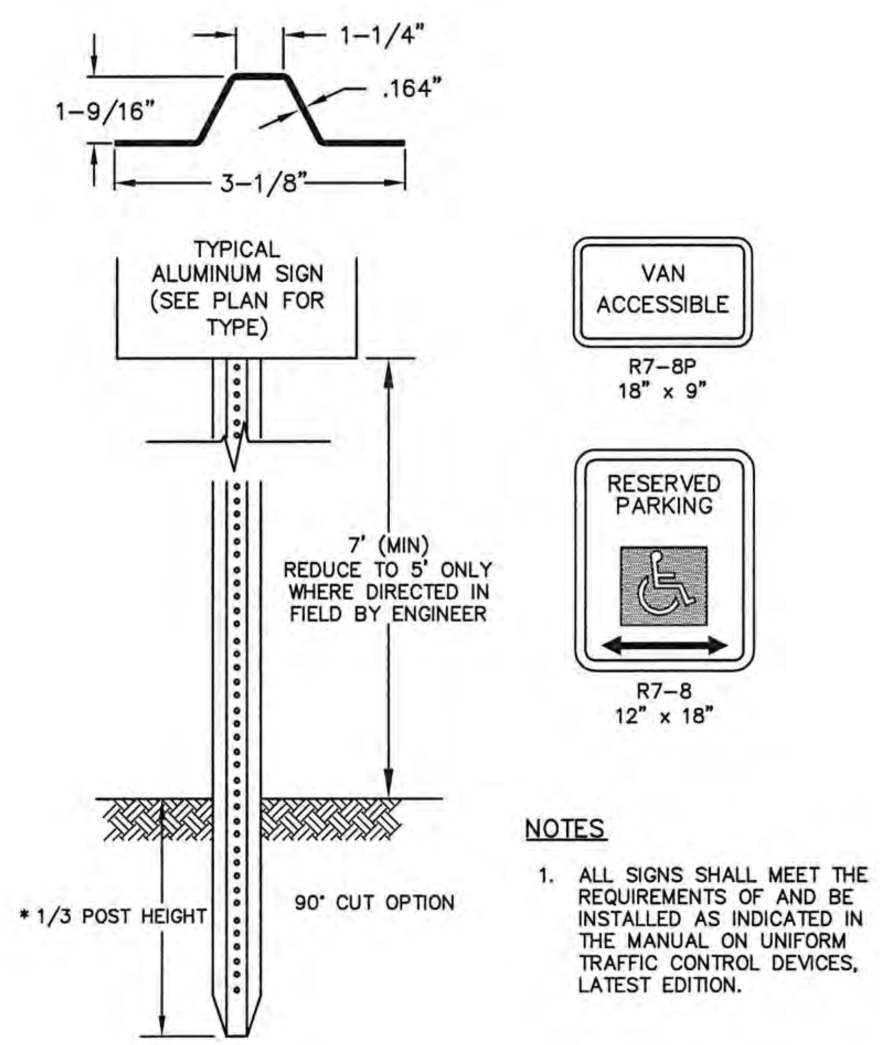
CONCRETE SIDEWALK DETAIL NOT TO SCALE



BOLLARD NOT TO SCALE



DRIP EDGE DETAIL NOT TO SCALE



NOTES

1. ALL SIGNS SHALL MEET THE REQUIREMENTS OF AND BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

• IN LEDGE DRILL & GROUT TO A MIN OF 2'

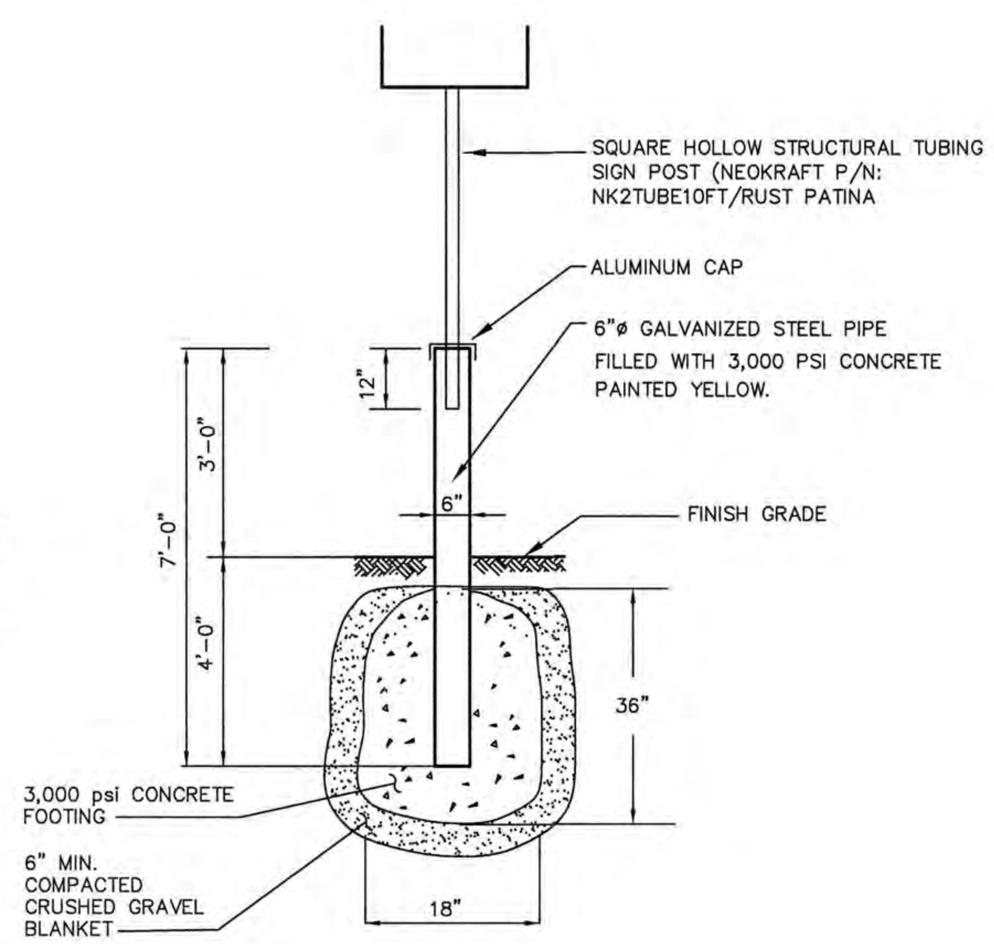
LENGTH: AS REQUIRED

WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)

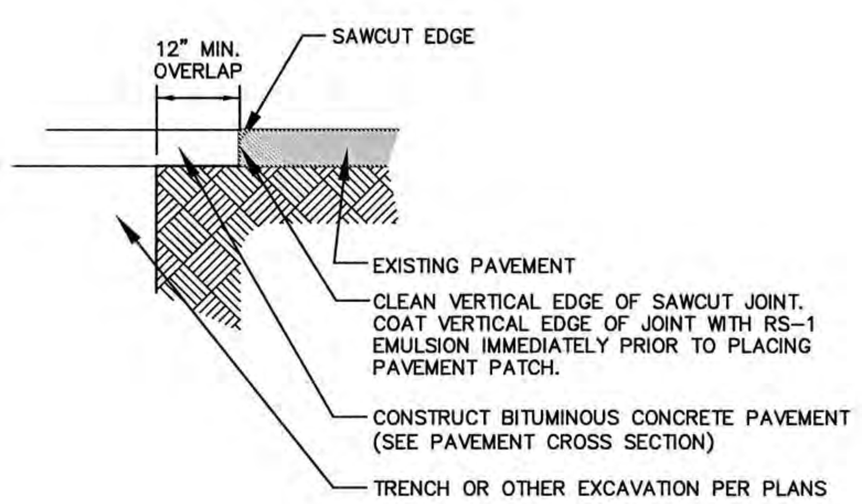
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH

STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 – 1080)

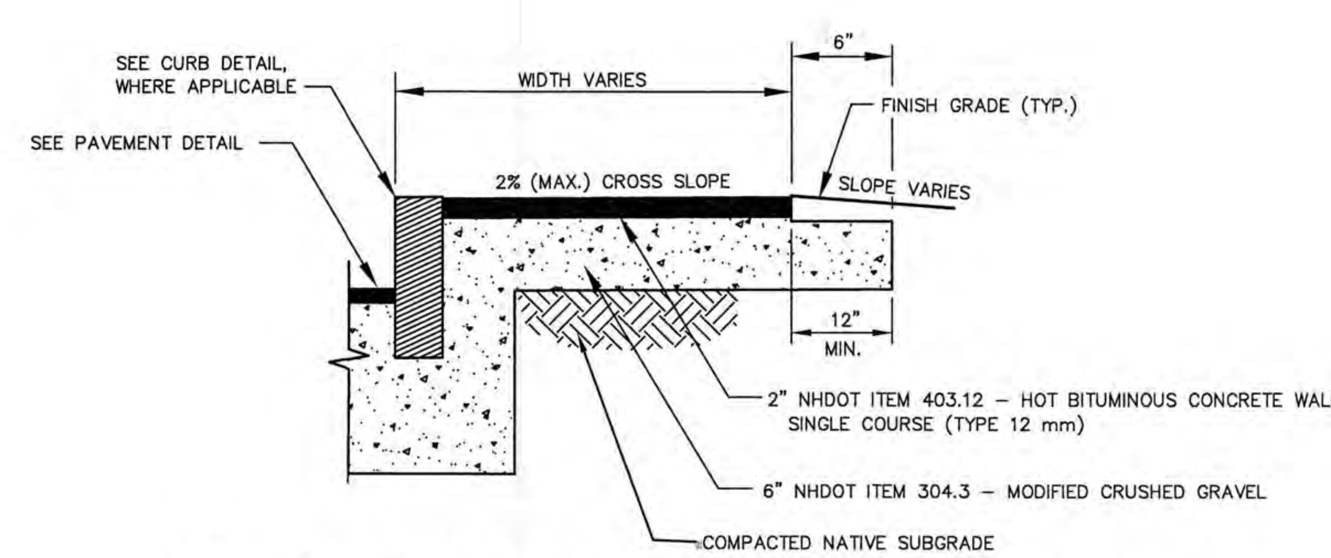
SIGN DETAILS NOT TO SCALE



SIGN BOLLARD DETAIL NOT TO SCALE



TYPICAL PAVEMENT SAWCUT NOT TO SCALE



NOTE: SUBGRADE AREA TO BE PROOF ROLLED PER GEOTECHNICAL REPORT RECOMMENDATIONS.

BITUMINOUS CONCRETE SIDEWALK NOT TO SCALE

P4801

ENGINEER:

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STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER

12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

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ASSESSOR'S PARCEL 266-5

APPLICANT:

SAINT PATRICK ACADEMY

125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:

SAINT PATRICK ACADEMY GYMNASIUM

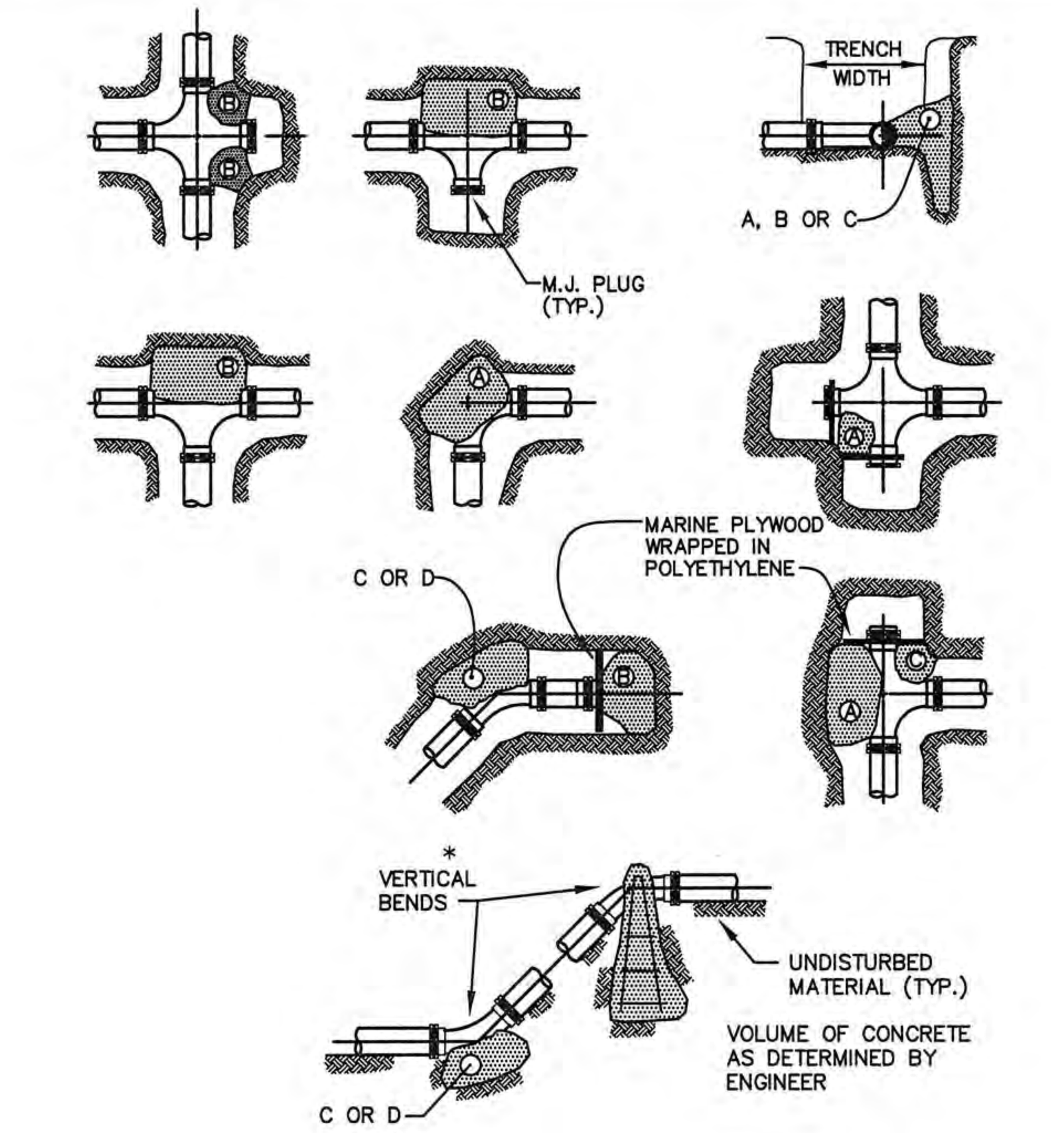
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:

DETAIL SHEET

SHEET NUMBER:

D-3

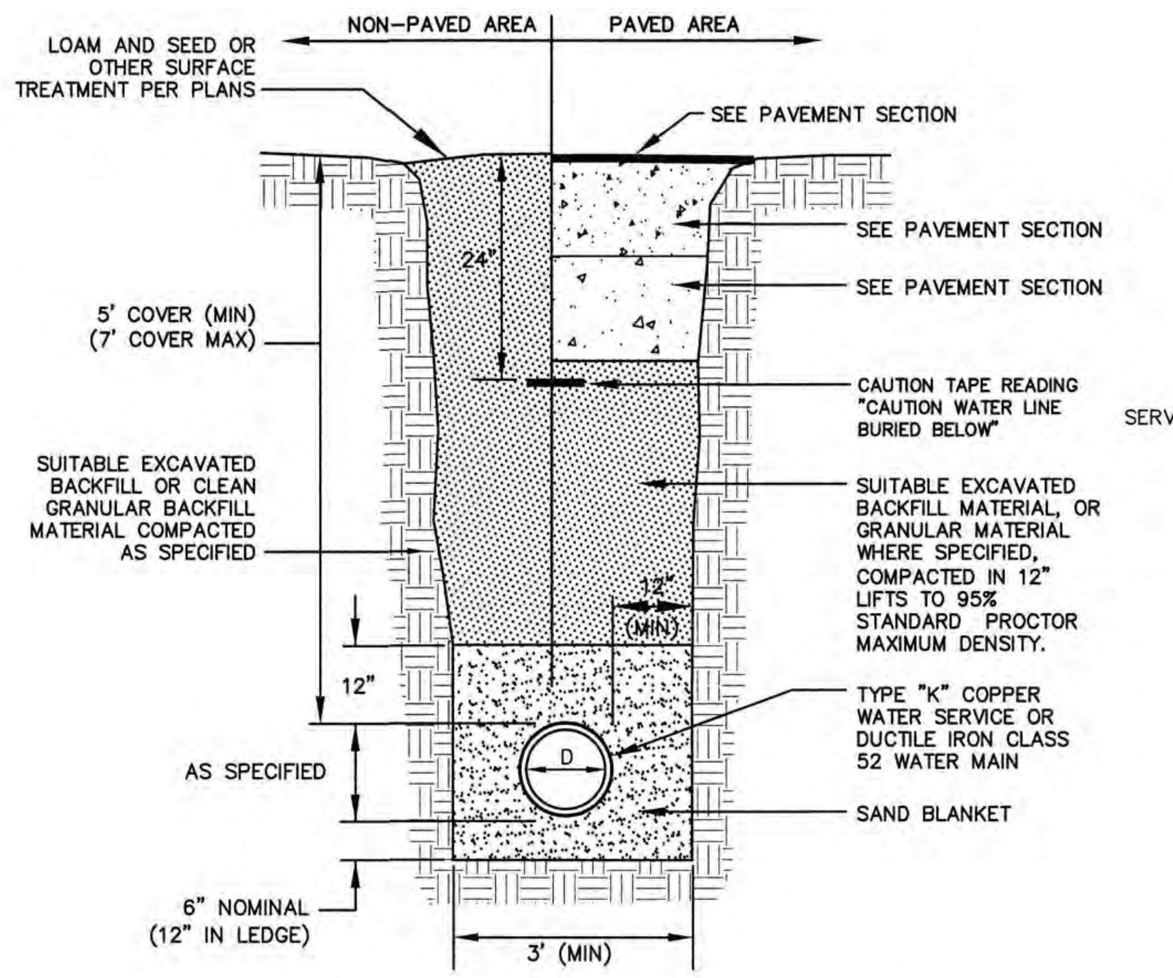


TEST PRESSURE = 150 psi	SQUARE FEET OF CONCRETE THRUST BLOCKING BEARING ON UNDISTURBED MATERIAL					
REACTION TYPE	PIPE SIZE					
	4"	6"	8"	10"	12"	
A 90°	0.89	2.19	3.82	11.14	17.24	
B 180°	0.65	1.55	2.78	8.38	12.00	
C 45°	0.48	1.19	2.12	6.02	9.32	
D 22-1/2°	0.25	0.60	1.06	3.08	4.74	
E 11-1/4°	0.13	0.30	0.54	1.54	2.38	

NOTES:

1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL. WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
4. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
5. POLYETHYLENE (6 MIL) SHALL BE PLACED AROUND FITTINGS PRIOR TO CONCRETE PLACEMENT.

THRUST BLOCKING DETAIL — NOT TO SCALE



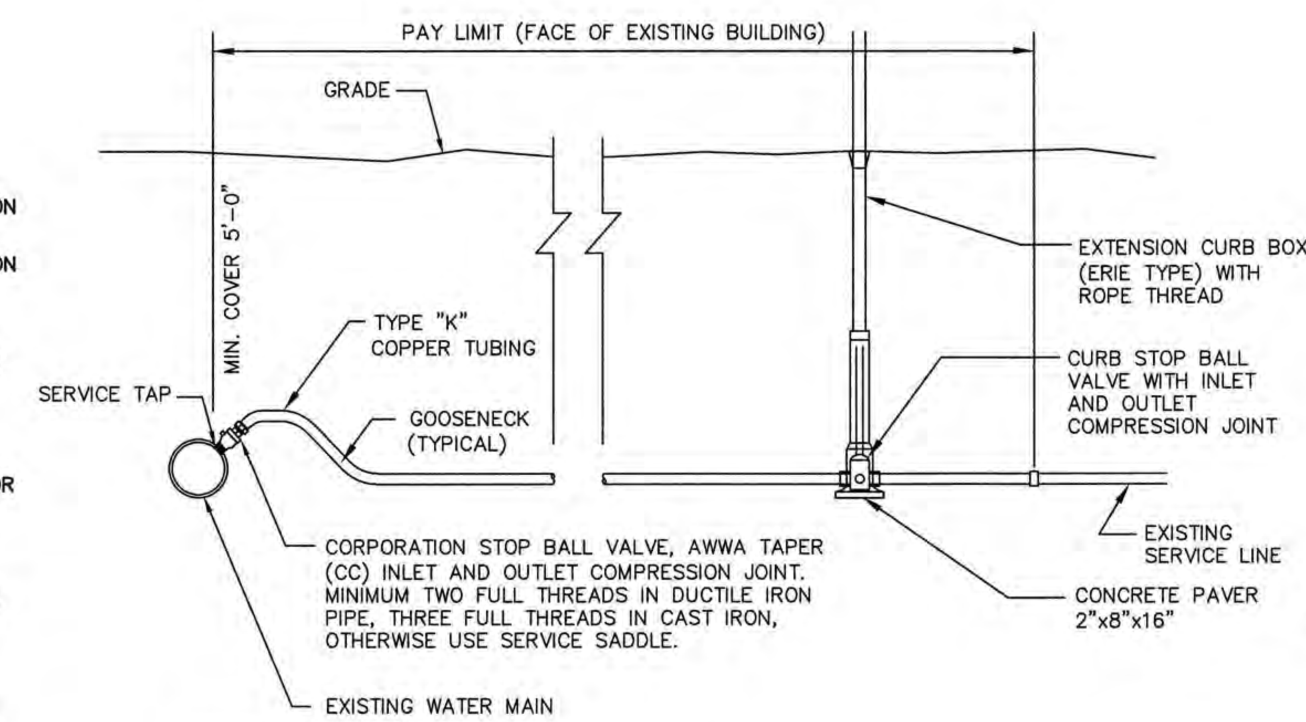
SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

NOTES

1. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
2. WATER MAINS SHALL BE POLY WRAPPED.
3. WATER MAINS SHALL HAVE 3 WEDGES PER JOINT.

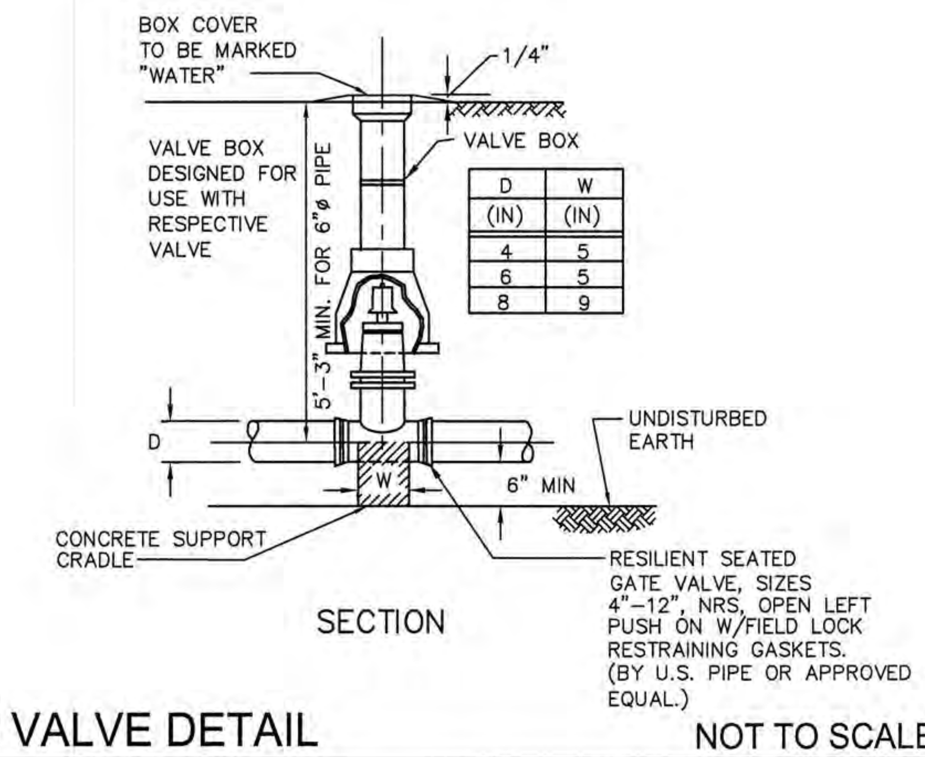
WATER MAIN TRENCH — NOT TO SCALE



NOTES

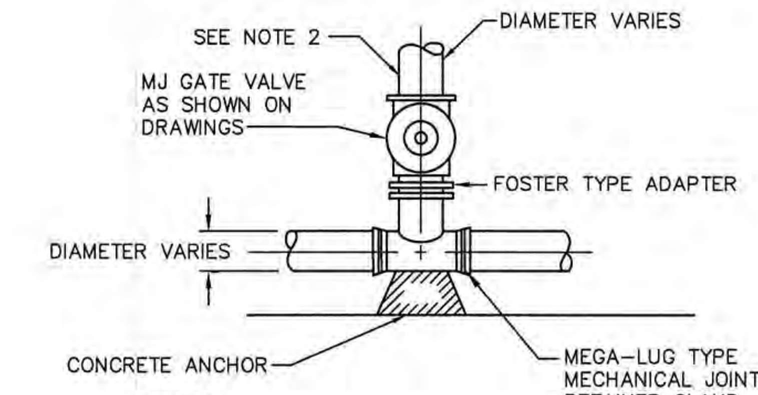
1. PROVIDE NEW LINE USING CONTINUOUS LENGTHS OF COPPER. NO COUPLING ALLOWED IN ROADWAY WITHOUT APPROVAL OF ENGINEER.
2. TAPS TO BE MADE AT APPROXIMATELY 2:00 & 10:00
3. PROVIDE FOR SERVICE LINE CONTRACTION AND EXPANSION BY INSTALLING "S" IN SERVICE LINE NEAR MAIN.
4. IF SERVICE IS INSTALLED WITH LESS THAN 5' COVER, INSULATE OVER LINE.
5. REMOVE EXISTING CURB STOP.
6. CONNECT CURB STOP TO EXISTING SERVICE LINE AT PROPERTY LINE OR AT LOCATION APPROVED BY THE ENGINEER (NO COUPLING WITHOUT APPROVAL OF ENGINEER) AFTER PRESSURE TESTING AND DISINFECTION.
7. SHUT OFF EXISTING CORPORATION AND REMOVE OR ABANDON EXISTING SERVICE LINE.
8. CURB BOX SHALL BE SET IN THE GRASS/LANDSCAPE AREA BETWEEN CURB AND SIDEWALK UNLESS DIRECTED OTHERWISE.
9. 2" OR LARGER SERVICE CONNECTIONS SHALL USE A STAINLESS STEEL SERVICE SADDLE.

SERVICE CONNECTION DETAIL — NOT TO SCALE



D (IN)	W (IN)
4	5
6	5
8	9

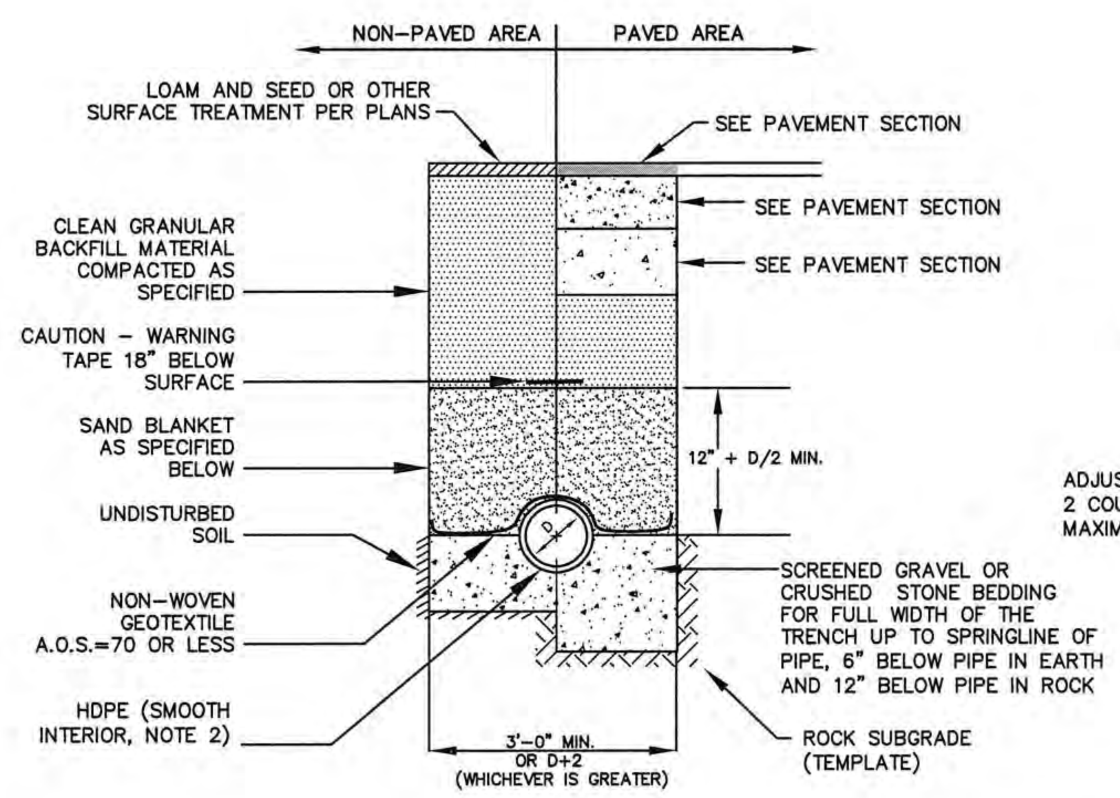
WATER VALVE DETAIL — NOT TO SCALE



NOTES:

1. GATE VALVES SHALL OPEN RIGHT, PER CITY STANDARDS.
2. BRANCH PIPING SHALL BE MECHANICALLY RESTRAINED AS NOTED UNDER THRUST BLOCK DETAIL REQUIREMENTS.

TEE & GATE VALVE ASSEMBLY DETAIL — NOT TO SCALE



NOTES:

1. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
2. ALL PIPE SHALL BE HDPE WITH SMOOTH INTERIOR AND CORRUGATED EXTERIOR, ADS TYPE N-12 OR APPROVED EQUAL.

SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

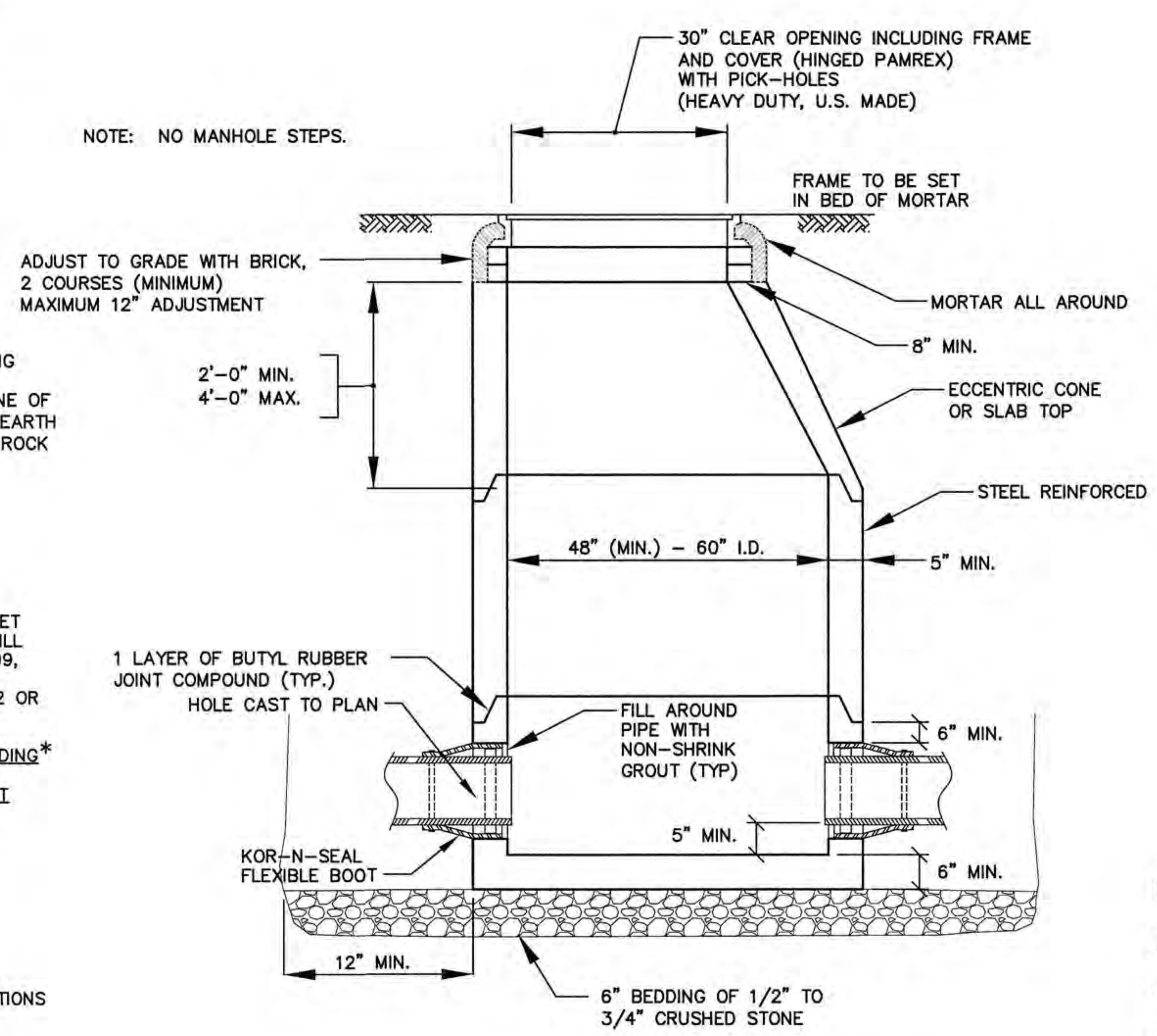
SCREENED GRAVEL OR CRUSHED STONE BEDDING*

SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90 – 100
3/8"	20 – 55
# 4	0 – 10
# 8	0 – 5

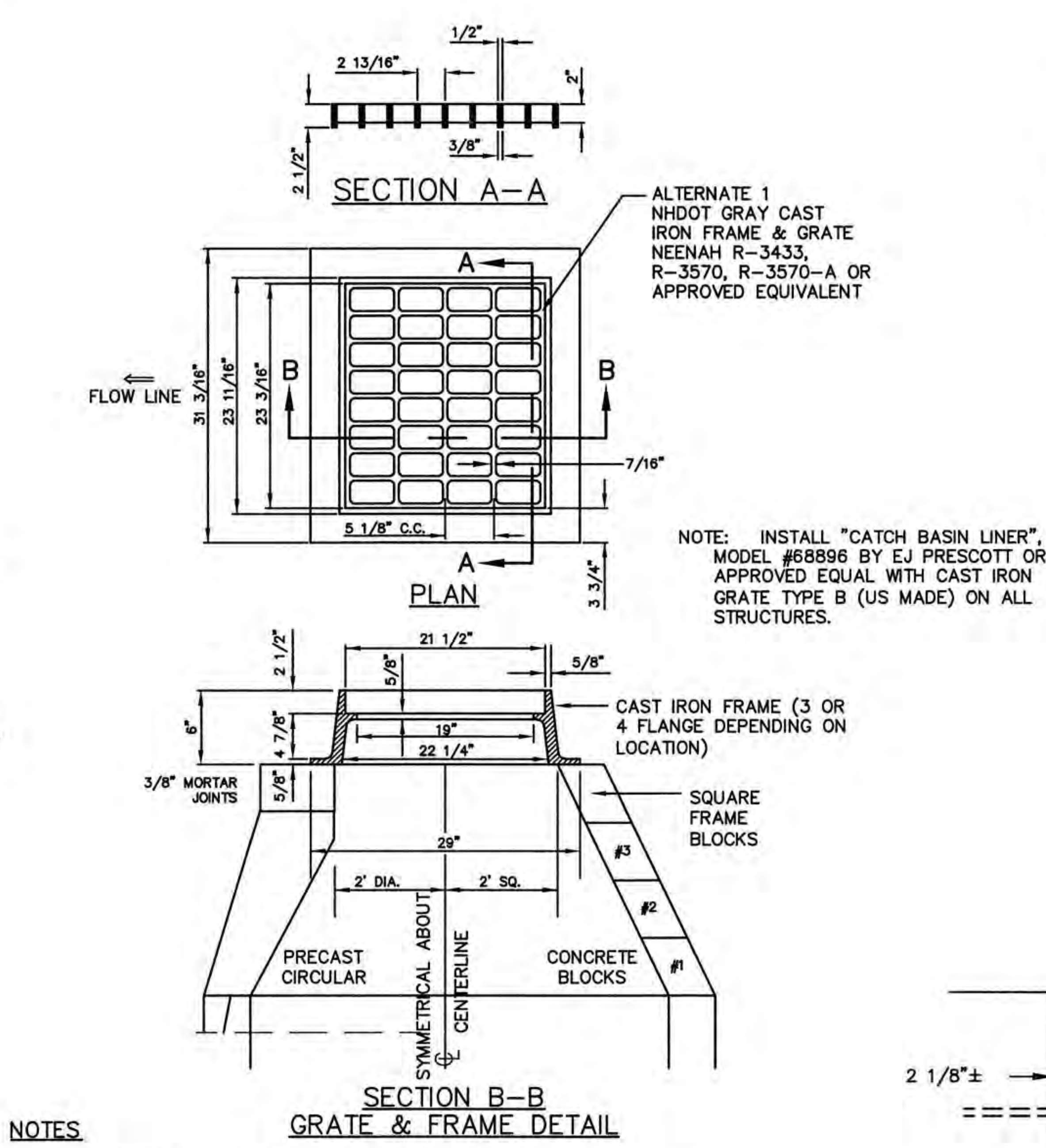
* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

STORM DRAIN TRENCH — NOT TO SCALE

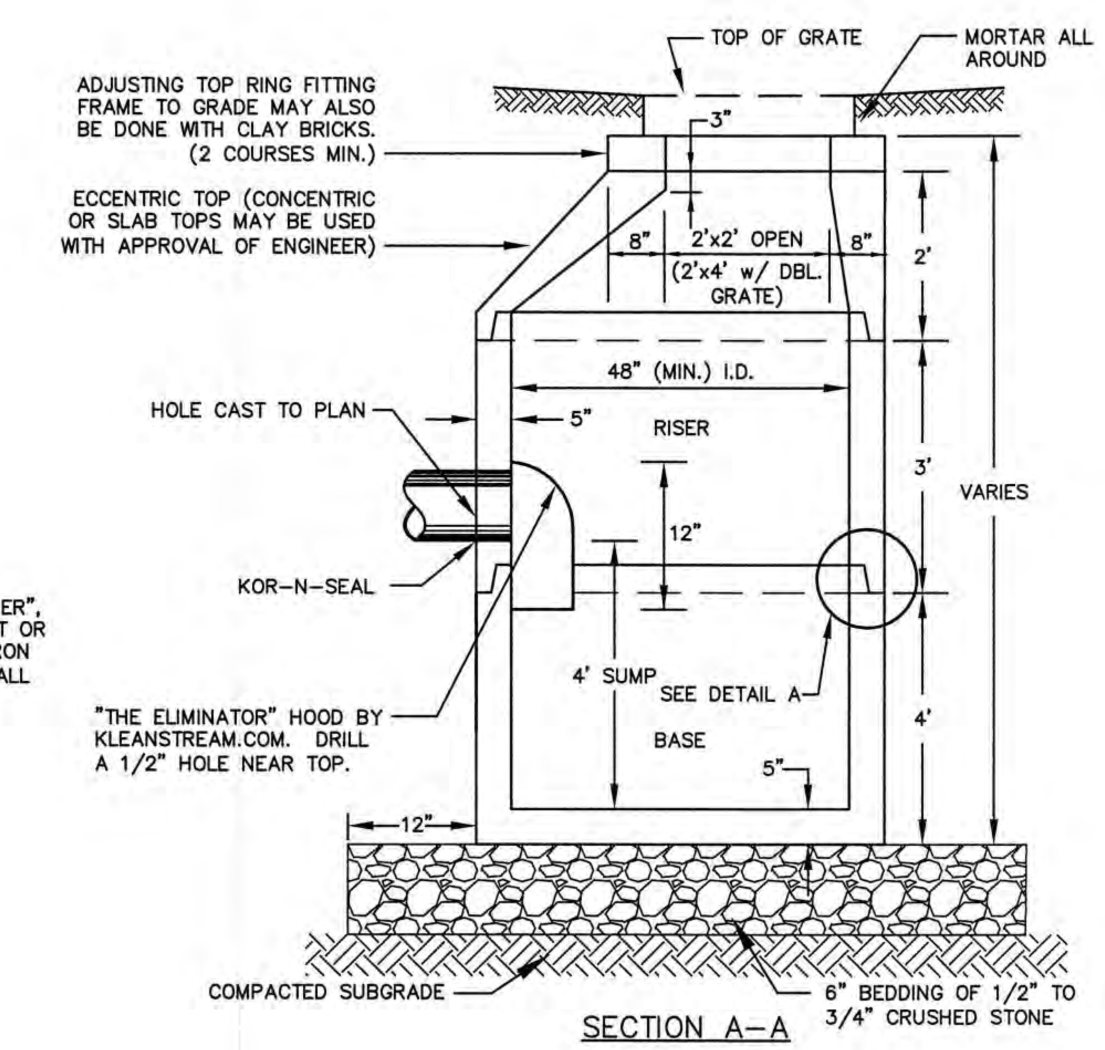
NOTE: NO MANHOLE STEPS.

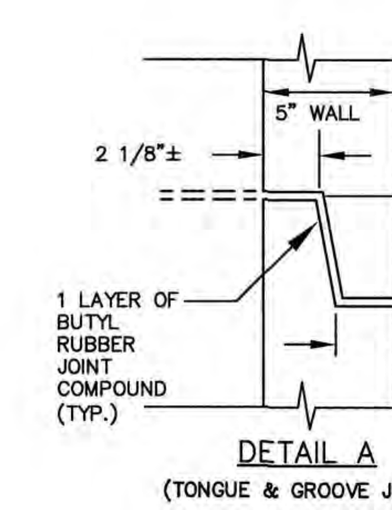


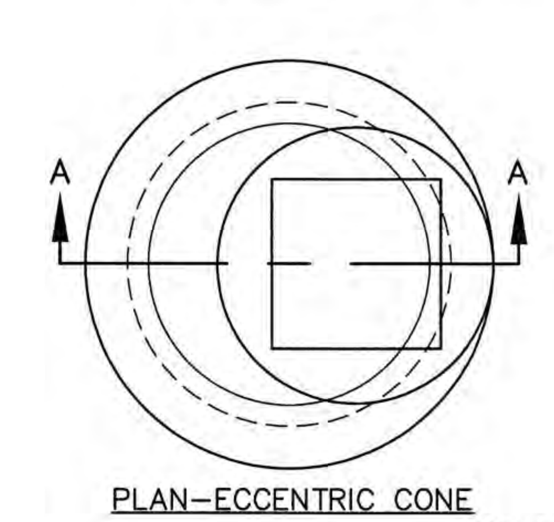
DRAIN MANHOLE DETAIL — NOT TO SCALE



NOTE: INSTALL "CATCH BASIN LINER", MODEL #68896 BY EJ PRESCOTT OR APPROVED EQUAL WITH CAST IRON GRATE TYPE B (US MADE) ON ALL STRUCTURES.







NOTES

1. ALL SECTIONS SHALL BE CONCRETE CLASS AA (4000 PSI).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ.IN. PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE OR GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
4. RISERS OF 1', 2', 3' & 4' CAN BE USED TO REACH DESIRED DEPTH.
5. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
6. USE H20 LOADING SLAB TOP SECTION IN LIEU OF ECCENTRIC TOP WHERE PIPE INVERT IS WITHIN 4' OF FINISH GRADE.
7. FRAME AND GRATE DIMENSIONS ARE TYPICAL BUT MAY VARY BASED ON PRODUCT SELECTED OR EQUIVALENT APPROVED BY THE ENGINEER.

DEEP SUMP CATCH BASIN — NOT TO SCALE

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET (603) 433-2335 PORTSMOUTH, NH 03801 www.ALTUS-ENG.com

STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER

12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801.2 DETAILS.DWG

SCALE:
22" x 34" – NOT TO SCALE
11" x 17" – NOT TO SCALE

OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:

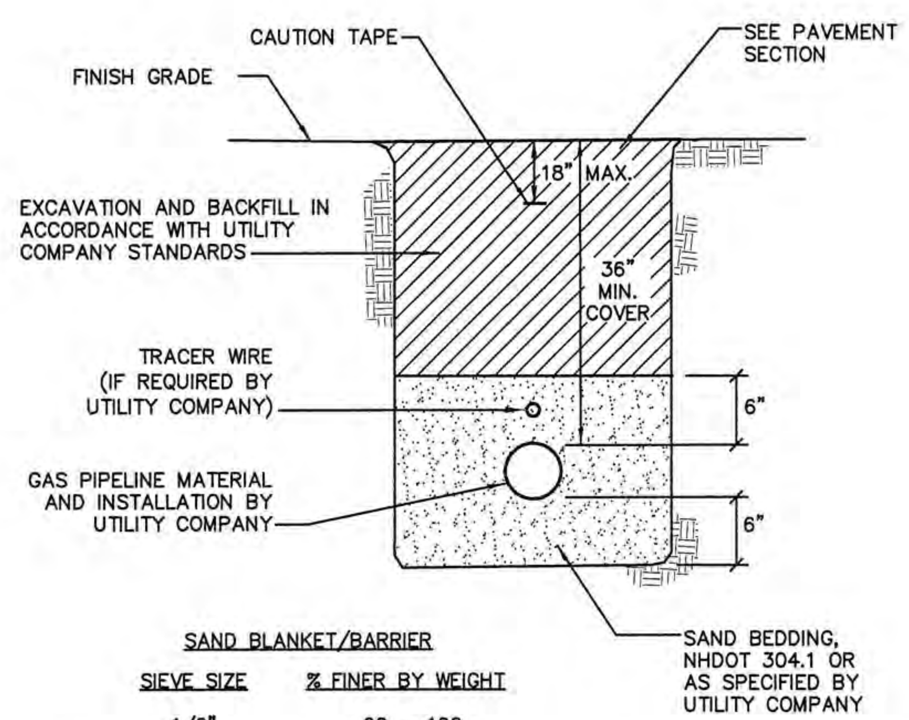
SAINT PATRICK ACADEMY

125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:
DETAIL SHEET

SHEET NUMBER:
D-4



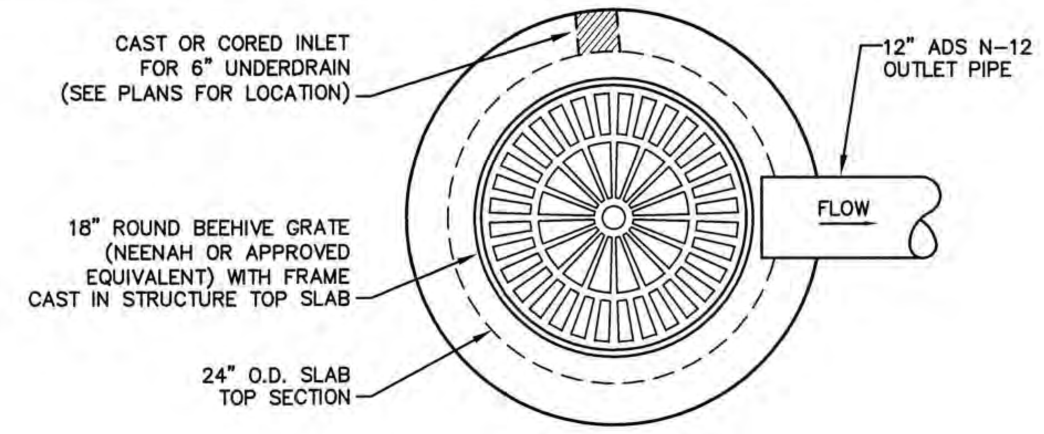
SAND BLANKET/BARRIER

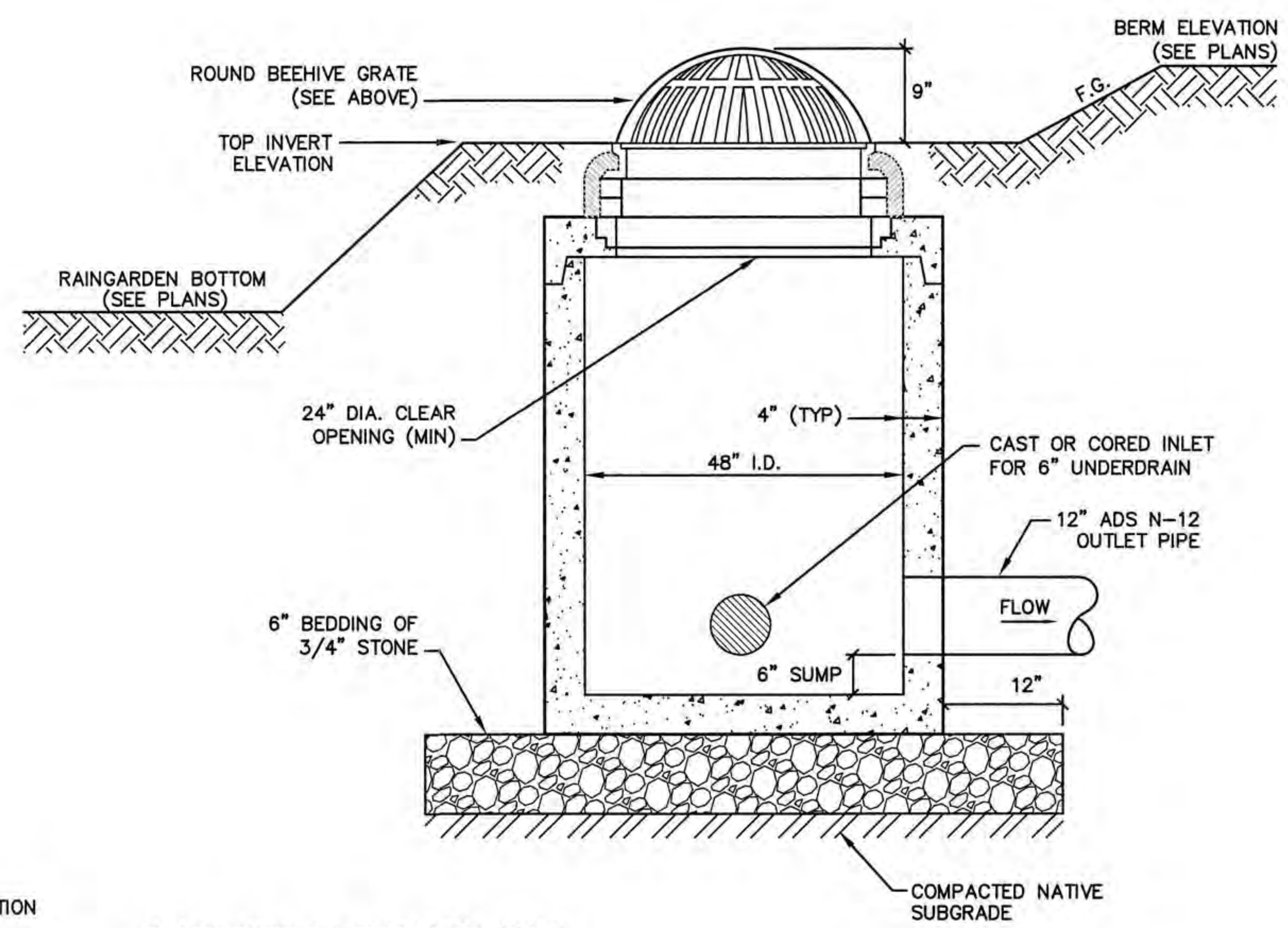
SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

NOTES

1. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY AND PROVIDE ALL EXCAVATION, COMPACTION AND BACKFILL FOR PIPE INSTALLATION WITHIN THE PROJECT SITE.
2. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.

GAS TRENCH NOT TO SCALE



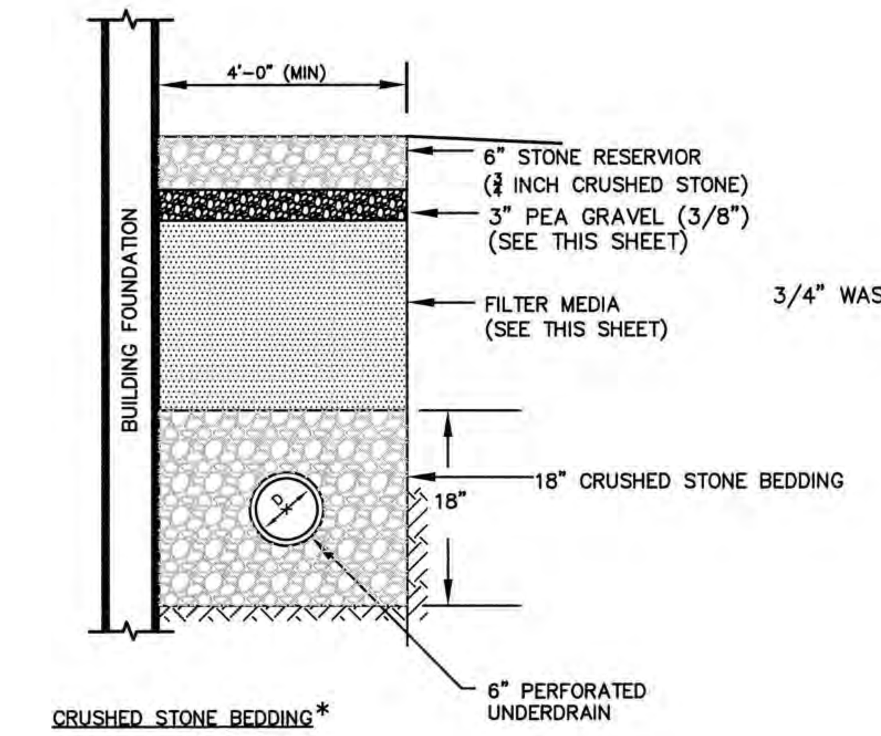


CONSTRUCTION SPECIFICATIONS

1. OUTLET STRUCTURE SHALL BE CONSTRUCTED ONSITE OR PRECAST TO EQUAL DIMENSIONS.
2. ALL JOINTS AND PIPE OPENINGS SHALL BE SEALED WATERTIGHT WITH MORTAR.
3. STRUCTURE IS TO BE BUILT TO WITHSTAND H20 LOADING.
4. SOIL UNDERLYING THE STRUCTURE'S GRAVEL BASE PAD AND THE PAD ITSELF ARE TO BE COMPACTED TO 95% MODIFIED PROCTOR.
5. ALL CONCRETE SHALL BE 4,000 PSI MINIMUM.

OUTLET STRUCTURE DETAIL NOT TO SCALE

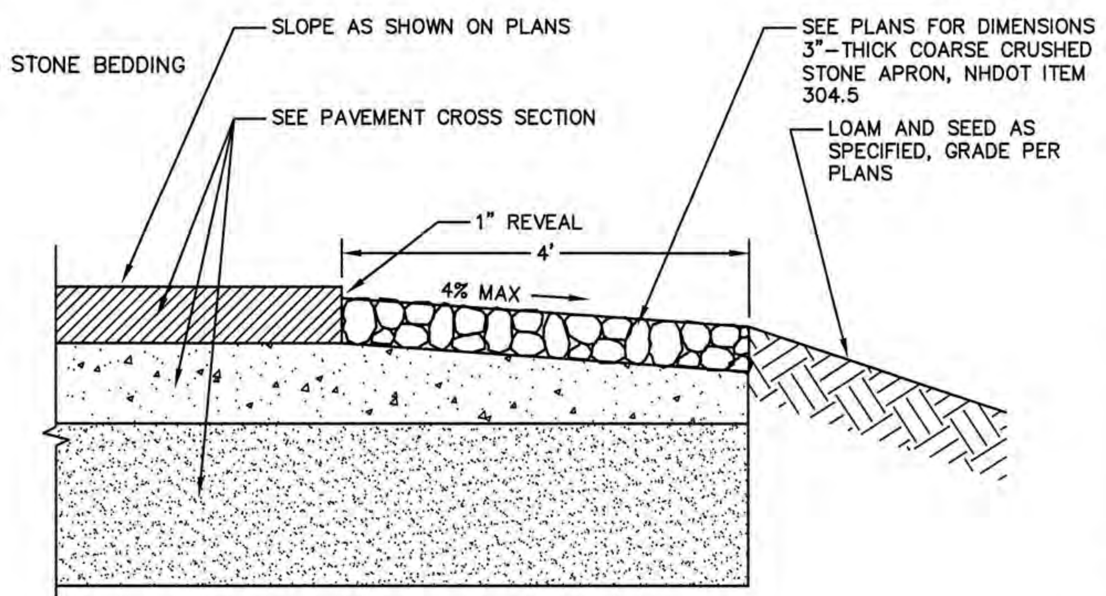
CITY OF PORTSMOUTH, PLANNING BOARD	
CHAIRMAN	DATE



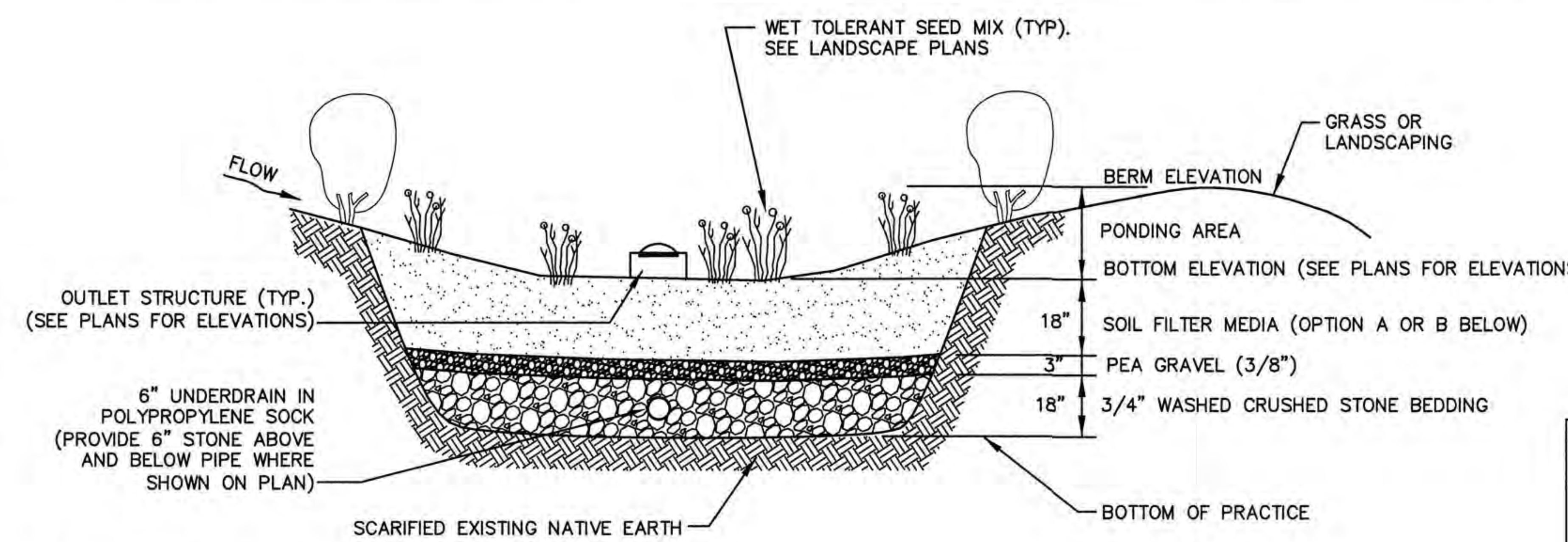
CRUSHED STONE BEDDING*

* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

ROOF DRIPLINE FILTER NOT TO SCALE



STONE (VELOCITY REDUCTION) APRON NOT TO SCALE



CRUSHED STONE BEDDING *

SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90 – 100
3/8"	20 – 55
# 4	0 –10
# 8	0 – 5

* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT NHDOT STANDARD SPECIFICATIONS

NOTES

1. WHEN CONTRACTOR EXCAVATES RAIN GARDEN AREA TO SUBGRADE, DESIGN ENGINEER SHALL PERFORM SUBSURFACE EVALUATION PRIOR TO THE PLACEMENT OF ANY SELECT MATERIAL OR OTHER BACKFILL.
2. SOIL FILTER MEDIA SHALL BE EITHER OPTION A OR OPTION B AT CONTRACTOR'S DISCRETION.
3. DO NOT PLACE THE RAIN GARDEN INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
4. DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO THE RAIN GARDEN AREA DURING ANY STAGE OF CONSTRUCTION.
5. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

MAINTENANCE REQUIREMENTS

- SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 2.5 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS A WARRANTED BY SUCH INSPECTION.
- PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.
- AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
- VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING, PRUNING, REMOVAL, AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

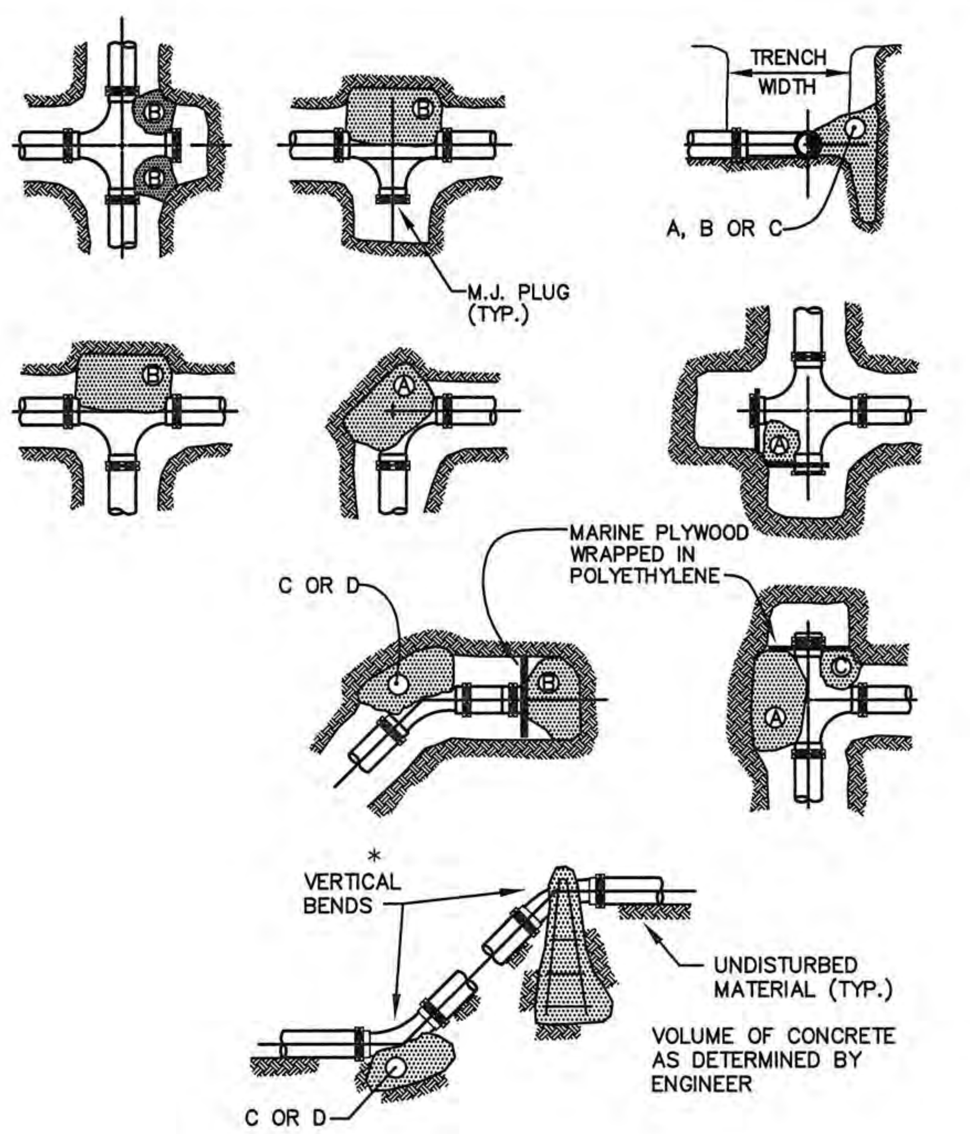
DESIGN REFERENCES

- UNH STORMWATER CENTER
- EPA (1999A)
- NEW HAMPSHIRE STORMWATER MANAGEMENT MANUAL, VOLUME 2, DECEMBER 2008 AS AMENDED.

FILTER MEDIA MIXTURES

Component Material	Percent of Mixture by Volume	Gradation of material: Sieve No.	Percent by Weight Passing Standard Sieve
Filter Media Option A			
ASTM C-33 concrete sand	50 to 55		
Loamy sand topsoil, with fines as indicated	20 to 30	200	15 to 25
Moderately fine shredded bark or wood fiber mulch, with fines as indicated	20 to 30	200	< 5
Filter Media Option B			
Moderately fine shredded bark or wood fiber mulch, with fines as indicated	20 to 30	200	< 5
Loamy coarse sand	70 to 80	10	85 to 100
		20	70 to 100
		60	15 to 40
		200	8 to 15

TYPICAL RAINGARDEN NOT TO SCALE

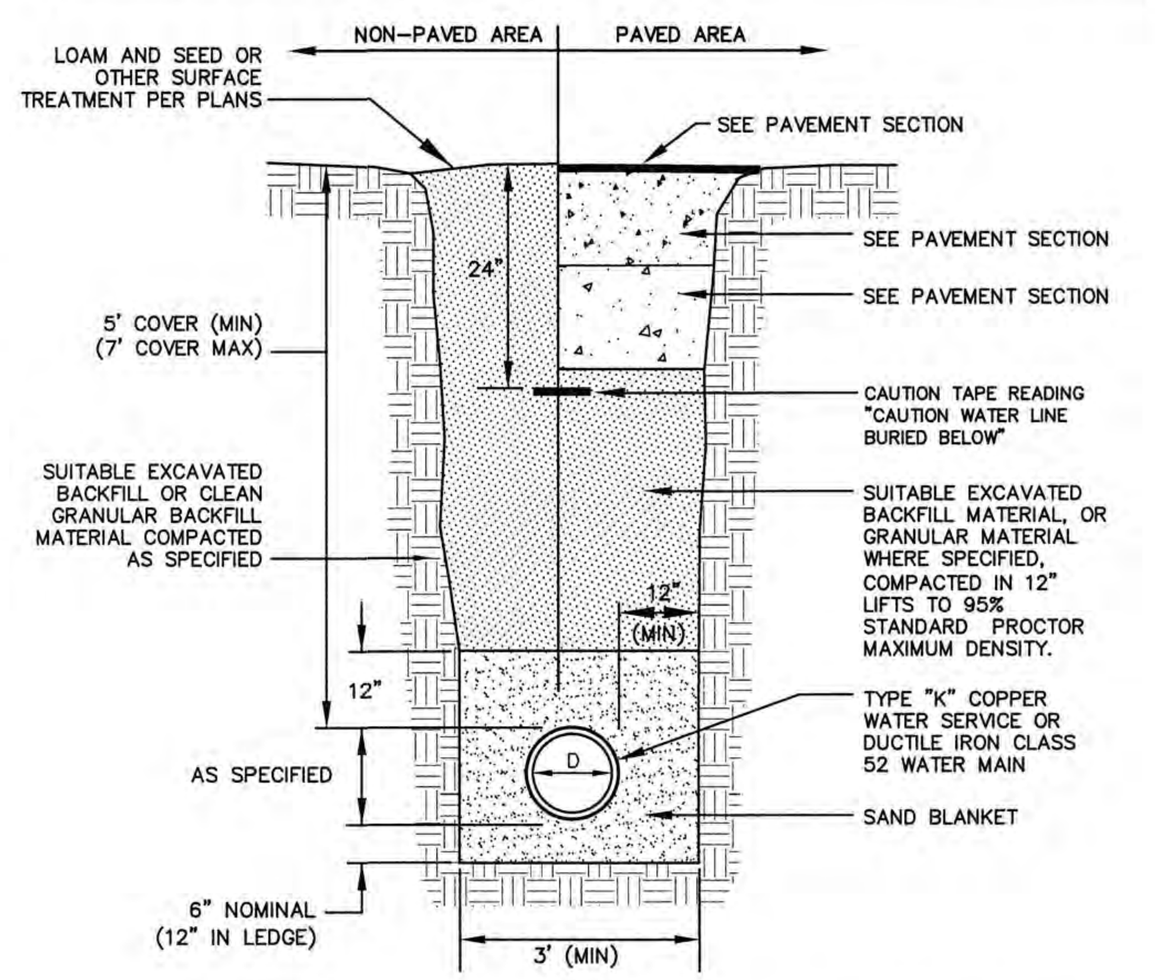


TEST PRESSURE = 150 psi — SQUARE FEET OF CONCRETE THRUST BLOCKING BEARING ON UNDISTURBED MATERIAL						
REACTION TYPE		PIPE SIZE 4"	6"	8"	10"	12"
A	90°	0.89	2.19	3.82	11.14	17.24
B	180°	0.65	1.55	2.78	8.38	12.00
C	45°	0.48	1.19	2.12	6.02	9.32
D	22-1/2°	0.25	0.60	1.06	3.08	4.74
E	11-1/4°	0.13	0.30	0.54	1.54	2.38

NOTES:

1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL, WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
4. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
5. POLYETHYLENE (6 MIL) SHALL BE PLACED AROUND FITTINGS PRIOR TO CONCRETE PLACEMENT.

THRUST BLOCKING DETAIL NOT TO SCALE



SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

NOTES

1. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
2. WATER MAINS SHALL BE POLY WRAPPED.
3. WATER MAINS SHALL HAVE 3 WEDGES PER JOINT.

WATER MAIN TRENCH NOT TO SCALE

P4801

ENGINEER:

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PORTSMOUTH, NH 03801 www.ALTUS-ENG.com

STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER
12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801.2 DETAILS.DWG

SCALE:
22" x 34" – NOT TO SCALE
11" x 17" – NOT TO SCALE

OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:
SAINT PATRICK ACADEMY
125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:
DETAIL SHEET

SHEET NUMBER:
D-5

MANHOLE NOTES:

1. IT IS THE INTENTION OF THE NHDES THAT THE MANHOLE, INCLUDING ALL COMPONENT PARTS, HAVE ADEQUATE SPACE, STRENGTH AND LEAKPROOF QUALITIES CONSIDERED NECESSARY BY THE COMMISSION FOR THE INTENDED SERVICE. SPACE REQUIREMENTS AND CONFIGURATIONS, SHALL BE AS SHOWN ON THE DRAWING. MANHOLES MAY BE AN ASSEMBLY OF PRECAST SECTIONS, WITH OR WITHOUT STEEL REINFORCEMENT, WITH ADEQUATE JOINTING, OR CONCRETE CAST MONOLITHICALLY IN PLACE WITH OR WITHOUT REINFORCEMENT IN ANY APPROVED MANHOLE. THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND LOADS OF 8 TONS (H–20 LOADING) WITHOUT FAILURE AND PREVENT LEAKAGE IN EXCESS OF ONE GALLON PER DAY PER VERTICAL FOOT OF MAN–HOLE CONTINUOUSLY FOR THE LIFE OF THE STRUCTURE, A PERIOD GENERALLY IN EXCESS OF 25 YEARS IS TO BE UNDERSTOOD IN BOTH CASES.

2. BARRELS AND CONE SECTIONS SHALL BE PRECAST REINFORCED.

3. PRECAST CONCRETE BARREL SECTIONS, CONES AND BASES SHALL CONFORM TO ASTM C478.

4. LEAKAGE TEST SHALL BE PERFORMED IN ACCORDANCE WITH THE TOWN'S STANDARD SPECIFICATIONS.

5. INVERTS AND SHELVES MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION. THE INVERTS SHALL BE LAID OUT IN CURVES, OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPE TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.

6. FRAMES AND COVERS MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30–INCH CLEAR OPENING. A 3–INCH (MINIMUM HEIGHT) LETTER "S" FOR SEWERS OR "D" FOR DRAINS SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.

7. BEDDING SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING ASTM C33.

   100% PASSING 1 INCH SCREEN — 0–10% PASSING #4 SIEVE
   90–100% PASSING 3/4 INCH SCREEN — 0–5% PASSING #8 SIEVE
   20–55% PASSING 3/8 INCH SCREEN

   WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1–1/2" TO 1/2" SHALL BE USED.

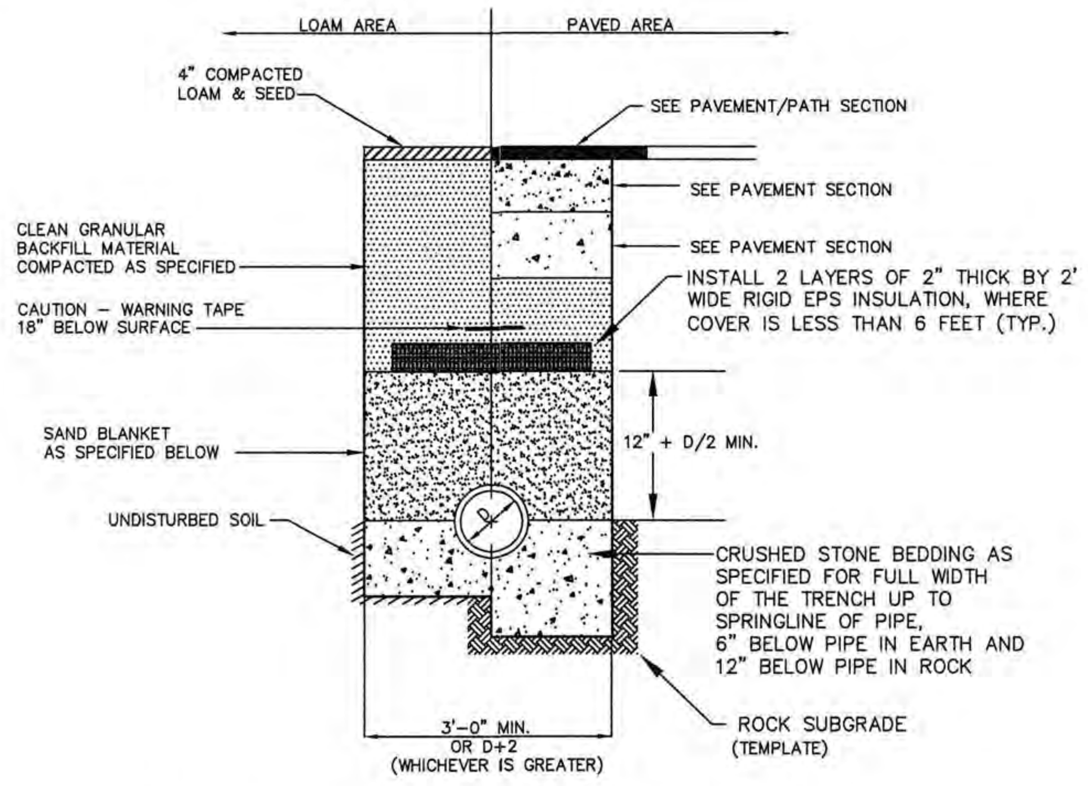
8. CONCRETE FOR DROP SUPPORT SHALL CONFORM TO THE REQUIREMENT FOR CLASS A (3000 LBS.) CONCRETE OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AS FOLLOWS:

   CEMENT 6.0 BAGS PER CUBIC YARD
   WATER 5.75 GALLONS PER BAG CEMENT
   MAXIMUM SIZE OF AGGREGATE 1 INCH

9. FLEXIBLE JOINT A FLEXIBLE JOINT SHALL BE PROVIDED WITHIN THE FOLLOWING DISTANCES:

   PVC PIPE – 60"
   RCP & CI PIPE – ALL SIZES – 48"
   AC & VC PIPE – UP THROUGH 12" DIAMETER – 18"
   AC & VC PIPE – LARGER THAN 12" DIAMETER – 36"

10. SHALLOW MANHOLE IN LIEU OF A CONE SECTION, WHEN MANHOLE DEPTH IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER MAY BE USED HAVING AN ECCENTRIC ENTRANCE OPENING AND CAPABLE OF SUPPORTING H–20 LOADS.



BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.

SAND BLANKET

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

CRUSHED STONE BEDDING *

SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90 – 100
3/8"	20 – 55
# 4	0 – 10
# 8	0 – 5

* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

SEWER TRENCH SECTION NOT TO SCALE

STANDARD TRENCH NOTES:

1. ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE: BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN OF THE DRAWING.

2. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING ASTM C33, STONE SIZE NO. 67.
   100% PASSING 1 INCH SCREEN
   90 – 100% PASSING 3/4 INCH SCREEN
   20 – 55% PASSING 3/8 INCH SCREEN
   0–10% PASSING #4 SIEVE
   0–5% PASSING #8 SIEVE
   WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1–1/2 INCH TO 1/2 INCH SHALL BE USED.

3. SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90 – 100% PASSES 1/2 INCH SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE. BLANKET MAY BE OMITTED FOR CAST–IRON, DUCTILE IRON, AND REINFORCED CONCRETE PIPE PROVIDED HOWEVER, THAT NO STONE LARGER THAN 2" IS IN CONTACT WITH THE PIPE.

4. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION; AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.

5. BASE COURSE AND PAVEMENT SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES – DIVISIONS 300 AND 400 RESPECTIVELY.

6. SHEETING, IF REQUIRED: WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID–DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAT 1 FOOT ABOVE THE TOP OF THE PIPE.

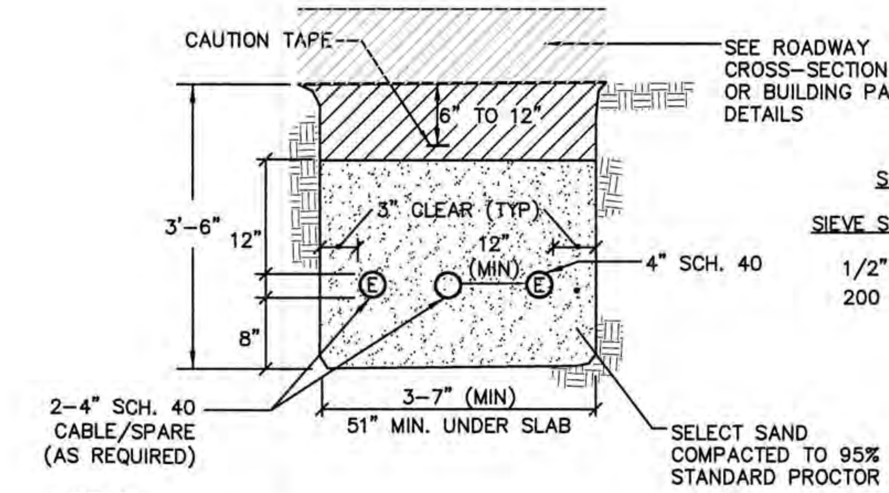
7. W = MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 15 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.) ALSO, W SHALL BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE.

8. FOR CROSS COUNTRY CONSTRUCTION, BACKFILL OR FILL SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.

9. CONCRETE FOR ENCASEMENT SHALL CONFORM TO THE NEW HAMPSHIRE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS STANDARD SPECIFICATION REQUIREMENTS FOR CLASS A (3000#) CONCRETE AS FOLLOWS:
   CEMENT: 6.0 BAGS PER CUBIC YARD
   WATER: 5.75 GALLONS PER BAG CEMENT
   MAXIMUM SIZE OF AGGREGATE: 1 INCH
   CONCRETE ENCASEMENT IS NOT ALLOWED FOR PVC PIPE.

10. CONCRETE FULL ENCASEMENT: IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I.D. (4" MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.

11. NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES DESIGN STANDARDS REQUIRE TEN FEET (10') SEPARATION BETWEEN WATER AND SEWER. REFER TO CITY'S STANDARD SPECIFICATIONS FOR METHODS OF PROTECTION IN AREAS THAT CANNOT MEET THESE REQUIREMENTS.



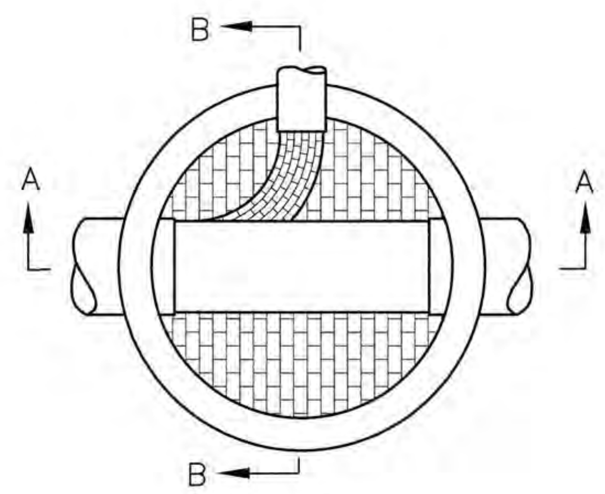
SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

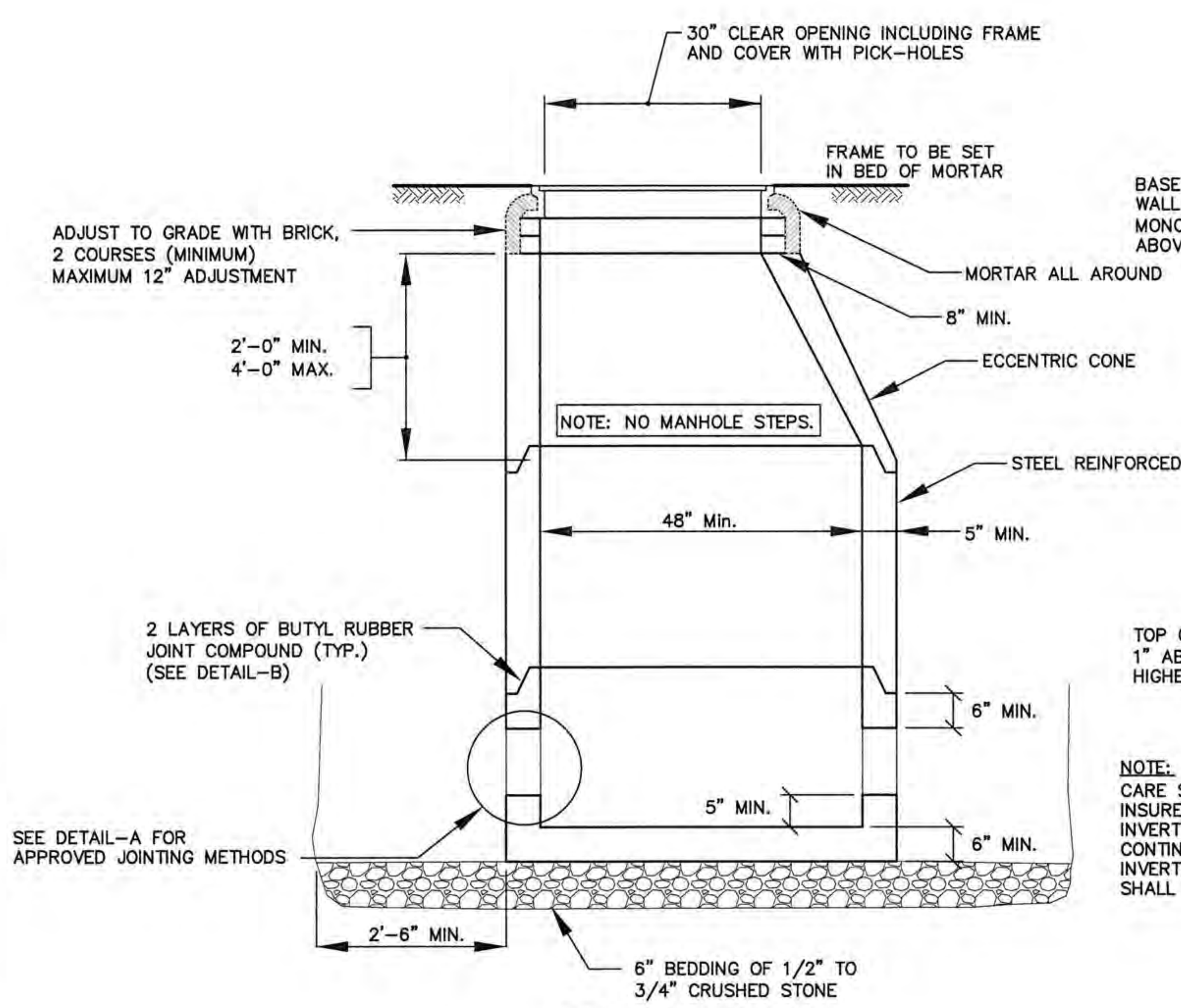
NOTES

1. ALL CONDUIT IS TO BE SCHEDULE 40 PVC, ELECTRICAL GRADE, GRAY IN COLOR AND INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS. A 10–FOOT HORIZONTAL SECTION OF RIGID GALVANIZED STEEL CONDUIT WILL BE REQUIRED AT EACH SWEEP, UNLESS IN THE OPINION OF THE SERVICE PROVIDER DESIGNER, THE SWEEP–PVC JOINT IS NOT SUBJECT TO FAILURE DURING PULLING OF THE CABLE. ALL JOINTS ARE TO BE WATERTIGHT.
2. ALL 90 DEGREE SWEEPS WILL BE MADE WITH RIGID GALVANIZED STEEL WITH A MINIMUM RADIUS OF 36 INCHES FOR PRIMARY CABLES AND 24 INCHES FOR SECONDARY CABLES.
3. BACKFILL MAY BE MADE WITH EXCAVATED MATERIAL OR COMPARABLE, UNLESS MATERIAL IS DEEMED UNSUITABLE BY SERVICE PROVIDER. BACKFILL SHALL BE FREE OF FROZEN LUMPS, ROCKS, DEBRIS, AND RUBBISH. ORGANIC MATERIAL SHALL NOT BE USED AS BACKFILL. BACKFILL SHALL BE IN 6–INCH LAYERS AND THOROUGHLY COMPACTED.
4. A SUITABLE PULLING STRING, CAPABLE OF 300 POUNDS OF PULL, MUST BE INSTALLED IN THE CONDUIT BEFORE SERVICE PROVIDER IS NOTIFIED TO INSTALL CABLE. THE STRING SHOULD BE BLOWN INTO THE CONDUIT AFTER THE RUN IS ASSEMBLED TO AVOID BONDING THE STRING TO THE CONDUIT. A MINIMUM OF TWENTY–FOUR (24") INCHES OF ROPE SLACK SHALL REMAIN AT THE END OF EACH DUCT. PULL ROPE SHALL BE INSTALLED IN ALL CONDUIT FOR FUTURE PULLS. PULL ROPE SHALL BE NYLON ROPE HAVING A MINIMUM TENSILE STRENGTH OF THREE HUNDRED (300#) LBS.
5. SERVICE PROVIDER SHALL BE GIVEN THE OPPORTUNITY TO INSPECT ALL CONDUIT PRIOR TO BACKFILL. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS SHOULD SERVICE PROVIDER BE UNABLE TO INSTALL ITS CABLE IN A SUITABLE MANNER.
6. TYPICAL CONDUIT SIZES ARE 3–INCH FOR SINGLE PHASE PRIMARY AND SECONDARY VOLTAGE CABLES, 4–INCH FOR THREE PHASE SECONDARY, AND 5–INCH FOR THREE PHASE PRIMARY. HOWEVER, SERVICE PROVIDERS MAY REQUIRE DIFFERENT NUMBERS, TYPES AND SIZES OF CONDUIT THAN THOSE SHOWN HERE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL CONDUIT SIZES, TYPES AND NUMBERS WITH EACH SERVICE PROVIDER PRIOR TO ORDERING THEM.
7. ROUTING OF CONDUIT, LOCATION OF MANHOLES, TRANSFORMERS, CABINETS, HANDHOLES, ETC., SHALL BE DETERMINED BY SERVICE PROVIDER DESIGN PERSONNEL. THE CONTRACTOR SHALL COORDINATE WITH ALL SERVICE PROVIDERS PRIOR TO THE INSTALLATION OF ANY CONDUIT.
8. ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND WHERE APPLICABLE, THE NATIONAL ELECTRIC CODE. WHERE REQUIRED BY UTILITY PROVIDER, CONDUIT SHALL BE SUPPORTED IN PLACE USING PIPE STANCHIONS PLACED EVERY FIVE (5') FEET ALONG THE CONDUIT RUN.
9. UNDER A BUILDING SLAB THE CONDUIT SHALL BE ENCASED IN 8" OF CONCRETE ON ALL SIDES.
10. ALL CONDUIT TERMINATIONS SHALL BE CAPPED TO PREVENT DEBRIS FROM ENTERING CONDUIT.

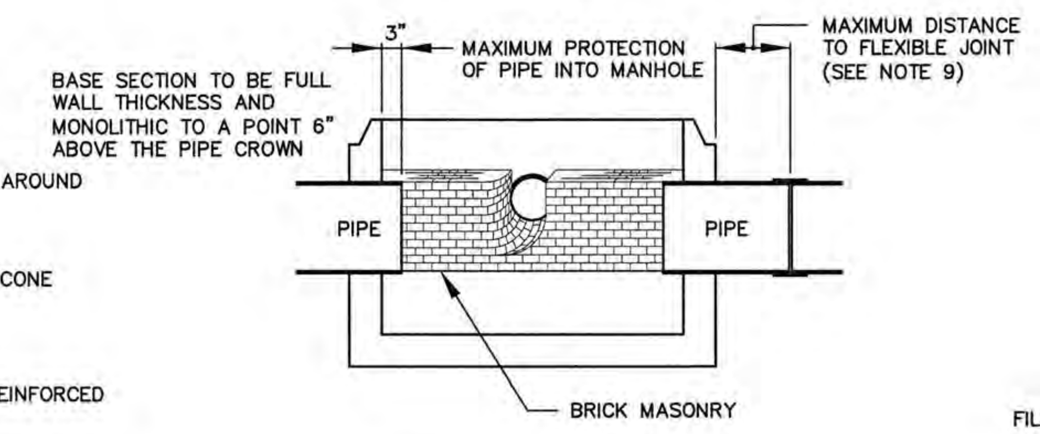
ELECTRIC / COMMUNICATION TRENCH NOT TO SCALE



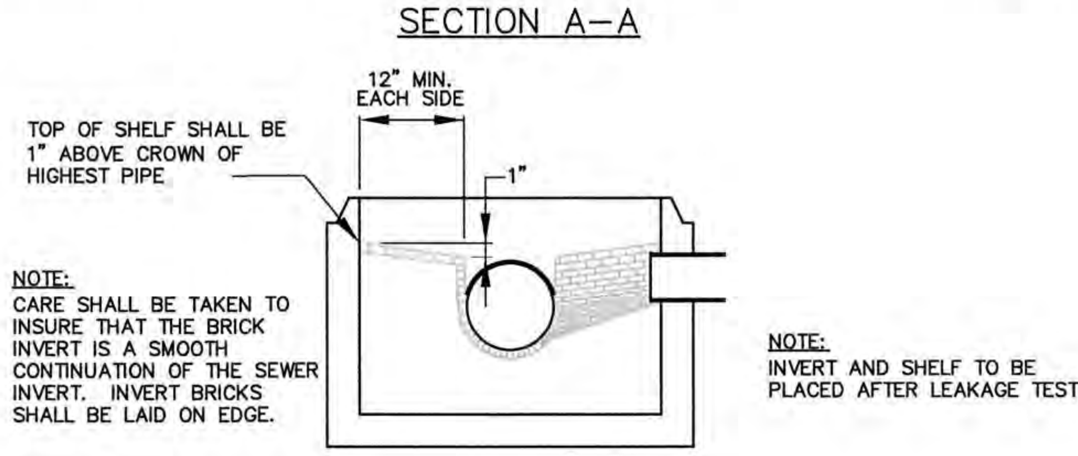
PLAN



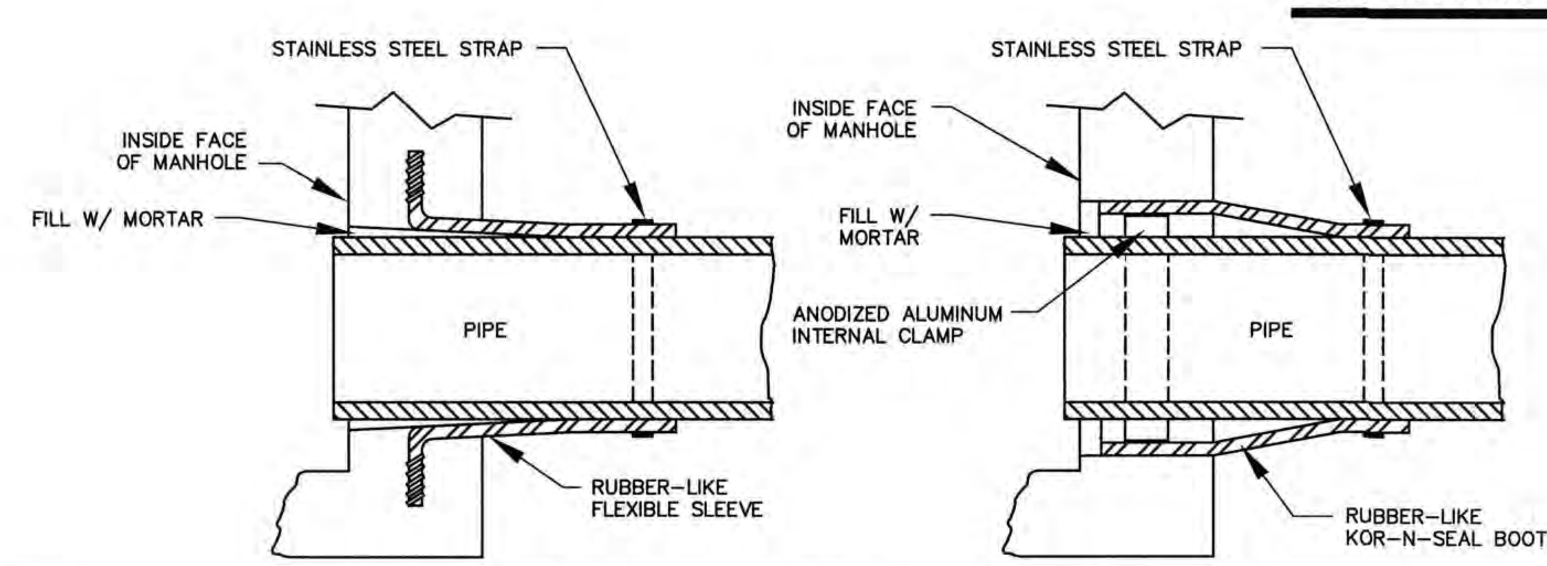
TYPICAL SECTION



SECTION A–A



SECTION B–B

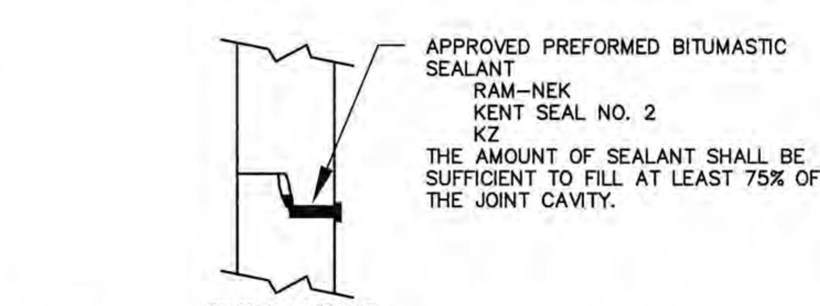


LOCK–JOINT FLEXIBLE MANHOLE SLEEVE (OR EQUAL)

KOR–N–SEAL JOINT SLEEVE (OR EQUAL)

NOTE: ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.

DETAIL–A



BITUMASTIC

NOTE: ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.

DETAIL–B
(APPROVED MANHOLE SECTION JOINTING METHODS)

SEWER MANHOLE DETAILS NOT TO SCALE

P4801

ENGINEER:

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER
12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801.2 DETAILS.DWG

SCALE:
22" x 34" – NOT TO SCALE
11" x 17" – NOT TO SCALE

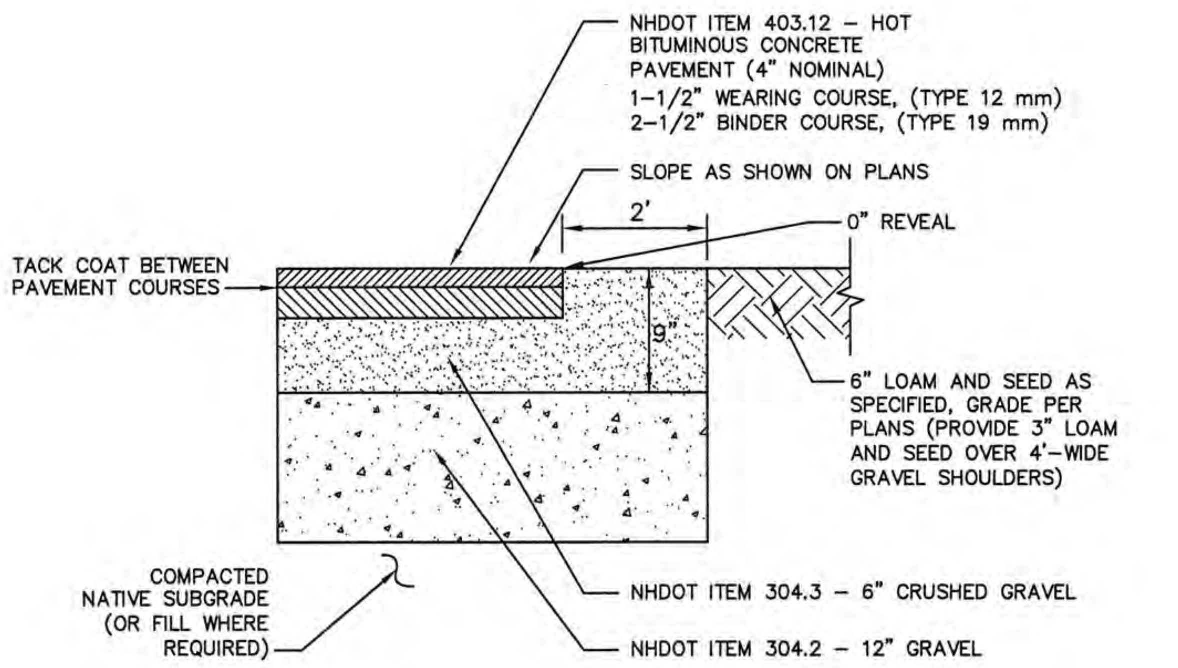
OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266–5

APPLICANT:
SAINT PATRICK ACADEMY
125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266–5

TITLE:
DETAIL SHEET

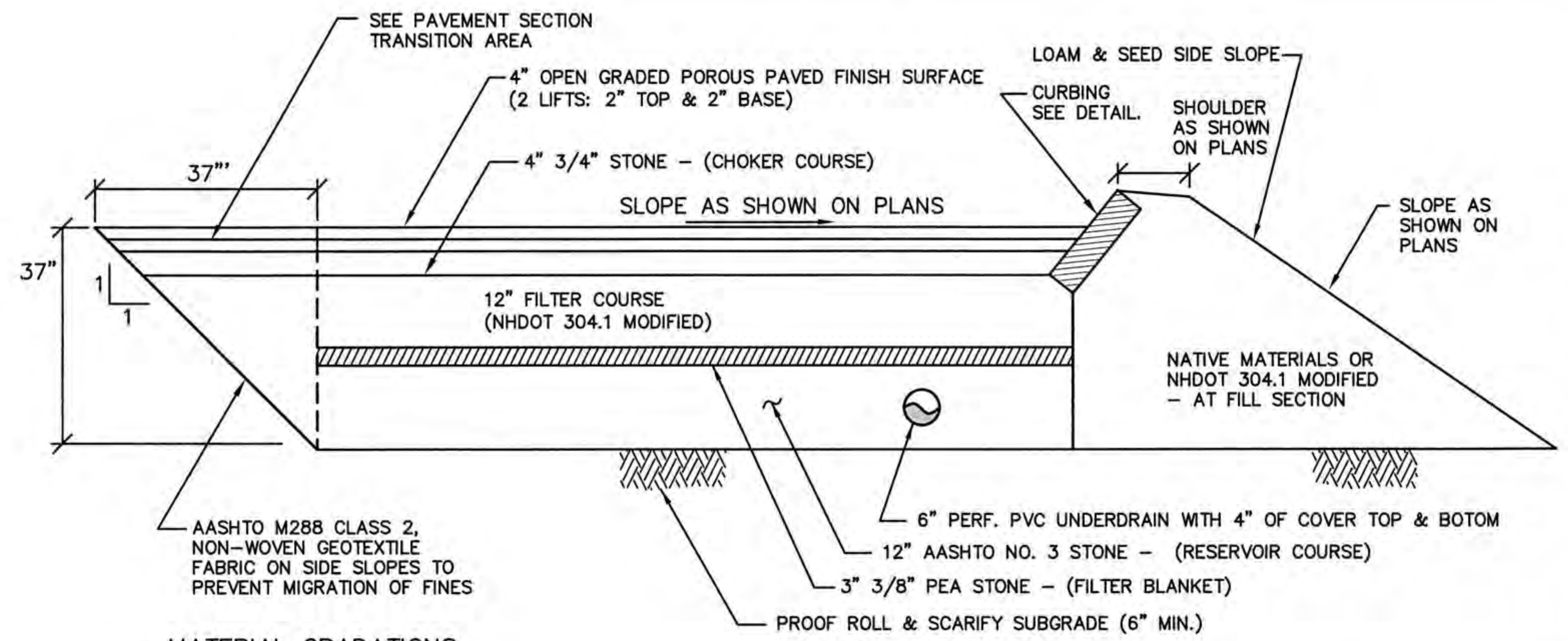
SHEET NUMBER:
D-6



HEAVY DUTY PAVEMENT NOTE: SECTION SHALL INCREASE TO 8" CRUSHED GRAVEL (NHDOT ITEM 304.3)

NOTE: SUBGRADE AREA TO BE PROOF ROLLED PER GEOTECHNICAL REPORT RECOMMENDATIONS.

PAVEMENT CROSS SECTION NOT TO SCALE



MATERIAL GRADATIONS

RESERVOIR COURSE		CHOKER COURSE STONE		GRAVEL FILTER COURSE (NHDOT 304.1 MODIFIED)		3/8" PEA STONE	
SIEVE SIZE	% PASSING BY WEIGHT	SIEVE SIZE	% PASSING BY WEIGHT	SIEVE SIZE	% PASSING BY WEIGHT	SIEVE SIZE	% PASSING BY WEIGHT
2-1/2"	100	1-1/2"	100	6"	100	1/2"	100
2"	90 – 100	1"	95 – 100	# 4	70 – 100	3/8"	85 – 100
1-1/2"	35 – 70	1/2"	25 – 60	# 200	0 – 6	# 4	10 – 30
1"	0 – 15	# 4	0 – 10			# 8	0 – 10
1/2"	0 – 5	# 8	0 – 5			# 16	0 – 15

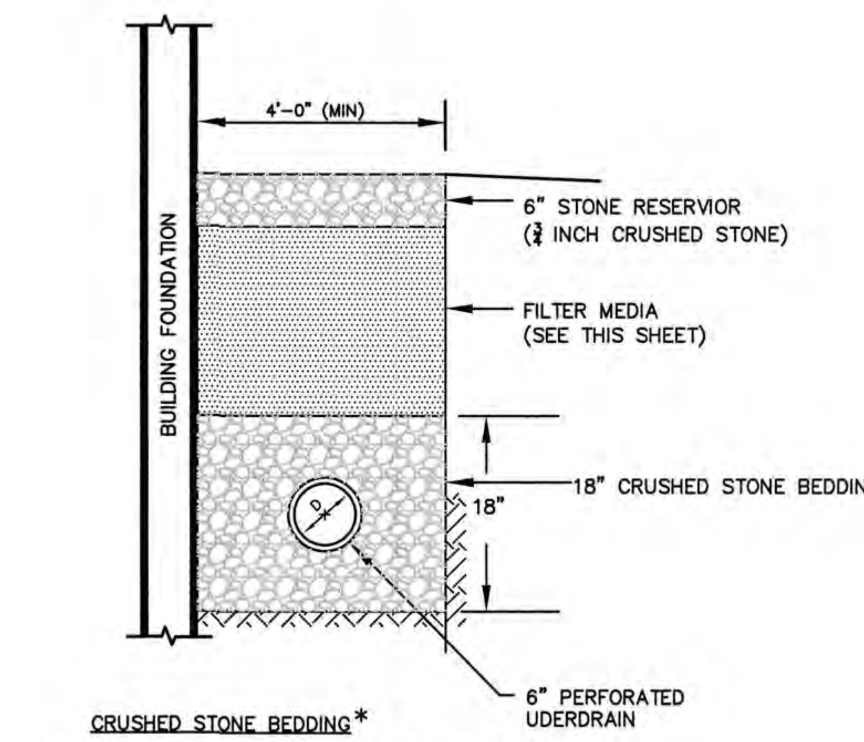
POROUS PAVEMENT CROSS SECTION NOT TO SCALE

NOTES:

1. DESIGN OF POROUS PAVEMENT SHALL BE IN ACCORDANCE WITH UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS.
2. CONTRACTOR TO REMOVE ANY EXISTING BURIED LAYERS OF LOAM OR UNSUITABLE MATERIAL DURING THE EXCAVATION OF THE PARKING AREA AND/OR WHENEVER ENCOUNTERED IN TRENCHES.
3. A PROFESSIONAL ENGINEER SHALL INSPECT SITE PREPARATION AND INSTALLATION OF POROUS PAVEMENT.
4. THE TOP LAYER (WEARING COURSE) SHALL BE PRE-BLENDED PG 76-28 MODIFIED WITH SBS. THE BASE COURSE SHOULD BE, AT A MINIMUM, PG 64-28 WITH 5 POUNDS OF FIBER PER TON ASPHALT MIX. IF SUFFICIENT STAGING OR USE OF THE BASE COURSE SECTION WILL BE REQUIRED PRIOR TO THE APPLICATION OF THE WEARING COURSE, THE ENGINEER MAY DECIDE TO USE PRE-BLENDED PG 64V-28 MODIFIED WITH SBS ON BOTH COURSES.
5. CONTRACTOR SHALL PROVIDE SUBMITTALS FOR POROUS PAVEMENT & SUBGRADE MATERIALS AS NOTED IN THE ABOVE SPECIFICATION A MINIMUM OF 14-DAYS PRIOR TO COMMENCING CONSTRUCTION.
6. THE CONSTRUCTION OF THE POROUS PAVEMENT SHALL BE IN ACCORDANCE WITH THE UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS.

CITY OF PORTSMOUTH, PLANNING BOARD

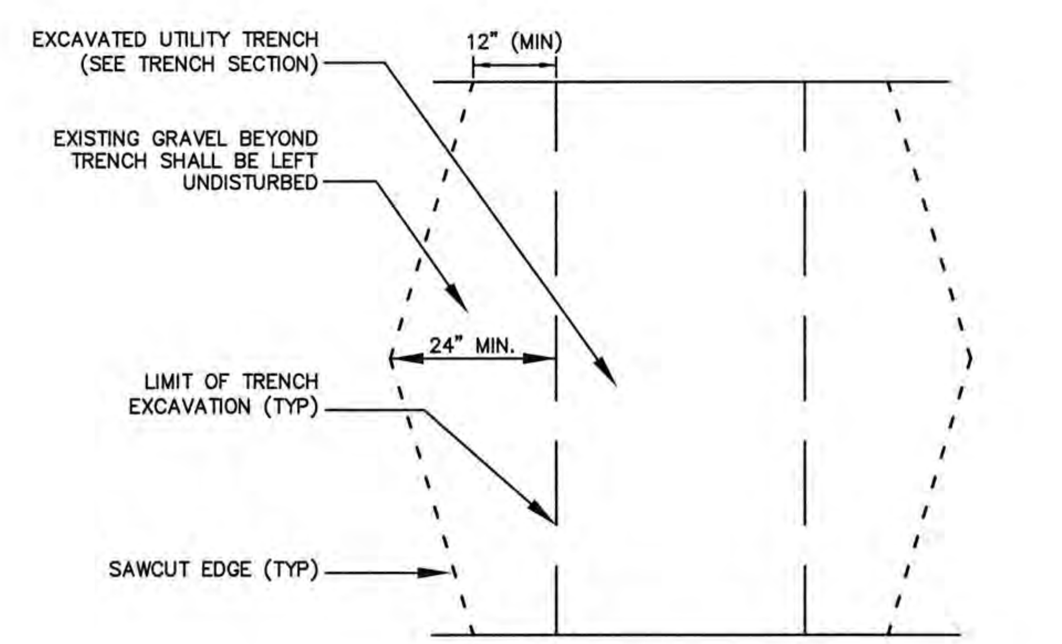
CHAIRMAN DATE



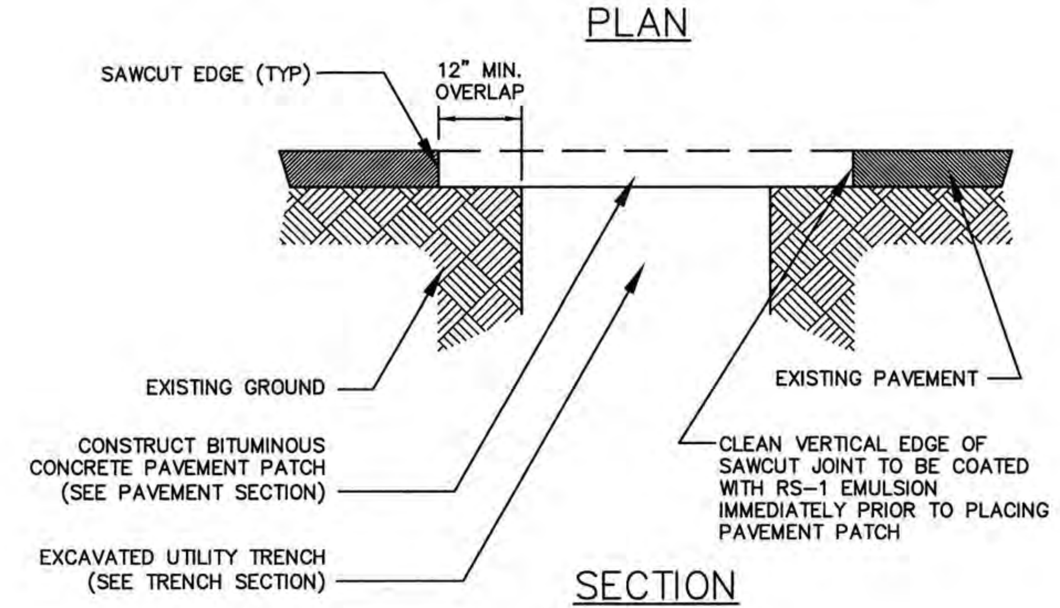
CRUSHED STONE BEDDING*

* EQUIVALENT TO STANDARD STONE SIZE #67 – SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

ROOF DRIPLINE FILTER NOT TO SCALE



PLAN

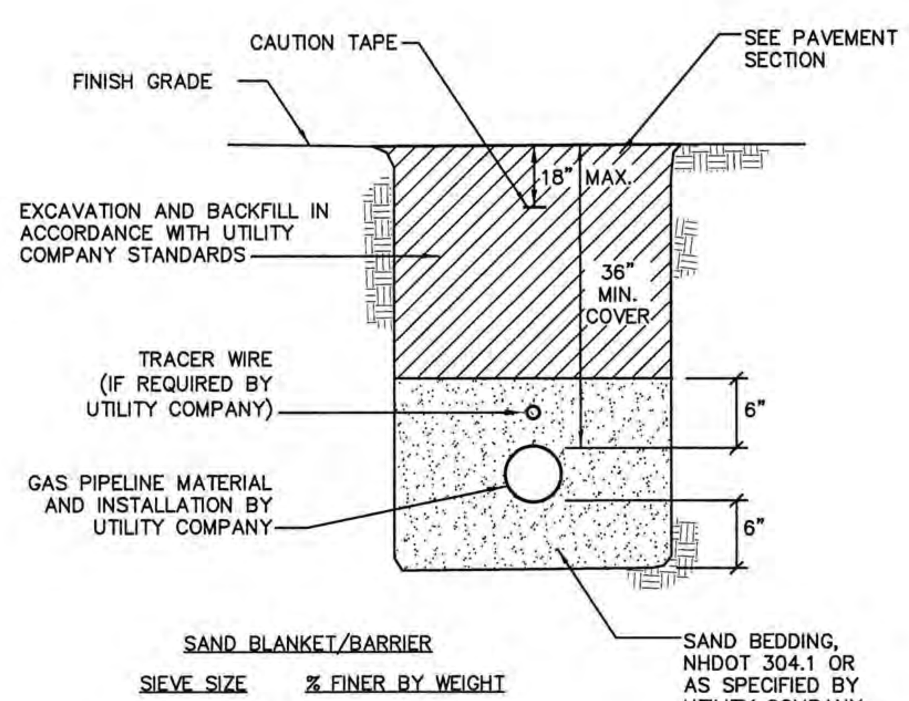


SECTION

NOTES

1. MACHINE CUT EXISTING PAVEMENT.
2. ALL TEMPORARY, DAMAGED OR DEFECTIVE PAVEMENT SHALL BE REMOVED PRIOR TO PLACEMENT OF PERMANENT TRENCH REPAIRS.
3. DIAMOND PATCHES, SHALL BE REQUIRED FOR ALL TRENCHES CROSSING ROADWAY. DIAMOND PATCHES SHALL MEET NHDOT REQUIREMENTS.

TYPICAL TRENCH PATCH NOT TO SCALE



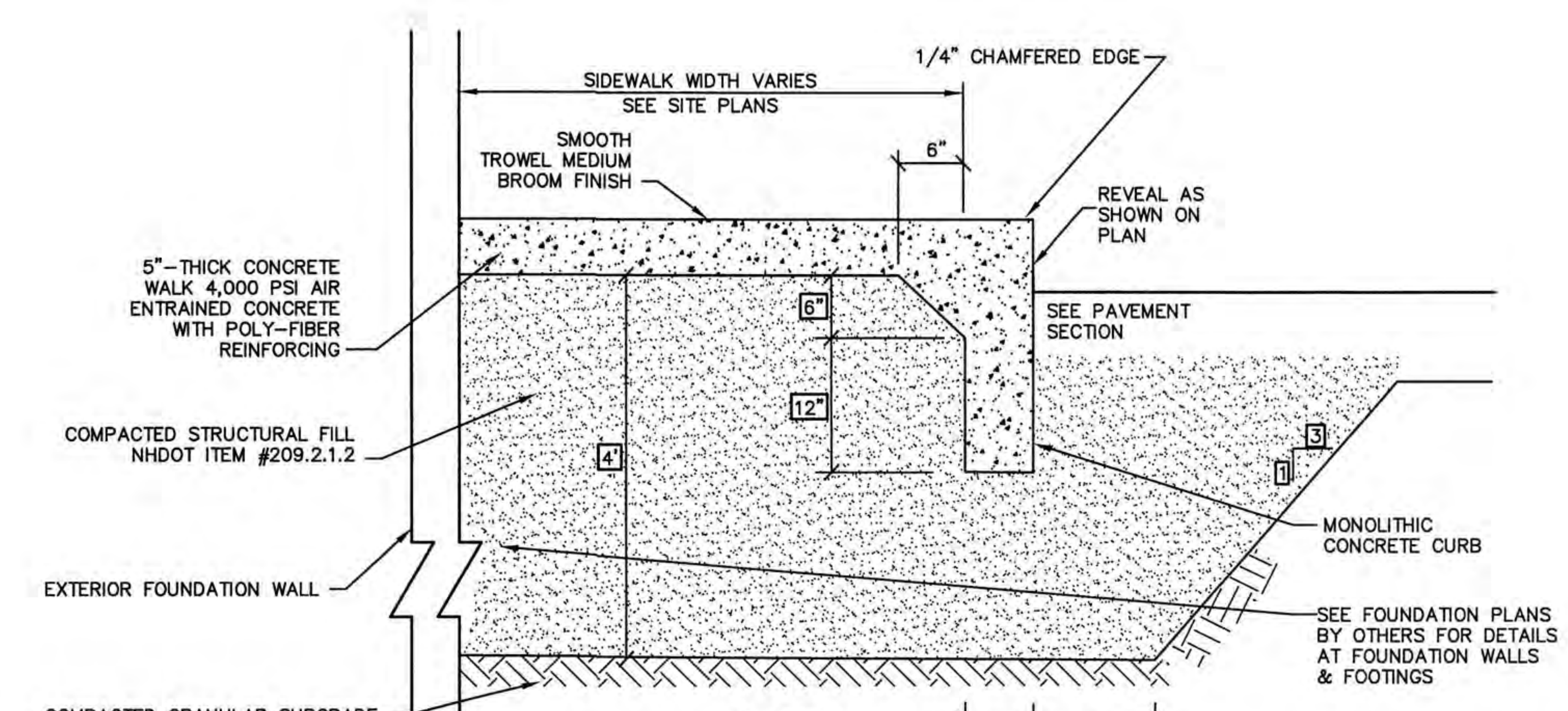
SAND BLANKET/BARRIER

SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 – 100
200	0 – 15

NOTES

1. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY AND PROVIDE ALL EXCAVATION, COMPACTION AND BACKFILL FOR PIPE INSTALLATION WITHIN THE PROJECT SITE.
2. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.

GAS TRENCH NOT TO SCALE



SECTION

CONCRETE SLAB (SIDEWALK) DETAILS @ BLDG. ENTRANCES NOT TO SCALE

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER 12/23/19

ISSUED FOR: TAC

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/23/19

DRAWN BY: CDB

APPROVED BY: EDW

DRAWING FILE: 4801.2 DETAILS.DWG

SCALE:

22" x 34" – NOT TO SCALE

11" x 17" – NOT TO SCALE

OWNER:

HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:

SAINT PATRICK ACADEMY

125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:

SAINT PATRICK ACADEMY GYMNASIUM

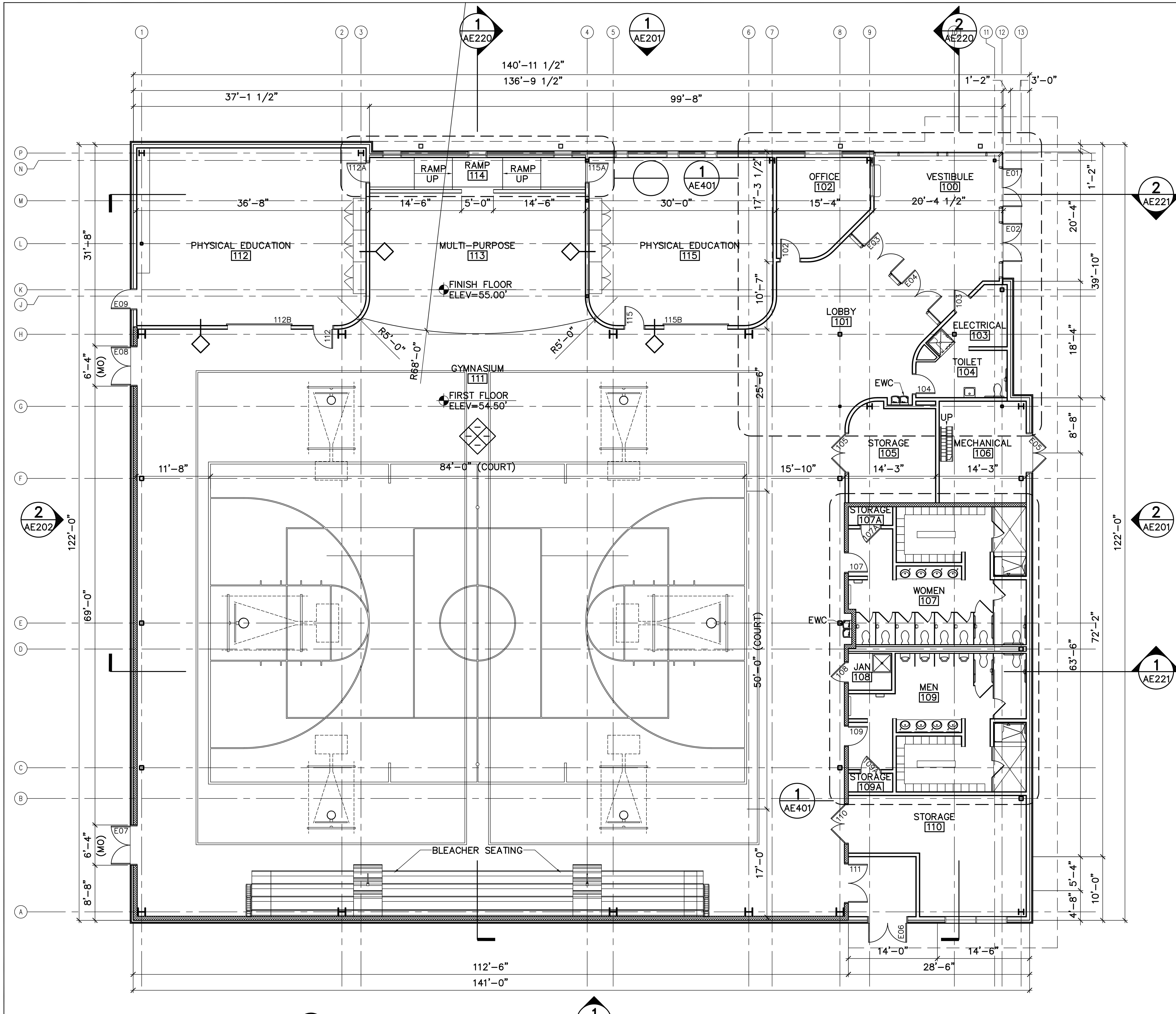
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:

DETAIL SHEET

SHEET NUMBER:

D-7



1 AE101 **FLOOR PLAN** SCALE: 1/8"=1'-0"

PLAN NORTH

28 Jan, 2020 – 2:29pm
C:\Dfile\21902.15–AE101.dwg

GENERAL NOTES:

1. SEE SHEET AE001 FOR WALL TYPES
2. SEE SHEET AE601 FOR DOOR SCHEDULE.

KEYNOTES:

1 KEYNOTE 1...

GRAPHIC SCALE

1/8"=1'-0" 8' 4' 0 8' 16'

CHECK GRAPHIC SCALE BEFORE USING

OAK POINT ASSOCIATES
ARCHITECTURE ■ ENGINEERING ■ PLANNING
85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870 www.oakpoint.com

50% SUBMISSION 01-31-20

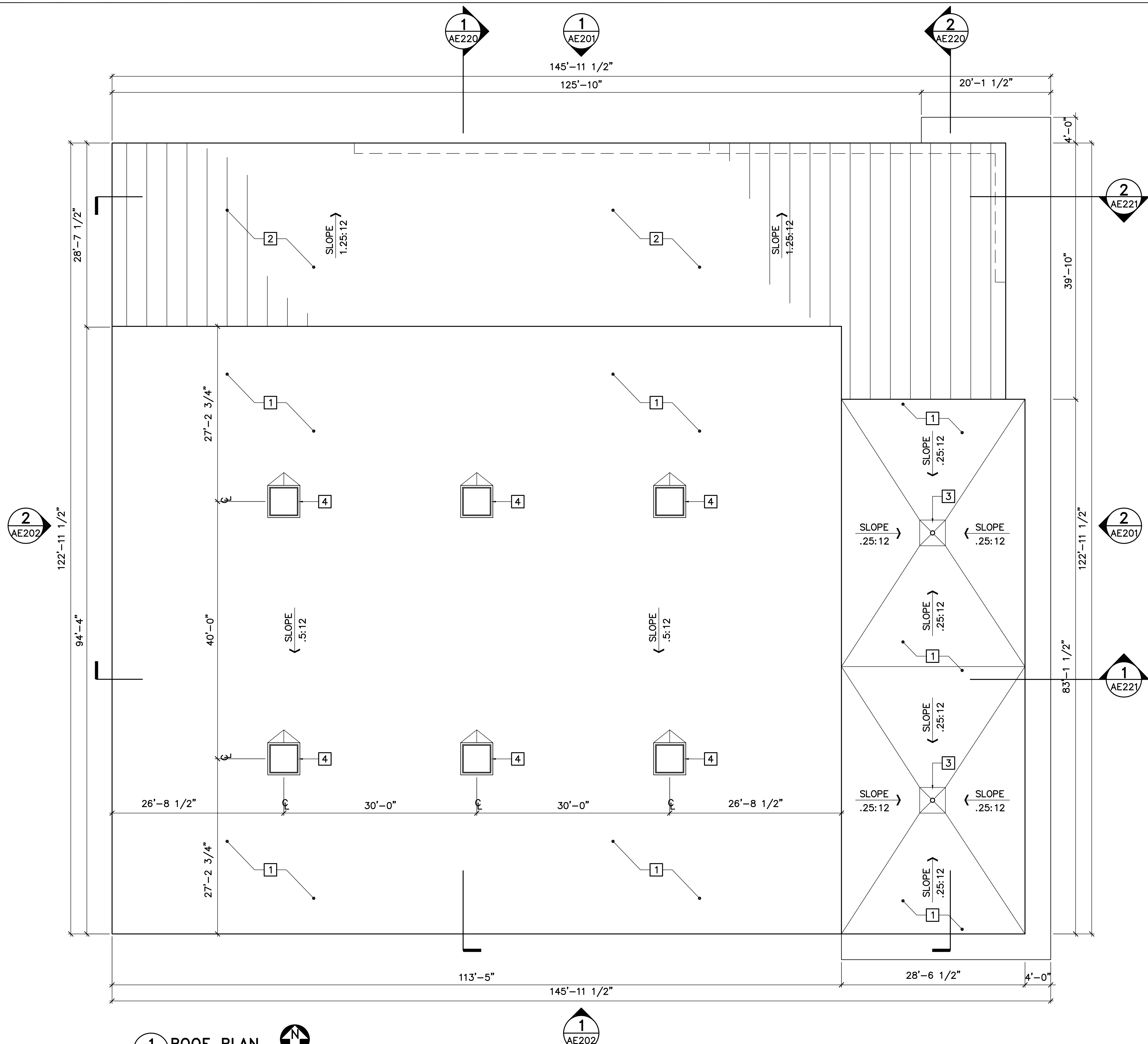
DESIGNED BY: RSH
DRAWN BY: RMT
CHECKED BY: RSH
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

FLOOR PLAN

SCALE: AS NOTED
DATE: 01-31-20
DWG.: **AE101**
SHEET: OF



1 AE120 ROOF PLAN
SCALE: 1/8"=1'-0"

28 Jan, 2020 – 1:02pm
C:\Dfile\21902.15–AE120.dwg

GENERAL NOTES:

1. UNVENTED, ABOVE DECK INSULATED MEMBRANE ROOF SYSTEM (TYPICAL).

KEYNOTES:

1. PVC ROOF SYSTEM, SEE DETAIL XX/AEXXX.
2. PVC ROOF SYSTEM WITH EXTRUDED PVC RIBS, SEE DETAIL XX/AEXXX.
3. ROOF DRAIN, SEE DETAIL XX/AE5XX.
4. 5'-0" SQUARE SKYLIGHT, SEE DETAIL XX/AE5XX.
5. VENT THRU ROOF, SEE DETAIL XX/AEXXX AND COORDINATE WITH PLUMBING DRAWINGS.

GRAPHIC SCALE
8' 4' 0 8' 16'
1/8"=1'-0"
CHECK GRAPHIC SCALE BEFORE USING

OAK POINT ASSOCIATES
ARCHITECTURE ■ ENGINEERING ■ PLANNING
85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870
www.oakpoint.com

50% SUBMISSION 01-31-20

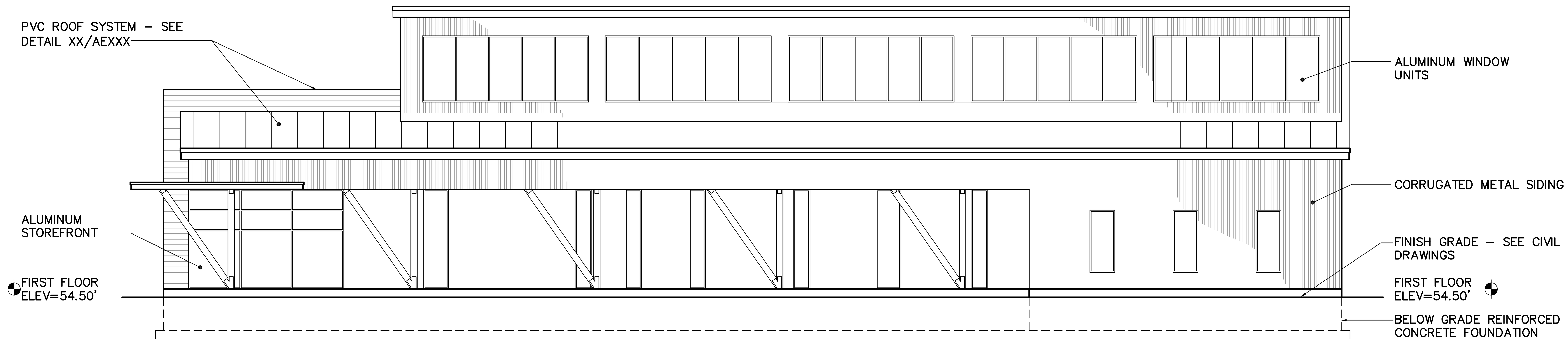
DESIGNED BY: RSH
DRAWN BY: RMT
CHECKED BY: RSH
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

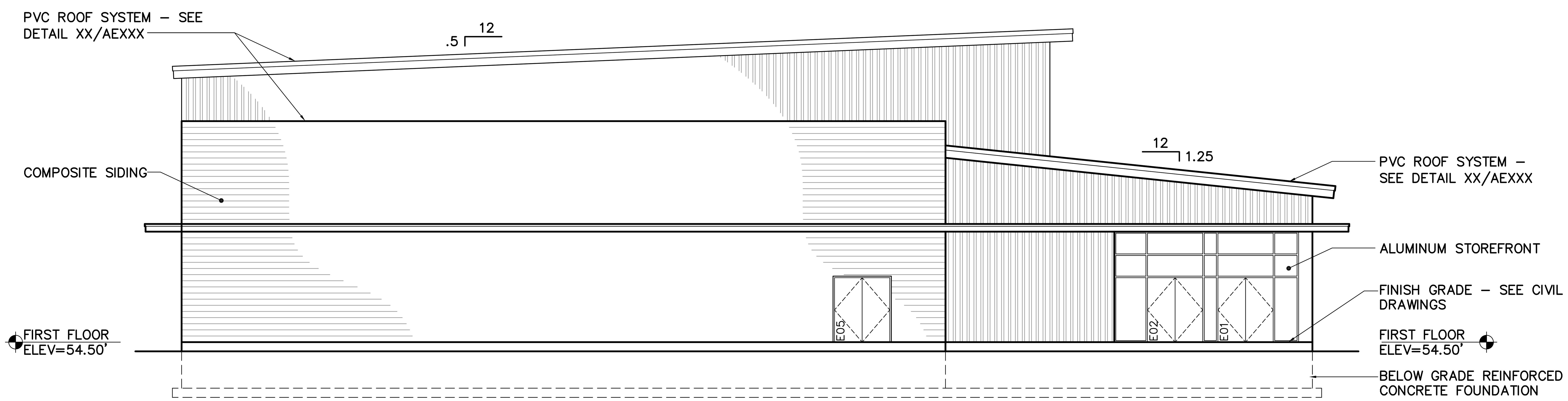
SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

ROOF PLAN

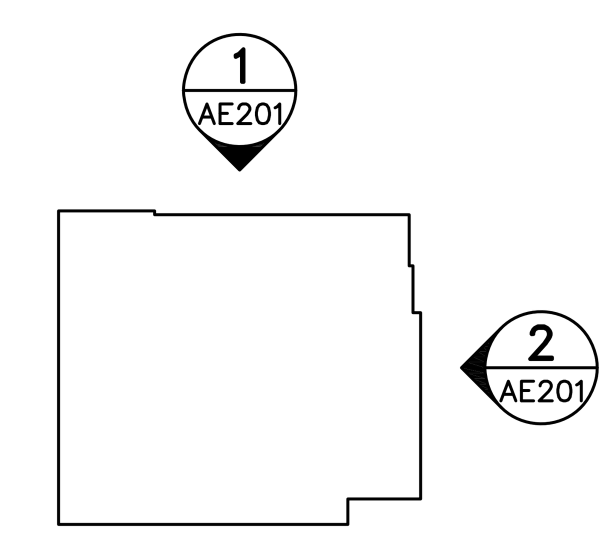
SCALE: AS NOTED
DATE: 01-31-20
DWG.: AE120
SHEET: OF



1 NORTH ELEVATION
AE201 SCALE: 1/8"=1'-0"
AE101,AE120



2 EAST ELEVATION
AE201 SCALE: 1/8"=1'-0"
AE101,AE120



KEY PLAN
NOT TO SCALE
PLAN NORTH

GRAPHIC SCALE
1/8"=1'-0" 8' 4' 0 8' 16'
CHECK GRAPHIC SCALE BEFORE USING

28 Jan, 2020 – 4:53pm
C:\Dfile\21902.15–AE201.dwg

OAK POINT ASSOCIATES
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85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870 www.oakpoint.com

50% SUBMISSION 01-31-20

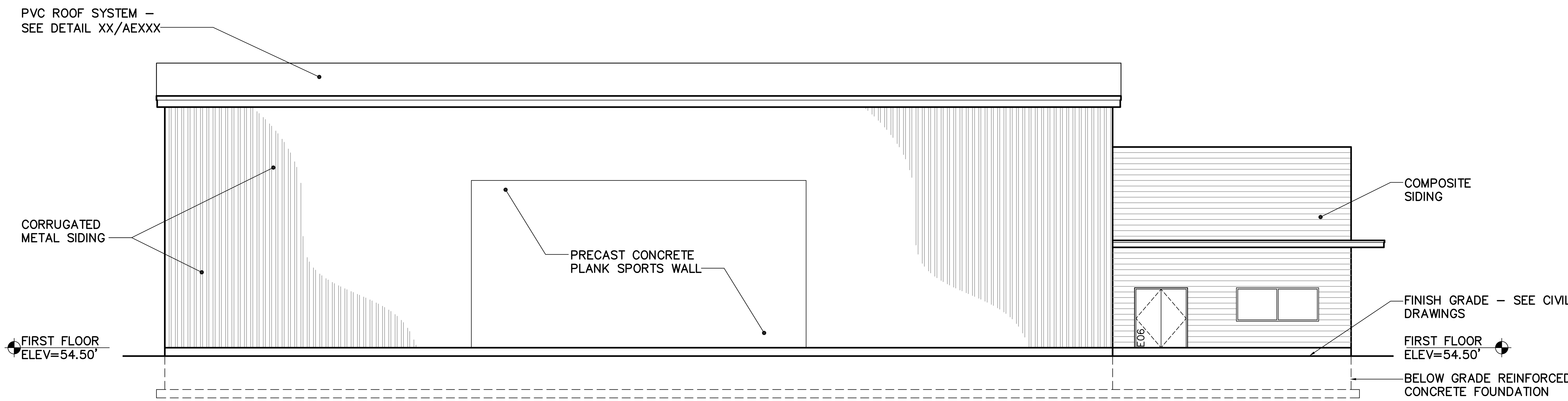
DESIGNED BY: RSH
DRAWN BY: RMT
CHECKED BY: RSH
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

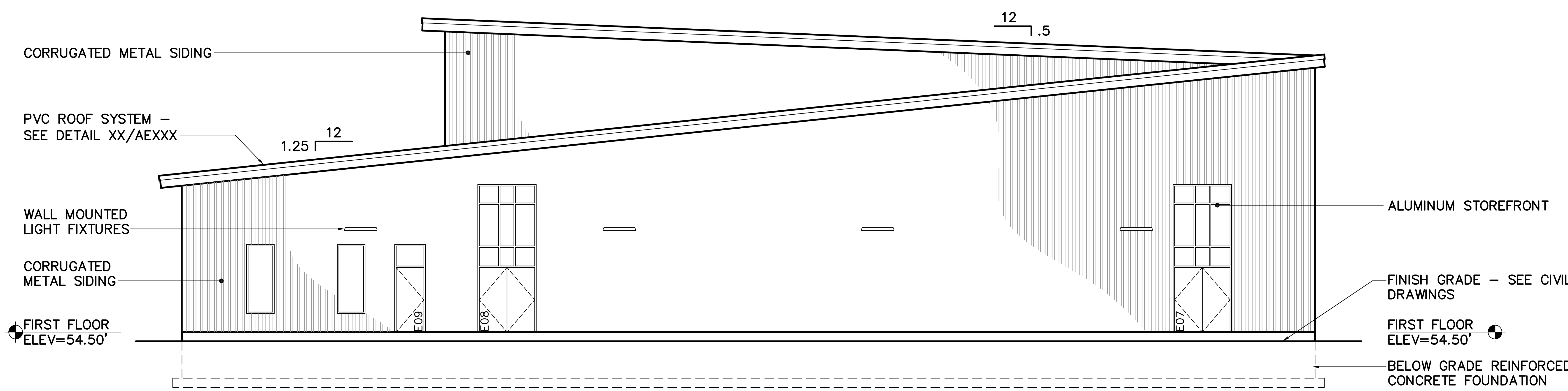
SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

NORTH AND EAST EXTERIOR ELEVATIONS

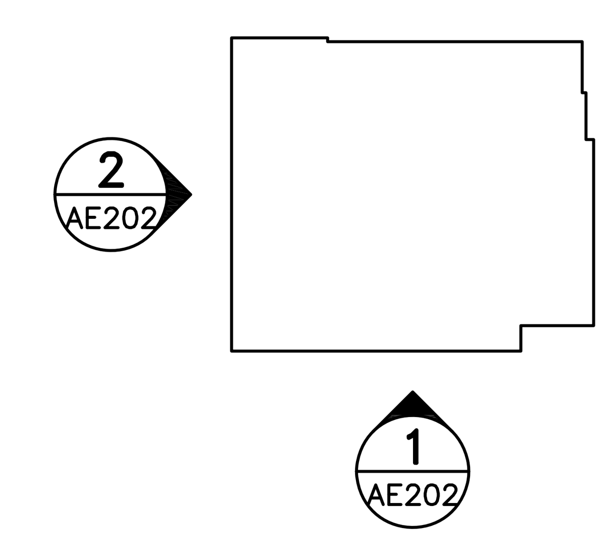
SCALE: AS NOTED
DATE: 01-31-20
DWG.: AE201
SHEET: OF



1 SOUTH ELEVATION
AE202 SCALE: 1/8"=1'-0"
AE101,AE120



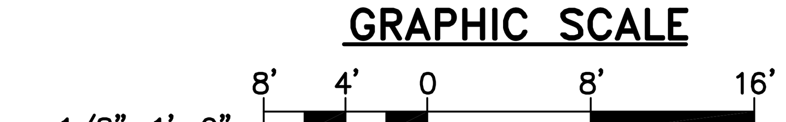
2 WEST ELEVATION
AE202 SCALE: 1/8"=1'-0"
AE101,AE120,AE202



KEY PLAN
NOT TO SCALE

N
PLAN NORTH

GRAPHIC SCALE



CHECK GRAPHIC SCALE BEFORE USING

28 Jan, 2020 – 4:45pm
C:\Dfile\21902.15–AE202.dwg

OAK POINT ASSOCIATES
ARCHITECTURE ■ ENGINEERING ■ PLANNING
85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870 www.oakpoint.com

50% SUBMISSION 01-31-20

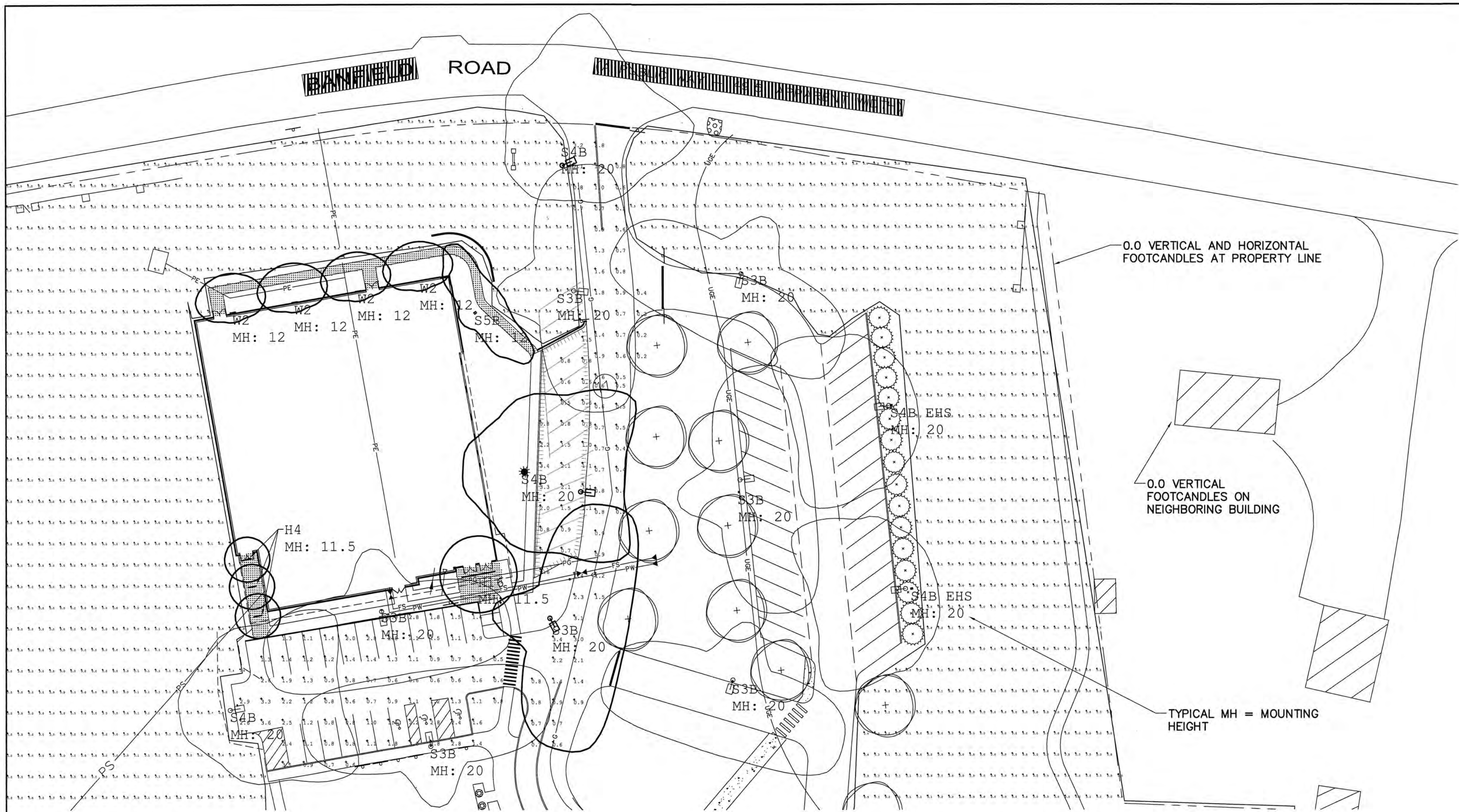
DESIGNED BY: RSH
DRAWN BY: RMT
CHECKED BY: RSH
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

SOUTH AND WEST EXTERIOR ELEVATIONS

SCALE: AS NOTED
DATE: 01-31-20
DWG.: **AE202**
SHEET: OF



1 ELECTRICAL SITE PLAN
ES101 1" = 30'

Calculation Summary			
Label	Qty	Description	Lum. Lumens
W2	10	AEL36-30W 4000K	2911
S4B EHS	2	ASL-8L-3K-210-4-EHS	4049
S3B	11	ASL-8L-3K-210-3	5752
S4B	4	ASL-8L-3K-210-4	5888
S5B	11	ASL-8L-3K-210-2	5906
H16	1	HP-4-WL-D-16ft-S-835	1517
H4	3	HP-4-WL-D-4ft-S-835	1517

Calculation Summary					
Label	Avg	Max	Min	Avg/Min	Max/Min
Entrance One Way	1.11	3.4	0.4	2.78	8.50
Gym Main Entrance_Exit	7.80	13.7	2.4	3.25	5.71
Gym North Lot	1.25	3.4	0.5	2.50	6.80
Gym Southeast Entrance_Exit	4.52	6.0	1.6	2.83	3.75
Gym Walkway West	3.78	14.9	1.0	3.78	14.90
Main EntranceExit	1.03	3.2	0.2	5.15	16.00
Overall	0.05	4.6	0.0	N.A.	N.A.
West Lot	1.52	3.9	0.5	3.04	7.80

GRAPHIC SCALE
30' 15' 0 30' 90'
1"=30'
CHECK GRAPHIC SCALE BEFORE USING

20 Dec, 2019 – 3:38pm
C:\dfile\21902.15-ES101-PERMIT.dwg

OAK POINT ASSOCIATES
ARCHITECTURE ■ ENGINEERING ■ PLANNING
85 Middle Street, Portsmouth, NH 03801 (T) 603.431.4849 (F) 603.431.1870 www.oakpoint.com

ISSUED FOR PLANNING BOARD APPROVAL NOT FOR CONSTRUCITON

DESIGNED BY: MHL
DRAWN BY: RSW
CHECKED BY: KAO
PROJECT: 21902.15

HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

SAINT PATRICK ACADEMY GYMNASIUM
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

ELECTRICAL SITE PLAN

SCALE: AS NOTED
DATE: 12-23-19
DWG.: ES101
SHEET: - OF

ALTUS
ENGINEERING, INC.

Civil
Site Planning
Environmental
Engineering

133 Court Street
Portsmouth, NH
03801-4413

December 23, 2019

Juliet T. H. Walker, AICP, Planning Director
City of Portsmouth Municipal Complex
Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Application for Site Plan Amendment**
St Patrick Academy
Assessor's Map 266, Lot 5
315 Banfield Road
Altus Project #P4801

Dear Juliet:

On behalf of the Hope for Tomorrow Foundation (HFT) and the St Patrick Academy, Altus Engineering, Inc. (Altus) is thrilled to submit an application for an Amended Site Plan Review for the construction of a new gymnasium at their facility on Banfield Road. In March 2017, the HFT obtained site approvals for the construction of the school. It was occupied in April 2018 slightly over a year later.

The Academy entered into an agreement with the Foundation for Seacoast Health (FSH) to use their gym for classes and athletic events. The school is thriving in its new location and now wishes to construct a standalone gymnasium building on their property for physical education classes and their athletic events.

We are not proposing to expand the population beyond the 200 maximum students allowed under the previous approval. The gym is an additional amenity to the existing school and not an expansion of use.

In 2017 when the school was approved, the parking ordinance required 0.3 spaces per student and allowed for an additional 20 percent for a maximum of 72 spaces. The facility was constructed with only 60-spaces. We are proposing to expand the parking to slightly above the maximum under the previous ordinance. Enclosed with this submission is a parking demand analysis to support the request.

Attached are ten copies of the following plans and documents for the Technical Advisory Committee's consideration:

- Site Plans (4 full sized, 6 reduced);
- Opinion of Sitework cost;
- Site Plan Review Checklist;
- Application fee worksheet;
- Green Statement;
- Letter of Authorization;
- Drainage Computations
- Basis of Sewer Design; (4 full copies, 6, executive summaries);
- Water meter readings;
- Traffic Study (4 full copies, 6, executive summaries);
- Parking Demand Analysis.

Also enclosed the application fee check in the sum of $1,850.

Altus looks forward to presenting this project at the January 7, 20120 TAC meeting. Please call or email me should you have any questions or need any additional information.

Sincerely,

ALTUS ENGINEERING, INC.

Eric D. Weinrieb, PE
President

wde/4801 TAC cvr ltr 12-23-19 submission

Enclosure

Ecopy: Jim Broom, HFT
James Melone, St Patrick's Academy
Scott Hughes, Oak Point Associates

ALTUS ENGINEERING, INC.

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ST PATRICK ACADEMY
K THROUGH 8 SCHOOL
GYMNASIUM PROJECT

315 BANFIELD ROAD
Portsmouth, NH

Bond Estimate - Site Work

DATE: 20-Dec-19
PROJECT: 4801

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
SITEWORK DEMOLITION				
SITE FEATURES	1	LS	$1,000.00	$1,000.00
CLEARING AND GRUBBING				
TREE AND VEGETATION REMOVAL	1	AC	$3,000.00	$3,000.00
WATER SUPPLY				
2.5" DOMESTIC WATER SERVICE	135	LF	$45.00	$6,075
6" DI CL 52 WATER PIPE	135	LF	$46.00	$6,210
6" GATE VALVE	1	EA	$800.00	$800
6 X 8 LIVE TAP	1	EA	$3,000.00	$3,000
TESTING AND CHLORINATION	1	LS	$1,500.00	$1,500
SEWER SERVICE				
CROSS COUNTRY 6 AND 8" PVC SDR 35 (INCLUDING RESTORATION)	486	LF	$50.00	$24,300
DRILL NEW INVERT AND REBRICK STRUCTURE	1	EA	$1,500.00	$1,500
SEWER MANHOLES	1	EA	$2,800.00	$2,800
GAS SERVICE				
TRENCHING AND BACKFILL	90	LF	$18.00	$1,620
ELECTRIC/PHONE/CABLE SERVICES				
SCH 40 CONDUIT (x4 PER TRENCH)	380	LF	$20.00	$7,600
CURBING				
VERTICAL GRANITE CURBING	375	LF	$28.00	$10,500
STORM DRAINAGE SYSTEM				
CATCH BASINS, OUTLET STRUCTURES, DRAIN MANHOLES	5	EA	$1,800.00	$9,000
YARD DRAINS	3	EA	$1,500.00	$4,500
6" UNDERDRAIN	150	LF	$15.00	$2,250
ROOF GUTTER COLLECTION DRAIN PIPE	1	LS	$250.00	$250
12" DRAIN PIPE	340	LF	$28.00	$9,520
RAIN GARDEN	190	SY	$28.00	$5,320
RIP RAP/STONE DRIP EDGE	1	LS	$1,500.00	$1,500
FLARED END SECTION	1	EA	$300.00	$300
SEDIMENT AND EROSION CONTROL				
TEMPORARY EROSION CONTROL/SWPPP	1	LS	$5,000.00	$5,000
CONCRETE FLATWORK				
CONCRETE SIDEWALKS AND PADS	230	SY	$28.00	$6,440
SIDEWALKS				
2" BITUMINOUS SIDEWALKS INCLUDING SUBGRADE MATERIALS	95	SY	$22.50	$2,138
RETAINING WALLS				
MODULAR BLOCK RETAINING WALL	100	SF	$16.00	$1,600
HOT BITUMINOUS PAVEMENT				

Tel: (603) 433-2335 E-mail: Altus@altus-eng.com

4'" PATCH - BUDGET	50	TON	$72.00	$3,600
HOT BITUMINOUS PAVEMENT - POROUS				
4" POROUS PAVEMENT - PATCH - REPAIR BUDGET	15	TON	$140.00	$2,100
4" POROUS PAVEMENT	90	TON	$110.00	$9,900
6" 3/4 INCH STONE	65	CY	$30.00	$1,950
12" NHDOT 304.1 GRAVEL	130	CY	$24.00	$3,120
8" #3 STONE	90	CY	$30.00	$2,700
3" PEA STONE	33	CY	$30.00	$990
STRIPING AND SIGNAGE				
STRIPING & SIGNAGE	1	LS	$1,000.00	$1,000
LANDSCAPING				
LANDSCAPING INCLUDING RAIN GARDEN PLANTINGS (ALLOWANCE)	1	LS	$5,000.00	$5,000
LOAM AND SEED - TURF ESTABLISHMENT	0.5	AC	$8,000.00	$4,000
LIGHTING				
RESET EXISTING POLES, POLE BASES AND FIXTURES INCLUDING CONDUIT	2	EA	$2,000.00	$4,000
AS BUILT PLANS	1	LS	$3,000.00	$3,000

SUBTOTAL **$159,083**

TOTAL: $159,083

EXCLUSIONS:
ITEMS EXCLUDED FROM THIS ESTIMATE INCLUDE, BUT ARE NOT LIMITED TO, THOSE ITEMS SPECIFIED ABOVE AS BEING NOT INCLUDED IN THIS ESTIMATE AND THE FOLLOWING:
INSPECTION FEES, MONUMENTATION, HVAC PADS, TEMPORARY FENCING AND BARRICADES, TRAFFIC CONTROL, MATERIALS AND COMPACTION TESTING, BUILDING FOUNDATION, BUILDING FOUNDATION EXCAVATION, BUILDING MOUNTED EXTERIOR LIGHTING, BUILDINGS, LEDGE REMOVAL

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"Green" Statement"
Assessor's Map 266 Lot 05
St Patricks Academy Gymnasium
315 Banfield Road
Altus Project P4801

Pursuant to Section 2.4.3.1(a) of the Site Plan Review Regulations, Altus Engineering, Inc. (Altus) respectfully submits the following list of the project's "green" components for the redevelopment of the property located at 315 Banfield Road:

- The existing school development site area will be expanded with the construction of a ±17,000 SF building. The building coverage will remain at less than 9% where up to 50 percent is allowed in the zoning district and lot coverage is allowed to be up to 80 percent. The lot coverage after the development will be approximately 23 percent of the site. This will reserve generous open space for the site and preserving the natural environment.
- Shade trees were planted around the perimeter of the parking lot to reduce the heat island effect in the initial phase. Additional shade trees are proposed.
- The proposed development has bicycle racks.
- The stormwater management system is designed to meet the NHDES Alteration of Terrain Program's design standards and uses elements of low impact design (LID) to treat and detain stormwater. The drainage system is designed to mimic the predevelopment runoff conditions at the wetlands and property lines. The expansion will also meet the AOT design criteria. The computations include the 15% increase in the rainfall events which is a new requirement subsequent to the original approval.
- The development was designed to have pedestrian links to the Foundation for Seacoast Health Community Campus facility as well as the future City of Portsmouth Recreation area.
- The building code compliant building with components that will meet or exceed all applicable energy codes.
- Building components shall maximize recycled content and be locally sourced if possible. Although not LEED compliant, the intent of the proposed building will be to utilize this guideline to implement sustainable strategies.
- Efforts have been made to preserve as much of the existing mature vegetation as possible along the frontage, the southern boundary and along the eastern boundary where the land abuts a large wetland system. .
- The proposed site lighting will have LED fixtures. They will be mounted at a maximum height of 16-feet. The lights will be dark sky friendly and will meet or exceed the minimum City requirements.

Tel: (603) 433-2335 E-mail: Altus@altus-eng.com

- Runoff from the paved surfaces currently discharges directly into the wetland system. The surface runoff from the paved surfaces will no longer discharge directly into the wetland. The runoff will be treated in a series of rain gardens. Thus, the stormwater runoff quality will be significantly enhanced.
- No wetland or wetland buffers will be impacted by the project development.
- New paved surfaces will be constructed from pervious materials to promote infiltration and recharge groundwater.

Wde/4801-App-City-Site-GreenStatment - gym

Letter of Authorization

I, James Patrick Broom of the Hope for Tomorrow Foundation, hereby authorize Altus Engineering, Inc. of Portsmouth, New Hampshire and Oak Point Associates, Inc. of Portsmouth, NH to represent you in all matters concerning engineering, architecture and related permitting for the development of a gymnasium at 315 Banfield Road in Portsmouth, NH. The property is identified on the Assessor's Maps as Tax Map 266, Lot 5. This authorization shall include any signatures required for Federal, State and Municipal permit applications.

Signature	James Broom Print Name	Date
Witness	RICHARD HACKEMAN Print Name	10/3/19 Date

State of New Hampshire
Department of Environmental Services
29 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-4128

SEWER CONNECTION PERMIT

Project Name: St Patrick Academy
Location : 355 Banfield Road
Engineer : Altus Engineering - Eric Weinrieb, PE

Municipality/POTW : Portsmouth
Official Signature : Terry Desmarais, PE
Date of Request : 5/16/2017

PERMIT/REQUEST NUMBER **D2017-0512**

FLOW : **1,628** **gallons/day** APPROVAL DATE **6/6/2017**

The New Hampshire Department of Environmental Services (NHDES) has reviewed and hereby approves the request as follows:
Approval of the connection to the municipality's wastewater facilities is based on a review of the supporting information submitted and is subject to the conditions indicated below.

CONDITIONS :

Approval applies only to the sewerage plans and sewer connection application received by NHDES.

This approval will become void if the sewerage construction or discharge has not begun within three years of the approval date.

All sewerage construction must comply with the requirements of Chapter Env-Wq 700, the Standards of Design and Construction for Sewerage and Wastewater Treatment Facilities.

DES approves design plans and specifications for sewer extension (940 LF 8" PVC SDR 35)

Issued by : Dennis Greene
Dennis Greene, PE

WATER DIVISION - WASTEWATER ENGINEERING BUREAU - DESIGN REVIEW SECTION

cc: Altus Engineering - Eric Weinrieb, PE

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315 BANFIELD ROAD

ST PATRICKS ACADEMY GYMANSIUM PROJECT
APPLICATION FEE SPREADSHEET
December 23, 2019

P4801

All developments		$500
plus $5.00 per $1,000 of site work cost	$160,000	$800
plus $10.00 per 1,000 SF of development area	55,000 SF	$550
TOTAL APPLICATION FEE		**$1,850**

Tel: (603) 433-2335 E-mail: Altus@altus-eng.com

Unitil

12/20/19

Oak Point Associates
85 Middle Street
Portsmouth, NH 03801

RE: Natural gas service to 315 Banfield Road, Portsmouth, NH
Saint Patrick's Academy proposed gymnasium

Unitil's natural gas division has reviewed the requested site for natural gas service.

Unitil hereby confirms natural gas is available from Banfield Road to supply the proposed facility.

Please contact me with any questions at 603-294-5144.

Sincerely,

David Beaulieu
Business Development Executive
Unitil
325 West Road
Portsmouth, NH 03801

St. Patrick's School
Water Usage Analysis

Current Date	Current Reading	Previous Date	Previous Reading	Units of Usage	Gallons of Usage	Days of Usage	Average Gallons Per Day	Weekdays of Usage	Average Gallons Per Weekday	School Days of Usage	Average Gallons Per School Day	Average Gallons Per School Day per Occupant *	Estimated GPD for 200 Students + 40 Faculty/Staff
04/30/18	4	04/17/18	0	4	2,992	13	230.15	10	299.20	5	598.40	3.23	776.30
05/31/18	111	04/30/18	4	107	80,036	31	2,581.81	23	3,479.83	22	3,638.00	19.66	4,719.57
06/30/18	150	05/31/18	111	39	29,172	30	972.40	21	1,389.14	8	3,646.50	19.71	4,730.59
07/31/18	251	06/30/18	150	101	75,548	31	2,437.03	22	3,434.00	N/A			
08/31/18	253	07/31/18	251	2	1,496	31	48.26	23	65.04	N/A			
09/30/18	270	08/31/18	253	17	12,716	30	423.87	20	635.80	19	669.26	3.62	868.23
10/31/18	288	09/30/18	270	18	13,464	31	434.32	23	585.39	22	612.00	3.31	793.95
11/30/18	302	10/31/18	288	14	10,472	30	349.07	22	476.00	19	551.16	2.98	715.02
12/31/18	313	11/30/18	302	11	8,228	31	265.42	21	391.81	15	548.53	2.97	711.61
01/31/19	328	12/31/18	313	15	11,220	31	361.94	23	487.83	21	534.29	2.89	693.13
02/28/19	339	01/31/19	328	11	8,228	28	293.86	20	411.40	15	548.53	2.97	711.61
03/31/19	354	02/28/19	339	15	11,220	31	361.94	22	510.00	21	534.29	2.89	693.13
04/30/19	366	03/31/19	354	12	8,976	30	299.20	22	408.00	17	528.00	2.85	684.97
05/31/19	385	04/30/19	366	19	14,212	31	458.45	23	617.91	22	646.00	3.49	838.05
06/30/19	399	05/31/19	385	14	10,472	30	349.07	20	523.60	16	654.50	3.54	849.08
07/31/19	401	06/30/19	399	2	1,496	31	48.26	23	65.04	N/A			
08/31/19	417	07/31/19	401	16	11,968 **	31	386.06	22	544.00	N/A			
09/30/19	460	08/31/19	417	43	32,164 **	30	1,072.13	21	1,531.62	19	1,692.84	8.06 **	1,934.68
10/31/19	490	09/30/19	460	30	22,440 **	31	723.87	23	975.65	22	1,020.00	4.86 **	1,165.71
								AVERAGE	629.58	AVERAGE	711.62	AVERAGE	888.26

2018 - 2019 School Year Average = 582.66

Note: Figures above the red line are from prior to installation of irrigation meter on 7/11/18
Averages include only usage after installation of the irrigation meter.

* For school year 2018 to 2019 - 165 students / 20 staff
For school year 2019 to 2020 - 190 students / 20 faculty

** 2019 - 2020 school flows are outliers. Further data is requireed to determine if flow increase based on actual use, leaking fixtures or inaccurate meter.

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PARKING DEMAND ANALYSIS
Assessor's Map 266 Lot 05
St. Patricks Academy Gymnasium
Banfield Road
Altus Project P4801

St. Patricks Academy is proposing to expand the existing K through 8 with the construction of a freestanding gymnasium building. The gym will allow the school to host practices and athletic events for the students. The gym is not intended to host non-school related events.

In April 2017, the Portsmouth Planning Board approved the initial phase of the project as a 200-student school without an on-site gymnasium. At that time, the City parking requirements were 0.3 parking spaces for every student and allowed for an additional 20-percent. 60-stalls were required with an allowance up to 72. Due to cost factors, the school elected to construct the minimum.

The gymnasium is proposed to allow students interior recreation space for gym class as well as to practice and play competitive sports between other local schools. As a K through 8 school, they frequently host back to back athletic events like soccer and basketball. Soccer and basketball games can generate up 25 to 30 spectator vehicles per game plus referees and coaches. A typical game night could create a demand for 70-vehicles leaving only a few for faculty and staff that may remain on-site after school.

With the construction of the gymnasium, additional parking will be needed to mitigate the cross over parking demand in between events.

Additionally, throughout the schoolyear there are occasional full student body and family events occur on the grounds. These events include Christmas program, meet and greet at the beginning of the school year, Halloween Parade, and a few others. These events have parking demand for nearly 140-families. The school has partnered with the Girl Scout camp, which is typically vacant during the schoolyear, across the street and the FSH to handle the large peak events. The school also hires an officer for traffic control to ensure safe conditions.

The school is proposing to provide 77 parking spaces for the 200-student population, which approximately satisfies half the parking demand during major events.

At a ratio of 0.4 parking spaces per student, which is slightly above the maximum parking spaces allowed at the time of the 2017 approval, it is Altus' opinion as professional engineers that providing 77 parking stalls for a 200-student private K through 8 elementary school is reasonable and justified.

Wde/4801-parking demand analysis 12-2019

City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Owner/Applicant: Hope for Tomorrow Foundation Date Submitted: 12/23/19

Phone Number: 603-969-3100 E-mail: jpatrickbroom@gmail.com

Site Address: 315 Banfield Road Map: 266 Lot: 5

Zoning District: Industrial Lot area: 468,400 sq. ft.

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☒	Fully executed and signed Application form. **(2.5.2.3)**	Application package	N/A
☒	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF). **(2.5.2.8)**	Application package	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Statement that lists and describes “green” building components and systems. **(2.5.3.1A)**	Application package	
☒	Gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. **(2.5.3.1B)**	Architectural floor plans	N/A
☒	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1C)**	Cover sheet and plan title block	N/A
☒	Owner’s name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1D)**	Application and cover sheet	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1E)**	As built survey plans	N/A
☒	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1F)**	Cover sheet	N/A
☒	List of reference plans. **(2.5.3.1G)**	As built survey plans	N/A
☒	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1H)**	General notes sheet	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director. Submittals shall be a minimum of 11 inches by 17 inches as specified by Planning Dept. staff. **(2.5.4.1A)**	Required on all plan sheets	N/A
☒	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Required on all plan sheets architectural's and detail sheets - exempt	N/A
☒	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**	General notes sheet note	N/A
☒	Plans shall be drawn to scale. **(2.5.4.1D)**	Required on all plan sheets	N/A
☒	Plans shall be prepared and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	Only plans prepared by Altus	N/A
☒	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	Wetlands delineation per original survey Joe Noel, 9/2016	N/A
☒	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	All site plans	N/A
☒	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	Cover sheet, title block all sheets	N/A
☒	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Required on all plan sheets	N/A
☒	Source and date of data displayed on the plan. **(2.5.4.2D)**	As built plans, General notes sheet	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." **(2.5.4.2E)**	Note 3 Overall site plan	N/A
☒	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." **(2.13.3)**	Note 15 Overall site plan Note 14 Overall site plan	N/A
☒	Plan sheets showing landscaping and screening shall also include the following additional notes: a. "The property owner and all future property owners shall be responsible for the maintenance, repair and replacement of all required screening and landscape materials." b. "All required plant materials shall be tended and maintained in a healthy growing condition, replaced when necessary, and kept free of refuse and debris. All required fences and walls shall be maintained in good repair." c. "The property owner shall be responsible to remove and replace dead or diseased plant materials immediately with the same type, size and quantity of plant materials as originally installed, unless alternative plantings are requested, justified and approved by the Planning Board or Planning Director." **(2.13.4)**	Landscape Plan LS101	N/A

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
	1. Existing Conditions: (2.5.4.3A)		
☒	a. Surveyed plan of site showing existing natural and built features;	**Previous submission package supplemented with as-built plan**	
☒	b. Zoning boundaries;		
☒	c. Dimensional Regulations;		
☒	d. Wetland delineation, wetland function and value assessment;		
☒	e. SFHA, 100-year flood elevation line and BFE data.	**NOT RESUBMITTED**	
	2. Buildings and Structures: (2.5.4.3B)		
☒	a. Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation;	AE101	
☒	b. Elevations: Height, massing, placement, materials, lighting, façade treatments;	AE201 and 202	
☒	c. Total Floor Area;	AE101	
☒	d. Number of Usable Floors;	AE101	
☒	e. Gross floor area by floor and use.	AE101	
	3. Access and Circulation: (2.5.4.3C)		
☒	a. Location/width of access ways within site;	Overall site plan and site plan	
☒	b. Location of curbing, right of ways, edge of pavement and sidewalks;	Overall site plan and site plan	
☒	c. Location, type, size and design of traffic signing (pavement markings);	Overall site plan and site plan	
☒	d. Names/layout of existing abutting streets;	Overall site plan and site plan	
☒	e. Driveway curb cuts for abutting prop. and public roads;	Overall site plan and site plan	
☒	f. If subdivision; Names of all roads, right of way lines and easements noted;	NA	
☒	g. AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	NA - turning movements per original site plan submission	
	4. Parking and Loading: (2.5.4.3D)		
☒	a. Location of off street parking/loading areas, landscaped areas/buffers;	Overall site plan, site plan and LS101	
☒	b. Parking Calculations (# required and the # provided).	Overall site plan	
	5. Water Infrastructure: (2.5.4.3E)		
☒	a. Size, type and location of water mains, shut-offs, hydrants & Engineering data;	Utilities plan, C-4	
☒	b. Location of wells and monitoring wells (include protective radii).	NA	
	6. Sewer Infrastructure: (2.5.4.3F)		
☒	a. Size, type and location of sanitary sewage facilities & Engineering data.	Utility Plan, C-4, application package for design flow criteria	
	7. Utilities: (2.5.4.3G)		
☒	a. The size, type and location of all above & below ground utilities;	Utilities plan, C-4	
☒	b. Size type and location of generator pads, transformers and other fixtures.	Utilities plan, C-4	

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	**8. Solid Waste Facilities: (2.5.4.3H)**		
☒	a. The size, type and location of solid waste facilities.	Overall site plan - existing no expansion proposed	
	9. Storm water Management: (2.5.4.3I)		
☒	a. The location, elevation and layout of all storm-water drainage.	Grading and drainage plan, C-3	
	10. Outdoor Lighting: (2.5.4.3J)		
☒	a. Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and; b. photometric plan.	Electrical Site Plan, ES101	
☒	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	Electrical Site Plan, ES101	
	12. Landscaping: (2.5.4.3K)		
☒	a. Identify all undisturbed area, existing vegetation and that which is to be retained;	Grading plan, C-4, Overall site plan	
☒	**b.** Location of any irrigation system and water source.	None proposed - existing playfield is irrigated	
	13. Contours and Elevation: (2.5.4.3L)		
☒	a. Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Grading plan, C-4	
	14. Open Space: (2.5.4.3M)		
☒	a. Type, extent and location of all existing/proposed open space.	Overall site plan	
☒	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	Overall site plan, As-built plans	
☒	**16. Location of snow storage areas and/or off-site snow removal. (2.5.4.3O)**	Site plan, note 9 overall site plan	
☒	**17. Character/Civic District (All following information shall be included): (2.5.4.3Q)**	NOT APPLICABLE	
	a. Applicable Building Height (10.5A21.20 & 10.5A43.30);		
	b. Applicable Special Requirements (10.5A21.30);		
	c. Proposed building form/type (10.5A43);		
	d. Proposed community space (10.5A46).		

Other Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Traffic Impact Study or Trip Generation Report, as required. (*Four (4) hardcopies of the full study/report and Six (6) summaries to be submitted with the Site Plan Application*) **(3.2.1-2)**	Application package	
☒	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	Green statement application package	
☒	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. **(7.3.1)**	Not applicable	
☒	Indicate where measures to minimize impervious surfaces have been implemented. **(7.4.3)**	Project infill, green statement permeable materials used where possible	
☒	Calculation of the maximum effective impervious surface as a percentage of the site. **(7.4.3.2)**	Drainage compuations	
☒	Stormwater Management and Erosion Control Plan. (*Four (4) hardcopies of the full plan/report and Six (6) summaries to be submitted with the Site Plan Application*) **(7.4.4.1)**	Application package	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	All local approvals, permits, easements and licenses required, including but not limited to: a. Waivers; b. Driveway permits; c. Special exceptions; d. Variances granted; e. Easements; f. Licenses. **(2.5.3.2A)**	a. none requested b. existing, none requested c. none requested d. 2016 and 2017, listed on cover sheet e. As-built plans f. none requested	
☒	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: a. Calculations relating to stormwater runoff; b. Information on composition and quantity of water demand and wastewater generated; c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; d. Estimates of traffic generation and counts pre- and post-construction; e. Estimates of noise generation; f. A Stormwater Management and Erosion Control Plan; g. Endangered species and archaeological / historical studies; h. Wetland and water body (coastal and inland) delineations; i. Environmental impact studies. **(2.5.3.2B)**	a. application package - drainage study b. application package - water demand analysis c. non-industrial uses d. see traffic study e. not applicable f. see drainage computations g. not applicable h. on survey plans - no wetland or wetland buffers will be impacted i. not applicable	

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133 Court Street
Portsmouth, NH
03801-4413

January 29, 2020

Juliet T. H. Walker, AICP, Planning Director
City of Portsmouth Municipal Complex
Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Application for Site Plan**
Planning Board Submission
St Patrick Academy
Assessor's Map 266, Lot 5
315 (355) Banfield Road
Altus Project #P4801

Dear Juliet:

On January 7, 2020, the Portsmouth Technical Advisory Committee voted to recommend approval for gymnasium expansion at St Patricks Academy on Banfield Road. The application package was revised to address the comments and concerns of the Committee.

The revisions include:

- A "no parking" sign has been added at the aisle for the handicap accessible parking stall to ensure that the area is not used for parking.
- The width of the sidewalk adjacent to the proposed angled parking stalls has been increased to 6-feet.
- The landscaped islands have been removed in front of the gymnasium entrance to improve pedestrian flow.
- A copy of the original recoding overall site plan is included as a reference plan for the Board to better understand the parking changes.
- The sewer service for the new building has been reduced to 6-inches as suggested by DPW.
- The proposed domestic water service has been revised from 2 ½" inch diameter to a 3-inch diameter external. Once inside the building, the service will be reduced in size.
- The architect has confirmed that the maximum occupant load is 853 people.

In March 2017, the Hope for Tomorrow Foundation (HFT), which operates the school secured site approvals for the construction of the school. It was occupied in April 2018 slightly over a year later.

At that time, the Academy entered into an agreement with the Foundation for Seacoast Health (FSH) to use their gym for classes and athletic events. The school is thriving in its new location and now wishes to construct a standalone gymnasium building on their property for physical education classes and their athletic events.

We are not proposing to expand the population beyond the 200 maximum students allowed under the previous approval. The gym is an additional amenity to the existing school and not an expansion of use.

In 2017 when the school was approved, the parking ordinance required 0.3 spaces per student and allowed for an additional 20 percent for a maximum of 72 spaces. The facility was constructed with only 60-spaces. We are proposing to expand the parking to slightly above the maximum under the previous ordinance. Enclosed with this submission is a parking demand analysis to support the request.

Attached please find the following for consideration at the February 20th Planning Board meeting:

- Site Plans (1 full sized, 1 reduced to 11 x 17);
- Site Plan Review Checklist;
- Letter of Authorization;
- Opinion of Sitework cost;
- Application fee worksheet;
- Green Statement;
- Basis of Sewer Design;
- Parking Demand Analysis;
- Recording Site Plan from 2017 Site Plan Approval (22"x 34" and 11"x 17")
- Drainage Study:
- Stormwater Inspection and Maintenance Manual;
- Traffic Study.

Please call or email me should you have any questions or need any additional information.

Sincerely,

ALTUS ENGINEERING, INC.

Eric D. Weinrieb, PE
President

wde/4801 TAC cvr ltr 12-23-19 submission

Enclosure

Ecopy: Jim Broom, HFT
James Melone, St Patrick's Academy
Scott Hughes, Oak Point Associates

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ST PATRICK ACADEMY
K THROUGH 8 SCHOOL
GYMNASIUM PROJECT

315 BANFIELD ROAD
Portsmouth, NH

Bond Estimate - Site Work

DATE: 20-Dec-19
PROJECT: 4801

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
SITEWORK DEMOLITION				
SITE FEATURES	1	LS	$1,000.00	$1,000.00
CLEARING AND GRUBBING				
TREE AND VEGETATION REMOVAL	1	AC	$3,000.00	$3,000.00
WATER SUPPLY				
2.5" DOMESTIC WATER SERVICE	135	LF	$45.00	$6,075
6" DI CL 52 WATER PIPE	135	LF	$46.00	$6,210
6" GATE VALVE	1	EA	$800.00	$800
6 X 8 LIVE TAP	1	EA	$3,000.00	$3,000
TESTING AND CHLORINATION	1	LS	$1,500.00	$1,500
SEWER SERVICE				
CROSS COUNTRY 6 AND 8" PVC SDR 35 (INCLUDING RESTORATION)	486	LF	$50.00	$24,300
DRILL NEW INVERT AND REBRICK STRUCTURE	1	EA	$1,500.00	$1,500
SEWER MANHOLES	1	EA	$2,800.00	$2,800
GAS SERVICE				
TRENCHING AND BACKFILL	90	LF	$18.00	$1,620
ELECTRIC/PHONE/CABLE SERVICES				
SCH 40 CONDUIT (x4 PER TRENCH)	380	LF	$20.00	$7,600
CURBING				
VERTICAL GRANITE CURBING	375	LF	$28.00	$10,500
STORM DRAINAGE SYSTEM				
CATCH BASINS, OUTLET STRUCTURES, DRAIN MANHOLES	5	EA	$1,800.00	$9,000
YARD DRAINS	3	EA	$1,500.00	$4,500
6" UNDERDRAIN	150	LF	$15.00	$2,250
ROOF GUTTER COLLECTION DRAIN PIPE	1	LS	$250.00	$250
12" DRAIN PIPE	340	LF	$28.00	$9,520
RAIN GARDEN	190	SY	$28.00	$5,320
RIP RAP/STONE DRIP EDGE	1	LS	$1,500.00	$1,500
FLARED END SECTION	1	EA	$300.00	$300
SEDIMENT AND EROSION CONTROL				
TEMPORARY EROSION CONTROL/SWPPP	1	LS	$5,000.00	$5,000
CONCRETE FLATWORK				
CONCRETE SIDEWALKS AND PADS	230	SY	$28.00	$6,440
SIDEWALKS				
2" BITUMINOUS SIDEWALKS INCLUDING SUBGRADE MATERIALS	95	SY	$22.50	$2,138
RETAINING WALLS				
MODULAR BLOCK RETAINING WALL	100	SF	$16.00	$1,600
HOT BITUMINOUS PAVEMENT				

4"' PATCH - BUDGET	50	TON	$72.00	$3,600
HOT BITUMINOUS PAVEMENT - POROUS				
4" POROUS PAVEMENT - PATCH - REPAIR BUDGET	15	TON	$140.00	$2,100
4" POROUS PAVEMENT	90	TON	$110.00	$9,900
6" 3/4 INCH STONE	65	CY	$30.00	$1,950
12" NHDOT 304.1 GRAVEL	130	CY	$24.00	$3,120
8" #3 STONE	90	CY	$30.00	$2,700
3" PEA STONE	33	CY	$30.00	$990
STRIPING AND SIGNAGE				
STRIPING & SIGNAGE	1	LS	$1,000.00	$1,000
LANDSCAPING				
LANDSCAPING INCLUDING RAIN GARDEN PLANTINGS (ALLOWANCE)	1	LS	$5,000.00	$5,000
LOAM AND SEED - TURF ESTABLISHMENT	0.5	AC	$8,000.00	$4,000
LIGHTING				
RESET EXISTING POLES, POLE BASES AND FIXTURES INCLUDING CONDUIT	2	EA	$2,000.00	$4,000
AS BUILT PLANS	1	LS	$3,000.00	$3,000
SUBTOTAL				**$159,083**
			TOTAL:	***$159,083***

EXCLUSIONS:

ITEMS EXCLUDED FROM THIS ESTIMATE INCLUDE, BUT ARE NOT LIMITED TO, THOSE ITEMS SPECIFIED ABOVE AS BEING NOT INCLUDED IN THIS ESTIMATE AND THE FOLLOWING:

INSPECTION FEES, MONUMENTATION, HVAC PADS, TEMPORARY FENCING AND BARRICADES, TRAFFIC CONTROL, MATERIALS AND COMPACTION TESTING, BUILDING FOUNDATION, BUILDING FOUNDATION EXCAVATION, BUILDING MOUNTED EXTERIOR LIGHTING, BUILDINGS, LEDGE REMOVAL

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"Green" Statement"
Assessor's Map 266 Lot 05
St Patricks Academy Gymnasium
315 Banfield Road
Altus Project P4801

Pursuant to Section 2.4.3.1(a) of the Site Plan Review Regulations, Altus Engineering, Inc. (Altus) respectfully submits the following list of the project's "green" components for the redevelopment of the property located at 315 Banfield Road:

- The existing school development site area will be expanded with the construction of a ±17,000 SF building. The building coverage will remain at less than 9% where up to 50 percent is allowed in the zoning district and lot coverage is allowed to be up to 80 percent. The lot coverage after the development will be approximately 23 percent of the site. This will reserve generous open space for the site and preserving the natural environment.
- Shade trees were planted around the perimeter of the parking lot to reduce the heat island effect in the initial phase. Additional shade trees are proposed.
- The proposed development has bicycle racks.
- The stormwater management system is designed to meet the NHDES Alteration of Terrain Program's design standards and uses elements of low impact design (LID) to treat and detain stormwater. The drainage system is designed to mimic the predevelopment runoff conditions at the wetlands and property lines. The expansion will also meet the AOT design criteria. The computations include the 15% increase in the rainfall events which is a new requirement subsequent to the original approval.
- The development was designed to have pedestrian links to the Foundation for Seacoast Health Community Campus facility as well as the future City of Portsmouth Recreation area.
- The building code compliant building with components that will meet or exceed all applicable energy codes.
- Building components shall maximize recycled content and be locally sourced if possible. Although not LEED compliant, the intent of the proposed building will be to utilize this guideline to implement sustainable strategies.
- Efforts have been made to preserve as much of the existing mature vegetation as possible along the frontage, the southern boundary and along the eastern boundary where the land abuts a large wetland system. .
- The proposed site lighting will have LED fixtures. They will be mounted at a maximum height of 16-feet. The lights will be dark sky friendly and will meet or exceed the minimum City requirements.

Tel: (603) 433-2335 E-mail: Altus@altus-eng.com

- Runoff from the paved surfaces currently discharges directly into the wetland system. The surface runoff from the paved surfaces will no longer discharge directly into the wetland. The runoff will be treated in a series of rain gardens. Thus, the stormwater runoff quality will be significantly enhanced.
- No wetland or wetland buffers will be impacted by the project development.
- New paved surfaces will be constructed from pervious materials to promote infiltration and recharge groundwater.

Wde/4801-App-City-Site-GreenStatment - gym

Letter of Authorization

I, James Patrick Broom of the Hope for Tomorrow Foundation, hereby authorize Altus Engineering, Inc. of Portsmouth, New Hampshire and Oak Point Associates, Inc. of Portsmouth, NH to represent you in all matters concerning engineering, architecture and related permitting for the development of a gymnasium at 315 Banfield Road in Portsmouth, NH. The property is identified on the Assessor's Maps as Tax Map 266, Lot 5. This authorization shall include any signatures required for Federal, State and Municipal permit applications.

Signature	James Broom Print Name	Date
Witness	RICHARD HACKEMAN Print Name	10/3/19 Date

State of New Hampshire
Department of Environmental Services
29 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-4128

SEWER CONNECTION PERMIT

Project Name: St Patrick Academy
Location : 355 Banfield Road
Engineer : Altus Engineering - Eric Weinrieb, PE

Municipality/POTW : Portsmouth
Official Signature : Terry Desmarais, PE
Date of Request : 5/16/2017

PERMIT/REQUEST NUMBER **D2017-0512**

FLOW : **1,628** **gallons/day** APPROVAL DATE **6/6/2017**

The New Hampshire Department of Environmental Services (NHDES) has reviewed and hereby approves the request as follows:
Approval of the connection to the municipality's wastewater facilities is based on a review of the supporting information submitted and is subject to the conditions indicated below.

CONDITIONS :

Approval applies only to the sewerage plans and sewer connection application received by NHDES.

This approval will become void if the sewerage construction or discharge has not begun within three years of the approval date.

All sewerage construction must comply with the requirements of Chapter Env-Wq 700, the Standards of Design and Construction for Sewerage and Wastewater Treatment Facilities.

DES approves design plans and specifications for sewer extension (940 LF 8" PVC SDR 35)

Issued by : Dennis Greene
Dennis Greene, PE

WATER DIVISION - WASTEWATER ENGINEERING BUREAU - DESIGN REVIEW SECTION

cc: Altus Engineering - Eric Weinrieb, PE

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315 BANFIELD ROAD

ST PATRICKS ACADEMY GYMANSIUM PROJECT
APPLICATION FEE SPREADSHEET
December 23, 2019

P4801

All developments		$500
plus $5.00 per $1,000 of site work cost	$160,000	$800
plus $10.00 per 1,000 SF of development area	55,000 SF	$550
TOTAL APPLICATION FEE		**$1,850**

Tel: (603) 433-2335 E-mail: Altus@altus-eng.com

Unitil

12/20/19

Oak Point Associates
85 Middle Street
Portsmouth, NH 03801

RE: Natural gas service to 315 Banfield Road, Portsmouth, NH
Saint Patrick's Academy proposed gymnasium

Unitil's natural gas division has reviewed the requested site for natural gas service.

Unitil hereby confirms natural gas is available from Banfield Road to supply the proposed facility.

Please contact me with any questions at 603-294-5144.

Sincerely,

David Beaulieu
Business Development Executive
Unitil
325 West Road
Portsmouth, NH 03801

St. Patrick's School
Water Usage Analysis

Current Date	Current Reading	Previous Date	Previous Reading	Units of Usage	Gallons of Usage	Days of Usage	Average Gallons Per Day	Weekdays of Usage	Average Gallons Per Weekday	School Days of Usage	Average Gallons Per School Day	Average Gallons Per School Day per Occupant *	Estimated GPD for 200 Students + 40 Faculty/Staff
04/30/18	4	04/17/18	0	4	2,992	13	230.15	10	299.20	5	598.40	3.23	776.30
05/31/18	111	04/30/18	4	107	80,036	31	2,581.81	23	3,479.83	22	3,638.00	19.66	4,719.57
06/30/18	150	05/31/18	111	39	29,172	30	972.40	21	1,389.14	8	3,646.50	19.71	4,730.59
07/31/18	251	06/30/18	150	101	75,548	31	2,437.03	22	3,434.00	N/A			
08/31/18	253	07/31/18	251	2	1,496	31	48.26	23	65.04	N/A			
09/30/18	270	08/31/18	253	17	12,716	30	423.87	20	635.80	19	669.26	3.62	868.23
10/31/18	288	09/30/18	270	18	13,464	31	434.32	23	585.39	22	612.00	3.31	793.95
11/30/18	302	10/31/18	288	14	10,472	30	349.07	22	476.00	19	551.16	2.98	715.02
12/31/18	313	11/30/18	302	11	8,228	31	265.42	21	391.81	15	548.53	2.97	711.61
01/31/19	328	12/31/18	313	15	11,220	31	361.94	23	487.83	21	534.29	2.89	693.13
02/28/19	339	01/31/19	328	11	8,228	28	293.86	20	411.40	15	548.53	2.97	711.61
03/31/19	354	02/28/19	339	15	11,220	31	361.94	22	510.00	21	534.29	2.89	693.13
04/30/19	366	03/31/19	354	12	8,976	30	299.20	22	408.00	17	528.00	2.85	684.97
05/31/19	385	04/30/19	366	19	14,212	31	458.45	23	617.91	22	646.00	3.49	838.05
06/30/19	399	05/31/19	385	14	10,472	30	349.07	20	523.60	16	654.50	3.54	849.08
07/31/19	401	06/30/19	399	2	1,496	31	48.26	23	65.04	N/A			
08/31/19	417	07/31/19	401	16	11,968 **	31	386.06	22	544.00	N/A			
09/30/19	460	08/31/19	417	43	32,164 **	30	1,072.13	21	1,531.62	19	1,692.84	8.06 **	1,934.68
10/31/19	490	09/30/19	460	30	22,440 **	31	723.87	23	975.65	22	1,020.00	4.86 **	1,165.71
								AVERAGE	629.58	AVERAGE	711.62	AVERAGE	888.26

2018 - 2019 School Year Average = 582.66

Note: Figures above the red line are from prior to installation of irrigation meter on 7/11/18
Averages include only usage after installation of the irrigation meter.

* For school year 2018 to 2019 - 165 students / 20 staff
For school year 2019 to 2020 - 190 students / 20 faculty

** 2019 - 2020 school flows are outliers. Further data is requireed to determine if flow increase based on actual use, leaking fixtures or inaccurate meter.

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PARKING DEMAND ANALYSIS
Assessor's Map 266 Lot 05
St. Patricks Academy Gymnasium
Banfield Road
Altus Project P4801

St. Patricks Academy is proposing to expand the existing K through 8 with the construction of a freestanding gymnasium building. The gym will allow the school to host practices and athletic events for the students. The gym is not intended to host non-school related events.

In April 2017, the Portsmouth Planning Board approved the initial phase of the project as a 200-student school without an on-site gymnasium. At that time, the City parking requirements were 0.3 parking spaces for every student and allowed for an additional 20-percent. 60-stalls were required with an allowance up to 72. Due to cost factors, the school elected to construct the minimum.

The gymnasium is proposed to allow students interior recreation space for gym class as well as to practice and play competitive sports between other local schools. As a K through 8 school, they frequently host back to back athletic events like soccer and basketball. Soccer and basketball games can generate up 25 to 30 spectator vehicles per game plus referees and coaches. A typical game night could create a demand for 70-vehicles leaving only a few for faculty and staff that may remain on-site after school.

With the construction of the gymnasium, additional parking will be needed to mitigate the cross over parking demand in between events.

Additionally, throughout the schoolyear there are occasional full student body and family events occur on the grounds. These events include Christmas program, meet and greet at the beginning of the school year, Halloween Parade, and a few others. These events have parking demand for nearly 140-families. The school has partnered with the Girl Scout camp, which is typically vacant during the schoolyear, across the street and the FSH to handle the large peak events. The school also hires an officer for traffic control to ensure safe conditions.

The school is proposing to provide 77 parking spaces for the 200-student population, which approximately satisfies half the parking demand during major events.

At a ratio of 0.4 parking spaces per student, which is slightly above the maximum parking spaces allowed at the time of the 2017 approval, it is Altus' opinion as professional engineers that providing 77 parking stalls for a 200-student private K through 8 elementary school is reasonable and justified.

Wde/4801-parking demand analysis 12-2019

Tel: (603) 433-2335 E-mail: Altus@altus-eng.com

City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Owner/Applicant: Hope for Tomorrow Foundation Date Submitted: 12/23/19

Phone Number: 603-969-3100 E-mail: jpatrickbroom@gmail.com

Site Address: 315 Banfield Road Map: 266 Lot: 5

Zoning District: Industrial Lot area: 468,400 sq. ft.

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☒	Fully executed and signed Application form. **(2.5.2.3)**	Application package	N/A
☒	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF). **(2.5.2.8)**	Application package	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Statement that lists and describes "green" building components and systems. **(2.5.3.1A)**	Application package	
☒	Gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. **(2.5.3.1B)**	Architectural floor plans	N/A
☒	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1C)**	Cover sheet and plan title block	N/A
☒	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1D)**	Application and cover sheet	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1E)**	As built survey plans	N/A
☒	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1F)**	Cover sheet	N/A
☒	List of reference plans. **(2.5.3.1G)**	As built survey plans	N/A
☒	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1H)**	General notes sheet	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director. Submittals shall be a minimum of 11 inches by 17 inches as specified by Planning Dept. staff. **(2.5.4.1A)**	Required on all plan sheets	N/A
☒	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Required on all plan sheets architectural's and detail sheets - exempt	N/A
☒	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**	General notes sheet note	N/A
☒	Plans shall be drawn to scale. **(2.5.4.1D)**	Required on all plan sheets	N/A
☒	Plans shall be prepared and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	Only plans prepared by Altus	N/A
☒	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	Wetlands delineation per original survey Joe Noel, 9/2016	N/A
☒	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	All site plans	N/A
☒	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	Cover sheet, title block all sheets	N/A
☒	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Required on all plan sheets	N/A
☒	Source and date of data displayed on the plan. **(2.5.4.2D)**	As built plans, General notes sheet	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." **(2.5.4.2E)**	Note 3 Overall site plan	N/A
☒	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." **(2.13.3)**	Note 15 Overall site plan Note 14 Overall site plan	N/A
☒	Plan sheets showing landscaping and screening shall also include the following additional notes: a. "The property owner and all future property owners shall be responsible for the maintenance, repair and replacement of all required screening and landscape materials." b. "All required plant materials shall be tended and maintained in a healthy growing condition, replaced when necessary, and kept free of refuse and debris. All required fences and walls shall be maintained in good repair." c. "The property owner shall be responsible to remove and replace dead or diseased plant materials immediately with the same type, size and quantity of plant materials as originally installed, unless alternative plantings are requested, justified and approved by the Planning Board or Planning Director." **(2.13.4)**	Landscape Plan LS101	N/A

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
	1. Existing Conditions: (2.5.4.3A)		
☒	a. Surveyed plan of site showing existing natural and built features;	**Previous submission package supplemented with as-built plan**	
☒	b. Zoning boundaries;		
☒	c. Dimensional Regulations;		
☒	d. Wetland delineation, wetland function and value assessment;		
☒	e. SFHA, 100-year flood elevation line and BFE data.	**NOT RESUBMITTED**	
	2. Buildings and Structures: (2.5.4.3B)		
☒	a. Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation;	AE101	
☒	b. Elevations: Height, massing, placement, materials, lighting, façade treatments;	AE201 and 202	
☒	c. Total Floor Area;	AE101	
☒	d. Number of Usable Floors;	AE101	
☒	e. Gross floor area by floor and use.	AE101	
	3. Access and Circulation: (2.5.4.3C)		
☒	a. Location/width of access ways within site;	Overall site plan and site plan	
☒	b. Location of curbing, right of ways, edge of pavement and sidewalks;	Overall site plan and site plan	
☒	c. Location, type, size and design of traffic signing (pavement markings);	Overall site plan and site plan	
☒	d. Names/layout of existing abutting streets;	Overall site plan and site plan	
☒	e. Driveway curb cuts for abutting prop. and public roads;	Overall site plan and site plan	
☒	f. If subdivision; Names of all roads, right of way lines and easements noted;	NA	
☒	g. AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	NA - turning movements per original site plan submission	
	4. Parking and Loading: (2.5.4.3D)		
☒	a. Location of off street parking/loading areas, landscaped areas/buffers;	Overall site plan, site plan and LS101	
☒	b. Parking Calculations (# required and the # provided).	Overall site plan	
	5. Water Infrastructure: (2.5.4.3E)		
☒	a. Size, type and location of water mains, shut-offs, hydrants & Engineering data;	Utilities plan, C-4	
☒	b. Location of wells and monitoring wells (include protective radii).	NA	
	6. Sewer Infrastructure: (2.5.4.3F)		
☒	a. Size, type and location of sanitary sewage facilities & Engineering data.	Utility Plan, C-4, application package for design flow criteria	
	7. Utilities: (2.5.4.3G)		
☒	a. The size, type and location of all above & below ground utilities;	Utilities plan, C-4	
☒	b. Size type and location of generator pads, transformers and other fixtures.	Utilities plan, C-4	

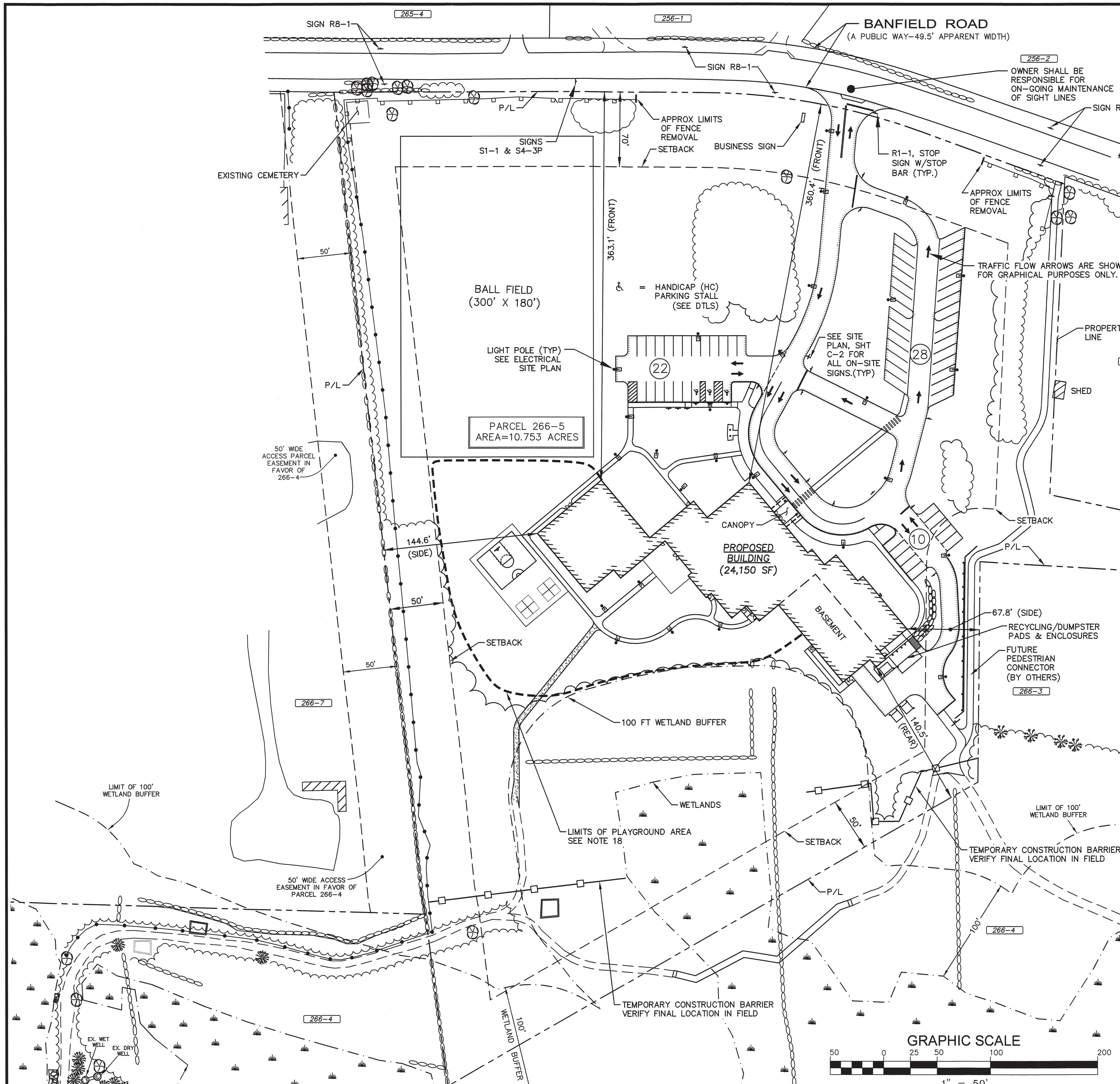
Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	**8. Solid Waste Facilities: (2.5.4.3H)**		
☒	a. The size, type and location of solid waste facilities.	Overall site plan - existing no expansion proposed	
	9. Storm water Management: (2.5.4.3I)		
☒	a. The location, elevation and layout of all storm-water drainage.	Grading and drainage plan, C-3	
	10. Outdoor Lighting: (2.5.4.3J)		
☒	a. Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and; b. photometric plan.	Electrical Site Plan, ES101	
☒	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	Electrical Site Plan, ES101	
	12. Landscaping: (2.5.4.3K)		
☒	a. Identify all undisturbed area, existing vegetation and that which is to be retained;	Grading plan, C-4, Overall site plan	
☒	**b.** Location of any irrigation system and water source.	None proposed - existing playfield is irrigated	
	13. Contours and Elevation: (2.5.4.3L)		
☒	a. Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Grading plan, C-4	
	14. Open Space: (2.5.4.3M)		
☒	a. Type, extent and location of all existing/proposed open space.	Overall site plan	
☒	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	Overall site plan, As-built plans	
☒	**16. Location of snow storage areas and/or off-site snow removal. (2.5.4.3O)**	Site plan, note 9 overall site plan	
☒	**17. Character/Civic District (All following information shall be included): (2.5.4.3Q)**	NOT APPLICABLE	
	a. Applicable Building Height (10.5A21.20 & 10.5A43.30);		
	b. Applicable Special Requirements (10.5A21.30);		
	c. Proposed building form/type (10.5A43);		
	d. Proposed community space (10.5A46).		

Other Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Traffic Impact Study or Trip Generation Report, as required. (*Four (4) hardcopies of the full study/report and Six (6) summaries to be submitted with the Site Plan Application*) **(3.2.1-2)**	Application package	
☒	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	Green statement application package	
☒	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. **(7.3.1)**	Not applicable	
☒	Indicate where measures to minimize impervious surfaces have been implemented. **(7.4.3)**	Project infill, green statement permeable materials used where possible	
☒	Calculation of the maximum effective impervious surface as a percentage of the site. **(7.4.3.2)**	Drainage compuations	
☒	Stormwater Management and Erosion Control Plan. (*Four (4) hardcopies of the full plan/report and Six (6) summaries to be submitted with the Site Plan Application*) **(7.4.4.1)**	Application package	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	All local approvals, permits, easements and licenses required, including but not limited to: a. Waivers; b. Driveway permits; c. Special exceptions; d. Variances granted; e. Easements; f. Licenses. **(2.5.3.2A)**	a. none requested b. existing, none requested c. none requested d. 2016 and 2017, listed on cover sheet e. As-built plans f. none requested	
☒	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: a. Calculations relating to stormwater runoff; b. Information on composition and quantity of water demand and wastewater generated; c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; d. Estimates of traffic generation and counts pre- and post-construction; e. Estimates of noise generation; f. A Stormwater Management and Erosion Control Plan; g. Endangered species and archaeological / historical studies; h. Wetland and water body (coastal and inland) delineations; i. Environmental impact studies. **(2.5.3.2B)**	a. application package - drainage study b. application package - water demand analysis c. non-industrial uses d. see traffic study e. not applicable f. see drainage computations g. not applicable h. on survey plans - no wetland or wetland buffers will be impacted i. not applicable	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. **(2.5.3.2D)**	in application package	
☒	A list of any required state and federal permit applications required for the project and the status of same. **(2.5.3.2E)**	Cover sheet	

Applicant's Signature: Eric D. Weinrieb, PE **Date:** 12/23/19



NH STATE PLANE COORDINATE SYSTEM NAD 1983

THE SOLE PURPOSE OF THIS PLAN IS TO DEPICT THE LOCATION OF EXISTING AND PROPOSED IMPROVEMENTS ON THE SITE. RECORDING OF THIS PLAN WAS A REQUIREMENT OF THE PORTSMOUTH PLANNING BOARD AS PART OF THEIR APPROVAL.

FOR JAMES VERRA & ASSOCIATES, INC.

6-9-2017
DATE

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 625 JAMES VERRA SIGNATURE

SITE NOTES

1. ON SEPTEMBER 30, 2016 THE PORTSMOUTH BOARD OF ADJUSTMENT GRANTED THE FOLLOWING:
   * A VARIANCE FROM SECTIONS 10.440 and 10.335 OF THE PORTSMOUTH ZONING ORDINANCE TO ALLOW A LAWFUL NONCONFORMING USE TO BE CHANGED TO ANOTHER NONCONFORMING USE;
   * A VARIANCE FROM SECTION 10.440.3.21 TO ALLOW A PRIMARY OR SECONDARY SCHOOL IN A DISTRICT WHERE THE USE IS NOT PERMITTED.

   ON MARCH 21, 2017 THE PORTSMOUTH BOARD OF ADJUSTMENT GRANTED THE FOLLOWING:
   * A VARIANCE FROM SECTION 10.1113.20 TO ALLOW OFF–STREET PARKING SPACES TO BE LOCATED BETWEEN A PRINCIPAL BUILDING AND A STREET.
2. ALL BONDS AND FEES SHALL BE PAID/POSTED PRIOR TO INITIATING CONSTRUCTION.
3. ALL CONDITIONS OF THIS APPROVAL SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
4. ALL CONSTRUCTION SHALL MEET THE MINIMUM CONSTRUCTION STANDARDS OF THE CITY OF PORTSMOUTH & NHDOT'S STANDARD SPECIFICATIONS FOR ROAD & BRIDGE, LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL GOVERN.
5. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAWCUT LINE WITH RS–1 IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
6. THE CONTRACTOR SHALL VERIFY ALL BENCHMARKS AND TOPOGRAPHY IN THE FIELD PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PRIOR TO CONSTRUCTION. ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER FOR RESOLUTION.
8. AREA OF DISTURBANCE IS OVER 100,000 SF, COVERAGE UNDER EPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT REQUIRED (NOI TO BE PREPARED AND SUBMITTED BY CONTRACTOR, SWPPP AND INSPECTIONS TO BE PREPARED AND PERFORMED BY CONTRACTOR). NHDES ALTERATION OF TERRAIN PERMIT IS REQUIRED.
9. SNOW SHALL BE STORED AT THE EDGE OF PAVEMENT, IN UPLAND AREAS SHOWN THEREON, AND IN AREAS A MINIMUM OF 100–FEET FROM THE WETLANDS. NO SNOW STORAGE SHALL BE PROVIDED WITHIN 25' OF THE LANDSCAPED ISLAND BETWEEN THE DRIVEWAY ENTRANCE THAT WOULD RESTRICT SITE VEHICULAR AND PEDESTRIAN SIGHT DISTANCE. IF ADEQUATE ON–SITE SNOW STORAGE IS NOT AVAILABLE, THE SNOW SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED.
10. PAVEMENT MARKINGS SHALL BE CONSTRUCTED USING WHITE, YELLOW, OR BLUE TRAFFIC PAINT (WHERE SPECIFIED) MEETING THE REQUIREMENTS OF AASHTO M248, TYPE F OR EQUAL. PAINTED ISLANDS AND LOADING ZONES SHALL BE 4"–WIDE DIAGONAL WHITE LINES 3'–0" O.C. BORDERED BY 4"–WIDE WHITE LINES. PARKING STALLS SHALL BE SEPARATED BY 4"–WIDE WHITE LINES. SEE DETAILS FOR HANDICAP SYMBOLS, SIGNS AND SIGN DETAILS. PAVEMENT MARKINGS SHALL BE INSTALLED AT LEAST 14–DAYS AFTER INSTALLATION OF WEARING COURSE PAVEMENT. CONTRACTOR SHALL APPLY TWO (2) COATS OF ALL PAVEMENT MARKINGS.
11. PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC DEVICES," "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AND THE AMERICANS WITH DISABILITIES ACT (ADA), LATEST EDITIONS.
12. UNLESS OTHERWISE NOTED, ALL NEW CURBING SHALL BE VERTICAL GRANITE WITH A MINIMUM RADIUS OF 4'.
13. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY AND ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF BOTH THE ARCHITECT AND CIVIL ENGINEER FOR RESOLUTION.
14. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
15. THE SITE PLAN & LANDSCAPE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
16. SITEWORK CONTRACTOR SHALL PREPARE A LICENSED LAND SURVEYOR (LLS) STAMPED AS–BUILT SITE PLAN & PROVIDE A DIGITAL (CAD FORMAT) COPY FOR THE CITY'S G.I.S. DATA BASE.
17. HOPE FOR TOMORROW FOUNDATION SHALL PROVIDE A PEDESTRIAN / BICYCLE EASEMENT ACROSS THE PROPERTY TO ALLOW ACCESS FROM TAX MAP 266, LOT 4 TO BANFIELD ROAD. EASEMENT SHALL FOLLOW PAVED SURFACE BUT MAY BE SUBJECT TO BE RELOCATED WITH CONCURRENCE FROM BOTH PARTIES. CITY OF PORTSMOUTH SHALL BE RESPONSIBLE FOR CONSTRUCTION & MAINTENANCE OF ALL WAY FINDING SIGNS & BIKE PATH AMENITIES.
18. PLAYGROUND AREA SHALL BE SUBJECT TO FLEXIBLE PLANNING & BUILT IMPROVEMENTS. AREA DEPICTED SHOWS LIMITS OF PROPOSED PLAYGROUND. FINAL LOCATIONS OF EQUIPMENT, HARDSCAPE & PATHS TO BE DETERMINED BY OWNER. MODIFICATIONS TO PLAYGROUND INSIDE DEPICTED AREA SHALL BE EXEMPT FROM PLANNING BOARD APPROVAL.
19. PARENT DROP–OFF/PICKUP VEHICLE QUEUEING & RELEASE OF STUDENTS SHALL BE MANAGED BASED ON DAILY EXPECTATIONS. SCHOOL SHALL ENSURE THAT BYPASS LANES ARE USABLE AT ALL TIMES. THERE SHALL BE NO STACKING OR VEHICLE PARKING ON BANFIELD ROAD. SHOULD THERE BE TRAFFIC ISSUES A STACKING LANE SHALL BE CONSTRUCTED.
20. SCHOOL BUSES FOR DAILY TRANSPORT OF STUDENTS IS NOT PERMITTED. APPROVAL FROM THE PLANNING BOARD SHALL BE REQUIRED FOR A MODIFICATION TO THIS REQUIREMENT.

P4801

CITY OF PORTSMOUTH, PLANNING BOARD

CHAIRMAN DATE

ENGINEER:

ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433–2335 www.ALTUS–ENG.com

STATE OF NEW HAMPSHIRE ERIC D. WEINRIEB No. 7634 LICENSED PROFESSIONAL ENGINEER

6/7/17

ISSUED FOR:
PLANNING BOARD

ISSUE DATE:
MAY 31, 2017

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	CDB	02/13/17
1	PER TAC WS COMMENTS	CDB	02/23/17
2	PER TAC COMMENTS	EDW	03/07/17
3	PB COMMENTS	EDW	05/01/17
4	COND OF APPROVAL	EDW	05/31/17

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801–SITE.DWG

SCALE:
22" x 34" – 1" = 50'
11" x 17" – 1" = 100'

OWNER:
HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266–5

APPLICANT:
SAINT PATRICK SCHOOL
125 AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
315 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266–5

TITLE:
OVERALL SITE PLAN

SHEET NUMBER:
C-1

TRAFFIC IMPACT ASSESSMENT UPDATE

ST. PATRICK ACADEMY – PROPOSED GYMNASIUM

Portsmouth, New Hampshire

December 2019

Prepared for

Hope for Tomorrow Foundation

Stephen G. Pernaw & Company, Inc.

Stephen G. Pernaw
& Company, Inc.

P.O. Box 1721 • Concord, NH 03302
tel: (603) 731-8500 • fax: (866) 929-6094 • sgp@ pernaw.com

Transportation: Engineering • Planning • Design

TRAFFIC IMPACT ASSESSMENT UPDATE
ST. PATRICK ACADEMY PROPOSED GYMNASIUM
PORTSMOUTH, NEW HAMPSHIRE
December 19, 2019

BACKGROUND

On January 31, 2017 this office published the report entitled *"Traffic Impact Assessment - Proposed St. Patrick Academy"* on behalf of the Hope for Tomorrow Foundation. Now that the Academy is in full operation, the Foundation desires to construct a standalone gymnasium building on their property for physical education classes and athletic events. The purpose of this update is to quantify the current trip generating characteristics of the existing school, the anticipated changes in traffic demand due to the proposed gymnasium, and to evaluate the Banfield Road / Existing Site Driveway intersection in terms of traffic operations, capacity, and safety.

CURRENT PROPOSAL

The current development proposal calls for the construction of a 17,000 square-foot gymnasium building on the south side of the subject site. This building will be used primarily for after-school practices (typically from 3-6 PM) and athletic events (typically from 6-8 PM). The building will also be used for occasional concerts, science fairs, dances, and pep rallies.

On typical "practice" days, fewer parents will retrieve their children during the normal pick-up time (2-3 PM) since practices generally end at 6 PM, well after the peak traffic hour of the adjacent street system. It is reasonable to expect that parent arrivals will occur between 3-6 PM, as some will arrive early to watch the practice.

On typical "event" days traffic will be affected in several different ways: 1) traveling visitors and referees will arrive before 6 PM and depart after 8 PM, 2) Academy staff will remain on site and depart after 8 PM rather than during the late afternoon, and 3) parents will arrive later in the day in either one or two vehicles to watch the event and then depart after 8 PM.

Additional on-site parking is proposed adjacent to the new gymnasium building. Vehicular access to the gymnasium site will be provided via the existing two-way driveway that currently intersects the south side of Banfield Road. Attachment 1 shows the location of the proposed building with respect to the site and the adjacent street system.

EXISTING TRAFFIC VOLUMES

To quantify the traffic demand and the travel patterns at the Banfield Road / Existing Site Driveway intersection, Pernaw & Company, Inc. conducted turning movement and vehicle classification counts at the intersection on two typical weekdays: Wednesday, November 13, 2019 and Thursday, November 14, 2019. These counts were conducted from 7:00 to 9:00 AM and from 2:00 to 6:00 PM, similar to the original traffic study. Figure 1 summarizes this data for the three analysis periods: the weekday AM Street Peak Hour, the School Peak Hour, and the PM Street Peak Hour.

Pernaw & Company, Inc

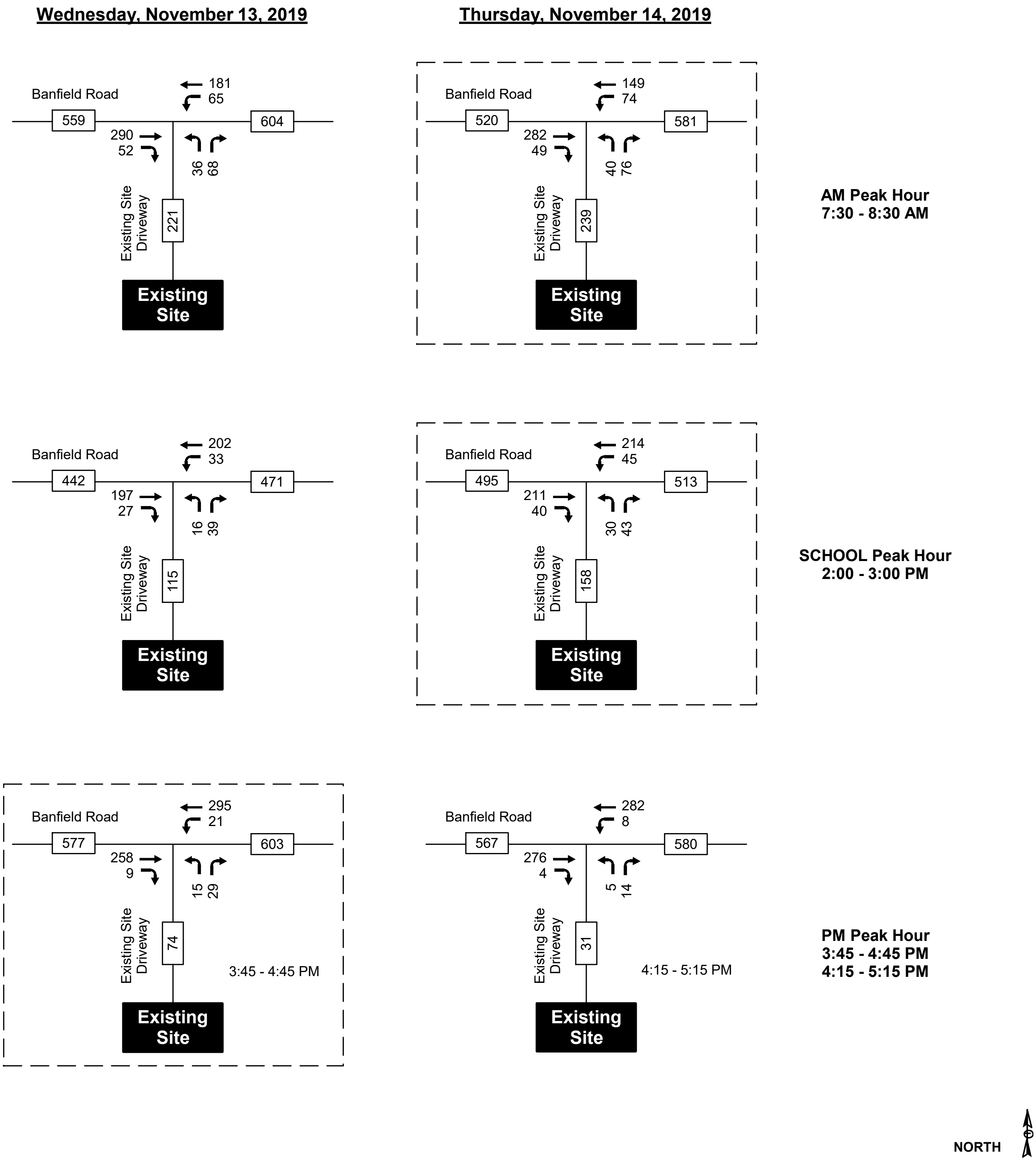


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Figure 1

2019 Existing Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

Several facts and conclusions are evident from this data:

- The Thursday traffic volumes were generally higher than the Wednesday volumes, except for the weekday PM peak hour period. Data from the higher of the two count days were selected for traffic projection and analysis purposes.

- The two-way traffic volume on Banfield Road (east of the subject site) totaled 581 (AM), 513 (School), and 603 (PM) vehicles during the three peak hour periods. The predominant travel direction was eastbound during the AM peak hour; the directional flows were relatively balanced during the school and PM peak hour periods.

- On the higher count days the existing school generated 239 (AM), 158 (School) and 74 (PM) vehicle-trips during the three peak hour periods. The majority of school traffic (56-68%) traveled to/from points east on Banfield Road, depending upon the specific hour.
- During the School peak hour period from 2:00 to 3:00 PM the traffic volumes on Banfield Road are typically lower than during the typical AM and PM commuter peak hour periods.

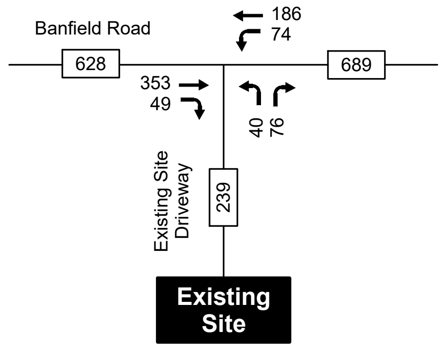
The detail sheets summarizing the raw turning movement count data are found on Attachments 2-11.

CRASH HISTORY

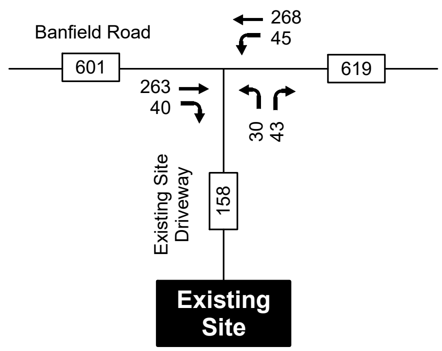
According to the Portsmouth Police Department there have been no reported crashes at the Banfield Road/Existing Site Driveway intersection since the Academy began operations (see, Attachment 12). The closest crashes on Banfield Road occurred at #470 (approximately 1,400 feet west of the Academy site) and #225 (approximately 1,325 feet east of the Academy site).

NO-BUILD TRAFFIC PROJECTIONS

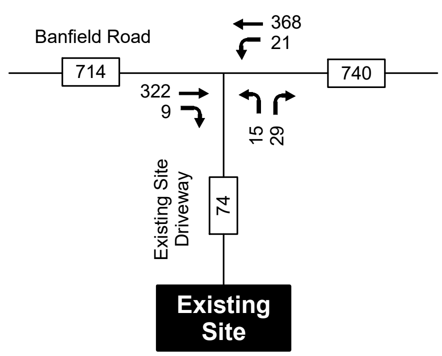
The No-Build traffic volumes for the 2030 horizon year are summarized schematically on Figure 2. These projections are based on the November 2019 traffic volumes, a one-percent annual background traffic growth rate (compounded annually) to account for normal growth in through traffic in the area, and a peak-month seasonal adjustment factor of 1.12 (see Attachment 13).



AM Peak Hour



SCHOOL Peak Hour



PM Peak Hour

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NORTH

Figure 2

2030 No-Build Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

SITE GENERATED TRAFFIC

To estimate the quantity of vehicle-trips that will be produced by the proposed gymnasium, Pernaw & Company, Inc. typically utilizes the trip generation rates published by the Institute of Transportation Engineers (ITE) [1]. Unfortunately, there is no applicable ITE land use category. Consequently, the trip estimates contained herein are based upon the manual derivation that reflects the unique circumstances that will occur on a typical "practice" day and "event" day.

Table 1 summarizes the results of this analysis and it shows that on "practice" days there will be a decrease in site traffic during the weekday School peak hour, and a slight increase during the PM peak hour period. On "event" days there will be decreases during both peak hour periods, as most traffic will be exiting from the site after 8 PM, when the traffic volumes on Banfield Road are well below peak levels.

The proposed gymnasium will not alter the traffic flow during the AM Street Peak Hour period.

The additional traffic associated with the gymnasium is expected to mirror the traffic patterns observed at the existing intersection. Attachment 14 shows the distribution of site traffic at this intersection on a typical practice day and event day. The derivation of the trip generation estimates is found on Attachment 15.

BUILD TRAFFIC PROJECTIONS

The Build traffic volumes for the horizon year 2030 are summarized schematically on Figure 3. These projections are based on the No-Build projections, the trip generation estimates contained in Table 1, and the expectation that the additional trips will mirror the travel patterns observed at the existing intersection.

[1] Institute of Transportation Engineers, *Trip Generation*, ninth edition (Washington, D.C., 2012).

Table 1 — **Trip Generation Summary**
Proposed Gymnasium at St. Patrick Academy

	Existing School[1]	Proposed Gymnasium: Typical Practice Day[2]	Proposed Gymnasium: Typical Event Day[3]	Post-Development Volumes: Typical Practice Day	Post-Development Volumes: Typical Event Day
Weekday AM Street Peak Hour (7:30 - 8:30 AM)					
Entering	123 veh	0 veh	0 veh	123 veh	123 veh
Exiting	116 veh	0 veh	0 veh	116 veh	116 veh
Total	239 trips	0 trips	0 trips	239 trips	239 trips
Weekday School Peak Hour (2:00 - 3:00 PM)					
Entering	85 veh	-20 veh	-30 veh	65 veh	55 veh
Exiting	73 veh	-20 veh	-30 veh	53 veh	43 veh
Total	158 trips	-40 trips	-60 trips	118 trips	98 trips
Weekday PM Street Peak Hour (4:00 - 5:00 PM +/-)					
Entering	30 veh	5 veh	0 veh	35 veh	30 veh
Exiting	44 veh	0 veh	-16 veh	44 veh	28 veh
Total	74 trips	5 trips	-16 trips	79 trips	58 trips
Weekday Total					
Entering	NA	NA	NA	NA	NA
Exiting	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA

[1] Driveway counts conducted on 11/13/19 and 11/14/19.
[2] Typical practices run from 3-6 PM. Approximately 20 fewer parents take students at normal time (2-3 PM), and arrive between 3-6 PM to watch and take their children home after 6 PM.
[3] Typical events run from 6-8 PM. Approximately 24 staff remain on-site and depart after 8 PM, approximately 30 fewer parents take students at normal time (2-3 PM) and arrive in 1 or 2 vehicles before/after 6 PM to watch and retrieve, approximately 40 travelling visitors & referees arrive before 6 PM and depart after 8 PM.

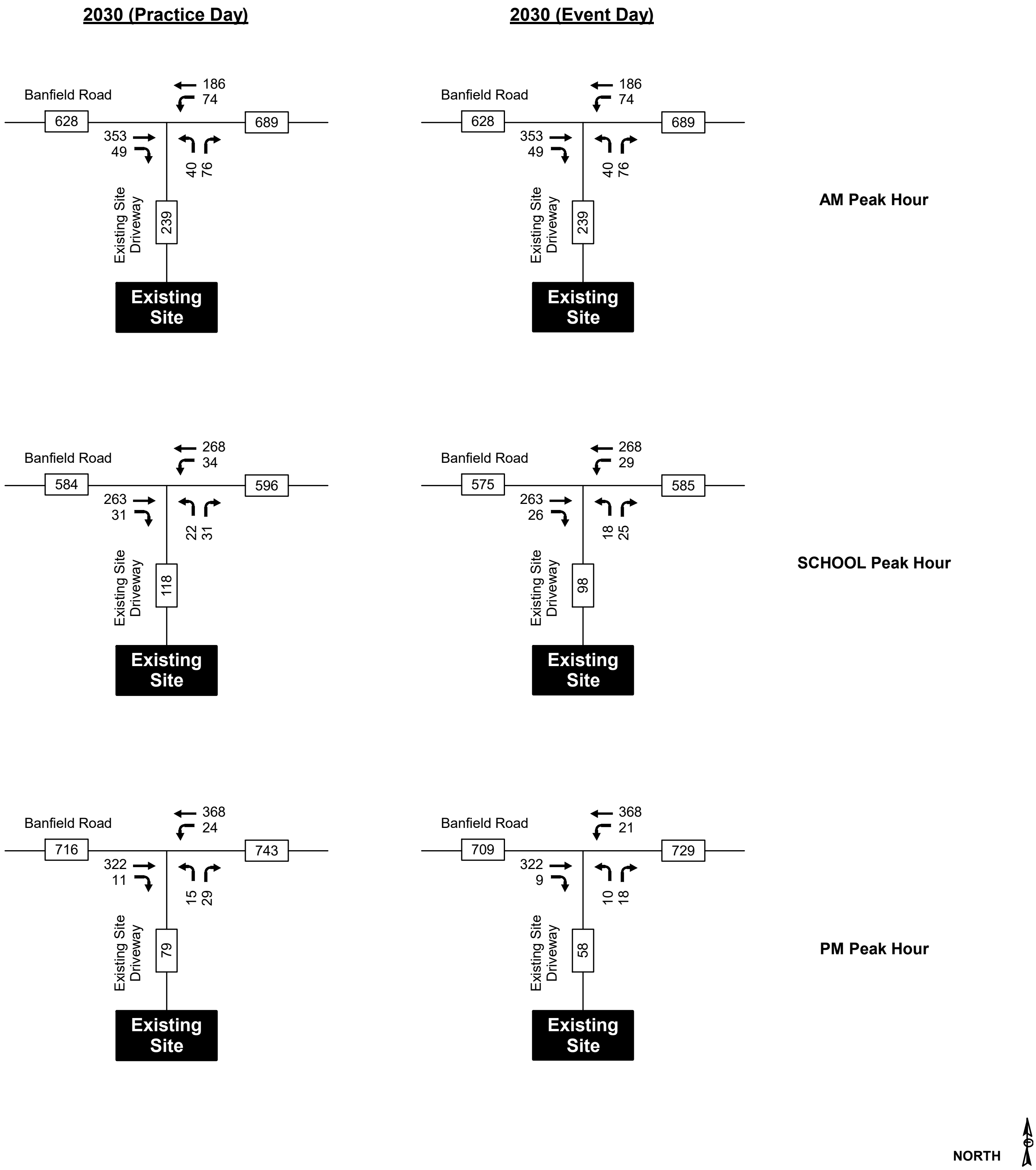

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Figure 3

2030 Build Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

TRAFFIC OPERATIONS AND SAFETY

INTERSECTION CAPACITY – UNSIGNALIZED INTERSECTIONS

The long-range traffic projections were utilized to assess traffic operations at the existing site driveway intersection on Banfield Road. This intersection was analyzed according to the methodologies of the *Highway Capacity Manual*[2] as replicated by the latest edition of the *Synchro Traffic Signal Timing Software (Version 9)*, which also performs unsignalized intersection capacity analyses.

Capacity and Level of Service (LOS) calculations pertaining to unsignalized intersections address the quality of service for those vehicles turning into and out of intersecting side streets. The availability of adequate gaps in the traffic stream on the major street actually controls the potential capacity for vehicle movements to and from the minor approach. Levels of Service are simply letter grades (A-F), which categorize the vehicle delays associated with specific turning maneuvers. Table 2 describes the criteria used in this analysis. Calculations pertaining to these analyses are included as Attachments 16-27.

Table 2 — Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Control Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: Transportation Research Board, Highway Capacity Manual 2010.

The results of the analysis for the **Banfield Road/Existing Site Driveway** intersection are summarized in Table 3 and confirm that vehicle departures from the Existing Site Driveway will continue to operate below capacity through 2030 with the proposed gymnasium in use on typical "practice" and "event" days. By 2030 long delays (LOS F) should be expected during the morning peak hour period as much of the school traffic is concentrated during the peak 15-minute interval prior to the start of the school day. Favorably, the proposed gymnasium does not affect the driveway volumes during the morning peak hour period.

The analysis also confirms that shorter delays will be encountered during the school peak hour and evening peak hour periods in 2030. The westbound left-turn arrival movement from Banfield Road on to the site driveway will operate at LOS A and with minimal delay during all hours of the day through 2030, with the school gymnasium in full operation.

[2] Transportation Research Board, *Highway Capacity Manual* (Washington, D.C., 2010).

Table 3 — **STOP-Controlled Intersection Capacity Analysis**
Banfield Road / Existing Site Driveway

	Weekday AM Peak Hour				School Peak Hour				Weekday PM Peak Hour			
	Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]
Typical Practice Day												
Existing Site Driveway - L & R-Turn Departures												
2030 No-Build	54.2	0.86	F	8	15.9	0.36	C	2	13.9	0.15	B	1
2030 Build	54.2	0.86	F	8	14.1	0.26	B	1	14.0	0.15	B	1
Banfield Road - WB Left Turns												
2030 No-Build	9.2	0.11	A	<1	8.1	0.04	A	<1	8.2	0.02	A	<1
2030 Build	9.2	0.11	A	<1	8.1	0.03	A	<1	8.2	0.02	A	<1
Typical Event Day												
Existing Site Driveway - L & R-Turn Departures												
2030 No-Build	54.2	0.86	F	8	15.9	0.36	C	2	13.9	0.15	B	1
2030 Build	54.2	0.86	F	8	13.4	0.20	B	1	13.5	0.10	B	<1
Banfield Road - WB Left Turns												
2030 No-Build	9.2	0.11	A	<1	8.1	0.04	A	<1	8.2	0.02	A	<1
2030 Build	9.2	0.11	A	<1	8.0	0.03	A	<1	8.2	0.02	A	<1

[1] HCM Control Delay (seconds per vehicle), [2] HCM Volume to Capacity Ratio, [3] HCM Level of Service, [4] HCM 95th Percentile Queue (vehicles)

AUXILIARY TURN LANE WARRANTS ANALYSIS

Left-Turn Treatment - The type of treatment needed to accommodate left-turning vehicles from any street or highway to an intersecting side street (or driveway) can range from no treatment, where turning volumes are low; to the provision of a bypass lane for through traffic to travel around left-turning vehicles; to the addition of a formal center turn lane used exclusively by left-turning vehicles for deceleration and storage while waiting to complete their maneuvers.

Analysis of the 2030 Build traffic volumes at the Banfield Road/Existing Site Driveway intersection using NCHRP 457 guidelines confirmed that left-turn treatment is not warranted on Banfield Road for westbound vehicles entering the site driveway. This means that the existing westbound travel lane on Banfield Road will continue to function adequately as a shared left-through lane. Table 4 summarizes the findings of this analysis (see Attachments 28-33).

Table 4	Left-Turn Lane Warrants Analysis Banfield Road / Existing Site Driveway		
	2030 AM Build Volumes	2030 School Build Volumes	2030 PM Build Volumes
Typical Practice Day			
Peak Hour Inputs			
Left-Turn Volume (WB)	74	34	24
Advancing Volume (WB)	260	302	392
Opposing Volume (EB)	402	294	333
Percent Lefts	28.5%	11.3%	6.1%
Speed (mph)	30	30	30
Limiting Advancing Volume (veh/h)	273	437	553
Conclusion			
Left-Turn Treatment Warranted	**NO**	**NO**	**NO**
Typical Event Day			
Peak Hour Inputs			
Left-Turn Volume (WB)	74	29	21
Advancing Volume (WB)	260	297	389
Opposing Volume (EB)	402	289	331
Percent Lefts	28.5%	9.8%	5.4%
Speed (mph)	30	30	30
Limiting Advancing Volume (veh/h)	273	468	588
Conclusion			
Left-Turn Treatment Warranted	**NO**	**NO**	**NO**

Right-Turn Treatment - The type of treatment needed to accommodate right-turning vehicles from any street or highway to any intersecting side street (or driveway) can range from a radius only, where turning volumes are low; to the provision of a short 10:1 right-turn taper; to the addition of an exclusive right-turn lane, where turning volumes and through traffic volumes are significant.

Analysis of the 2030 Build traffic volumes at the Banfield Road/Existing Site Driveway intersection using NCHRP 457 guidelines confirmed that right-turn treatment is <u>not</u> warranted on Banfield Road for eastbound vehicles entering the existing site driveway. This means that the existing eastbound travel lane on Banfield Road will continue to function adequately as a shared through-right lane. The results of these analyses are summarized on Table 5 (see Attachments 34-39).

Table 5 — **Right-Turn Lane Warrants Analysis**
Banfield Road / Existing Site Driveway

	2030 AM Build Volumes	2030 School Build Volumes	2030 PM Build Volumes
Typical Practice Day			
Peak Hour Inputs			
Right-Turn Volume (EB)	49	31	11
Total Approach Volume (EB)	402	294	333
Speed (mph)	30	30	30
Limiting Right-Turn Volume (veh/h)	>1000	>1000	>1000
Conclusion			
Add Right-Turn Bay	**NO**	**NO**	**NO**
Typical Event Day			
Peak Hour Inputs			
Right-Turn Volume (EB)	49	26	9
Total Approach Volume (EB)	402	289	331
Speed (mph)	30	30	30
Limiting Right-Turn Volume (veh/h)	>1000	>1000	>1000
Conclusion			
Add Right-Turn Bay	**NO**	**NO**	**NO**

Minor-Road Approach Treatment – The type of treatment needed to accommodate exiting vehicles from the minor-road approach at a stop-controlled intersection can range from a single lane (shared left-right lane) in low-volume conditions, to two exit lanes (exclusive left-turn lane and exclusive right-turn lane) where turning volumes and through traffic volumes are significant, to multiple exit lanes in extreme cases.

Analysis of the 2030 Build traffic volumes using NCHRP 457 guidelines confirmed that a shared left-right lane on the existing site driveway approach to Banfield Road is sufficient for the anticipated traffic volumes. The results of these analyses are summarized on Table 6 (see Attachments 40-45).

Table 6 — **Minor-Road Approach Geometry**
Banfield Road / Existing Site Driveway

	2030 AM Build Volumes	2030 School Build Volumes	2030 PM Build Volumes
Typical Practice Day			
Peak Hour Inputs			
Major-Road Volume (EB-WB)	662	596	725
% Right-Turns on Minor (NB)	66	59	66
Minor-Road Approach Volume	116	53	44
Limiting Minor-Road Volume (veh/h)	344	346	324
Conclusion			
Consider TWO Approach Lanes	**NO**	**NO**	**NO**
Typical Event Day			
Peak Hour Inputs			
Major-Road Volume (EB-WB)	662	586	720
% Right-Turns on Minor (NB)	66	58	64
Minor-Road Approach Volume	116	43	28
Limiting Minor-Road Volume (veh/h)	344	349	320
Conclusion			
Consider TWO Approach Lanes	**NO**	**NO**	**NO**

STUDY UPDATE FINDINGS AND RECOMMENDATIONS

Based on the existing conditions data collected at the Banfield Road/Existing Site Driveway, the anticipated traffic increases from the proposed gymnasium, and the analysis of the 2030 horizon year traffic volumes, Pernaw & Company, Inc. concludes that:

1. During the morning peak hour, traffic levels were highest from 7:30 to 9:30 AM on both count days. The higher driveway volume occurred on Thursday, November 14, 2019 when a total of 239 vehicles was observed arriving/departing from the site driveway. The majority of school vehicles traveled to/from points east on Banfield Road.
2. During the school peak hour (2:00 to 3:00 PM), the higher driveway volume occurred on Thursday, November 14, 2019 when a total of 158 vehicles was observed arriving/departing from the site driveway. Similarly, the majority of school vehicles traveled to/from points east on Banfield Road.
3. During the evening peak hour, traffic levels were highest from 3:45 to 4:45 PM on Wednesday, November 13, 2019 when a total of 74 vehicles was observed arriving/departing from the site driveway. Again, the majority of school vehicles traveled to/from points east on Banfield Road.
4. The trip generation analysis indicates that on "practice" days the proposed gymnasium will result in traffic decreases during the weekday School peak hour, and a slight increase during the PM peak hour period. This is primarily due to fewer student "pick-ups" immediately after school; with more site departures occurring after 6:00 PM when practices have ended. On "event" days there will be decreases during both the school and evening peak hour periods, as most traffic will be arriving prior to 6:00 PM and departing after 8:00 PM, when most events typically end.
5. The intersection capacity and Level of Service analyses indicate that all applicable traffic movements will operate below capacity through 2030 on both practice days and event days. Long delays will continue to be encountered during the morning peak hour as most traffic is concentrated during the 15-minute interval prior to the start of the school day. Favorably, the proposed gymnasium will not alter the traffic demand during the AM peak hour period.
6. The 2030 horizon year auxiliary turn lane warrants analyses confirmed that this intersection will continue to operate safely and efficiently with one shared general-purpose travel lane on each approach to this intersection.

To conclude, the recent traffic counts, future projections and technical analyses contained herein demonstrate that the Banfield Road/Existing Site Driveway intersection is capable of accommodating the anticipated traffic changes as a result of the proposed gymnasium project, and that physical modifications to the subject intersection are not necessary.

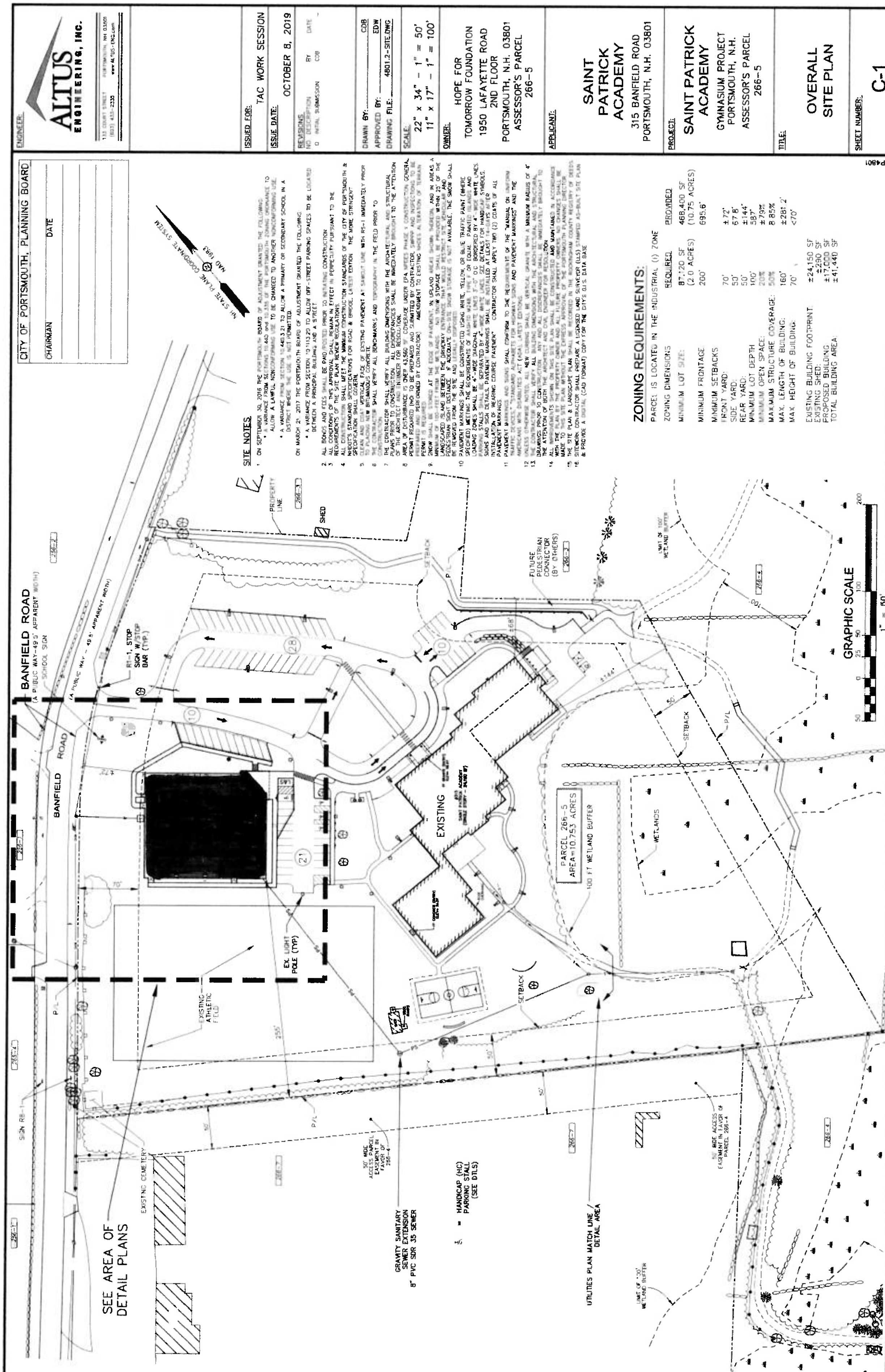
STATE OF NEW HAMPSHIRE
STEPHEN G. PERNAW No. 5234
LICENSED
PROFESSIONAL ENGINEER

12/19/19

Attachments

ATTACHMENTS

Attachment 1

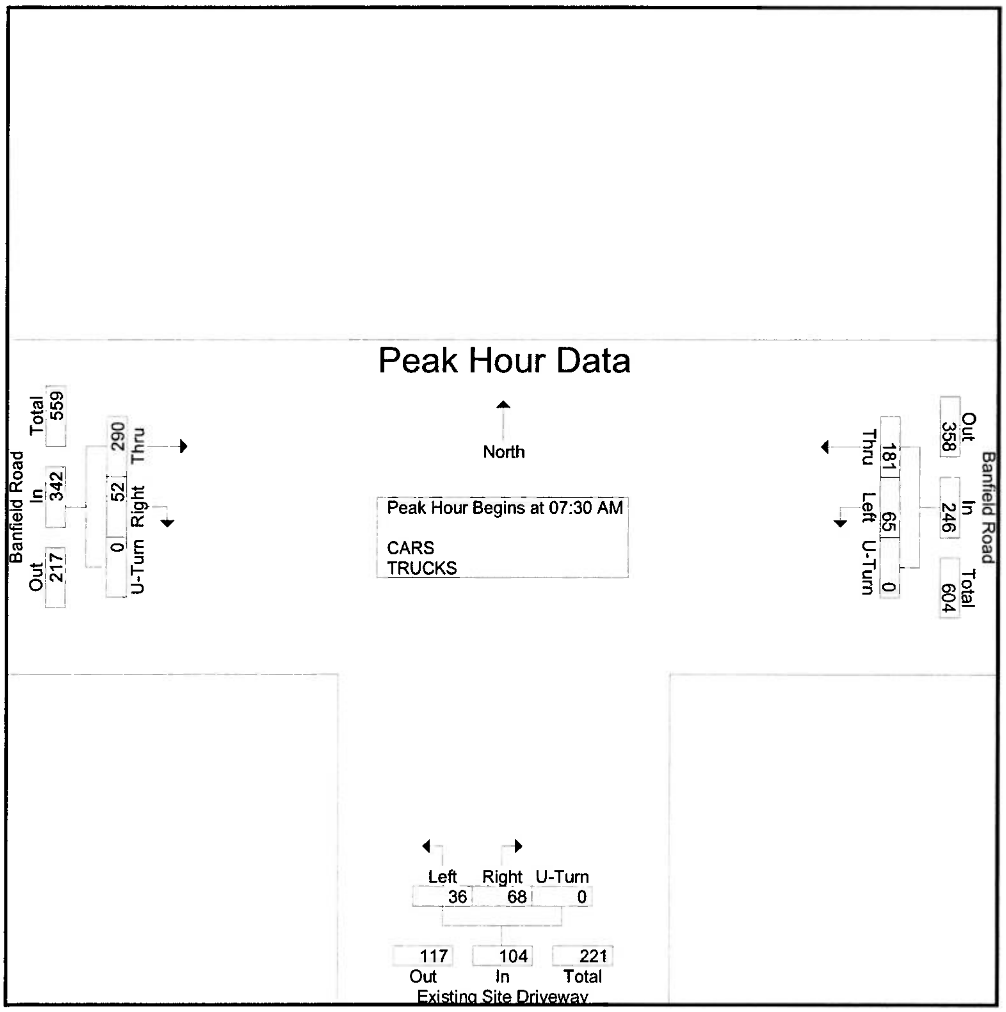


Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 2

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	38	15	0	53	6	2	0	8	7	64	0	71	132
07:45 AM	**50**	**37**	0	**87**	**38**	**24**	0	**62**	**38**	**90**	0	**128**	**277**
08:00 AM	44	11	0	55	22	8	0	30	5	80	0	85	170
08:15 AM	49	2	0	51	2	2	0	4	2	56	0	58	113
Total Volume	181	65	0	246	68	36	0	104	52	290	0	342	692
% App. Total	73.6	26.4	0		65.4	34.6	0		15.2	84.8	0		
PHF	.905	.439	.000	.707	.447	.375	.000	.419	.342	.806	.000	.668	.625



Attachment 3

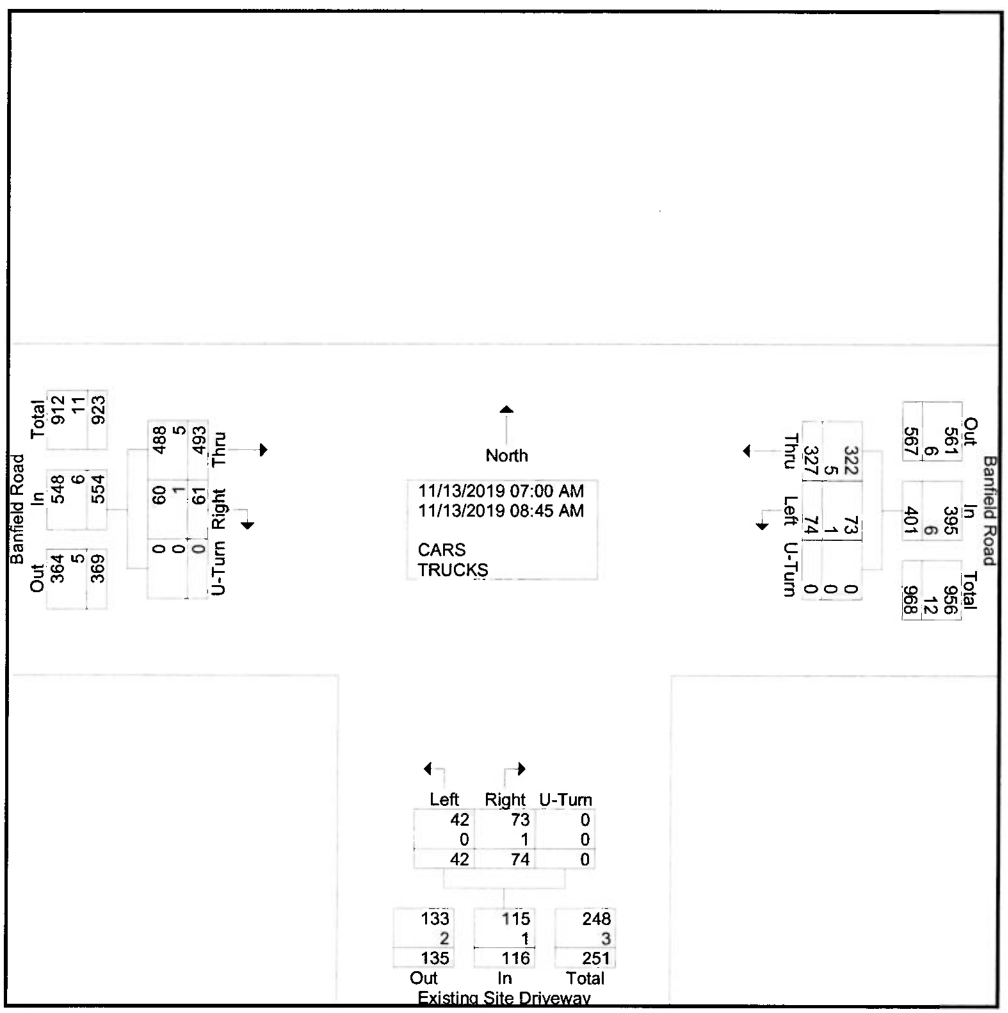
Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	21	5	0	26	1	1	0	2	3	28	0	31	59
07:15 AM	38	3	0	41	3	2	0	5	4	53	0	57	103
07:30 AM	38	15	0	53	6	2	0	8	7	64	0	71	132
07:45 AM	50	37	0	87	38	24	0	62	38	90	0	128	277
Total	147	60	0	207	48	29	0	77	52	235	0	287	571
08:00 AM	44	11	0	55	22	8	0	30	5	80	0	85	170
08:15 AM	49	2	0	51	2	2	0	4	2	56	0	58	113
08:30 AM	49	0	0	49	2	1	0	3	0	50	0	50	102
08:45 AM	38	1	0	39	0	2	0	2	2	72	0	74	115
Total	180	14	0	194	26	13	0	39	9	258	0	267	500
Grand Total	327	74	0	401	74	42	0	116	61	493	0	554	1071
Apprch %	81.5	18.5	0		63.8	36.2	0		11	89	0		
Total %	30.5	6.9	0	37.4	6.9	3.9	0	10.8	5.7	46	0	51.7	
CARS	322	73	0	395	73	42	0	115	60	488	0	548	1058
% CARS	98.5	98.6	0	98.5	98.6	100	0	99.1	98.4	99	0	98.9	98.8
TRUCKS	5	1	0	6	1	0	0	1	1	5	0	6	13
% TRUCKS	1.5	1.4	0	1.5	1.4	0	0	0.9	1.6	1	0	1.1	1.2



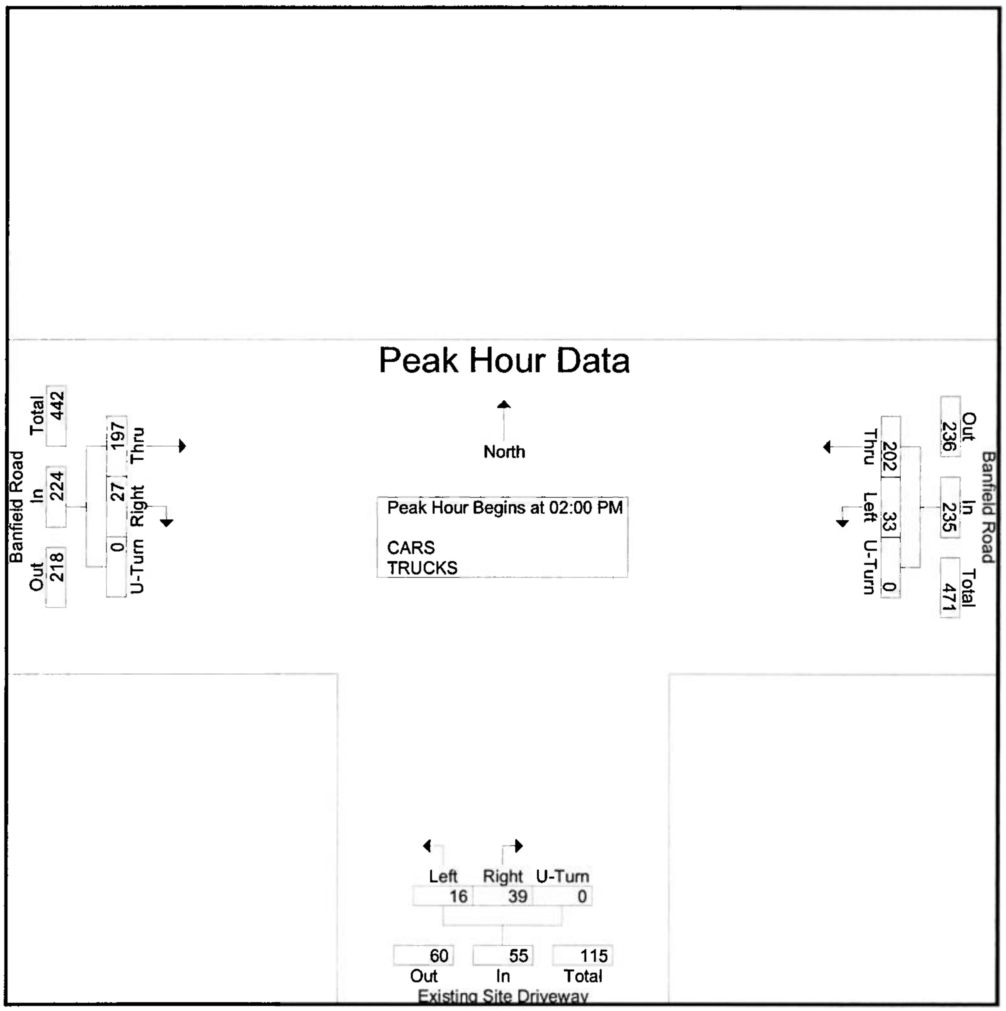
Attachment 4

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 2

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	**56**	1	0	57	1	0	0	1	0	45	0	45	103
02:15 PM	45	4	0	49	0	0	0	0	3	**59**	0	62	111
02:30 PM	54	**15**	0	**69**	16	**8**	0	24	**13**	50	0	**63**	**156**
02:45 PM	47	13	0	60	**22**	8	0	**30**	11	43	0	54	144
Total Volume	202	33	0	235	39	16	0	55	27	197	0	224	514
% App. Total	86	14	0		70.9	29.1	0		12.1	87.9	0		
PHF	.902	.550	.000	.851	.443	.500	.000	.458	.519	.835	.000	.889	.824



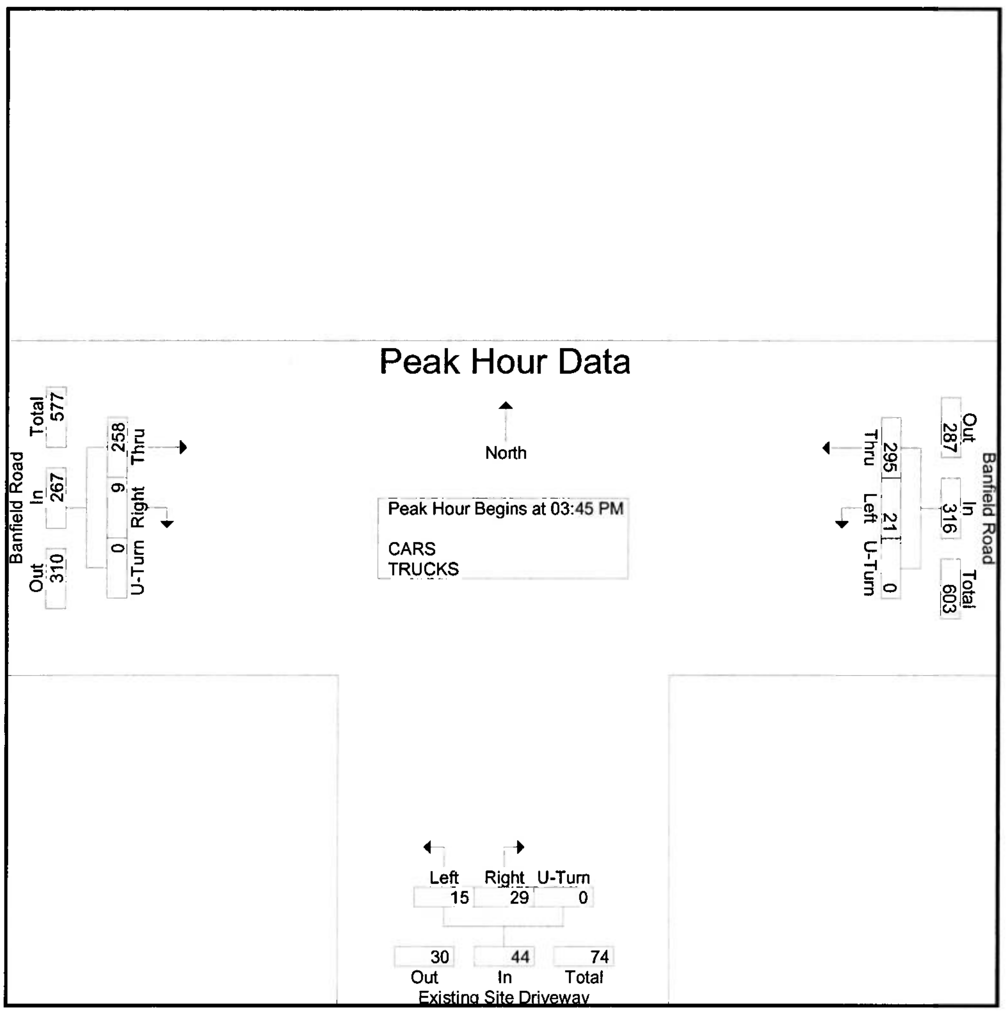
Attachment 5

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 3

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:45 PM													
03:45 PM	71	**11**	0	82	7	3	0	10	**6**	54	0	60	152
04:00 PM	**81**	7	0	**88**	**15**	3	0	**18**	2	57	0	59	**165**
04:15 PM	75	1	0	76	6	**6**	0	12	0	63	0	63	151
04:30 PM	68	2	0	70	1	3	0	4	1	**84**	0	**85**	159
Total Volume	295	21	0	316	29	15	0	44	9	258	0	267	627
% App. Total	93.4	6.6	0		65.9	34.1	0		3.4	96.6	0		
PHF	.910	.477	.000	.898	.483	.625	.000	.611	.375	.768	.000	.785	.950



Attachment 6

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
03:00 PM	54	5	0	59	9	3	0	12	0	45	0	45	116
03:15 PM	67	3	0	70	1	2	0	3	2	68	0	70	143
03:30 PM	88	4	0	92	5	0	0	5	0	56	0	56	153
03:45 PM	71	11	0	82	7	3	0	10	6	54	0	60	152
Total	280	23	0	303	22	8	0	30	8	223	0	231	564
04:00 PM	81	7	0	88	15	3	0	18	2	57	0	59	165
04:15 PM	75	1	0	76	6	6	0	12	0	63	0	63	151
04:30 PM	68	2	0	70	1	3	0	4	1	84	0	85	159
04:45 PM	73	0	0	73	4	1	0	5	1	59	0	60	138
Total	297	10	0	307	26	13	0	39	4	263	0	267	613
05:00 PM	81	2	0	83	1	2	0	3	0	81	0	81	167
05:15 PM	93	0	0	93	2	3	0	5	2	60	0	62	160
05:30 PM	62	0	0	62	1	0	0	1	1	47	0	48	111
05:45 PM	47	0	0	47	2	1	0	3	1	62	0	63	113
Total	283	2	0	285	6	6	0	12	4	250	0	254	551
Grand Total	860	35	0	895	54	27	0	81	16	736	0	752	1728
Apprch %	96.1	3.9	0		66.7	33.3	0		2.1	97.9	0		
Total %	49.8	2	0	51.8	3.1	1.6	0	4.7	0.9	42.6	0	43.5	
CARS	846	35	0	881	54	27	0	81	15	731	0	746	1708
% CARS	98.4	100	0	98.4	100	100	0	100	93.8	99.3	0	99.2	98.8
TRUCKS	14	0	0	14	0	0	0	0	1	5	0	6	20
% TRUCKS	1.6	0	0	1.6	0	0	0	0	6.2	0.7	0	0.8	1.2

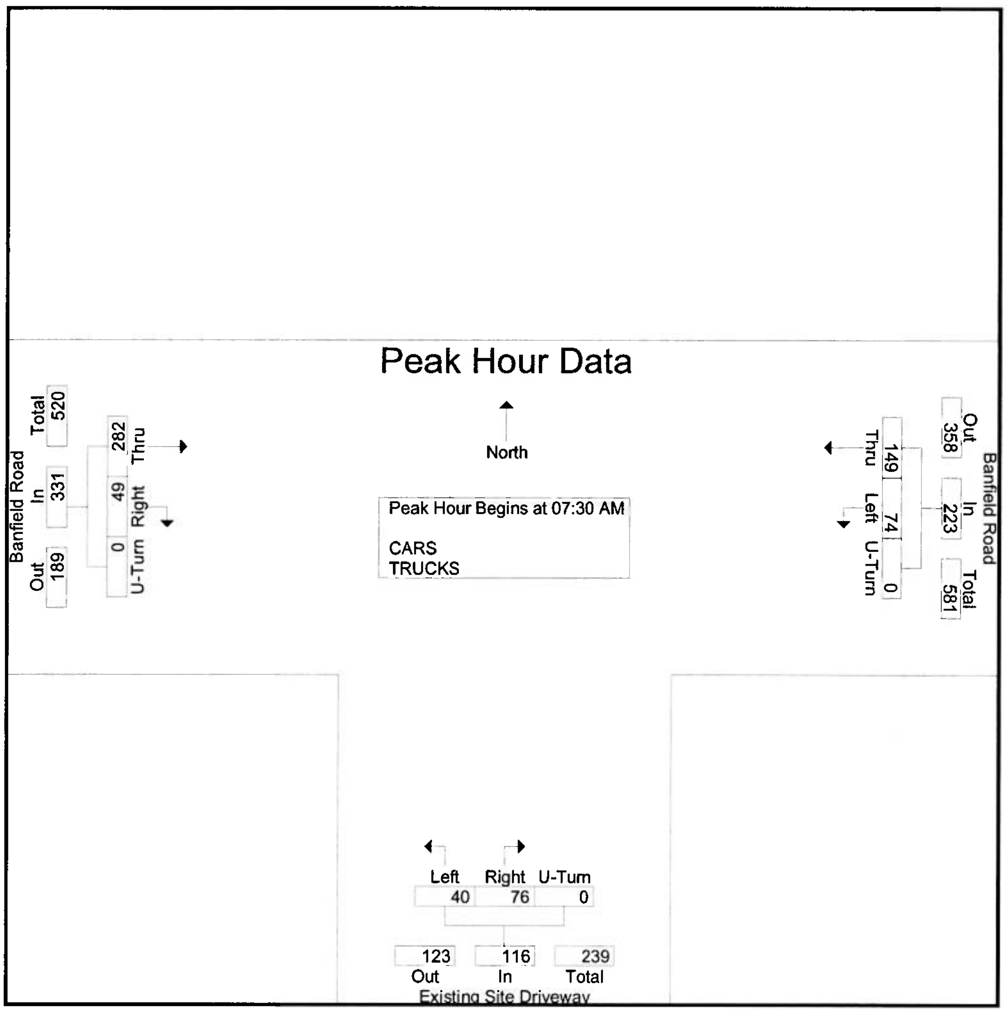
Attachment 7

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	34	13	0	47	4	6	0	10	11	56	0	67	124
07:45 AM	32	**45**	0	**77**	**53**	**22**	0	**75**	**29**	**103**	0	**132**	**284**
08:00 AM	40	14	0	54	18	9	0	27	7	68	0	75	156
08:15 AM	**43**	2	0	45	1	3	0	4	2	55	0	57	106
Total Volume	149	74	0	223	76	40	0	116	49	282	0	331	670
% App. Total	66.8	33.2	0		65.5	34.5	0		14.8	85.2	0		
PHF	.866	.411	.000	.724	.358	.455	.000	.387	.422	.684	.000	.627	.590



Attachment 8

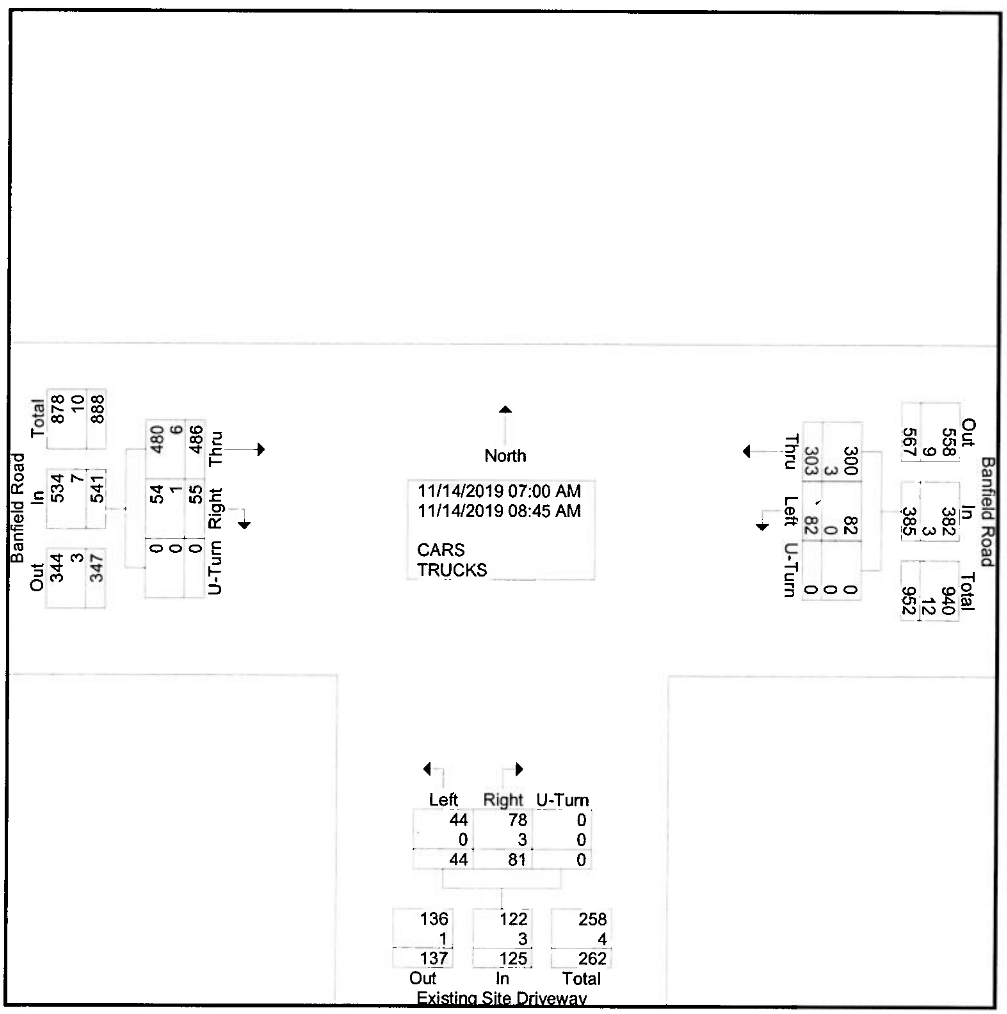
Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	27	2	0	29	0	1	0	1	2	25	0	27	57
07:15 AM	33	4	0	37	1	1	0	2	3	56	0	59	98
07:30 AM	34	13	0	47	4	6	0	10	11	56	0	67	124
07:45 AM	32	45	0	77	53	22	0	75	29	103	0	132	284
Total	126	64	0	190	58	30	0	88	45	240	0	285	563
08:00 AM	40	14	0	54	18	9	0	27	7	68	0	75	156
08:15 AM	43	2	0	45	1	3	0	4	2	55	0	57	106
08:30 AM	48	1	0	49	1	1	0	2	1	65	0	66	117
08:45 AM	46	1	0	47	3	1	0	4	0	58	0	58	109
Total	177	18	0	195	23	14	0	37	10	246	0	256	488
Grand Total	303	82	0	385	81	44	0	125	55	486	0	541	1051
Apprch %	78.7	21.3	0		64.8	35.2	0		10.2	89.8	0		
Total %	28.8	7.8	0	36.6	7.7	4.2	0	11.9	5.2	46.2	0	51.5	
CARS	300	82	0	382	78	44	0	122	54	480	0	534	1038
% CARS	99	100	0	99.2	96.3	100	0	97.6	98.2	98.8	0	98.7	98.8
TRUCKS	3	0	0	3	3	0	0	3	1	6	0	7	13
% TRUCKS	1	0	0	0.8	3.7	0	0	2.4	1.8	1.2	0	1.3	1.2



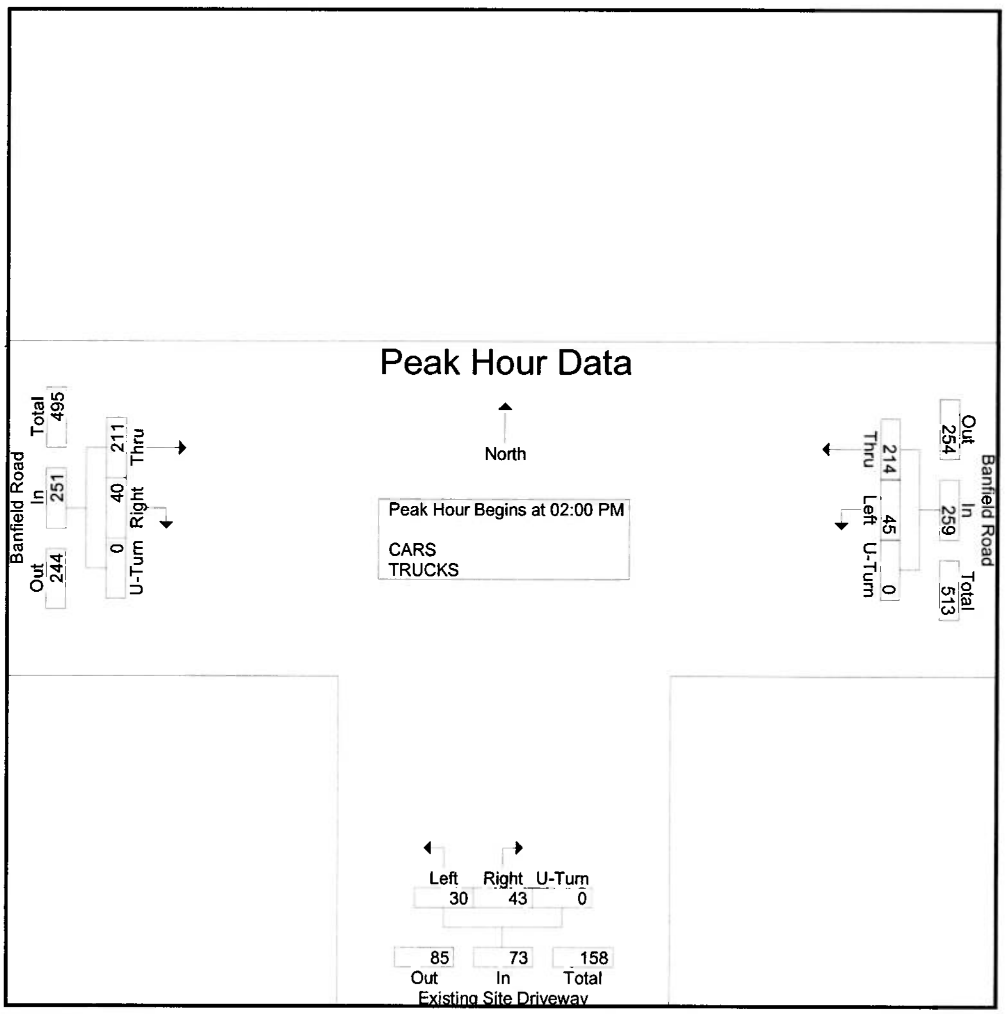
Attachment 9

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 2

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	50	1	0	51	1	0	0	1	0	57	0	57	109
02:15 PM	**65**	9	0	**74**	2	0	0	2	3	50	0	53	129
02:30 PM	51	16	0	67	15	8	0	23	10	**58**	0	68	158
02:45 PM	48	**19**	0	67	**25**	**22**	0	**47**	**27**	46	0	**73**	**187**
Total Volume	214	45	0	259	43	30	0	73	40	211	0	251	583
% App. Total	82.6	17.4	0		58.9	41.1	0		15.9	84.1	0		
PHF	.823	.592	.000	.875	.430	.341	.000	.388	.370	.909	.000	.860	.779

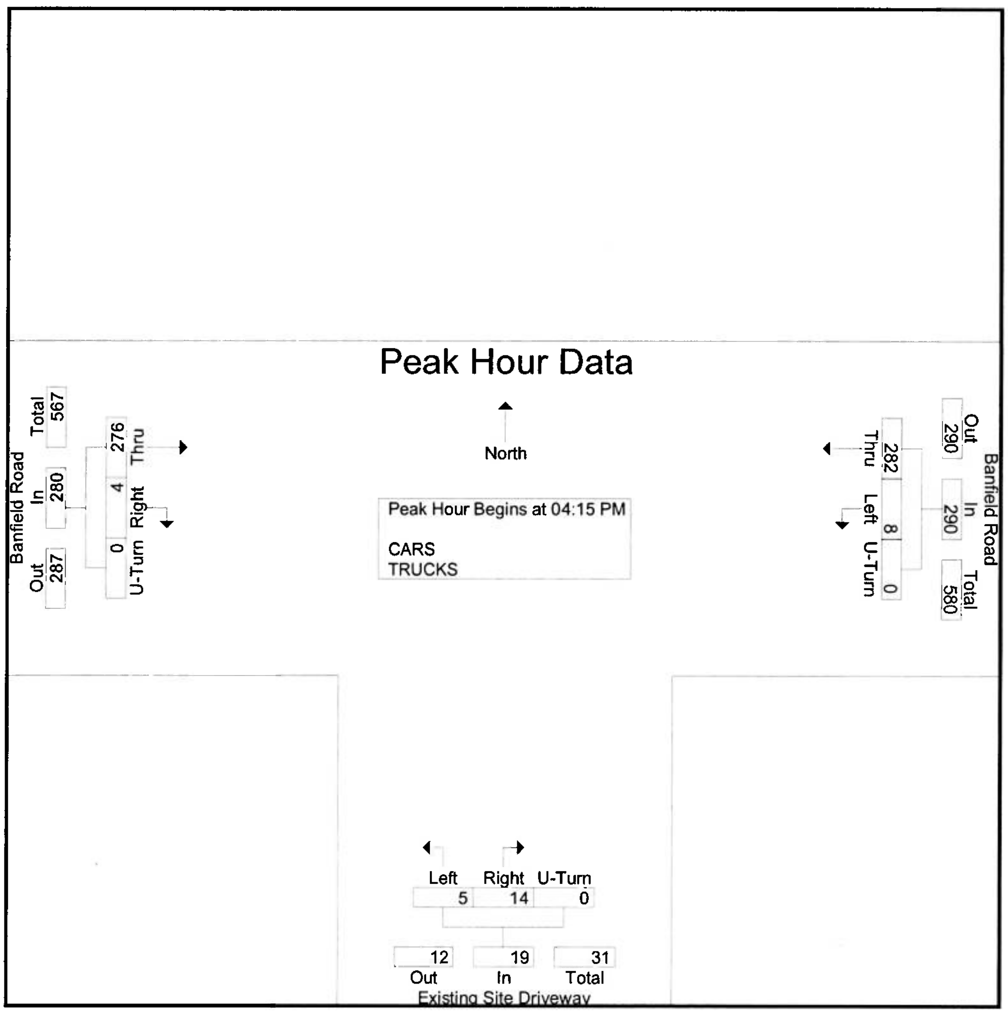


Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 3

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	72	2	0	74	**7**	**2**	0	**9**	**2**	61	0	63	146
04:30 PM	66	**4**	0	70	5	1	0	6	1	70	0	71	147
04:45 PM	67	2	0	69	2	0	0	2	0	68	0	68	139
05:00 PM	**77**	0	0	**77**	0	2	0	2	1	**77**	0	**78**	**157**
Total Volume	282	8	0	290	14	5	0	19	4	276	0	280	589
% App. Total	97.2	2.8	0		73.7	26.3	0		1.4	98.6	0		
PHF	.916	.500	.000	.942	.500	.625	.000	.528	.500	.896	.000	.897	.938



Attachment 11

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
03:00 PM	67	4	0	71	10	4	0	14	0	54	1	55	140
03:15 PM	74	1	0	75	1	0	0	1	0	67	0	67	143
03:30 PM	98	2	0	100	8	2	0	10	1	54	0	55	165
03:45 PM	68	1	0	69	5	1	0	6	1	56	0	57	132
Total	307	8	0	315	24	7	0	31	2	231	1	234	580
04:00 PM	71	5	0	76	3	4	0	7	2	58	0	60	143
04:15 PM	72	2	0	74	7	2	0	9	2	61	0	63	146
04:30 PM	66	4	0	70	5	1	0	6	1	70	0	71	147
04:45 PM	67	2	0	69	2	0	0	2	0	68	0	68	139
Total	276	13	0	289	17	7	0	24	5	257	0	262	575
05:00 PM	77	0	0	77	0	2	0	2	1	77	0	78	157
05:15 PM	67	3	0	70	4	3	0	7	0	63	0	63	140
05:30 PM	56	0	0	56	0	0	0	0	0	55	0	55	111
05:45 PM	41	0	0	41	0	0	0	0	0	54	0	54	95
Total	241	3	0	244	4	5	0	9	1	249	0	250	503
Grand Total	824	24	0	848	45	19	0	64	8	737	1	746	1658
Apprch %	97.2	2.8	0		70.3	29.7	0		1.1	98.8	0.1		
Total %	49.7	1.4	0	51.1	2.7	1.1	0	3.9	0.5	44.5	0.1	45	
CARS	809	24	0	833	45	19	0	64	8	730	1	739	1636
% CARS	98.2	100	0	98.2	100	100	0	100	100	99.1	100	99.1	98.7
TRUCKS	15	0	0	15	0	0	0	0	0	7	0	7	22
% TRUCKS	1.8	0	0	1.8	0	0	0	0	0	0.9	0	0.9	1.3

Stephen G. Pernaw

From:	eric weinrieb <eric@altusengineering2.onmicrosoft.com>
Sent:	Wednesday, December 4, 2019 8:41 AM
To:	sgp@pernaw.com
Subject:	FW: St Patricks Academy crash data

Eric

Altus Engineering, Inc.
133 Court Street
Portsmouth, NH 03801

From: Nicole Pappaioanou <NPappaioanou@cityofportsmouth.com>
Sent: Thursday, November 14, 2019 1:58 PM
To: eric weinrieb <eric@altusengineering2.onmicrosoft.com>
Subject: RE: St Patricks Academy crash data

I ran a query for accidents on Banfield Rd from 4/1/2018 to today. I have no idea where 300 feet from the St Pat's driveway is on the road so I guessed. I had 2 accidents. One was located at 225 Banfield and the other was located at 470 Banfield.

Nicole Pappaioanou
Portsmouth Police Department
Office Manager
Records Unit
Phone (603)610-7446
Fax (603)610-7670

From: eric weinrieb [mailto:eric@altusengineering2.onmicrosoft.com]
Sent: Wednesday, November 13, 2019 4:21 PM
To: Nicole Pappaioanou <NPappaioanou@cityofportsmouth.com>
Cc: James Broom <jpatrickbroom@gmail.com>
Subject: St Patricks Academy crash data

Nichole,

Thank you for taking the time to talk to me earlier today.

As suggested attached is a request on letterhead asking for crash data for the Banfield Road area near the new St Patricks Academy.

Thank you for your time.

Seasonal Adjustment Factors
NHDOT Group 4 (Urban Highways)

Stephen G. Pernaw & Company, Inc.

Year 2018 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	11,282	1.13	1.24
Feb	11,848	1.08	1.18
Mar	11,828	1.08	1.18
Apr	12,491	1.02	1.12
May	13,587	0.94	1.03
Jun	13,911	0.92	1.00
Jul	13,765	0.93	1.01
Aug	13,945	0.92	1.00
Sep	13,168	0.97	1.06
Oct	13,367	0.96	1.04
Nov	12,215	1.05	1.14
Dec	11,963	1.07	1.17

Year 2017 Monthly Data - Urban

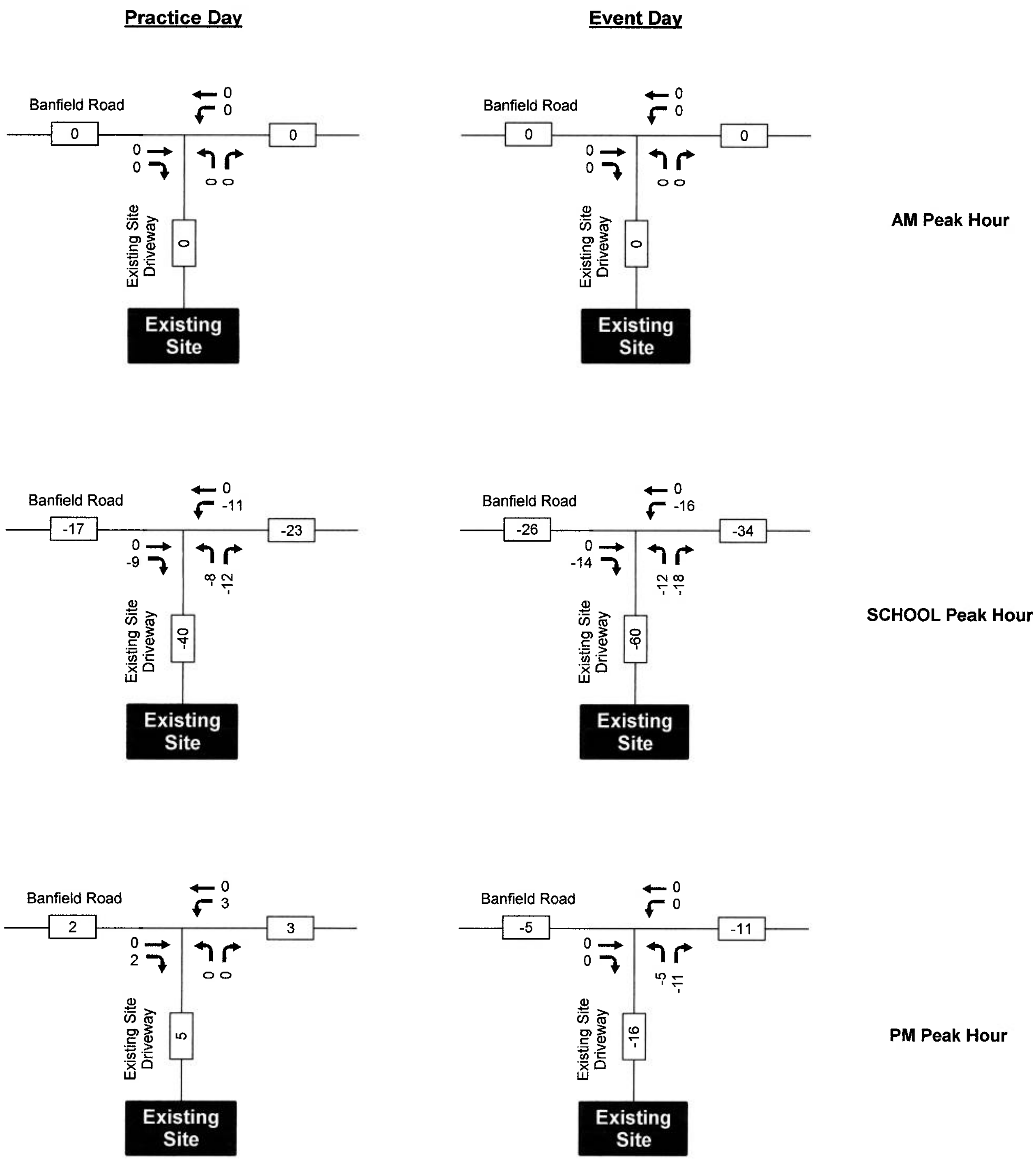
		Adjustment to	
Month	ADT	Average	Peak
Jan	12254	1.21	1.33
Feb	13494	1.10	1.21
Mar	14335	1.03	1.14
Apr	15004	0.99	1.09
May	15547	0.95	1.05
Jun	16310	0.91	1.00
Jul	15523	0.95	1.05
Aug	15974	0.93	1.02
Sep	15546	0.95	1.05
Oct	15104	0.98	1.08
Nov	14544	1.02	1.12
Dec	14151	1.05	1.15

Year 2016 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	13573	1.16	1.25
Feb	14038	1.12	1.21
Mar	15731	1.00	1.08
Apr	16139	0.97	1.05
May	15705	1.00	1.08
Jun	16766	0.94	1.01
Jul	15752	1.00	1.08
Aug	16529	0.95	1.03
Sep	17007	0.92	1.00
Oct	16598	0.94	1.02
Nov	15649	1.00	1.09
Dec	14638	1.07	1.16

Average Peak-Month Factor 1.12

Pernaw & Company, Inc



1978A

NORTH

Attachment

Site Generated Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

Stephen G. Pernaw & Company, Inc.

Trip Generation Derivation - Proposed Gymnasium

	Parent Pick-Ups [1]		Visitors/Refs [2]		Staff [3]		TOTAL TRIPS		
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Total
Typical Event Days									
2-3 PM	-30	-30					-30	-30	-60
3-4 PM						-8	0	-8	-8
4-5 PM						-16	0	-16	-16
5-6 PM	40		40				80	0	80
6-7 PM	5						5	0	5
7-8 PM							0	0	0
8-9 PM		45		40		24	0	109	109
Total:	15	15	40	40		0	55	55	110
Typical Practice Days									
2-3 PM	-20	-20					-20	-20	-40
3-4 PM	5						5	0	5
4-5 PM	5						5	0	5
5-6 PM	5						5	0	5
6-7 PM	5	20					5	20	25
7-8 PM							0	0	0
8-9 PM							0	0	0
Total:	0	0	0	0	0	0	0	0	0

[1] Event Days: Approximately 30 fewer parents take students at normal time (2-3 PM) and arrive in 1 or 2 vehicles before/after 6 PM to watch and retrieve.

Practice Days: Approximately 20 fewer parents take student at normal time (2-3 PM) and arrive between 3-6 PM to watch and retreive.

[2] Event Days: Approximately 40 travelling visitors & referees arrive before 6 PM and depart after 8 PM.

[3] Event Days: Approximatley 24 staff from St. Patrick remain on-site and depart after 8 PM.

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	13.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection						
Int Delay, s/veh	13.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		2.6		54.2	
HCM LOS					F	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	263	40	45	268	30	43
Future Vol, veh/h	263	40	45	268	30	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	47	51	305	77	110

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	737	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	407	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1206	-	389	716
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	676	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	369	716
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	516	-	-	1206	-
HCM Lane V/C Ratio	0.363	-	-	0.042	-
HCM Control Delay (s)	15.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection						
Int Delay, s/veh	2.7					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	263	31	34	268	22	31
Future Vol, veh/h	263	31	34	268	22	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	36	39	305	56	79

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	707	324
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1217	-	405	722
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1217	-	389	722
Mov Cap-2 Maneuver	-	-	-	-	389	-
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	667	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	533	-	-	1217	-
HCM Lane V/C Ratio	0.255	-	-	0.032	-
HCM Control Delay (s)	14.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	9	21	368	15	29
Future Vol, veh/h	322	9	21	368	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	11	23	409	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	869	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1151	-	325	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1151	-	317	643
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	476	-	-	1151	-
HCM Lane V/C Ratio	0.152	-	-	0.02	-
HCM Control Delay (s)	13.9	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	11	24	368	15	29
Future Vol, veh/h	322	11	24	368	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	14	27	409	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	422	0	878	415
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	463	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1148	-	321	642
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1148	-	311	642
Mov Cap-2 Maneuver	-	-	-	-	311	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	619	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1148	-
HCM Lane V/C Ratio	0.153	-	-	0.023	-
HCM Control Delay (s)	14	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	13.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection						
Int Delay, s/veh	13.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	263	40	45	268	30	43
Future Vol, veh/h	263	40	45	268	30	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	47	51	305	77	110

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	737	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	407	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1206	-	389	716
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	676	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	369	716
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	516	-	-	1206	-
HCM Lane V/C Ratio	0.363	-	-	0.042	-
HCM Control Delay (s)	15.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	263	26	29	268	18	25
Future Vol, veh/h	263	26	29	268	18	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	30	33	305	46	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	336	0	692	321
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1223	-	413	724
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1223	-	400	724
Mov Cap-2 Maneuver	-	-	-	-	400	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	680	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	541	-	-	1223	-
HCM Lane V/C Ratio	0.204	-	-	0.027	-
HCM Control Delay (s)	13.4	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	9	21	368	15	29
Future Vol, veh/h	322	9	21	368	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	11	23	409	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	869	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1151	-	325	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1151	-	317	643
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	476	-	-	1151	-
HCM Lane V/C Ratio	0.152	-	-	0.02	-
HCM Control Delay (s)	13.9	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	9	21	368	10	18
Future Vol, veh/h	322	9	21	368	10	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	11	23	409	16	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	869	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1151	-	325	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1151	-	317	643
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	470	-	-	1151	-
HCM Lane V/C Ratio	0.098	-	-	0.02	-
HCM Control Delay (s)	13.5	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

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Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

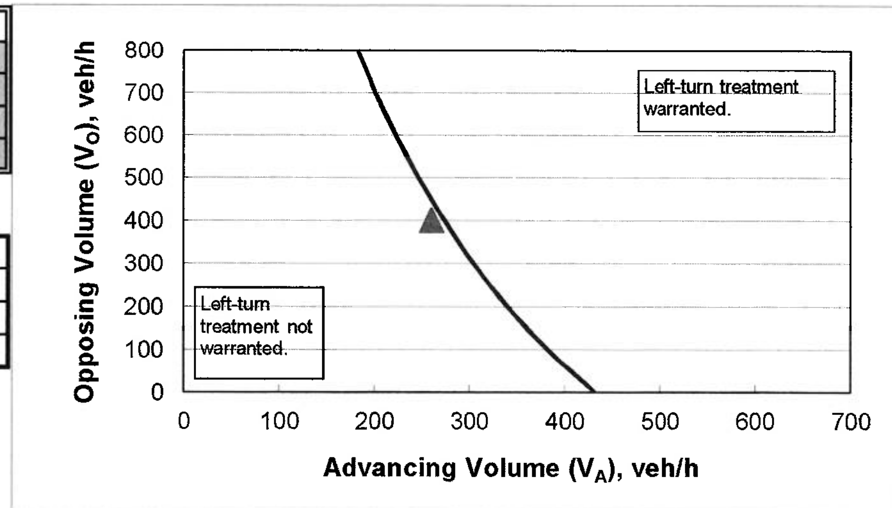
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	28%
Advancing volume (V_A), veh/h:	260
Opposing volume (V_O), veh/h:	402

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	273
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

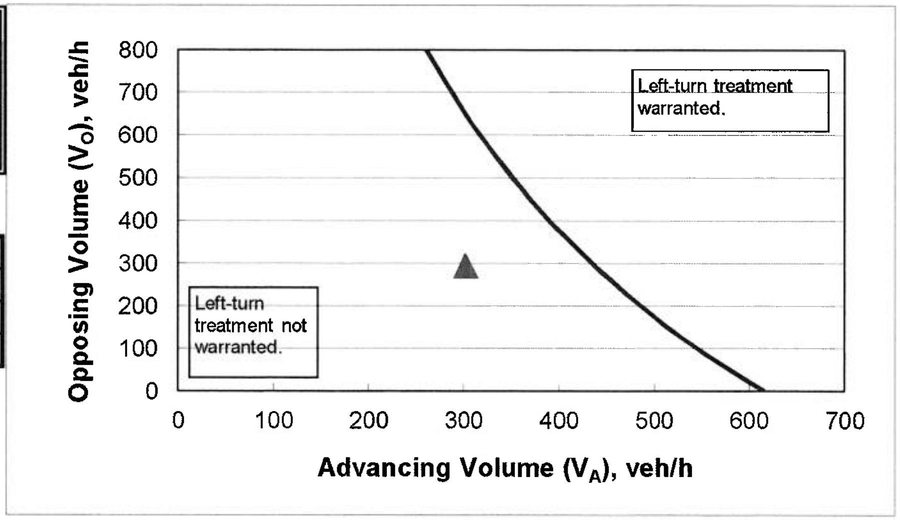
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	11%
Advancing volume (V_A), veh/h:	302
Opposing volume (V_O), veh/h:	294

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	437
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

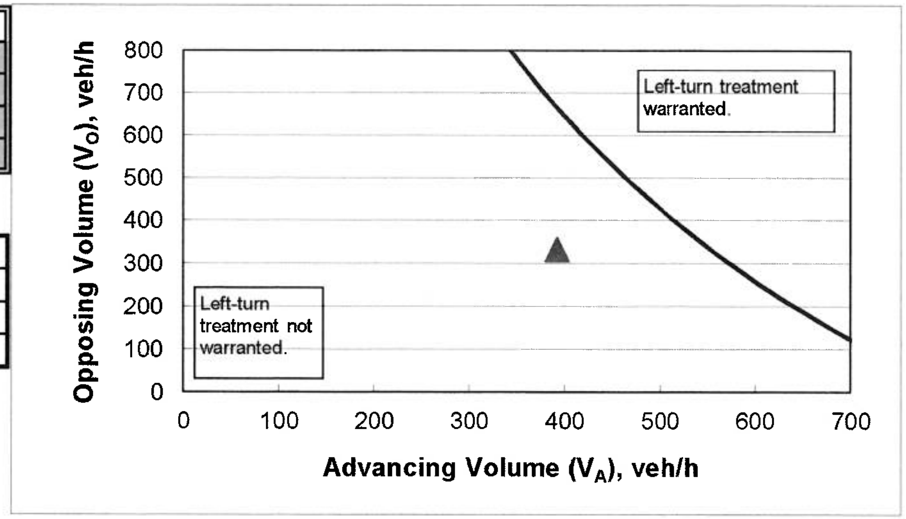
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	6%
Advancing volume (V_A), veh/h:	392
Opposing volume (V_O), veh/h:	333

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	553
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

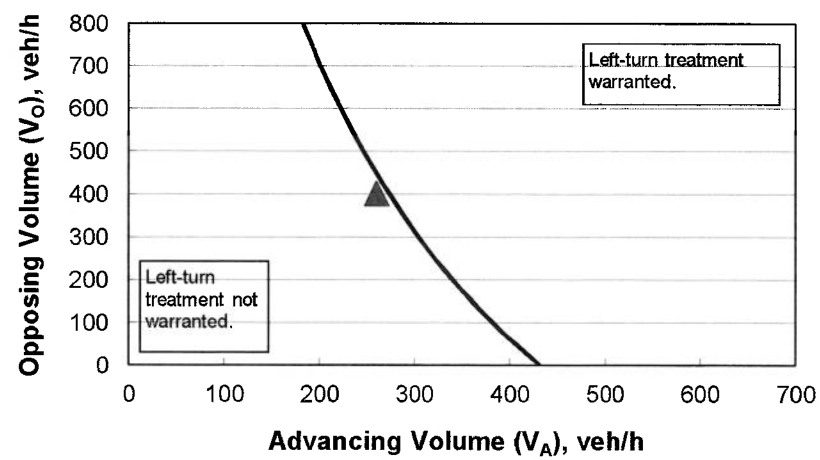
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	28%
Advancing volume (V_A), veh/h:	260
Opposing volume (V_O), veh/h:	402

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	273
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

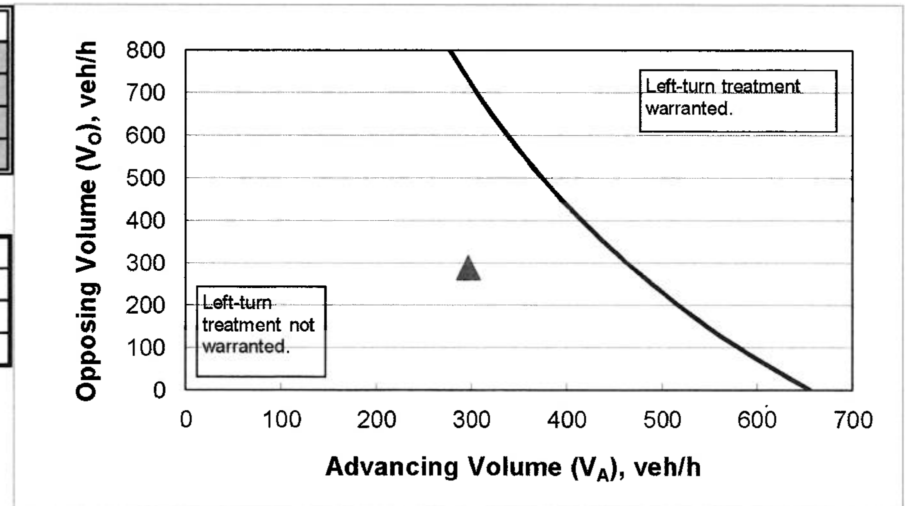
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	10%
Advancing volume (V_A), veh/h:	297
Opposing volume (V_O), veh/h:	289

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	468
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

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Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

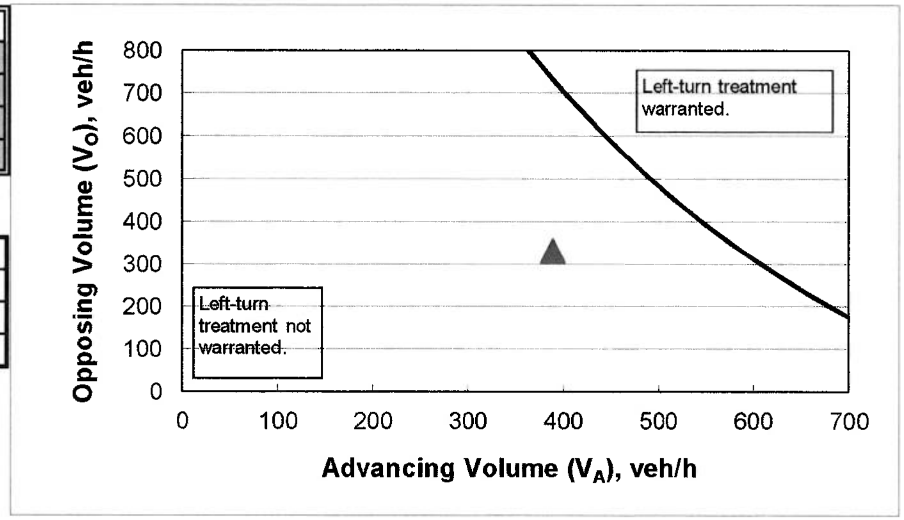
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	5%
Advancing volume (V_A), veh/h:	389
Opposing volume (V_O), veh/h:	331

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	588
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Stephen G. Pernaw & Company, Inc.

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadw ay

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	402
Right-turn volume, veh/h:	49

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	1578
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

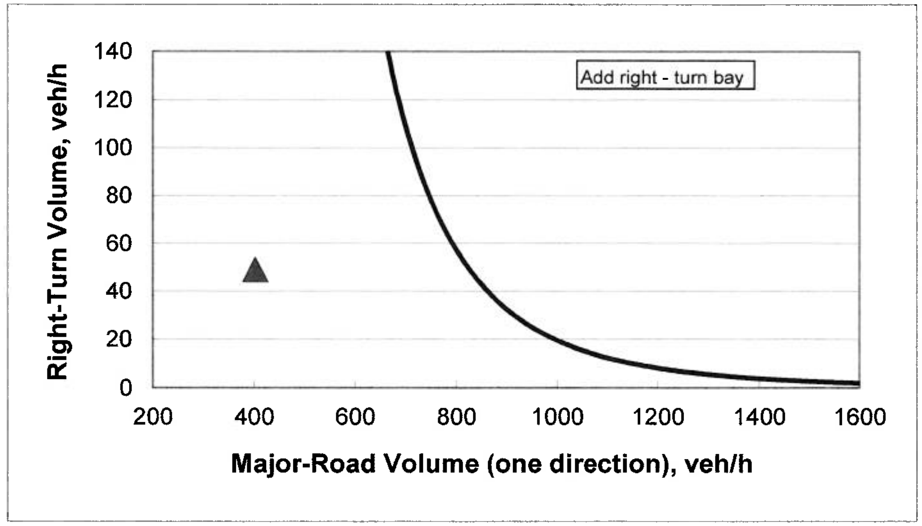


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadw ay

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	294
Right-turn volume, veh/h:	31

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	7128
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

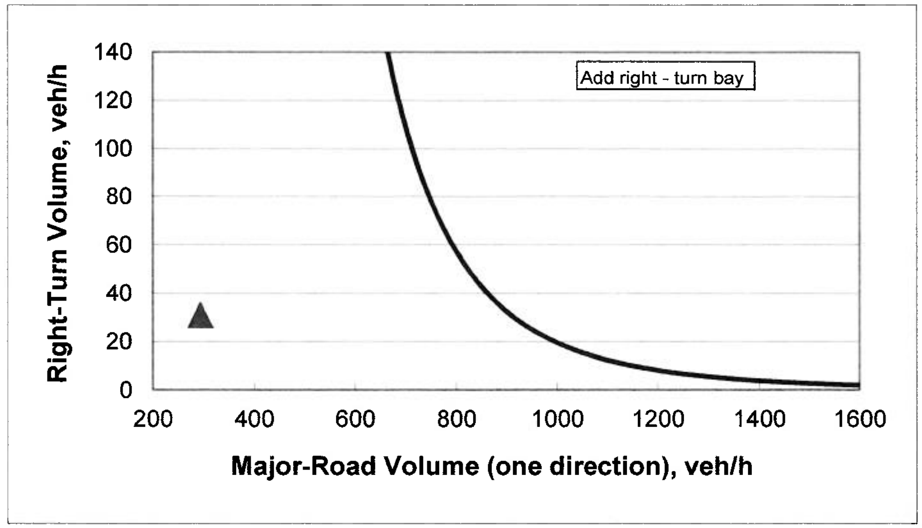


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	333
Right-turn volume, veh/h:	11

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	3911
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

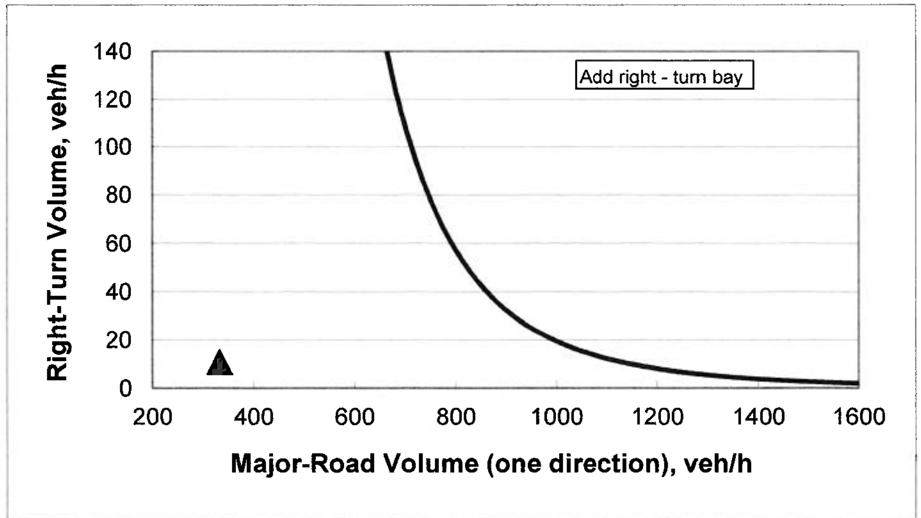


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	402
Right-turn volume, veh/h:	49

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	1578
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

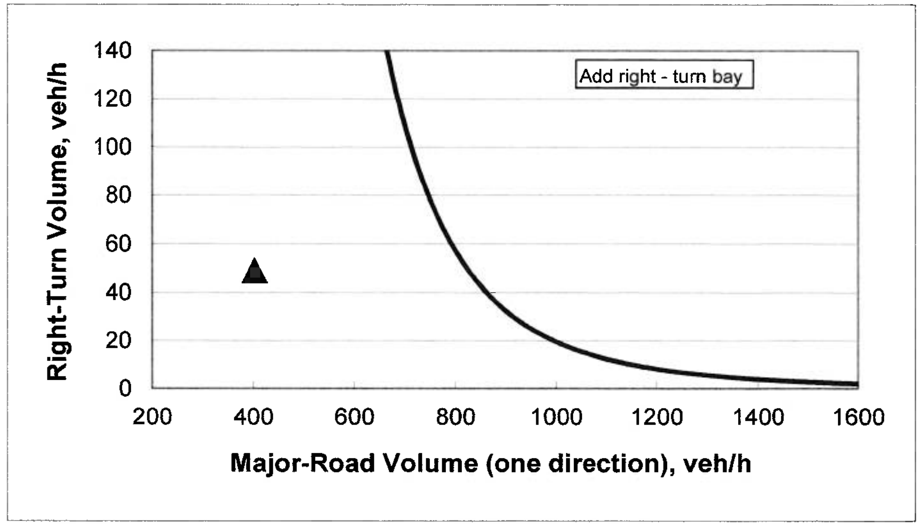


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	289
Right-turn volume, veh/h:	26

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	7742
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

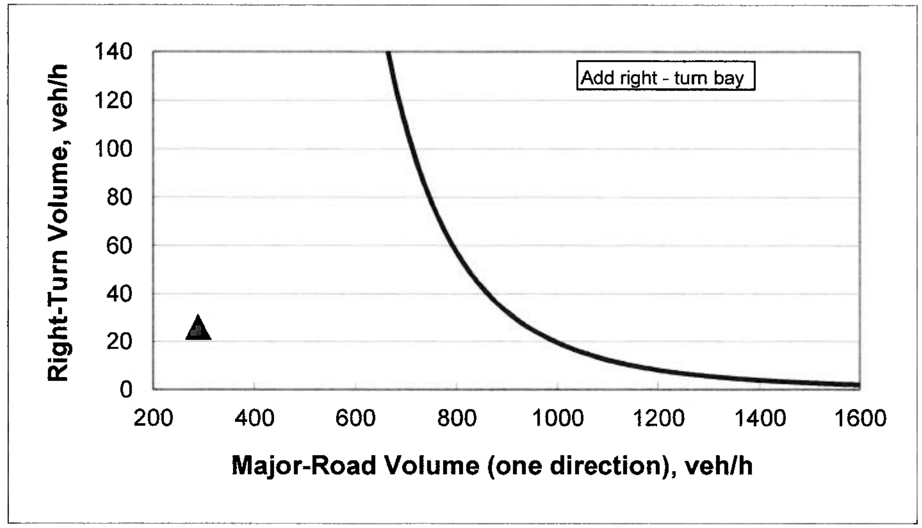


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	331
Right-turn volume, veh/h:	9

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	4026
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

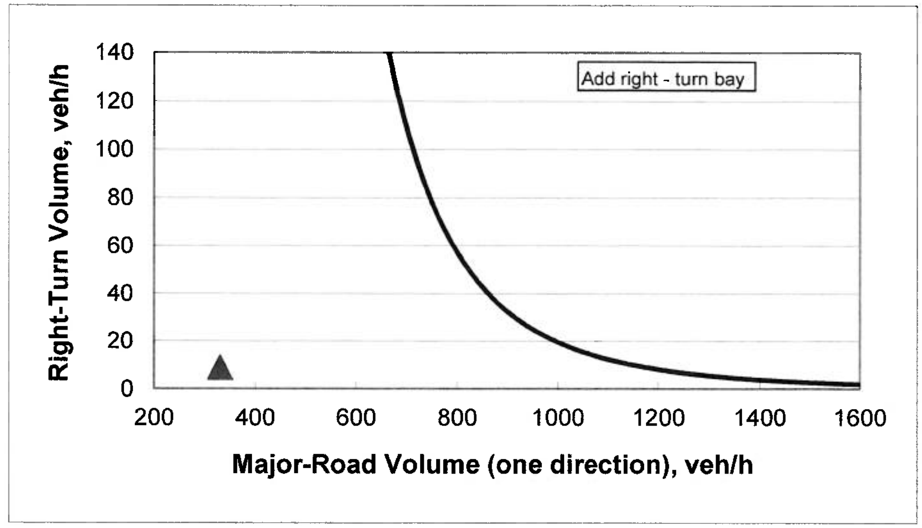


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	662
Percentage of right-turns on minor road, %:	66%
Minor-road volume (one direction), veh/h:	116

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	344
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

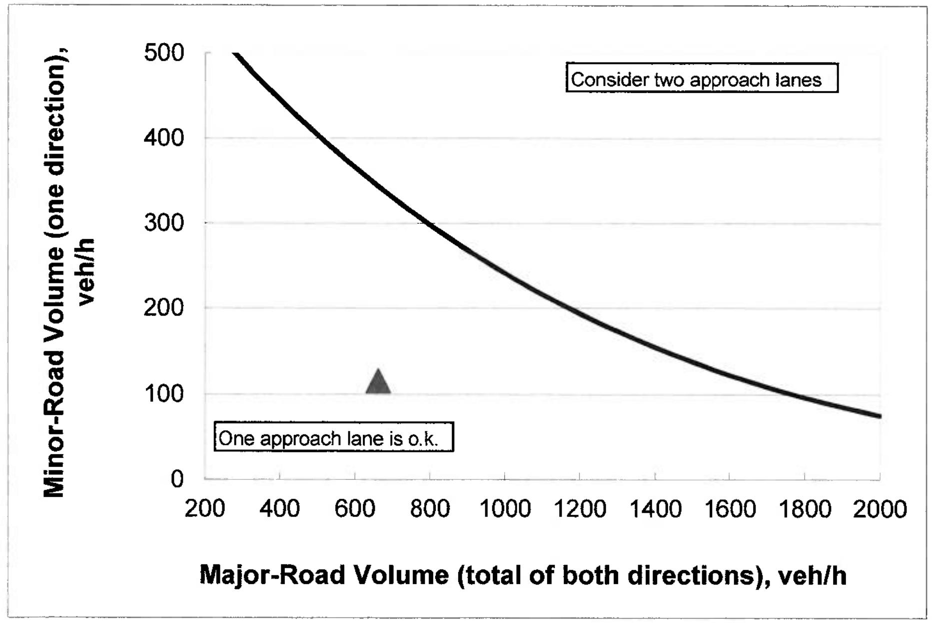
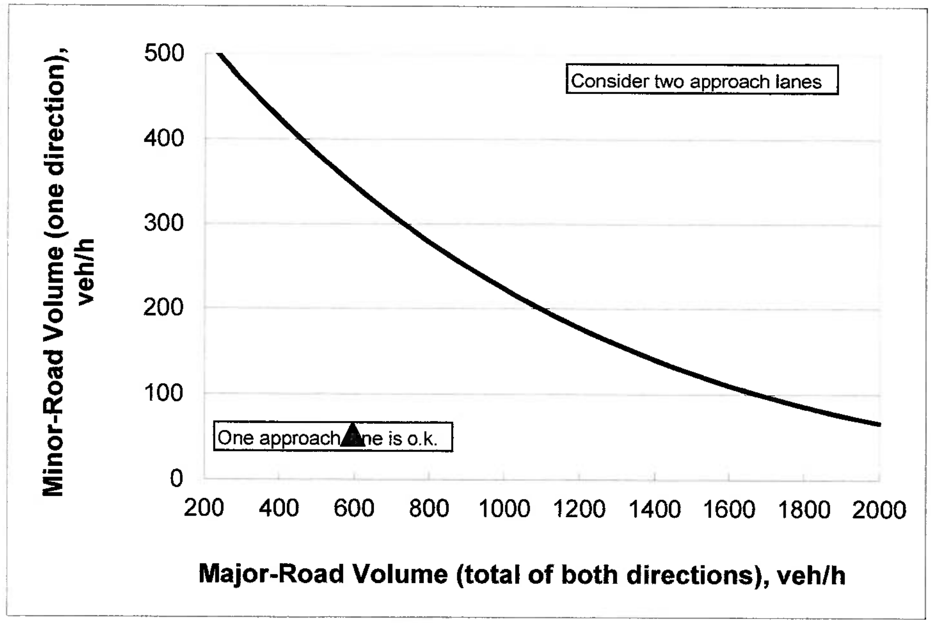


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	596
Percentage of right-turns on minor road, %:	59%
Minor-road volume (one direction), veh/h:	53



OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	346
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

Stephen G. Pernaw & Company, Inc.

Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	725
Percentage of right-turns on minor road, %:	66%
Minor-road volume (one direction), veh/h:	44

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	324
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

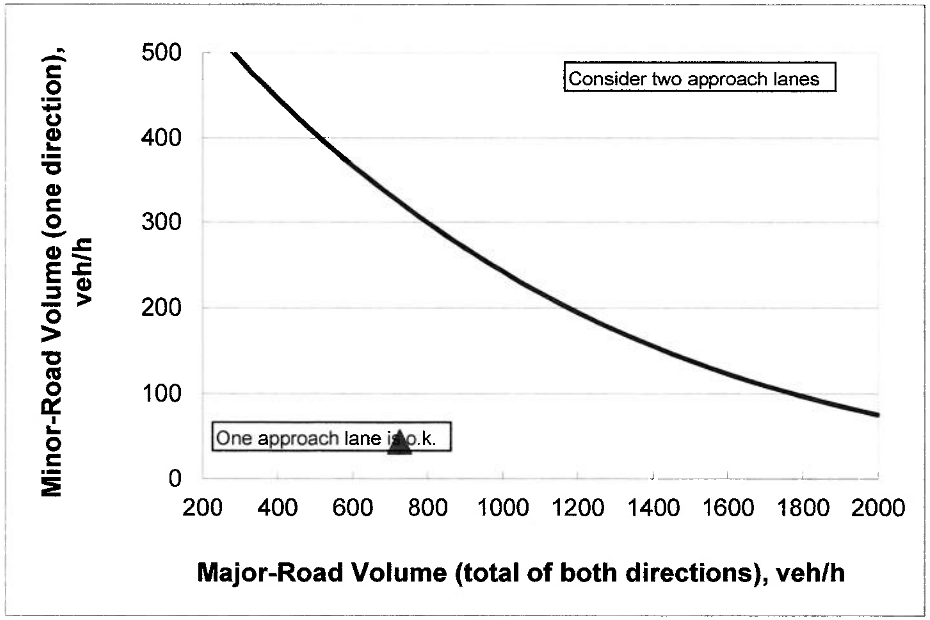


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	662
Percentage of right-turns on minor road, %:	66%
Minor-road volume (one direction), veh/h:	116

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	344
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

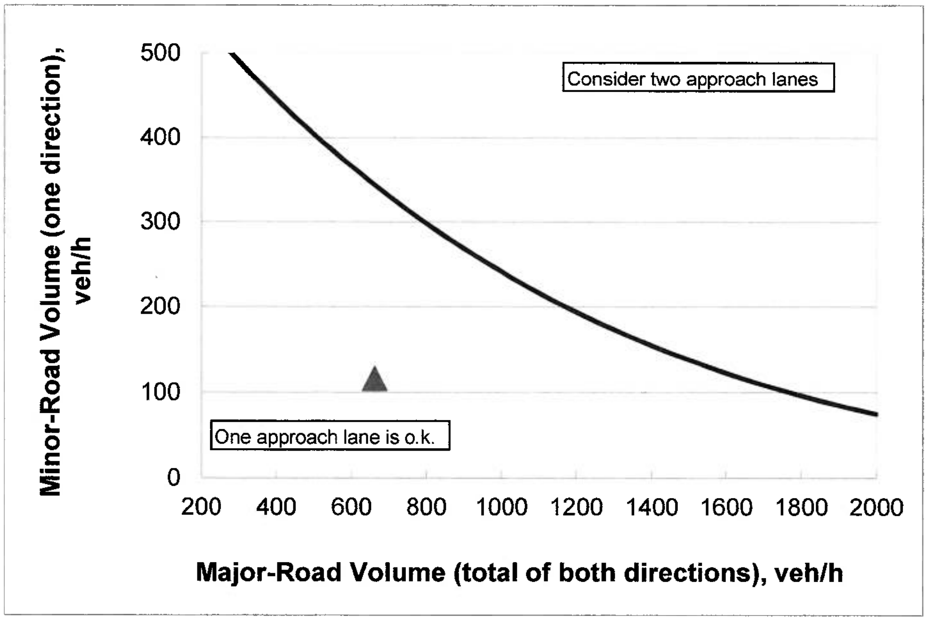


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	586
Percentage of right-turns on minor road, %:	58%
Minor-road volume (one direction), veh/h:	43

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	349
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

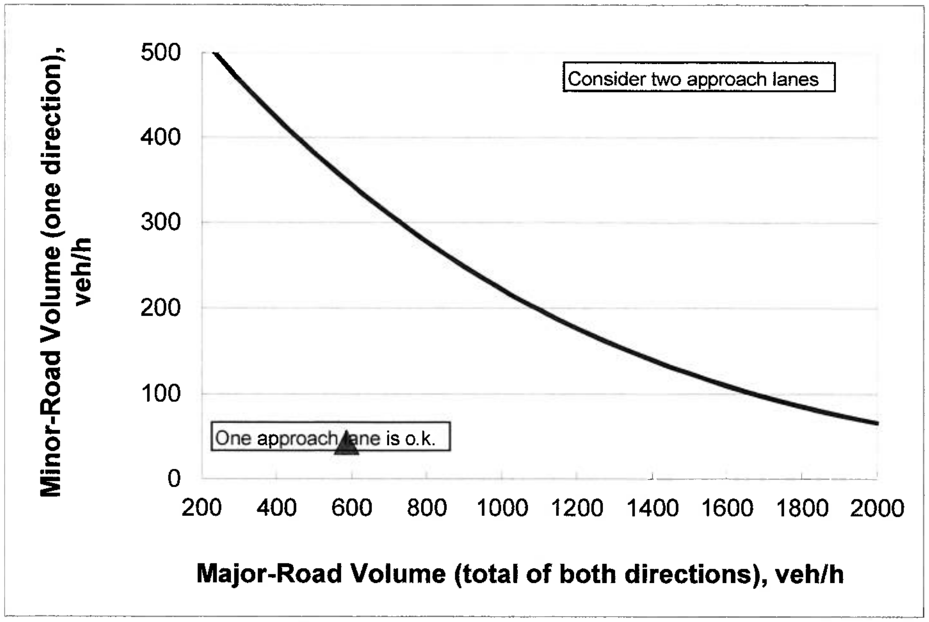


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	720
Percentage of right-turns on minor road, %:	64%
Minor-road volume (one direction), veh/h:	28

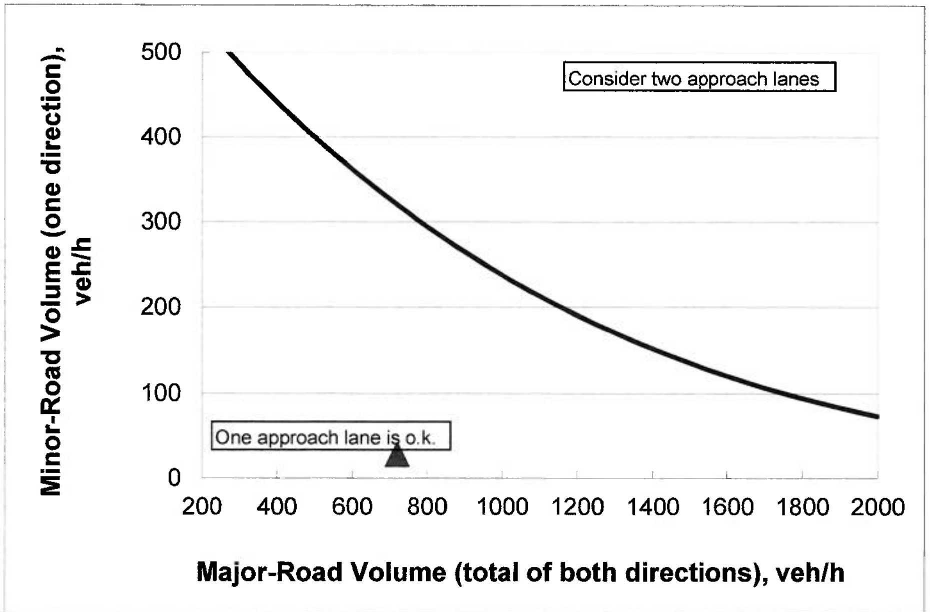
OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	320
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM



DRAINAGE STUDY

FOR

New Gymnasium Project At Saint Patrick Academy

315 Banfield Road
Portsmouth, NH
Assessor's Parcel 266-5

January 2020

Owner:
Hope for Tomorrow Foundation
1950 Lafayette Road, 2nd Floor
Portsmouth, NH 03801

Applicant:
Saint Patrick Academy
315 Banfield Road
Portsmouth, NH 03801

Prepared By:
Altus Engineering, Inc.
133 Court Street
Portsmouth, NH 03801
Phone: (603) 433-2335

STATE OF NEW HAMPSHIRE
CORY
D.
BELDEN
No. 14239
LICENSED
PROFESSIONAL ENGINEER

1/28/20

New Gymnasium Project
at Saint Patrick Academy

TABLE OF CONTENTS

SCALE 1:12000

0 1000 2000 3000

FEET

PROJECT DESCRIPTION

Site Overview

The Hope for Tomorrow Foundation (HFTF) and Saint Patrick Academy (Academy) constructed a new 200 student school on the 10.7 acre site located at 315 Banfield Road in 2017. In March 2017, the HFTF obtained site approvals for the construction of the school and it was occupied in April 2018 slightly over a year later. The Academy is now thriving in its new location and wishes to construct a stand-alone gymnasium building on the property for physical education classes and their athletic events. Currently the Academy has entered into an agreement with the Foundation for Seacoast Health (FSH) to use their gym for classes and athletic events, but the goal is the keep the students on campus and offer the physical education and athletic events on site. The proposed gymnasium will not expand the school population beyond the 200 maximum students allowed under the previous approval. The gym is an additional amenity to the existing school and not an expansion of use.

In 2017 when the school was approved, the parking ordinance required 0.3 spaces per student and allowed for an additional 20 percent for a maximum of 72 spaces. The facility was constructed with only 60-spaces and this project will expand the parking to 77 spaces.

The 2017 project was permitted under the NHDES Alteration of Terrain Bureau under Permit #AoT-1252, dated May 9, 2017. The propose gymnasium project will also require NHDSES permit approval and will be required to increase the rainfall intensity by 15% per the updated regulations for seacoast communities. All new drainage calculations will incorporate the 15% rainfall intensity increase to both the Pre and Post development analyses.

Pre-Development (Existing Conditions)

The pre-development site conditions reflect the conditions of the site after the 2017 construction of the new school and site improvements. In 2019, James Verra and Associates (JVA) performed a site survey of the proposed development area to accurately depict the current site conditions. The area of survey is shown on the development plans. The areas outside of the survey limit are shown as the proposed 2017 design plans indicated.

The site discharges to two primary discharge locations. The first discharge point is located behind the school to the south in the wetlands. This location will not be altered by the proposed gymnasium development and is not included in the analysis calculations. The second discharge point is in the northeast corner of the site, which drains to the ditch along Banfield Road. This watershed primarily includes the front of the school, ballfield, driveway, and parking areas. It is identified on the Watershed Plans as Point of Analysis #1. The pre-development site was modeled by using the post-development design model from the 2017 site improvements and updates from the 2019 survey data. The site is divided into multiple divided watersheds to reflect the current site conditions. The discharge point is POA #1, adjacent to Banfield Road in the northeast corner of the site.

Post-Development (Proposed Site Design)

The Hope for Tomorrow Foundation (HFTF) is proposing to construct a new 17,000 square foot gymnasium with associated parking, walkways, and stormwater infrastructure. All new parking areas will be constructed with permeable pavement or pavers. The proposed stormwater management plan will include permeable pavement, an 1100 square foot raingarden, roof dripline filter, and a stormwater retention pond. Because all new parking areas will be constructed with permeable surfaces, pre-treatment is not required for the roof and walkways. The stormwater management system proposed for the site will reduce peak flows and treat site runoff prior to discharging back to the surface stormwater system. The proposed development area is a tributary to Sagamore Creek, as referenced by the attached USGS map.

As described in the pre-development conditions, the proposed site improvements are located on the north side of the existing school. This watershed primarily includes the front of the school, ballfield, driveway, and parking areas and is identified on the Watershed Plans as Point of Analysis #1.

The proposed gymnasium site improvements are almost entirely on the west side of the access drive from Banfield Road. For this reason, Point of Analysis #2 is also included in the results to depict the Pre and Post development results at the driveway crossing. The two points of analysis are the same for the pre and post development models and are used for comparison of flows prior to construction and after the site is development as shown on the plans.

The "Post-Development Watershed Plan" illustrates the proposed stormwater management system. The subcatchments from the Pre-Development conditions have been divided into smaller areas to emulate the proposed grading and stormwater management system proposed for construction. The post-development conditions were analyzed at the same primary discharge point examined in the pre-development modeling.

Pollutant Removal

Based on the New Hampshire Stormwater Manual (Volume 2), the following pollutant removal rates would be expected from the implementation of the proposed raingardens:

Pollutant	Removal %
Total Suspended Solids (TSS)	90%
Total Nitrogen (TN)	65%
Total Phosphorus (TP)	65%

Drainage Analysis

A complete summary of the drainage model is included later in this report. The following table compares pre- and post-development peak rates of runoff for all analyzed storm events at the two Points of Analysis:

Stormwater Modeling Summary
Peak Q (cfs) for Type III 24-Hour Storm Events

	2-Yr Storm (3.23 inch)	10-Yr Storm (4.90 inch)	25-Yr Storm (6.21 inch)	50-Yr Storm (7.45 inch)
POA #1 – Banfield Road				
Pre	6.15	12.60	16.66	25.51
Post	5.67	11.76	15.73	24.15
Net Change	**-0.48**	**-0.84**	**-0.93**	**-1.36**
POA #2 – Driveway Crossing				
Pre	3.18	6.81	9.61	12.66
Post	2.40	4.51	8.50	12.02
Net Change	**-0.78**	**-2.30**	**-1.11**	**-0.64**

As the above table demonstrates, the proposed peak rates of runoff will be decreased from the existing conditions of the site at the analysis points for all analyzed storm events.

CONCLUSION

This proposed Saint Patrick Academy site development located at 315 Banfield Road in Portsmouth, NH will not have an adverse effect on abutting properties and infrastructure as a result of stormwater runoff. Post-construction peak rates of runoff from the site will be lower than the Pre-development conditions for all analyzed storm events. The construction of a comprehensive stormwater drainage system will provide the required treatment to stormwater runoff. Appropriate steps will be taken to properly mitigate erosion and sedimentation through the use of temporary and permanent Best Management Practices for sediment and erosion control.

Site Soils

A Site Specific Soils Survey was conducted by Joseph Noel, New Hampshire Certified Soil Scientist No. 017, in December of 2016 to delineate the soils on site. The proposed project area was found to have soils that ranged from well drained to somewhat poorly drained, with the majority of the site being a hydrologic soil group (HSG) C. The following soils were identified on site:

NUMERICAL SYMBOL	SOIL MAP UNIT NAME	HSG
40	CHATFIELD (WELL DRAINED)-HOLLIS (WELL DRAINED) COMPLEX	B
299	UDORTHENTS, SMOOTHED	C
448	SCITUATE	C
533	RAYNHAM (POORLY DRAINED)	D
926	RIDGEBURY (SOMEWHAT POORLY DRAINED)	D
931	RAYNHAM (SOMEWHAT POORLY DRAINED)	D

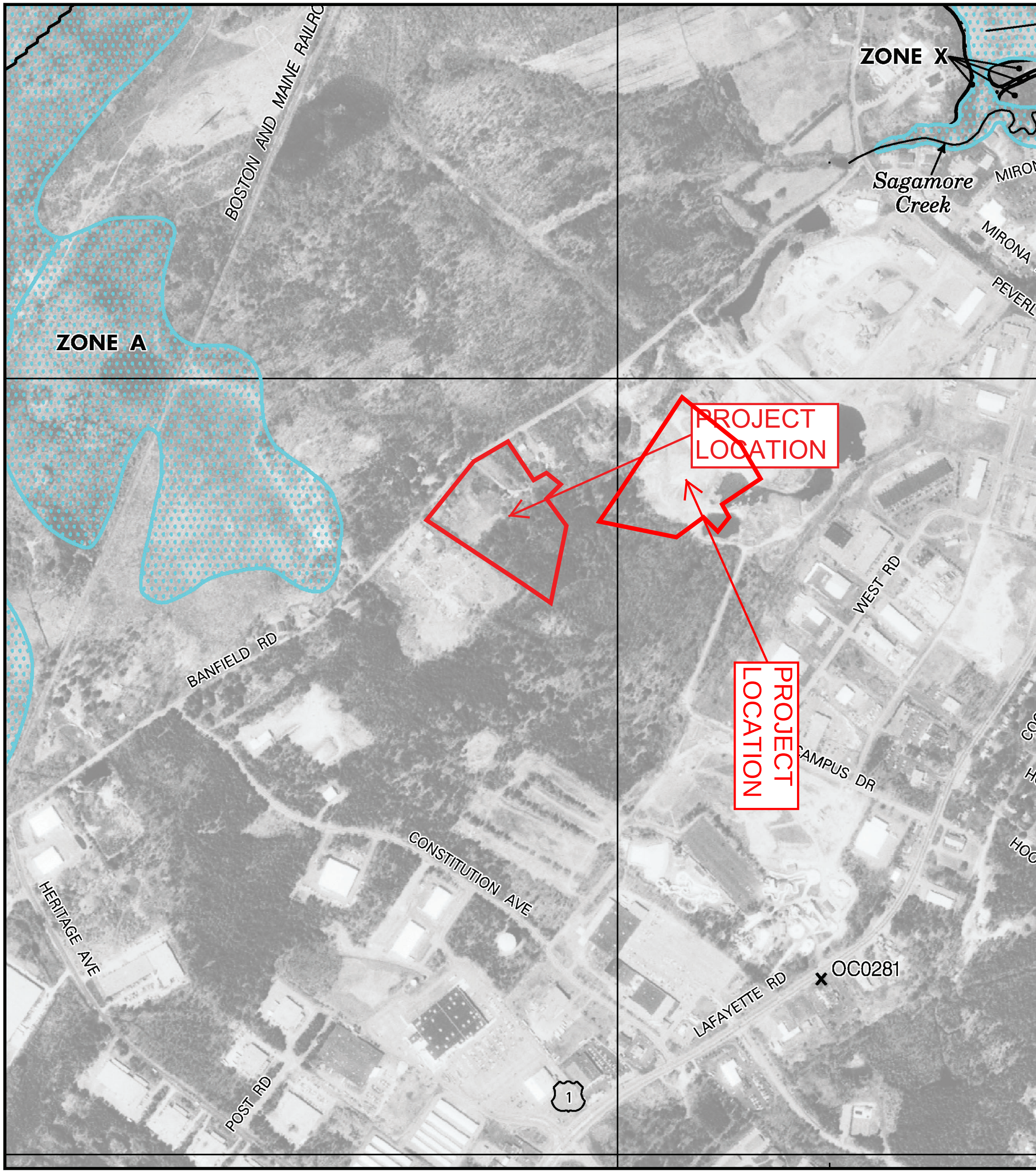
Due to the well-drained soils located on the majority of the site, test pits and infiltration tests were conducted by R.W. Gillespie & Associates, Inc. to determine the feasibility of infiltration and the depths of groundwater and bedrock on site.

CALCULATION METHODS

The drainage study was completed using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. Reservoir routing was performed with the Dynamic Storage Indication method which automates the calculation of Tailwater conditions. A Type III 24-hour rainfall distribution was utilized in analyzing the data for the 2, 10, 25, and 50 Year - 24-hour storm events using rainfall data provided by Northeast Regional Climate Center – Extreme Precipitation Tables. A fifteen percent (15%) increase was added to the NRCC rainfall intensities for Seacoast Communities.

Disclaimer

Altus Engineering, Inc. notes that stormwater modeling is limited in its capacity to precisely predict peak rates of runoff and flood elevations. Results should not be considered to represent actual storm events due to the number of variables and assumptions involved in the modeling effort. Surface roughness coefficients (n), entrance loss coefficients (ke), velocity factors (kv) and times of concentration (Tc) are based on subjective field observations and engineering judgment using available data. For design purposes, curve numbers (Cn) describe the average conditions. However, curve numbers will vary from storm to storm depending on the antecedent runoff conditions (ARC) including saturation and frozen ground. Also, higher water elevations than predicted by modeling could occur if drainage channels, closed drain systems or culverts are not maintained and/or become blocked by debris before and/or during a storm event as this will impact flow capacity of the structures. Structures should be re-evaluated if future changes occur within relevant drainage areas in order to assess any required design modifications.



onal Flood Insurance Program at 1–800–638–6620.

N

MAP SCALE 1" = 1000'

00 0 1000 2000 FEET

PANEL 0270E

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ROCKINGHAM COUNTY,
NEW HAMPSHIRE
(ALL JURISDICTIONS)

PANEL 270 OF 681

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENLAND, TOWN OF	330210	0270	E
NORTH HAMPTON, TOWN OF	330232	0270	E
PORTSMOUTH, CITY OF	330139	0270	E
RYE, TOWN OF	330141	0270	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

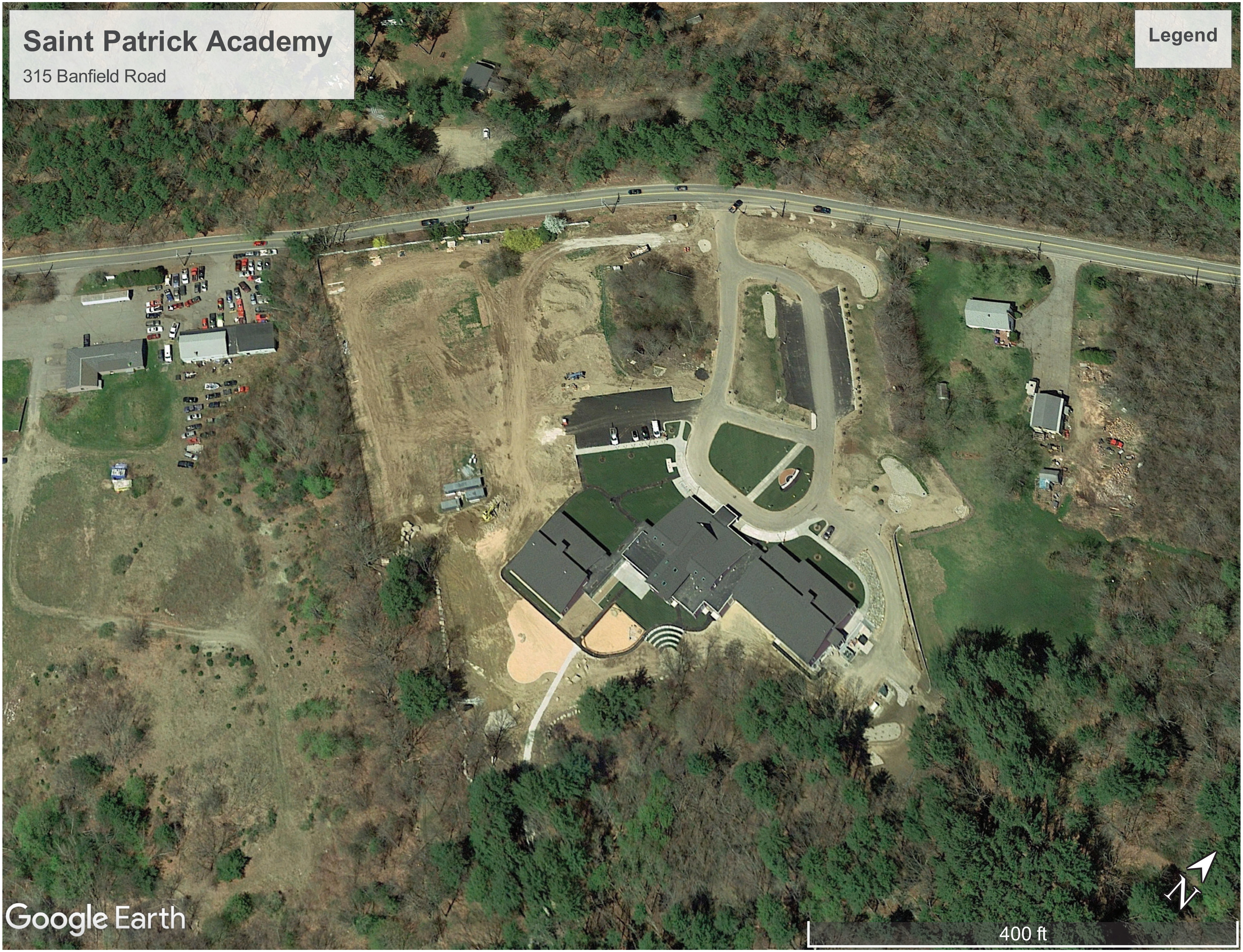
U.S. DEPARTMENT OF HOMELAND SECURITY

MAP NUMBER
33015C0270E

EFFECTIVE DATE
MAY 17, 2005

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


Saint Patrick Academy
315 Banfield Road
Legend
Google Earth
400 ft
N

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Node RG-B: Raingarden B**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
1.41	ac	A = Area draining to the practice	
0.32	ac	A_I = Impervious area draining to the practice	
0.23	decimal	I = percent impervious area draining to the practice, in decimal form	
0.25	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.36	ac-in	WQV= 1" x Rv x A	
1,301	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
325	cf	25% x WQV (check calc for sediment forebay volume)	
976	cf	75% x WQV (check calc for surface sand filter volume)	
NR-Roof Only		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← **≥ 25%WQV**
1,100	sf	A_{SA} = surface area of the practice	
2.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
5.7	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← **≤ 72-hrs**
45.50	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
44.25	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
45.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
43.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.25	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← **≥ 1'**
2.50	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← **≥ 1'**
0.50	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← **≥ 1'**
47.85	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
48.60	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← **yes**

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← **< 10 ac**
	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ 75%WQV**
	inches	D_{FC} = filter course thickness	← **18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← **yes**

If a bioretention area is proposed:

YES ac		Drainage Area no larger than 5 ac?	← yes
2,027 cf		V = volume of storage[3] (attach a stage-storage table)	← ≥ WQV
18.0 inches		D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	D-7	Note what sheet in the plan set contains the filter course specification	
4.0 :1		Pond side slopes	← ≥3:1
Sheet	L-1	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

	Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
acres	A_{SA} = surface area of the pervious pavement	
#DIV/0! :1	ratio of the contributing area to the pervious surface area	← 5:1
inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet	Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Note: The infiltration rate of 2.5 in/hr used for the modeling is for the media filter material.
Exfiltration is not used for the design. Underdrains are provided.

Stage-Area-Storage for Pond 11P: Raingarden B [redacted]

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
44.25	1,100	0	46.85	1,100	679
44.30	1,100	22	46.90	1,100	685
44.35	1,100	44	46.95	1,100	690
44.40	1,100	66	47.00	1,100	696
44.45	1,100	88	47.05	1,145	784
44.50	1,100	110	47.10	1,190	873
44.55	1,100	132	47.15	1,235	962
44.60	1,100	154	47.20	1,280	1,051
44.65	1,100	176	47.25	1,325	1,140
44.70	1,100	198	47.30	1,370	1,228
44.75	1,100	220	47.35	1,415	1,317
44.80	1,100	242	47.40	1,460	1,406
44.85	1,100	264	47.45	1,505	1,495
44.90	1,100	286	47.50	1,550	1,583
44.95	1,100	308	47.55	1,595	1,672
45.00	1,100	330	47.60	1,640	1,761
45.05	1,100	352	47.65	1,685	1,849
45.10	1,100	374	47.70	1,730	1,938
45.15	1,100	396	47.75	1,775	2,027
45.20	1,100	418	47.80	1,820	2,116
45.25	1,100	440	47.85	1,865	2,205
45.30	1,100	458	47.90	1,910	2,293
45.35	1,100	476	47.95	1,955	2,382
45.40	1,100	494	48.00	2,000	2,471
45.45	1,100	513	48.05	2,045	2,559
45.50	1,100	531	48.10	2,090	2,648
45.55	1,100	536	48.15	2,135	2,737
45.60	1,100	542	48.20	2,180	2,826
45.65	1,100	547	48.25	2,225	2,915
45.70	1,100	553	48.30	2,270	3,003
45.75	1,100	558	48.35	2,315	3,092
45.80	1,100	564	48.40	2,360	3,181
45.85	1,100	569	48.45	2,405	3,270
45.90	1,100	575	48.50	**2,450**	**3,358**
45.95	1,100	580			
46.00	1,100	586			
46.05	1,100	591			
46.10	1,100	597			
46.15	1,100	602			
46.20	1,100	608			
46.25	1,100	613			
46.30	1,100	619			
46.35	1,100	624			
46.40	1,100	630			
46.45	1,100	635			
46.50	1,100	641			
46.55	1,100	646			
46.60	1,100	652			
46.65	1,100	657			
46.70	1,100	663			
46.75	1,100	668			
46.80	1,100	674			

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Node 7P: Roof Dripline Filter**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
0.19	ac	A = Area draining to the practice	
0.18	ac	A_I = Impervious area draining to the practice	
0.95	decimal	I = percent impervious area draining to the practice, in decimal form	
0.90	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.17	ac-in	WQV= 1” x Rv x A	
623	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
156	cf	25% x WQV (check calc for sediment forebay volume)	
467	cf	75% x WQV (check calc for surface sand filter volume)	
NR-roof		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = sediment forebay volume, if used for pretreatment	**← ≥ 25%WQV**
360	sf	A_{SA} = surface area of the practice	
2.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
8.3	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	**← ≤ 72-hrs**
54.00	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
53.00	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
50.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
50.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	**← ≥ 1'**
4.00	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	**← ≥ 1'**
4.00	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	**← ≥ 1'**
56.02	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
56.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	**← < 10 ac**
	cf	V = volume of storage[3] (attach a stage-storage table)	**← ≥ 75%WQV**
	inches	D_{FC} = filter course thickness	**← 18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← **yes**
292	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ WQV**
18.0	inches	D_{FC} = filter course thickness	← **18", or 24" if within GPA**
Sheet	D-7	Note what sheet in the plan set contains the filter course specification	
10.0	:1	Pond side slopes	← **≥3:1**
Sheet	L-1	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← **5:1**
	inches	D_{FC} = filter course thickness	← **12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	← **304.1 sand**

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Note: The roofline drip filter is in addition ot the Raingarden B.
The roof runoff will enter the dripline filter and overflow to surface flow, where
it will be conveyed to Rangarden B, therefoere being treated twice.

Stage-Area-Storage for Pond 7P: Roof Dripline Filter & Cleanout

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
52.50	**360**	0	55.10	360	218
52.55	360	6	55.15	360	220
52.60	360	12	55.20	360	221
52.65	360	18	55.25	360	223
52.70	360	24	55.30	360	225
52.75	360	30	55.35	360	227
52.80	360	36	55.40	360	229
52.85	360	42	55.45	360	230
52.90	360	48	55.50	360	232
52.95	360	53	55.55	360	238
53.00	360	59	55.60	360	244
53.05	360	65	55.65	360	250
53.10	360	71	55.70	360	256
53.15	360	77	55.75	360	262
53.20	360	83	55.80	360	268
53.25	360	89	55.85	360	274
53.30	360	95	55.90	360	280
53.35	360	101	55.95	360	286
53.40	360	107	56.00	360	292
53.45	360	113	56.05	360	298
53.50	360	119	56.10	360	303
53.55	360	125	56.15	360	309
53.60	360	131	56.20	360	315
53.65	360	137	56.25	360	**321**
53.70	360	143			
53.75	360	149			
53.80	360	154			
53.85	360	160			
53.90	360	166			
53.95	360	172			
54.00	360	178			
54.05	360	180			
54.10	360	182			
54.15	360	184			
54.20	360	185			
54.25	360	187			
54.30	360	189			
54.35	360	191			
54.40	360	193			
54.45	360	194			
54.50	360	196			
54.55	360	198			
54.60	360	200			
54.65	360	202			
54.70	360	203			
54.75	360	205			
54.80	360	207			
54.85	360	209			
54.90	360	211			
54.95	360	212			
55.00	360	214			
55.05	360	216			

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.788 degrees West
Latitude	43.044 degrees North
Elevation	0 feet
Date/Time	Sun, 22 Dec 2019 12:46:51 -0500

Extreme Precipitation Estimates

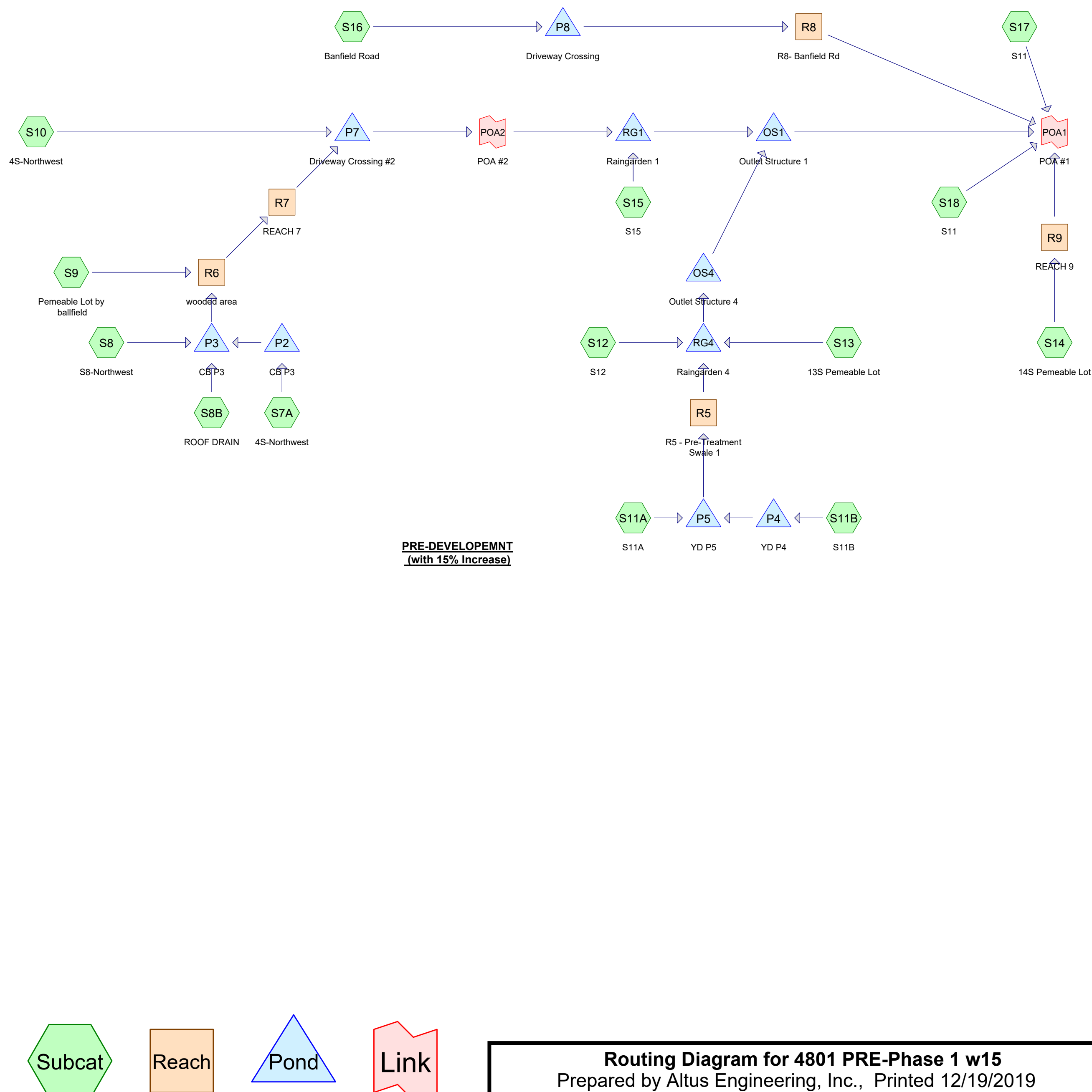
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.71	0.98	1.22	1.57	2.04	2.67	2.94	**1yr**	2.37	2.83	3.24	3.96	4.58	**1yr**
2yr	0.32	0.50	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.50	3.23	3.59	**2yr**	2.86	3.45	3.96	4.71	5.36	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.15	4.09	4.61	**5yr**	3.62	4.43	5.07	5.97	6.74	**5yr**
10yr	0.41	0.65	0.82	1.12	1.45	1.89	**10yr**	1.25	1.73	2.24	2.90	3.77	4.90	5.57	**10yr**	4.34	5.35	6.13	7.16	8.03	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.34	**25yr**	1.53	2.15	2.78	3.64	4.76	6.21	7.15	**25yr**	5.50	6.87	7.87	9.09	10.12	**25yr**
50yr	0.54	0.86	1.10	1.54	2.08	2.76	**50yr**	1.79	2.53	3.30	4.34	5.69	7.45	8.64	**50yr**	6.59	8.31	9.50	10.90	12.07	**50yr**
100yr	0.60	0.97	1.25	1.77	2.42	3.26	**100yr**	2.09	2.98	3.92	5.18	6.81	8.92	10.46	**100yr**	7.90	10.05	11.49	13.08	14.39	**100yr**
200yr	0.68	1.10	1.43	2.05	2.83	3.85	**200yr**	2.44	3.52	4.63	6.16	8.13	10.69	12.65	**200yr**	9.46	12.16	13.89	15.69	17.16	**200yr**
500yr	0.80	1.32	1.72	2.49	3.49	4.78	**500yr**	3.01	4.39	5.79	7.74	10.29	13.60	16.27	**500yr**	12.03	15.65	17.86	19.98	21.68	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.89	**1yr**	0.63	0.87	0.92	1.33	1.67	2.24	2.55	**1yr**	1.99	2.45	2.88	3.17	3.91	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.34	3.08	3.48	**2yr**	2.72	3.35	3.85	4.58	5.11	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.41	**5yr**	1.01	1.38	1.61	2.12	2.73	3.82	4.24	**5yr**	3.38	4.08	4.76	5.59	6.30	**5yr**
10yr	0.39	0.60	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.81	2.39	3.06	4.41	4.93	**10yr**	3.91	4.74	5.52	6.49	7.28	**10yr**
25yr	0.44	0.67	0.84	1.19	1.57	1.91	**25yr**	1.36	1.86	2.10	2.76	3.54	4.75	6.00	**25yr**	4.20	5.77	6.78	7.92	8.80	**25yr**
50yr	0.49	0.74	0.92	1.32	1.78	2.18	**50yr**	1.54	2.13	2.35	3.08	3.94	5.37	6.95	**50yr**	4.75	6.68	7.91	9.22	10.17	**50yr**
100yr	0.54	0.82	1.03	1.48	2.03	2.48	**100yr**	1.75	2.42	2.63	3.42	4.36	6.04	8.04	**100yr**	5.35	7.73	9.24	10.74	11.76	**100yr**
200yr	0.60	0.90	1.14	1.66	2.31	2.83	**200yr**	1.99	2.77	2.94	3.78	4.81	6.78	9.31	**200yr**	6.00	8.95	10.79	12.52	13.61	**200yr**
500yr	0.70	1.04	1.34	1.94	2.76	3.39	**500yr**	2.38	3.31	3.42	4.32	5.49	7.89	11.30	**500yr**	6.99	10.86	13.26	15.37	16.49	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.72	0.89	1.08	**1yr**	0.77	1.06	1.26	1.74	2.20	3.01	3.16	**1yr**	2.66	3.04	3.61	4.39	5.08	**1yr**
2yr	0.34	0.52	0.64	0.86	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.51	3.45	3.71	**2yr**	3.05	3.57	4.10	4.85	5.67	**2yr**
5yr	0.40	0.62	0.77	1.05	1.34	1.62	**5yr**	1.15	1.59	1.88	2.53	3.24	4.36	4.96	**5yr**	3.86	4.77	5.40	6.38	7.17	**5yr**
10yr	0.47	0.72	0.89	1.25	1.61	1.98	**10yr**	1.39	1.93	2.28	3.10	3.94	5.37	6.20	**10yr**	4.75	5.96	6.80	7.85	8.76	**10yr**
25yr	0.58	0.88	1.09	1.56	2.05	2.57	**25yr**	1.77	2.51	2.95	4.06	5.13	7.84	8.31	**25yr**	6.94	7.99	9.09	10.34	11.41	**25yr**
50yr	0.67	1.02	1.27	1.83	2.46	3.13	**50yr**	2.12	3.06	3.59	4.99	6.28	9.81	10.40	**50yr**	8.68	10.00	11.34	12.71	13.95	**50yr**
100yr	0.79	1.19	1.49	2.16	2.96	3.81	**100yr**	2.55	3.72	4.36	6.14	7.71	12.28	13.01	**100yr**	10.87	12.51	14.13	15.66	17.06	**100yr**
200yr	0.92	1.39	1.76	2.55	3.55	4.65	**200yr**	3.07	4.55	5.32	7.56	9.46	15.41	16.29	**200yr**	13.63	15.66	17.64	19.29	20.88	**200yr**
500yr	1.14	1.70	2.19	3.18	4.53	6.04	**500yr**	3.91	5.90	6.91	9.98	12.44	20.81	21.93	**500yr**	18.42	21.08	23.64	25.40	27.27	**500yr**



Routing Diagram for 4801 PRE-Phase 1 w15
Prepared by Altus Engineering, Inc., Printed 12/19/2019
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.849	74	>75% Grass cover, Good, HSG C (S10, S11A, S11B, S12, S13, S14, S15, S16, S17, S18, S7A, S8, S9)
0.426	98	Paved parking, HSG C (S11A, S11B, S12, S13, S14, S15, S17)
0.164	98	Paved roads w/curbs & sewers, HSG C (S16, S17)
0.323	98	Permeable Pavement, HSG C (S13, S14, S9)
0.071	98	Roofs, HSG B (S7A, S8B)
0.093	98	Roofs, HSG C (S7A, S8)
0.109	98	Unconnected pavement, HSG C (S11A, S11B, S8, S9)
0.243	70	Woods, Good, HSG C (S16, S17, S18)
0.261	77	Woods, Good, HSG D (S10)
5.539	**79**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.071	HSG B	S7A, S8B
5.207	HSG C	S10, S11A, S11B, S12, S13, S14, S15, S16, S17, S18, S7A, S8, S9
0.261	HSG D	S10
0.000	Other	
5.539		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.849	0.000	0.000	3.849	>75% Grass cover, Good	S10, S11 A, S11 B, S12, S13, S14, S15, S16, S17, S18, S7A, S8, S9
0.000	0.000	0.426	0.000	0.000	0.426	Paved parking	S11 A, S11 B, S12, S13, S14, S15, S17
0.000	0.000	0.164	0.000	0.000	0.164	Paved roads w/curbs & sewers	S16, S17
0.000	0.000	0.323	0.000	0.000	0.323	Permeable Pavement	S13, S14, S9
0.000	0.071	0.093	0.000	0.000	0.164	Roofs	S7A, S8, S8B

Ground Covers (selected nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.109	0.000	0.000	0.109	Unconnected pavement	S11 A, S11 B, S8, S9
0.000	0.000	0.243	0.261	0.000	0.504	Woods, Good	S10, S16, S17, S18
0.000	**0.071**	**5.207**	**0.261**	**0.000**	**5.539**	**TOTAL AREA**	

Summary for Subcatchment S10: 4S-Northwest

Runoff = 2.56 cfs @ 12.22 hrs, Volume= 0.252 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
83,610	74	>75% Grass cover, Good, HSG C
11,369	77	Woods, Good, HSG D
94,979	74	Weighted Average
94,979		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.4	300	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.3	400	Total			

Summary for Subcatchment S11A: S11A

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 0.88 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.03 cfs @ 21.94 hrs, Volume= 0.024 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.03 cfs @ 21.94 hrs, Volume= 0.028 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16: Banfield Road

Runoff = 1.05 cfs @ 12.21 hrs, Volume= 0.100 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
27,713	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
32,853	77	Weighted Average
29,055		88.44% Pervious Area
3,798		11.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.7	280	0.0350	2.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.6	380	Total			

Summary for Subcatchment S17: S11

Runoff = 0.63 cfs @ 12.11 hrs, Volume= 0.047 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.051 af, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 0.58 cfs @ 12.20 hrs, Volume= 0.054 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.05 cfs @ 21.94 hrs, Volume= 0.046 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	8,822	97	Weighted Average
	389		4.41% Pervious Area
	8,433		95.59% Impervious Area
	778		9.23% Unconnected

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

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 2.23" for 2-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.77 cfs @ 12.11 hrs, Volume= 0.058 af, Atten= 4%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.35 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 2.3 min

Peak Storage= 41 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

‡

Summary for Reach R6: wooded area

Inflow Area =	0.658 ac, 60.97% Impervious, Inflow Depth > 2.38"	for 2-Year event	
Inflow =	0.84 cfs @ 12.15 hrs, Volume=	0.131 af	
Outflow =	0.77 cfs @ 12.34 hrs, Volume=	0.130 af, Atten= 9%, Lag= 11.7 min	

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.30 fps, Min. Travel Time= 6.6 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 19.8 min

Peak Storage= 304 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 14.61 cfs

10.00' x 1.00' deep channel, n= 0.100 Earth, dense brush, high stage
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 120.0' Slope= 0.0042 '/'
Inlet Invert= 51.00', Outlet Invert= 50.50'

‡

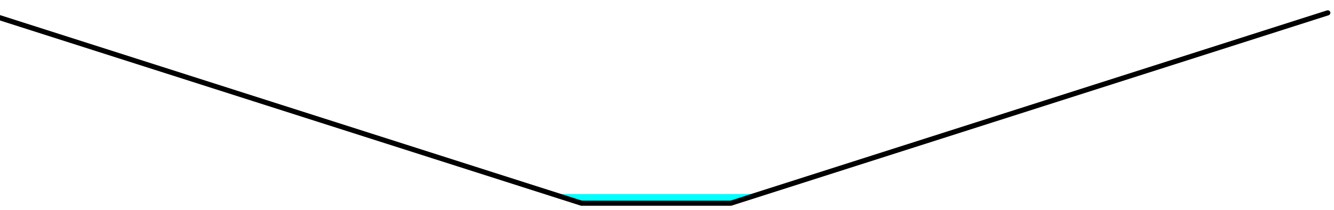
Summary for Reach R7: REACH 7

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 2.36" for 2-Year event
Inflow = 0.77 cfs @ 12.34 hrs, Volume= 0.130 af
Outflow = 0.77 cfs @ 12.35 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.37 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 0.6 min

Peak Storage= 11 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 376.59 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 18.00'
Length= 50.0' Slope= 0.0700 '/'
Inlet Invert= 50.50', Outlet Invert= 47.00'



‡

Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 1.59" for 2-Year event
Inflow = 1.04 cfs @ 12.23 hrs, Volume= 0.100 af
Outflow = 1.02 cfs @ 12.30 hrs, Volume= 0.100 af, Atten= 2%, Lag= 4.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.34 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 5.5 min

Peak Storage= 128 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'

‡

Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 2.73" for 2-Year event
Inflow = 0.03 cfs @ 21.94 hrs, Volume= 0.028 af
Outflow = 0.03 cfs @ 21.94 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 3.912 ac, 22.29% Impervious, Inflow Depth > 1.53" for 2-Year event
Inflow = 4.37 cfs @ 12.26 hrs, Volume= 0.498 af
Outflow = 4.39 cfs @ 12.26 hrs, Volume= 0.498 af, Atten= 0%, Lag= 0.0 min
Primary = 4.39 cfs @ 12.26 hrs, Volume= 0.498 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 39.34' @ 12.26 hrs Surf.Area= 13 sf Storage= 14 cf

Plug-Flow detention time= 0.0 min calculated for 0.497 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (951.0 - 951.0)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.34 cfs @ 12.26 hrs HW=39.32' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.34 cfs @ 5.52 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 1.81" for 2-Year event
Inflow = 1.53 cfs @ 12.16 hrs, Volume= 0.122 af
Outflow = 1.56 cfs @ 12.16 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.16 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.67' @ 12.16 hrs Surf.Area= 13 sf Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (981.8 - 981.7)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.16 hrs HW=42.66' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.52 cfs @ 2.76 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 3.15" for 2-Year event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.52' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (776.7 - 776.5)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 12.09 hrs HW=53.52' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.20 cfs @ 1.59 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth = 2.22" for 2-Year event
Inflow = 0.84 cfs @ 12.15 hrs, Volume= 0.085 af
Outflow = 0.84 cfs @ 12.15 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.1 min
Primary = 0.84 cfs @ 12.15 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.01' @ 12.15 hrs Surf.Area= 13 sf Storage= 6 cf

Plug-Flow detention time= 0.4 min calculated for 0.084 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (813.6 - 813.2)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.84 cfs @ 12.15 hrs HW=52.01' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.84 cfs @ 3.05 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 2.29" for 2-Year event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.04' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (816.4 - 816.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.09 hrs HW=49.04' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.28 cfs @ 2.24 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 2.23" for 2-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 48.96' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.058 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (818.6 - 818.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.78 cfs @ 12.09 hrs HW=48.95' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.78 cfs @ 3.31 fps)

Summary for Pond P7: Driveway Crossing #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 1.61" for 2-Year event
Inflow = 3.18 cfs @ 12.25 hrs, Volume= 0.382 af
Outflow = 3.18 cfs @ 12.25 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.1 min
Primary = 3.18 cfs @ 12.25 hrs, Volume= 0.382 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 45.21' @ 12.25 hrs Surf.Area= 13 sf Storage= 15 cf

Plug-Flow detention time= 0.2 min calculated for 0.382 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (913.2 - 913.1)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below
#2	44.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		253 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0091 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.18 cfs @ 12.25 hrs HW=45.21' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.18 cfs @ 4.05 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 1.59" for 2-Year event
Inflow = 1.05 cfs @ 12.21 hrs, Volume= 0.100 af
Outflow = 1.04 cfs @ 12.23 hrs, Volume= 0.100 af, Atten= 1%, Lag= 1.1 min
Primary = 1.04 cfs @ 12.23 hrs, Volume= 0.100 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.28' @ 12.23 hrs Surf.Area= 128 sf Storage= 60 cf

Plug-Flow detention time= 0.4 min calculated for 0.100 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (852.7 - 852.3)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.03 cfs @ 12.23 hrs HW=47.27' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.03 cfs @ 2.47 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.106 ac, 15.91% Impervious, Inflow Depth > 1.64" for 2-Year event
Inflow = 3.49 cfs @ 12.24 hrs, Volume= 0.425 af
Outflow = 3.40 cfs @ 12.29 hrs, Volume= 0.376 af, Atten= 3%, Lag= 3.0 min
Primary = 3.40 cfs @ 12.29 hrs, Volume= 0.376 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.11' @ 12.29 hrs Surf.Area= 1,823 sf Storage= 2,868 cf

Plug-Flow detention time= 106.2 min calculated for 0.375 af (88% of inflow)
Center-of-Mass det. time= 36.5 min (941.1 - 904.6)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=3.38 cfs @ 12.29 hrs HW=42.11' (Free Discharge)
1=Orifice/Grate (Weir Controls 3.34 cfs @ 1.96 fps)
2=Orifice/Grate (Passes 0.04 cfs of 1.86 cfs potential flow)
3=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 2.16" for 2-Year event
Inflow = 1.63 cfs @ 12.10 hrs, Volume= 0.145 af
Outflow = 1.53 cfs @ 12.16 hrs, Volume= 0.122 af, Atten= 6%, Lag= 3.1 min
Primary = 1.53 cfs @ 12.16 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.71' @ 12.16 hrs Surf.Area= 1,248 sf Storage= 1,379 cf

Plug-Flow detention time= 172.3 min calculated for 0.121 af (84% of inflow)
Center-of-Mass det. time= 73.2 min (981.7 - 908.5)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=1.49 cfs @ 12.16 hrs HW=46.71' (Free Discharge)
1=Orifice/Grate (Passes 0.03 cfs of 1.88 cfs potential flow)
3=Exfiltration (Exfiltration Controls 0.03 cfs)
2=Orifice/Grate (Weir Controls 1.47 cfs @ 1.49 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.539 ac, 21.42% Impervious, Inflow Depth > 1.57" for 2-Year event
Inflow = 6.15 cfs @ 12.26 hrs, Volume= 0.723 af
Primary = 6.15 cfs @ 12.26 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 1.61" for 2-Year event
Inflow = 3.18 cfs @ 12.25 hrs, Volume= 0.382 af
Primary = 3.18 cfs @ 12.25 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Subcatchment S10: 4S-Northwest

Runoff = 5.50 cfs @ 12.22 hrs, Volume= 0.524 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
83,610	74	>75% Grass cover, Good, HSG C
11,369	77	Woods, Good, HSG D
94,979	74	Weighted Average
94,979		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.4	300	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.3	400	Total			

Summary for Subcatchment S11A: S11A

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.067 af, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 1.62 cfs @ 12.09 hrs, Volume= 0.119 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.04 cfs @ 21.94 hrs, Volume= 0.038 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.05 cfs @ 21.94 hrs, Volume= 0.044 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 1.12 cfs @ 12.09 hrs, Volume= 0.082 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16: Banfield Road

Runoff = 2.13 cfs @ 12.20 hrs, Volume= 0.199 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
27,713	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
32,853	77	Weighted Average
29,055		88.44% Pervious Area
3,798		11.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.7	280	0.0350	2.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.6	380	Total			

Summary for Subcatchment S17: S11

Runoff = 1.16 cfs @ 12.11 hrs, Volume= 0.088 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 1.35 cfs @ 12.13 hrs, Volume= 0.107 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 1.10 cfs @ 12.20 hrs, Volume= 0.102 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.08 cfs @ 21.94 hrs, Volume= 0.073 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	8,822	97	Weighted Average
	389		4.41% Pervious Area
	8,433		95.59% Impervious Area
	778		9.23% Unconnected

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

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 4.00" for 10-Year event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af
Outflow = 1.37 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.67 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 2.1 min

Peak Storage= 59 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

Summary for Reach R6: wooded area

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 4.07" for 10-Year event
Inflow = 1.51 cfs @ 12.15 hrs, Volume= 0.223 af
Outflow = 1.40 cfs @ 12.31 hrs, Volume= 0.222 af, Atten= 7%, Lag= 9.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.37 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 16.5 min

Peak Storage= 458 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 14.61 cfs

10.00' x 1.00' deep channel, n= 0.100 Earth, dense brush, high stage
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 120.0' Slope= 0.0042 '/'
Inlet Invert= 51.00', Outlet Invert= 50.50'

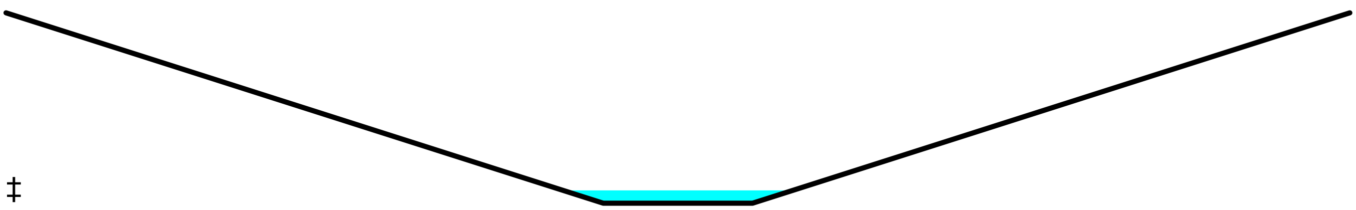
Summary for Reach R7: REACH 7

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 4.05" for 10-Year event
Inflow = 1.40 cfs @ 12.31 hrs, Volume= 0.222 af
Outflow = 1.40 cfs @ 12.32 hrs, Volume= 0.222 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 0.5 min

Peak Storage= 17 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 376.59 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 18.00'
Length= 50.0' Slope= 0.0700 '/'
Inlet Invert= 50.50', Outlet Invert= 47.00'



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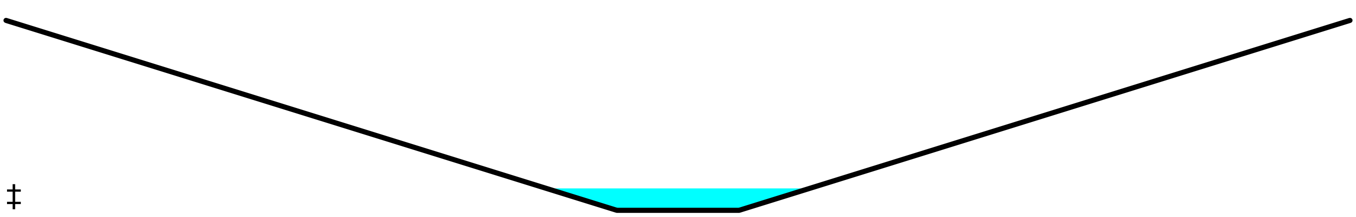
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 2.12 cfs @ 12.22 hrs, Volume= 0.199 af
Outflow = 2.07 cfs @ 12.27 hrs, Volume= 0.199 af, Atten= 2%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.88 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 4.7 min

Peak Storage= 211 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



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Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 4.31" for 10-Year event
Inflow = 0.05 cfs @ 21.94 hrs, Volume= 0.044 af
Outflow = 0.05 cfs @ 21.94 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 3.912 ac, 22.29% Impervious, Inflow Depth > 3.10" for 10-Year event
Inflow = 8.67 cfs @ 12.17 hrs, Volume= 1.010 af
Outflow = 8.77 cfs @ 12.16 hrs, Volume= 1.010 af, Atten= 0%, Lag= 0.0 min
Primary = 8.77 cfs @ 12.16 hrs, Volume= 1.010 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 43.37' @ 12.16 hrs Surf.Area= 13 sf Storage= 47 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (901.4 - 901.4)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=8.62 cfs @ 12.16 hrs HW=43.20' (Free Discharge)
1=Culvert (Inlet Controls 8.62 cfs @ 10.98 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 3.49" for 10-Year event
Inflow = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af
Outflow = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.1 min
Primary = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 43.08' @ 12.12 hrs Surf.Area= 13 sf Storage= 10 cf

Plug-Flow detention time= 0.0 min calculated for 0.234 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (918.1 - 918.0)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.80 cfs @ 12.12 hrs HW=43.05' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.80 cfs @ 3.57 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 5.05" for 10-Year event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.58' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (765.3 - 765.1)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.31 cfs @ 12.09 hrs HW=53.57' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.31 cfs @ 1.78 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth > 3.96" for 10-Year event
Inflow = 1.50 cfs @ 12.15 hrs, Volume= 0.150 af
Outflow = 1.50 cfs @ 12.15 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.1 min
Primary = 1.50 cfs @ 12.15 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.22' @ 12.15 hrs Surf.Area= 13 sf Storage= 9 cf

Plug-Flow detention time= 0.3 min calculated for 0.150 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (801.1 - 800.8)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.50 cfs @ 12.15 hrs HW=52.22' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.50 cfs @ 3.49 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 4.07" for 10-Year event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.15' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (800.1 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.09 hrs HW=49.14' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.49 cfs @ 2.55 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 4.00" for 10-Year event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af
Outflow = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.14' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (802.0 - 801.9)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.37 cfs @ 12.09 hrs HW=49.13' (Free Discharge)
1=Culvert (Barrel Controls 1.37 cfs @ 3.74 fps)

Summary for Pond P7: Driveway Crossing #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 3.15" for 10-Year event
Inflow = 6.68 cfs @ 12.23 hrs, Volume= 0.746 af
Outflow = 6.81 cfs @ 12.25 hrs, Volume= 0.746 af, Atten= 0%, Lag= 1.3 min
Primary = 6.81 cfs @ 12.25 hrs, Volume= 0.746 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.19' @ 12.25 hrs Surf.Area= 423 sf Storage= 253 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (883.6 - 883.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below
#2	44.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		253 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0091 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=6.75 cfs @ 12.25 hrs HW=49.09' (Free Discharge)
1=Culvert (Barrel Controls 6.75 cfs @ 8.59 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 2.13 cfs @ 12.20 hrs, Volume= 0.199 af
Outflow = 2.12 cfs @ 12.22 hrs, Volume= 0.199 af, Atten= 1%, Lag= 1.0 min
Primary = 2.12 cfs @ 12.22 hrs, Volume= 0.199 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.57' @ 12.22 hrs Surf.Area= 242 sf Storage= 122 cf

Plug-Flow detention time= 0.5 min calculated for 0.199 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (832.8 - 832.3)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.09 cfs @ 12.22 hrs HW=47.56' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.09 cfs @ 3.06 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.106 ac, 15.91% Impervious, Inflow Depth > 3.20" for 10-Year event
Inflow = 7.36 cfs @ 12.25 hrs, Volume= 0.828 af
Outflow = 6.76 cfs @ 12.30 hrs, Volume= 0.776 af, Atten= 8%, Lag= 3.0 min
Primary = 6.76 cfs @ 12.30 hrs, Volume= 0.776 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.37' @ 12.30 hrs Surf.Area= 2,016 sf Storage= 3,322 cf

Plug-Flow detention time= 61.4 min calculated for 0.776 af (94% of inflow)
Center-of-Mass det. time= 19.8 min (896.4 - 876.5)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=6.76 cfs @ 12.30 hrs HW=42.37' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 6.71 cfs @ 3.80 fps)
└─**2=Orifice/Grate** (Passes 0.05 cfs of 1.92 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 3.88" for 10-Year event
Inflow = 2.98 cfs @ 12.10 hrs, Volume= 0.260 af
Outflow = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af, Atten= 3%, Lag= 1.2 min
Primary = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.83' @ 12.12 hrs Surf.Area= 1,328 sf Storage= 1,484 cf

Plug-Flow detention time= 102.5 min calculated for 0.233 af (90% of inflow)
Center-of-Mass det. time= 35.4 min (918.0 - 882.7)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.81 cfs @ 12.12 hrs HW=46.82' (Free Discharge)
↑—**1=Orifice/Grate** (Passes 0.03 cfs of 1.91 cfs potential flow)
  ↑—**3=Exfiltration** (Exfiltration Controls 0.03 cfs)
└—**2=Orifice/Grate** (Weir Controls 2.78 cfs @ 1.85 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.539 ac, 21.42% Impervious, Inflow Depth > 3.14" for 10-Year event
Inflow = 12.60 cfs @ 12.16 hrs, Volume= 1.449 af
Primary = 12.60 cfs @ 12.16 hrs, Volume= 1.449 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 3.15" for 10-Year event
Inflow = 6.81 cfs @ 12.25 hrs, Volume= 0.746 af
Primary = 6.81 cfs @ 12.25 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Subcatchment S10: 4S-Northwest

Runoff = 7.97 cfs @ 12.21 hrs, Volume= 0.757 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
83,610	74	>75% Grass cover, Good, HSG C
11,369	77	Woods, Good, HSG D
94,979	74	Weighted Average
94,979		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.4	300	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.3	400	Total			

Summary for Subcatchment S11A: S11A

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.05 cfs @ 21.94 hrs, Volume= 0.048 af, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.06 cfs @ 21.94 hrs, Volume= 0.056 af, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 1.52 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16: Banfield Road

Runoff = 3.02 cfs @ 12.20 hrs, Volume= 0.282 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
27,713	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
32,853	77	Weighted Average
29,055		88.44% Pervious Area
3,798		11.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.7	280	0.0350	2.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.6	380	Total			

Summary for Subcatchment S17: S11

Runoff = 1.59 cfs @ 12.11 hrs, Volume= 0.122 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 1.98 cfs @ 12.12 hrs, Volume= 0.156 af, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 1.51 cfs @ 12.20 hrs, Volume= 0.142 af, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 6.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.10 cfs @ 21.94 hrs, Volume= 0.094 af, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	8,822	97	Weighted Average
	389		4.41% Pervious Area
	8,433		95.59% Impervious Area
	778		9.23% Unconnected

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

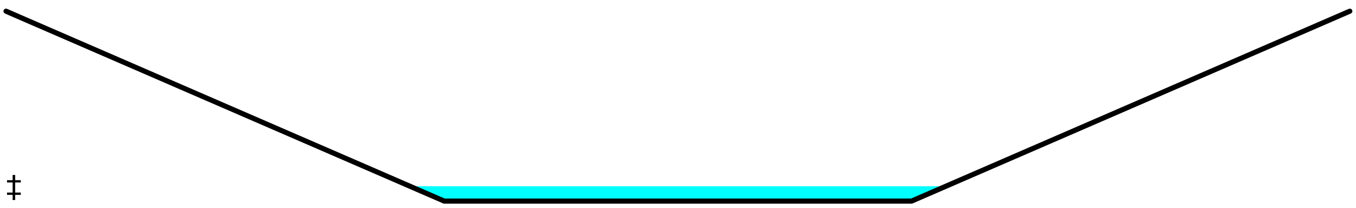
Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 5.43" for 25-Year event
Inflow = 1.88 cfs @ 12.09 hrs, Volume= 0.141 af
Outflow = 1.83 cfs @ 12.11 hrs, Volume= 0.141 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.86 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 2.1 min

Peak Storage= 71 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'



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Summary for Reach R6: wooded area

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 5.42" for 25-Year event
Inflow = 2.03 cfs @ 12.15 hrs, Volume= 0.298 af
Outflow = 1.90 cfs @ 12.30 hrs, Volume= 0.296 af, Atten= 6%, Lag= 8.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.41 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 14.8 min

Peak Storage= 566 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 14.61 cfs

10.00' x 1.00' deep channel, n= 0.100 Earth, dense brush, high stage
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 120.0' Slope= 0.0042 '/'
Inlet Invert= 51.00', Outlet Invert= 50.50'

‡

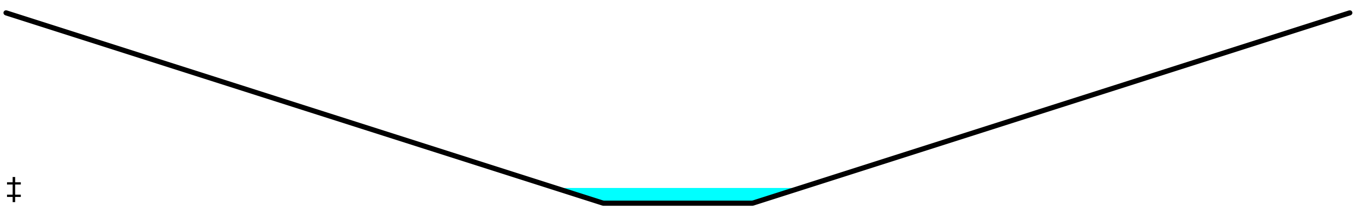
Summary for Reach R7: REACH 7

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 5.40" for 25-Year event
Inflow = 1.90 cfs @ 12.30 hrs, Volume= 0.296 af
Outflow = 1.90 cfs @ 12.31 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.52 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.5 min

Peak Storage= 21 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 376.59 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 18.00'
Length= 50.0' Slope= 0.0700 '/'
Inlet Invert= 50.50', Outlet Invert= 47.00'



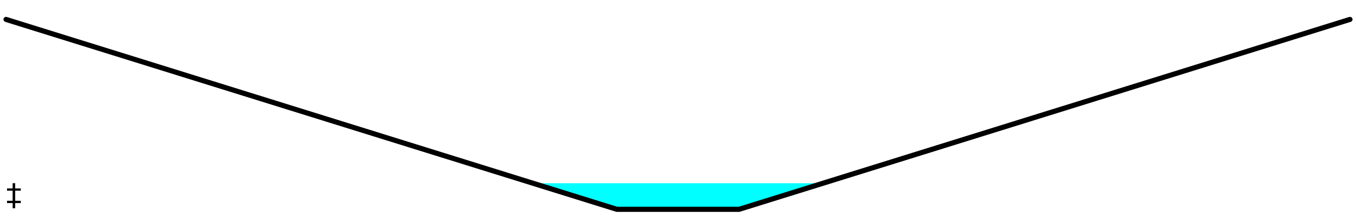
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 4.49" for 25-Year event
Inflow = 2.96 cfs @ 12.23 hrs, Volume= 0.282 af
Outflow = 2.91 cfs @ 12.27 hrs, Volume= 0.282 af, Atten= 2%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 4.3 min

Peak Storage= 269 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 5.55" for 25-Year event
Inflow = 0.06 cfs @ 21.94 hrs, Volume= 0.056 af
Outflow = 0.06 cfs @ 21.94 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 3.912 ac, 22.29% Impervious, Inflow Depth > 4.42" for 25-Year event
Inflow = 11.35 cfs @ 12.24 hrs, Volume= 1.440 af
Outflow = 11.36 cfs @ 12.20 hrs, Volume= 1.440 af, Atten= 0%, Lag= 0.0 min
Primary = 11.36 cfs @ 12.20 hrs, Volume= 1.440 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.03' @ 12.20 hrs Surf.Area= 13 sf Storage= 47 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (884.2 - 884.2)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=11.36 cfs @ 12.20 hrs HW=47.03' (Free Discharge)
└─**1=Culvert** (Inlet Controls 11.36 cfs @ 14.47 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 4.86" for 25-Year event
Inflow = 3.95 cfs @ 12.11 hrs, Volume= 0.326 af
Outflow = 3.94 cfs @ 12.12 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.1 min
Primary = 3.94 cfs @ 12.12 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 43.58' @ 12.12 hrs Surf.Area= 13 sf Storage= 17 cf

Plug-Flow detention time= 0.0 min calculated for 0.325 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (897.8 - 897.8)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.83 cfs @ 12.12 hrs HW=43.52' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.83 cfs @ 4.87 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 6.55" for 25-Year event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
Primary = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.62' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (759.7 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.09 hrs HW=53.61' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.40 cfs @ 1.90 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth > 5.37" for 25-Year event
Inflow = 2.03 cfs @ 12.15 hrs, Volume= 0.204 af
Outflow = 2.03 cfs @ 12.15 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.1 min
Primary = 2.03 cfs @ 12.15 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.37' @ 12.15 hrs Surf.Area= 13 sf Storage= 11 cf

Plug-Flow detention time= 0.3 min calculated for 0.204 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (794.3 - 794.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.02 cfs @ 12.15 hrs HW=52.37' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.02 cfs @ 3.73 fps)

Summary for Pond P4: YD P4

Inflow Area =	0.110 ac, 51.81% Impervious, Inflow Depth = 5.50" for 25-Year event			
Inflow =	0.67 cfs @	12.09 hrs, Volume=	0.051 af	
Outflow =	0.67 cfs @	12.09 hrs, Volume=	0.051 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.67 cfs @	12.09 hrs, Volume=	0.051 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.22' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (791.7 - 791.6)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.66 cfs @ 12.09 hrs HW=49.21' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.66 cfs @ 2.72 fps)

Summary for Pond P5: YD P5

Inflow Area =	0.312 ac, 48.12% Impervious, Inflow Depth = 5.43" for 25-Year event			
Inflow =	1.88 cfs @	12.09 hrs, Volume=	0.141 af	
Outflow =	1.88 cfs @	12.09 hrs, Volume=	0.141 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.88 cfs @	12.09 hrs, Volume=	0.141 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.27' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.141 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (793.5 - 793.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.84 cfs @ 12.09 hrs HW=49.26' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.84 cfs @ 3.97 fps)

Summary for Pond P7: Driveway Crossing #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 4.45" for 25-Year event
Inflow = 9.64 cfs @ 12.22 hrs, Volume= 1.053 af
Outflow = 9.61 cfs @ 12.23 hrs, Volume= 1.053 af, Atten= 0%, Lag= 0.2 min
Primary = 9.61 cfs @ 12.23 hrs, Volume= 1.053 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.33' @ 12.23 hrs Surf.Area= 423 sf Storage= 253 cf

Plug-Flow detention time= 0.3 min calculated for 1.053 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (870.0 - 869.8)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below
#2	44.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		253 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0091 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=9.52 cfs @ 12.23 hrs HW=54.13' (Free Discharge)
└─**1=Culvert** (Barrel Controls 9.52 cfs @ 12.12 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 4.49" for 25-Year event
Inflow = 3.02 cfs @ 12.20 hrs, Volume= 0.282 af
Outflow = 2.96 cfs @ 12.23 hrs, Volume= 0.282 af, Atten= 2%, Lag= 1.5 min
Primary = 2.96 cfs @ 12.23 hrs, Volume= 0.282 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.86' @ 12.23 hrs Surf.Area= 356 sf Storage= 185 cf

Plug-Flow detention time= 0.6 min calculated for 0.282 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (822.8 - 822.3)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.93 cfs @ 12.23 hrs HW=47.85' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.93 cfs @ 3.73 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.106 ac, 15.91% Impervious, Inflow Depth > 4.50" for 25-Year event
Inflow = 10.43 cfs @ 12.22 hrs, Volume= 1.165 af
Outflow = 9.36 cfs @ 12.31 hrs, Volume= 1.114 af, Atten= 10%, Lag= 5.4 min
Primary = 9.36 cfs @ 12.31 hrs, Volume= 1.114 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.94' @ 12.31 hrs Surf.Area= 2,439 sf Storage= 4,316 cf

Plug-Flow detention time= 47.3 min calculated for 1.112 af (95% of inflow)
Center-of-Mass det. time= 16.7 min (880.2 - 863.5)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=9.33 cfs @ 12.31 hrs HW=42.94' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 9.27 cfs @ 5.25 fps)
└─**2=Orifice/Grate** (Passes 0.06 cfs of 2.05 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 5.26" for 25-Year event
Inflow = 4.04 cfs @ 12.10 hrs, Volume= 0.353 af
Outflow = 3.95 cfs @ 12.11 hrs, Volume= 0.326 af, Atten= 2%, Lag= 1.1 min
Primary = 3.95 cfs @ 12.11 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.90' @ 12.11 hrs Surf.Area= 1,381 sf Storage= 1,554 cf

Plug-Flow detention time= 81.3 min calculated for 0.326 af (92% of inflow)
Center-of-Mass det. time= 27.2 min (897.8 - 870.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=3.84 cfs @ 12.11 hrs HW=46.89' (Free Discharge)
└─**1=Orifice/Grate** (Passes 0.03 cfs of 1.92 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.03 cfs)
└─**2=Orifice/Grate** (Weir Controls 3.80 cfs @ 2.05 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.539 ac, 21.42% Impervious, Inflow Depth > 4.45" for 25-Year event
Inflow = 16.66 cfs @ 12.19 hrs, Volume= 2.056 af
Primary = 16.66 cfs @ 12.19 hrs, Volume= 2.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 4.45" for 25-Year event
Inflow = 9.61 cfs @ 12.23 hrs, Volume= 1.053 af
Primary = 9.61 cfs @ 12.23 hrs, Volume= 1.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Subcatchment S10: 4S-Northwest

Runoff = 10.37 cfs @ 12.21 hrs, Volume= 0.988 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
83,610	74	>75% Grass cover, Good, HSG C
11,369	77	Woods, Good, HSG D
94,979	74	Weighted Average
94,979		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
2.4	300	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.3	400	Total			

Summary for Subcatchment S11A: S11A

Runoff = 1.50 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 6.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 2.78 cfs @ 12.09 hrs, Volume= 0.208 af, Depth= 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.06 cfs @ 21.94 hrs, Volume= 0.058 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.07 cfs @ 21.94 hrs, Volume= 0.068 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.143 af, Depth= 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16: Banfield Road

Runoff = 3.87 cfs @ 12.20 hrs, Volume= 0.365 af, Depth= 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
27,713	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
32,853	77	Weighted Average
29,055		88.44% Pervious Area
3,798		11.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.7	280	0.0350	2.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.6	380	Total			

Summary for Subcatchment S17: S11

Runoff = 1.99 cfs @ 12.11 hrs, Volume= 0.155 af, Depth= 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 2.59 cfs @ 12.12 hrs, Volume= 0.204 af, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 1.91 cfs @ 12.19 hrs, Volume= 0.181 af, Depth= 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.12 cfs @ 21.94 hrs, Volume= 0.113 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	8,822	97	Weighted Average
	389		4.41% Pervious Area
	8,433		95.59% Impervious Area
	778		9.23% Unconnected

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

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 6.81" for 50-Year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.28 cfs @ 12.10 hrs, Volume= 0.177 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 2.0 min

Peak Storage= 81 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

‡

Summary for Reach R6: wooded area

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 6.73" for 50-Year event
Inflow = 2.54 cfs @ 12.15 hrs, Volume= 0.369 af
Outflow = 2.38 cfs @ 12.29 hrs, Volume= 0.368 af, Atten= 6%, Lag= 8.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.44 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 13.7 min

Peak Storage= 662 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 14.61 cfs

10.00' x 1.00' deep channel, n= 0.100 Earth, dense brush, high stage
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 120.0' Slope= 0.0042 '/'
Inlet Invert= 51.00', Outlet Invert= 50.50'

‡

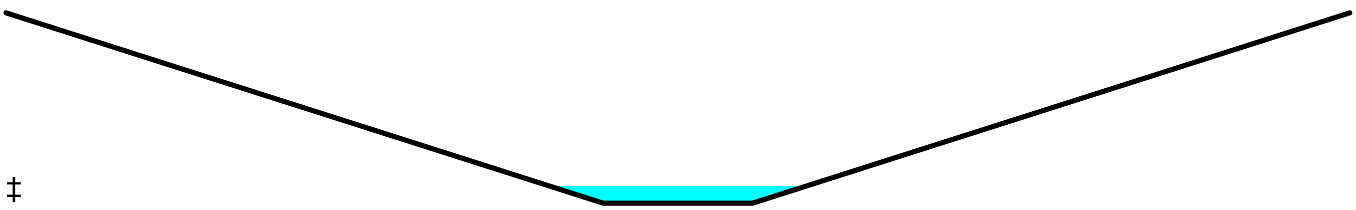
Summary for Reach R7: REACH 7

Inflow Area = 0.658 ac, 60.97% Impervious, Inflow Depth > 6.70" for 50-Year event
Inflow = 2.38 cfs @ 12.29 hrs, Volume= 0.368 af
Outflow = 2.38 cfs @ 12.30 hrs, Volume= 0.368 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.84 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.78 fps, Avg. Travel Time= 0.5 min

Peak Storage= 25 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 376.59 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 18.00'
Length= 50.0' Slope= 0.0700 '/'
Inlet Invert= 50.50', Outlet Invert= 47.00'



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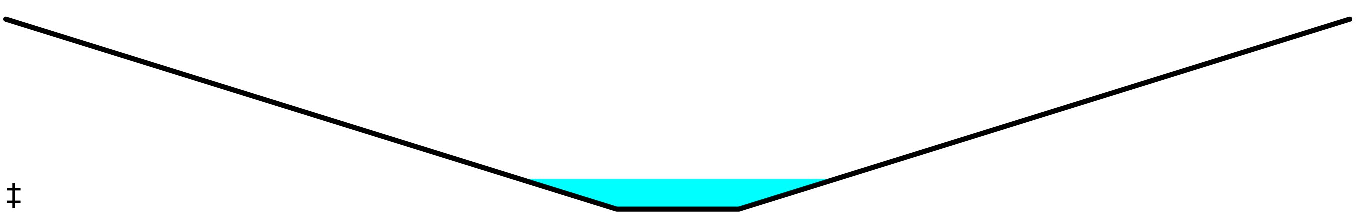
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 5.80" for 50-Year event
Inflow = 4.17 cfs @ 12.20 hrs, Volume= 0.365 af
Outflow = 3.80 cfs @ 12.25 hrs, Volume= 0.365 af, Atten= 9%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 4.0 min

Peak Storage= 331 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



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Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 6.72" for 50-Year event
Inflow = 0.07 cfs @ 21.94 hrs, Volume= 0.068 af
Outflow = 0.07 cfs @ 21.94 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 3.912 ac, 22.29% Impervious, Inflow Depth > 5.71" for 50-Year event
Inflow = 18.63 cfs @ 12.20 hrs, Volume= 1.863 af
Outflow = 18.60 cfs @ 12.20 hrs, Volume= 1.863 af, Atten= 0%, Lag= 0.0 min
Primary = 18.60 cfs @ 12.20 hrs, Volume= 1.863 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 62.17' @ 12.20 hrs Surf.Area= 13 sf Storage= 47 cf

Plug-Flow detention time= 0.0 min calculated for 1.863 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (873.0 - 872.9)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=18.46 cfs @ 12.20 hrs HW=61.83' (Free Discharge)
└─**1=Culvert** (Inlet Controls 18.46 cfs @ 23.51 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 6.20" for 50-Year event
Inflow = 4.95 cfs @ 12.11 hrs, Volume= 0.416 af
Outflow = 4.94 cfs @ 12.11 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.2 min
Primary = 4.94 cfs @ 12.11 hrs, Volume= 0.416 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 44.20' @ 12.11 hrs Surf.Area= 13 sf Storage= 24 cf

Plug-Flow detention time= 0.0 min calculated for 0.416 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (885.9 - 885.9)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.81 cfs @ 12.11 hrs HW=44.12' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.81 cfs @ 6.12 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 7.97" for 50-Year event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.65' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.040 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (755.7 - 755.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=53.64' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.48 cfs @ 2.00 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth > 6.73" for 50-Year event
Inflow = 2.53 cfs @ 12.15 hrs, Volume= 0.256 af
Outflow = 2.53 cfs @ 12.15 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.1 min
Primary = 2.53 cfs @ 12.15 hrs, Volume= 0.256 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.53' @ 12.15 hrs Surf.Area= 13 sf Storage= 13 cf

Plug-Flow detention time= 0.3 min calculated for 0.255 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (789.2 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.52 cfs @ 12.15 hrs HW=52.52' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.52 cfs @ 3.90 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 6.88" for 50-Year event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af
Outflow = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.28' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (785.6 - 785.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.81 cfs @ 12.09 hrs HW=49.27' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.81 cfs @ 2.86 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 6.81" for 50-Year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min
Primary = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.39' @ 12.09 hrs Surf.Area= 3 sf Storage= 3 cf

Plug-Flow detention time= 0.1 min calculated for 0.177 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (787.3 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.27 cfs @ 12.09 hrs HW=49.38' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.27 cfs @ 4.14 fps)

Summary for Pond P7: Driveway Crossing #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 5.73" for 50-Year event
Inflow = 12.51 cfs @ 12.22 hrs, Volume= 1.356 af
Outflow = 12.66 cfs @ 12.21 hrs, Volume= 1.356 af, Atten= 0%, Lag= 0.0 min
Primary = 12.66 cfs @ 12.21 hrs, Volume= 1.356 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 61.89' @ 12.21 hrs Surf.Area= 423 sf Storage= 253 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (860.6 - 860.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below
#2	44.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		253 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0091 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=12.45 cfs @ 12.21 hrs HW=61.33' (Free Discharge)
└─**1=Culvert** (Barrel Controls 12.45 cfs @ 15.85 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area = 0.754 ac, 11.56% Impervious, Inflow Depth = 5.80" for 50-Year event
Inflow = 3.87 cfs @ 12.20 hrs, Volume= 0.365 af
Outflow = 4.17 cfs @ 12.20 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min
Primary = 4.17 cfs @ 12.20 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 48.46' @ 12.20 hrs Surf.Area= 410 sf Storage= 215 cf

Plug-Flow detention time= 0.6 min calculated for 0.364 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (815.6 - 815.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	215 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	20	0.0	0	0
48.00	410	100.0	215	215

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.17 cfs @ 12.20 hrs HW=48.46' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.17 cfs @ 5.31 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.106 ac, 15.91% Impervious, Inflow Depth > 5.79" for 50-Year event
Inflow = 13.72 cfs @ 12.21 hrs, Volume= 1.499 af
Outflow = 15.15 cfs @ 12.21 hrs, Volume= 1.447 af, Atten= 0%, Lag= 0.0 min
Primary = 15.15 cfs @ 12.21 hrs, Volume= 1.447 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 44.88' @ 12.21 hrs Surf.Area= 2,480 sf Storage= 4,413 cf

Plug-Flow detention time= 40.0 min calculated for 1.447 af (97% of inflow)
Center-of-Mass det. time= 14.8 min (869.2 - 854.4)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=14.66 cfs @ 12.21 hrs HW=44.70' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 14.61 cfs @ 8.27 fps)
└─**2=Orifice/Grate** (Passes 0.06 cfs of 2.40 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 6.60" for 50-Year event
Inflow = 5.05 cfs @ 12.10 hrs, Volume= 0.443 af
Outflow = 4.95 cfs @ 12.11 hrs, Volume= 0.416 af, Atten= 2%, Lag= 1.0 min
Primary = 4.95 cfs @ 12.11 hrs, Volume= 0.416 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.97' @ 12.11 hrs Surf.Area= 1,427 sf Storage= 1,615 cf

Plug-Flow detention time= 68.2 min calculated for 0.415 af (94% of inflow)
Center-of-Mass det. time= 23.7 min (885.9 - 862.2)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.83 cfs @ 12.11 hrs HW=46.96' (Free Discharge)
↑—**1=Orifice/Grate** (Passes 0.03 cfs of 1.94 cfs potential flow)
  ↑—**3=Exfiltration** (Exfiltration Controls 0.03 cfs)
└—**2=Orifice/Grate** (Weir Controls 4.79 cfs @ 2.22 fps)

Summary for Link POA1: POA #1

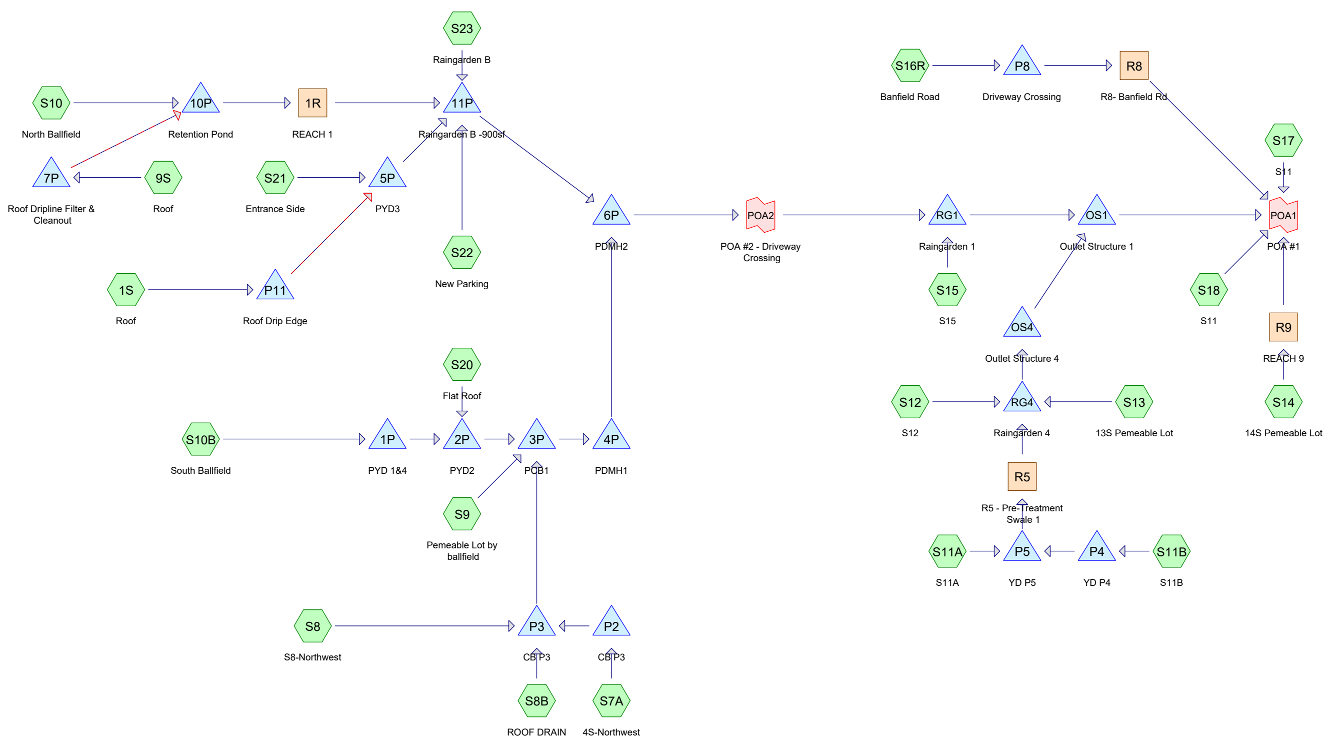
Inflow Area = 5.539 ac, 21.42% Impervious, Inflow Depth > 5.75" for 50-Year event
Inflow = 25.51 cfs @ 12.20 hrs, Volume= 2.654 af
Primary = 25.51 cfs @ 12.20 hrs, Volume= 2.654 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

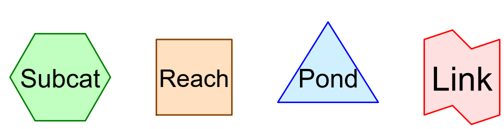
Summary for Link POA2: POA #2

Inflow Area = 2.839 ac, 14.14% Impervious, Inflow Depth > 5.73" for 50-Year event
Inflow = 12.66 cfs @ 12.21 hrs, Volume= 1.356 af
Primary = 12.66 cfs @ 12.21 hrs, Volume= 1.356 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs



POST-DEVELOPEMNT
(with 15% Increase)



Routing Diagram for 4801.2 POST-Ph2-Gym_012920
Prepared by Altus Engineering, Inc., Printed 1/28/2020
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.531	74	>75% Grass cover, Good, HSG C (9S, S10, S10B, S11A, S11B, S12, S13, S14, S15, S16R, S17, S18, S20, S22, S23, S7A, S8, S9)
0.058	80	>75% Grass cover, Good, HSG D (1S, S21)
0.426	98	Paved parking, HSG C (S11A, S11B, S12, S13, S14, S15, S17)
0.164	98	Paved roads w/curbs & sewers, HSG C (S16R, S17)
0.323	98	Permeable Pavement, HSG C (S13, S14, S9)
0.055	98	Permeable Pavement, HSG D (S22)
0.071	98	Roofs, HSG B (S7A, S8B)
0.372	98	Roofs, HSG C (9S, S10B, S20, S7A, S8)
0.108	98	Roofs, HSG D (1S, 9S)
0.148	98	Unconnected pavement, HSG C (S10, S10B, S11A, S11B, S23, S8, S9)
0.030	98	Unconnected pavement, HSG D (S22)
0.243	70	Woods, Good, HSG C (S16R, S17, S18)
5.529	**81**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.071	HSG B	S7A, S8B
5.207	HSG C	9S, S10, S10B, S11A, S11B, S12, S13, S14, S15, S16R, S17, S18, S20, S22, S23, S7A, S8, S9
0.251	HSG D	1S, 9S, S21, S22
0.000	Other	
5.529		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.531	0.058	0.000	3.589	>75% Grass cover, Good	1S, 9S, S10, S10 B, S11 A, S11 B, S12, S13, S14, S15, S16 R, S17, S18, S20, S21, S22, S23, S7A, S8, S9
0.000	0.000	0.426	0.000	0.000	0.426	Paved parking	S11 A, S11 B, S12, S13, S14, S15,

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.164	0.000	0.000	0.164	Paved roads w/curbs & sewers	S16R, S17
0.000	0.000	0.323	0.055	0.000	0.378	Permeable Pavement	S13, S14, S22, S9
0.000	0.071	0.372	0.108	0.000	0.551	Roofs	1S, 9S, S10B, S20, S7A, S8, S8B
0.000	0.000	0.148	0.030	0.000	0.178	Unconnected pavement	S10, S10B, S11A, S11B, S22, S23, S8, S9
0.000	0.000	0.243	0.000	0.000	0.243	Woods, Good	S16R, S17, S18
0.000	**0.071**	**5.207**	**0.251**	**0.000**	**5.529**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	50.00	49.65	65.0	0.0054	0.012	12.0	0.0	0.0
2	2P	49.55	49.40	30.0	0.0050	0.012	12.0	0.0	0.0
3	3P	49.30	48.90	60.0	0.0067	0.012	12.0	0.0	0.0
4	4P	48.80	44.20	160.0	0.0287	0.012	12.0	0.0	0.0
5	5P	47.35	47.15	35.0	0.0057	0.012	15.0	0.0	0.0
6	6P	44.10	42.00	100.0	0.0210	0.012	12.0	0.0	0.0
7	7P	53.00	52.00	25.0	0.0400	0.012	6.0	0.0	0.0
8	11P	44.25	44.15	5.0	0.0200	0.012	12.0	0.0	0.0
9	OS1	37.50	36.00	20.0	0.0750	0.012	12.0	0.0	0.0
10	OS4	42.00	37.85	110.0	0.0377	0.012	12.0	0.0	0.0
11	P2	53.30	51.60	72.0	0.0236	0.011	12.0	0.0	0.0
12	P3	51.50	51.00	98.0	0.0051	0.011	12.0	0.0	0.0
13	P4	48.75	48.60	25.0	0.0060	0.011	12.0	0.0	0.0
14	P5	48.50	48.00	65.0	0.0077	0.011	12.0	0.0	0.0
15	P8	46.75	44.00	80.0	0.0344	0.012	12.0	0.0	0.0

Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Roof Runoff Area=4,180 sf 88.04% Impervious Runoff Depth=3.25"
Tc=6.0 min CN=96 Runoff=0.33 cfs 0.026 af

Subcatchment 9S: Roof Runoff Area=8,320 sf 95.67% Impervious Runoff Depth=3.36"
Flow Length=300' Tc=14.5 min CN=97 Runoff=0.52 cfs 0.054 af

Subcatchment S10: North Ballfield Runoff Area=37,760 sf 1.06% Impervious Runoff Depth=1.39"
Flow Length=300' Tc=14.5 min CN=74 Runoff=1.04 cfs 0.100 af

Subcatchment S10B: South Ballfield Runoff Area=32,810 sf 8.63% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=76 Runoff=1.30 cfs 0.095 af

Subcatchment S11A: S11A Runoff Area=8,777 sf 46.10% Impervious Runoff Depth=2.20"
Tc=6.0 min CN=85 Runoff=0.51 cfs 0.037 af

Subcatchment S11B: S11B Runoff Area=4,806 sf 51.81% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=86 Runoff=0.29 cfs 0.021 af

Subcatchment S12: S12 Runoff Area=16,950 sf 32.45% Impervious Runoff Depth=1.96"
Flow Length=125' Tc=6.0 min CN=82 Runoff=0.88 cfs 0.063 af

Subcatchment S13: 13S Pemeable Lot Runoff Area=4,546 sf 97.12% Impervious Runoff Depth>2.73"
Tc=790.0 min CN=97 Runoff=0.03 cfs 0.024 af

Subcatchment S14: 14S Pemeable Lot Runoff Area=5,300 sf 97.42% Impervious Runoff Depth>2.73"
Tc=790.0 min CN=97 Runoff=0.03 cfs 0.028 af

Subcatchment S15: S15 Runoff Area=11,655 sf 34.71% Impervious Runoff Depth=1.96"
Flow Length=80' Slope=0.0600 '/' Tc=6.0 min CN=82 Runoff=0.60 cfs 0.044 af

Subcatchment S16R: Banfield Road Runoff Area=28,040 sf 13.54% Impervious Runoff Depth=1.59"
Flow Length=425' Tc=15.0 min CN=77 Runoff=0.89 cfs 0.085 af

Subcatchment S17: S11 Runoff Area=12,628 sf 37.42% Impervious Runoff Depth=1.96"
Flow Length=210' Tc=7.4 min CN=82 Runoff=0.63 cfs 0.047 af

Subcatchment S18: S11 Runoff Area=20,093 sf 0.00% Impervious Runoff Depth=1.32"
Flow Length=150' Tc=8.6 min CN=73 Runoff=0.62 cfs 0.051 af

Subcatchment S20: Flat Roof Runoff Area=2,890 sf 91.35% Impervious Runoff Depth=3.25"
Tc=6.0 min CN=96 Runoff=0.23 cfs 0.018 af

Subcatchment S21: Entrance Side Runoff Area=2,040 sf 0.00% Impervious Runoff Depth=1.80"
Tc=6.0 min CN=80 Runoff=0.10 cfs 0.007 af

Subcatchment S22: New Parking Runoff Area=5,020 sf 73.31% Impervious Runoff Depth>2.27"
Tc=790.0 min CN=92 Runoff=0.02 cfs 0.022 af

Subcatchment S23: Raingarden B Runoff Area=5,790 sf 8.64% Impervious Runoff Depth=1.45"
Tc=6.0 min UI Adjusted CN=75 Runoff=0.22 cfs 0.016 af

Subcatchment S7A: 4S-Northwest Runoff Area=2,646 sf 87.68% Impervious Runoff Depth=3.15"
Tc=6.0 min CN=95 Runoff=0.20 cfs 0.016 af

Subcatchment S8: S8-Northwest Runoff Area=15,025 sf 30.25% Impervious Runoff Depth=1.88"
Flow Length=280' Tc=14.3 min CN=81 Runoff=0.58 cfs 0.054 af

Subcatchment S8B: ROOF DRAIN Runoff Area=2,190 sf 100.00% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment S9: Pemeable Lot by ballfield Runoff Area=9,372 sf 95.85% Impervious Runoff Depth>2.73"
Tc=790.0 min CN=97 Runoff=0.05 cfs 0.049 af

Reach 1R: REACH 1 Avg. Flow Depth=0.06' Max Vel=2.18 fps Inflow=0.43 cfs 0.019 af
n=0.022 L=70.0' S=0.0500 '/' Capacity=77.07 cfs Outflow=0.42 cfs 0.019 af

Reach R5: R5 - Pre-Treatment Swale 1 Avg. Flow Depth=0.07' Max Vel=1.35 fps Inflow=0.80 cfs 0.058 af
n=0.022 L=70.0' S=0.0143 '/' Capacity=187.45 cfs Outflow=0.77 cfs 0.058 af

Reach R8: R8- Banfield Rd Avg. Flow Depth=0.14' Max Vel=2.22 fps Inflow=0.88 cfs 0.085 af
n=0.035 L=290.0' S=0.0500 '/' Capacity=238.60 cfs Outflow=0.86 cfs 0.085 af

Reach R9: REACH 9 Inflow=0.03 cfs 0.028 af
Outflow=0.03 cfs 0.028 af

Pond 1P: PYD 1&4 Peak Elev=50.68' Storage=2 cf Inflow=1.30 cfs 0.095 af
12.0" Round Culvert n=0.012 L=65.0' S=0.0054 '/' Outflow=1.30 cfs 0.095 af

Pond 2P: PYD2 Peak Elev=50.33' Storage=2 cf Inflow=1.52 cfs 0.113 af
12.0" Round Culvert n=0.012 L=30.0' S=0.0050 '/' Outflow=1.52 cfs 0.113 af

Pond 3P: PCB1 Peak Elev=50.26' Storage=12 cf Inflow=2.34 cfs 0.247 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0067 '/' Outflow=2.34 cfs 0.247 af

Pond 4P: PDMH1 Peak Elev=49.68' Storage=11 cf Inflow=2.34 cfs 0.247 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0287 '/' Outflow=2.34 cfs 0.247 af

Pond 5P: PYD3 Peak Elev=47.73' Storage=1 cf Inflow=0.52 cfs 0.013 af
15.0" Round Culvert n=0.012 L=35.0' S=0.0057 '/' Outflow=0.52 cfs 0.013 af

Pond 6P: PDMH2 Peak Elev=45.00' Storage=11 cf Inflow=2.40 cfs 0.317 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0210 '/' Outflow=2.40 cfs 0.317 af

Pond 7P: Roof Dripline Filter & Cleanout Peak Elev=56.01' Storage=293 cf Inflow=0.52 cfs 0.054 af
Discarded=0.03 cfs 0.025 af Primary=0.04 cfs 0.015 af Secondary=0.49 cfs 0.013 af Outflow=0.57 cfs 0.054 af

Pond 10P: Retention Pond Peak Elev=53.11' Storage=2,086 cf Inflow=1.54 cfs 0.128 af
Discarded=0.14 cfs 0.109 af Primary=0.43 cfs 0.019 af Outflow=0.56 cfs 0.128 af

Pond 11P: Raingarden B -900sf Peak Elev=47.27' Storage=1,172 cf Inflow=0.73 cfs 0.070 af
Outflow=0.08 cfs 0.070 af

Pond OS1: Outlet Structure 1 Peak Elev=39.09' Storage=11 cf Inflow=4.04 cfs 0.431 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0750 '/' Outflow=4.00 cfs 0.431 af

Pond OS4: Outlet Structure 4 Peak Elev=42.67' Storage=5 cf Inflow=1.53 cfs 0.122 af
12.0" Round Culvert n=0.012 L=110.0' S=0.0377 '/' Outflow=1.56 cfs 0.122 af

Pond P11: Roof Drip Edge Peak Elev=54.01' Storage=171 cf Inflow=0.33 cfs 0.026 af
Discarded=0.03 cfs 0.020 af Secondary=0.42 cfs 0.006 af Outflow=0.45 cfs 0.026 af

Pond P2: CB P3 Peak Elev=53.52' Storage=1 cf Inflow=0.20 cfs 0.016 af
12.0" Round Culvert n=0.011 L=72.0' S=0.0236 '/' Outflow=0.21 cfs 0.016 af

Pond P3: CB P3 Peak Elev=52.01' Storage=6 cf Inflow=0.84 cfs 0.085 af
12.0" Round Culvert n=0.011 L=98.0' S=0.0051 '/' Outflow=0.84 cfs 0.085 af

Pond P4: YD P4 Peak Elev=49.04' Storage=1 cf Inflow=0.29 cfs 0.021 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0060 '/' Outflow=0.29 cfs 0.021 af

Pond P5: YD P5 Peak Elev=48.96' Storage=1 cf Inflow=0.80 cfs 0.058 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0077 '/' Outflow=0.80 cfs 0.058 af

Pond P8: Driveway Crossing Peak Elev=47.23' Storage=103 cf Inflow=0.89 cfs 0.085 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0344 '/' Outflow=0.88 cfs 0.085 af

Pond RG1: Raingarden 1 Peak Elev=42.04' Storage=2,740 cf Inflow=3.00 cfs 0.360 af
Outflow=2.44 cfs 0.309 af

Pond RG4: Raingarden 4 Peak Elev=46.71' Storage=1,379 cf Inflow=1.63 cfs 0.145 af
Outflow=1.53 cfs 0.122 af

Link POA1: POA #1 Inflow=5.67 cfs 0.642 af
Primary=5.67 cfs 0.642 af

Link POA2: POA #2 - Driveway Crossing Inflow=2.40 cfs 0.317 af
Primary=2.40 cfs 0.317 af

Total Runoff Area = 5.529 ac Runoff Volume = 0.871 af Average Runoff Depth = 1.89"
69.31% Pervious = 3.832 ac 30.69% Impervious = 1.697 ac

Summary for Subcatchment 1S: Roof

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
500	80	>75% Grass cover, Good, HSG D
3,680	98	Roofs, HSG D
4,180	96	Weighted Average
500		11.96% Pervious Area
3,680		88.04% Impervious Area

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

Summary for Subcatchment 9S: Roof

Runoff = 0.52 cfs @ 12.19 hrs, Volume= 0.054 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
360	74	>75% Grass cover, Good, HSG C
6,930	98	Roofs, HSG C
1,030	98	Roofs, HSG D
0	98	Unconnected pavement, HSG C
8,320	97	Weighted Average
360		4.33% Pervious Area
7,960		95.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10: North Ballfield

Runoff = 1.04 cfs @ 12.21 hrs, Volume= 0.100 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
37,360	74	>75% Grass cover, Good, HSG C
0	98	Roofs, HSG C
0	98	Roofs, HSG D
400	98	Unconnected pavement, HSG C
37,760	74	Weighted Average
37,360		98.94% Pervious Area
400		1.06% Impervious Area
400		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10B: South Ballfield

Runoff = 1.30 cfs @ 12.10 hrs, Volume= 0.095 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
29,980	74	>75% Grass cover, Good, HSG C
2,590	98	Roofs, HSG C
240	98	Unconnected pavement, HSG C
32,810	76	Weighted Average
29,980		91.37% Pervious Area
2,830		8.63% Impervious Area
240		8.48% Unconnected

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

Summary for Subcatchment S11A: S11A

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 0.88 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.03 cfs @ 21.94 hrs, Volume= 0.024 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.03 cfs @ 21.94 hrs, Volume= 0.028 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16R: Banfield Road

Runoff = 0.89 cfs @ 12.22 hrs, Volume= 0.085 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
22,900	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
28,040	77	Weighted Average
24,242		86.46% Pervious Area
3,798		13.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
2.1	325	0.0300	2.60		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	425	Total			

Summary for Subcatchment S17: S11

Runoff = 0.63 cfs @ 12.11 hrs, Volume= 0.047 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.051 af, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S20: Flat Roof

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	250	74	>75% Grass cover, Good, HSG C
	2,640	98	Roofs, HSG C
	2,890	96	Weighted Average
	250		8.65% Pervious Area
	2,640		91.35% Impervious Area

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

Summary for Subcatchment S21: Entrance Side

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	2,040	80	>75% Grass cover, Good, HSG D
	0	98	Roofs, HSG D
	2,040	80	Weighted Average
	2,040		100.00% Pervious Area

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

Summary for Subcatchment S22: New Parking

Runoff = 0.02 cfs @ 21.96 hrs, Volume= 0.022 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	1,340	74	>75% Grass cover, Good, HSG C
*	2,380	98	Permeable Pavement, HSG D
	1,300	98	Unconnected pavement, HSG D
	5,020	92	Weighted Average
	1,340		26.69% Pervious Area
	3,680		73.31% Impervious Area
	1,300		35.33% Unconnected

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

Summary for Subcatchment S23: Raingarden B

Runoff = 0.22 cfs @ 12.10 hrs, Volume= 0.016 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Adj	Description
5,290	74		>75% Grass cover, Good, HSG C
0	98		Roofs, HSG C
500	98		Unconnected pavement, HSG C
5,790	76	75	Weighted Average, UI Adjusted
5,290			91.36% Pervious Area
500			8.64% Impervious Area
500			100.00% Unconnected

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

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 0.58 cfs @ 12.20 hrs, Volume= 0.054 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.05 cfs @ 21.94 hrs, Volume= 0.049 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.71"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	550	98	Unconnected pavement, HSG C
	9,372	97	Weighted Average
	389		4.15% Pervious Area
	8,983		95.85% Impervious Area
	1,328		14.78% Unconnected

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

Summary for Reach 1R: REACH 1

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 0.22" for 2-Year event
Inflow = 0.43 cfs @ 12.61 hrs, Volume= 0.019 af
Outflow = 0.42 cfs @ 12.63 hrs, Volume= 0.019 af, Atten= 2%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.18 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 1.1 min

Peak Storage= 13 cf @ 12.62 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 77.07 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 11.00'
Length= 70.0' Slope= 0.0500 '/'
Inlet Invert= 53.00', Outlet Invert= 49.50'

‡

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 2.23" for 2-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.77 cfs @ 12.11 hrs, Volume= 0.058 af, Atten= 4%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.35 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 2.3 min

Peak Storage= 41 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

‡

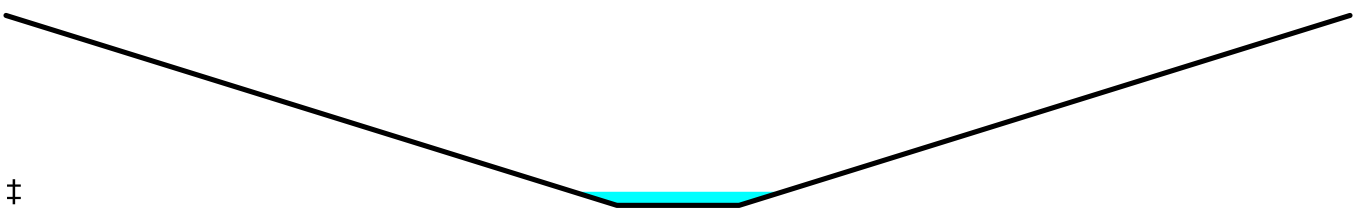
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.644 ac, 13.54% Impervious, Inflow Depth = 1.59" for 2-Year event
Inflow = 0.88 cfs @ 12.24 hrs, Volume= 0.085 af
Outflow = 0.86 cfs @ 12.31 hrs, Volume= 0.085 af, Atten= 2%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.22 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 5.8 min

Peak Storage= 114 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



‡

Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 2.73" for 2-Year event
Inflow = 0.03 cfs @ 21.94 hrs, Volume= 0.028 af
Outflow = 0.03 cfs @ 21.94 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PYD 1&4

Inflow Area = 0.753 ac, 8.63% Impervious, Inflow Depth = 1.52" for 2-Year event
Inflow = 1.30 cfs @ 12.10 hrs, Volume= 0.095 af
Outflow = 1.30 cfs @ 12.10 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min
Primary = 1.30 cfs @ 12.10 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 50.68' @ 12.10 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.095 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (847.4 - 847.3)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	53.50'	200 cf	**Custom Stage Data** Listed below
		211 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
53.50	0
54.00	200

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 50.00' / 49.65' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.29 cfs @ 12.10 hrs HW=50.68' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.29 cfs @ 3.22 fps)

Summary for Pond 2P: PYD2

Inflow Area = 0.820 ac, 15.32% Impervious, Inflow Depth = 1.66" for 2-Year event
Inflow = 1.52 cfs @ 12.10 hrs, Volume= 0.113 af
Outflow = 1.52 cfs @ 12.10 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.10 hrs, Volume= 0.113 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 50.33' @ 12.10 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.113 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (835.2 - 835.1)

Volume	Invert	Avail.Storage	Storage Description
#1	49.55'	12 cf	**2.00'D x 3.90'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.55'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 49.55' / 49.40' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.51 cfs @ 12.10 hrs HW=50.33' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.51 cfs @ 3.17 fps)

Summary for Pond 3P: PCB1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 1.99" for 2-Year event
Inflow = 2.34 cfs @ 12.10 hrs, Volume= 0.247 af
Outflow = 2.34 cfs @ 12.11 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.1 min
Primary = 2.34 cfs @ 12.11 hrs, Volume= 0.247 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 50.26' @ 12.11 hrs Surf.Area= 13 sf Storage= 12 cf

Plug-Flow detention time= 0.3 min calculated for 0.247 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (926.7 - 926.6)

Volume	Invert	Avail.Storage	Storage Description
#1	49.30'	63 cf	**4.00'D x 5.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.30'	**12.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 49.30' / 48.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.31 cfs @ 12.11 hrs HW=50.25' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.31 cfs @ 3.85 fps)

Summary for Pond 4P: PDMH1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 1.99" for 2-Year event
Inflow = 2.34 cfs @ 12.11 hrs, Volume= 0.247 af
Outflow = 2.34 cfs @ 12.11 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.1 min
Primary = 2.34 cfs @ 12.11 hrs, Volume= 0.247 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.68' @ 12.11 hrs Surf.Area= 13 sf Storage= 11 cf

Plug-Flow detention time= 0.2 min calculated for 0.246 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (926.9 - 926.7)

Volume	Invert	Avail.Storage	Storage Description
#1	48.80'	58 cf	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.80'	**12.0" Round Culvert** L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 48.80' / 44.20' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.31 cfs @ 12.11 hrs HW=49.67' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.31 cfs @ 3.18 fps)

Summary for Pond 5P: PYD3

Inflow Area = 0.143 ac, 59.16% Impervious, Inflow Depth = 1.12" for 2-Year event
Inflow = 0.52 cfs @ 12.10 hrs, Volume= 0.013 af
Outflow = 0.52 cfs @ 12.10 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.10 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.73' @ 12.10 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (788.1 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1	47.35'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**
#2	50.45'	56 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		66 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.45	5	0	0
51.00	200	56	56

Device	Routing	Invert	Outlet Devices
#1	Primary	47.35'	**15.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 47.35' / 47.15' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.50 cfs @ 12.10 hrs HW=47.72' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.50 cfs @ 2.46 fps)

Summary for Pond 6P: PDMH2

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 2.40 cfs @ 12.11 hrs, Volume= 0.317 af
Outflow = 2.40 cfs @ 12.11 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.1 min
Primary = 2.40 cfs @ 12.11 hrs, Volume= 0.317 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 45.00' @ 12.11 hrs Surf.Area= 13 sf Storage= 11 cf

Plug-Flow detention time= 0.2 min calculated for 0.317 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (964.9 - 964.7)

Volume	Invert	Avail.Storage	Storage Description
#1	44.10'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.10'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 44.10' / 42.00' S= 0.0210 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.37 cfs @ 12.11 hrs HW=44.99' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.37 cfs @ 3.21 fps)

Summary for Pond 7P: Roof Dripline Filter & Cleanout

Inflow Area = 0.191 ac, 95.67% Impervious, Inflow Depth = 3.36" for 2-Year event
Inflow = 0.52 cfs @ 12.19 hrs, Volume= 0.054 af
Outflow = 0.57 cfs @ 12.15 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.03 cfs @ 12.15 hrs, Volume= 0.025 af
Primary = 0.04 cfs @ 12.15 hrs, Volume= 0.015 af
Secondary = 0.49 cfs @ 12.15 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 56.01' @ 12.15 hrs Surf.Area= 360 sf Storage= 293 cf

Plug-Flow detention time= 29.5 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 29.5 min (799.8 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	321 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.50	360	0.0	0	0
54.00	360	33.0	178	178
55.50	360	10.0	54	232
56.25	360	33.0	89	321

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**6.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 53.00' / 52.00' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	56.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Device 1	52.50'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'
#4	Discarded	52.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'

Discarded OutFlow Max=0.03 cfs @ 12.15 hrs HW=56.01' (Free Discharge)
└─**4=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 12.15 hrs HW=56.01' (Free Discharge)
└─**1=Culvert** (Passes 0.04 cfs of 1.57 cfs potential flow)
  └─**3=Exfiltration** (Controls 0.04 cfs)

Secondary OutFlow Max=0.31 cfs @ 12.15 hrs HW=56.01' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.25 fps)

Summary for Pond 10P: Retention Pond

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 1.46" for 2-Year event
Inflow = 1.54 cfs @ 12.23 hrs, Volume= 0.128 af
Outflow = 0.56 cfs @ 12.61 hrs, Volume= 0.128 af, Atten= 63%, Lag= 22.4 min
Discarded = 0.14 cfs @ 12.61 hrs, Volume= 0.109 af
Primary = 0.43 cfs @ 12.61 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.11' @ 12.61 hrs Surf.Area= 2,073 sf Storage= 2,086 cf

Plug-Flow detention time= 158.7 min calculated for 0.128 af (100% of inflow)
Center-of-Mass det. time= 158.6 min (999.3 - 840.7)

Volume	Invert	Avail.Storage	Storage Description
#1	52.00'	3,290 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	1,160	0.0	0	0
53.75	2,600	100.0	3,290	3,290

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	52.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.14 cfs @ 12.61 hrs HW=53.11' (Free Discharge)
└─**2=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.42 cfs @ 12.61 hrs HW=53.11' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.42 cfs @ 0.77 fps)

Summary for Pond 11P: Raingarden B -900sf

Inflow Area = 1.449 ac, 25.70% Impervious, Inflow Depth > 0.58" for 2-Year event
Inflow = 0.73 cfs @ 12.10 hrs, Volume= 0.070 af
Outflow = 0.08 cfs @ 13.69 hrs, Volume= 0.070 af, Atten= 89%, Lag= 95.4 min
Primary = 0.08 cfs @ 13.69 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.27' @ 13.69 hrs Surf.Area= 1,341 sf Storage= 1,172 cf

Plug-Flow detention time= 129.6 min calculated for 0.070 af (99% of inflow)
Center-of-Mass det. time= 122.7 min (1,098.3 - 975.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.25'	3,358 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.25	1,100	0.0	0	0
45.25	1,100	40.0	440	440
45.50	1,100	33.0	91	531
47.00	1,100	10.0	165	696
48.50	2,450	100.0	2,663	3,358

Device	Routing	Invert	Outlet Devices
#1	Primary	44.25'	**12.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.25' / 44.15' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	47.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	44.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	44.25'	**2.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.08 cfs @ 13.69 hrs HW=47.27' (Free Discharge)
1=Culvert (Passes 0.08 cfs of 6.00 cfs potential flow)
2=Orifice/Grate (Controls 0.00 cfs)
3=Orifice/Grate (Passes 0.08 cfs of 1.57 cfs potential flow)
4=Exfiltration (Exfiltration Controls 0.08 cfs)

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 4.012 ac, 34.46% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 4.04 cfs @ 12.17 hrs, Volume= 0.431 af
Outflow = 4.00 cfs @ 12.17 hrs, Volume= 0.431 af, Atten= 1%, Lag= 0.3 min
Primary = 4.00 cfs @ 12.17 hrs, Volume= 0.431 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 39.09' @ 12.17 hrs Surf.Area= 13 sf Storage= 11 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (991.9 - 991.9)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.79 cfs @ 12.17 hrs HW=39.00' (Free Discharge)
1=Culvert (Inlet Controls 3.79 cfs @ 4.82 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 1.81" for 2-Year event
Inflow = 1.53 cfs @ 12.16 hrs, Volume= 0.122 af
Outflow = 1.56 cfs @ 12.16 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.16 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.67' @ 12.16 hrs Surf.Area= 13 sf Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (981.8 - 981.7)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.16 hrs HW=42.66' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.52 cfs @ 2.76 fps)

Summary for Pond P11: Roof Drip Edge

Inflow Area = 0.096 ac, 88.04% Impervious, Inflow Depth = 3.25" for 2-Year event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.45 cfs @ 12.10 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.9 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 0.020 af
Secondary = 0.42 cfs @ 12.10 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.01' @ 12.10 hrs Surf.Area= 500 sf Storage= 171 cf

Plug-Flow detention time= 33.1 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 33.1 min (803.0 - 770.0)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	500	0.0	0	0
54.00	500	33.0	165	165
54.25	500	100.0	125	290

Device	Routing	Invert	Outlet Devices
#1	Secondary	54.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	53.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 46.00'

Discarded OutFlow Max=0.03 cfs @ 12.10 hrs HW=54.01' (Free Discharge)
└─**2=Exfiltration** (Controls 0.03 cfs)

Secondary OutFlow Max=0.40 cfs @ 12.10 hrs HW=54.01' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.40 cfs @ 0.27 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 3.15" for 2-Year event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.52' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (776.7 - 776.5)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 12.09 hrs HW=53.52' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.20 cfs @ 1.59 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth = 2.22" for 2-Year event
Inflow = 0.84 cfs @ 12.15 hrs, Volume= 0.085 af
Outflow = 0.84 cfs @ 12.15 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.1 min
Primary = 0.84 cfs @ 12.15 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.01' @ 12.15 hrs Surf.Area= 13 sf Storage= 6 cf

Plug-Flow detention time= 0.4 min calculated for 0.084 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (813.6 - 813.2)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.84 cfs @ 12.15 hrs HW=52.01' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.84 cfs @ 3.05 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 2.29" for 2-Year event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.04' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (816.4 - 816.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.09 hrs HW=49.04' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.28 cfs @ 2.24 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 2.23" for 2-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 48.96' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.058 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (818.6 - 818.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.78 cfs @ 12.09 hrs HW=48.95' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.78 cfs @ 3.31 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area =	0.644 ac,	13.54% Impervious,	Inflow Depth =	1.59"	for 2-Year event
Inflow =	0.89 cfs @	12.22 hrs,	Volume=	0.085 af	
Outflow =	0.88 cfs @	12.24 hrs,	Volume=	0.085 af,	Atten= 1%, Lag= 1.3 min
Primary =	0.88 cfs @	12.24 hrs,	Volume=	0.085 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.23' @ 12.24 hrs Surf.Area= 103 sf Storage= 103 cf

Plug-Flow detention time= 5.6 min calculated for 0.085 af (100% of inflow)
Center-of-Mass det. time= 5.4 min (858.1 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1	46.75'	484 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.75	20	0.0	0	0
49.00	410	100.0	484	484

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.24 hrs HW=47.23' (Free Discharge)
└—**1=Culvert** (Inlet Controls 0.87 cfs @ 2.35 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.207 ac, 31.33% Impervious, Inflow Depth > 1.35" for 2-Year event
Inflow = 3.00 cfs @ 12.10 hrs, Volume= 0.360 af
Outflow = 2.44 cfs @ 12.19 hrs, Volume= 0.309 af, Atten= 19%, Lag= 5.0 min
Primary = 2.44 cfs @ 12.19 hrs, Volume= 0.309 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.04' @ 12.19 hrs Surf.Area= 1,769 sf Storage= 2,740 cf

Plug-Flow detention time= 136.6 min calculated for 0.309 af (86% of inflow)
Center-of-Mass det. time= 47.4 min (995.9 - 948.5)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.40 cfs @ 12.19 hrs HW=42.04' (Free Discharge)
├—**1=Orifice/Grate** (Weir Controls 2.36 cfs @ 1.75 fps)
└—**2=Orifice/Grate** (Passes 0.04 cfs of 1.84 cfs potential flow)
  └—**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 2.16" for 2-Year event
Inflow = 1.63 cfs @ 12.10 hrs, Volume= 0.145 af
Outflow = 1.53 cfs @ 12.16 hrs, Volume= 0.122 af, Atten= 6%, Lag= 3.1 min
Primary = 1.53 cfs @ 12.16 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.71' @ 12.16 hrs Surf.Area= 1,248 sf Storage= 1,379 cf

Plug-Flow detention time= 172.3 min calculated for 0.121 af (84% of inflow)

Center-of-Mass det. time= 73.2 min (981.7 - 908.5)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=1.49 cfs @ 12.16 hrs HW=46.71' (Free Discharge)
—**1=Orifice/Grate** (Passes 0.03 cfs of 1.88 cfs potential flow)
—**3=Exfiltration** (Exfiltration Controls 0.03 cfs)
—**2=Orifice/Grate** (Weir Controls 1.47 cfs @ 1.49 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.529 ac, 30.69% Impervious, Inflow Depth > 1.39" for 2-Year event
Inflow = 5.67 cfs @ 12.17 hrs, Volume= 0.642 af
Primary = 5.67 cfs @ 12.17 hrs, Volume= 0.642 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2 - Driveway Crossing

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 2.40 cfs @ 12.11 hrs, Volume= 0.317 af
Primary = 2.40 cfs @ 12.11 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Roof Runoff Area=4,180 sf 88.04% Impervious Runoff Depth=5.17"
Tc=6.0 min CN=96 Runoff=0.51 cfs 0.041 af

Subcatchment 9S: Roof Runoff Area=8,320 sf 95.67% Impervious Runoff Depth=5.29"
Flow Length=300' Tc=14.5 min CN=97 Runoff=0.81 cfs 0.084 af

Subcatchment S10: North Ballfield Runoff Area=37,760 sf 1.06% Impervious Runoff Depth=2.88"
Flow Length=300' Tc=14.5 min CN=74 Runoff=2.23 cfs 0.208 af

Subcatchment S10B: South Ballfield Runoff Area=32,810 sf 8.63% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=76 Runoff=2.66 cfs 0.193 af

Subcatchment S11A: S11A Runoff Area=8,777 sf 46.10% Impervious Runoff Depth=3.96"
Tc=6.0 min CN=85 Runoff=0.90 cfs 0.067 af

Subcatchment S11B: S11B Runoff Area=4,806 sf 51.81% Impervious Runoff Depth=4.07"
Tc=6.0 min CN=86 Runoff=0.50 cfs 0.037 af

Subcatchment S12: S12 Runoff Area=16,950 sf 32.45% Impervious Runoff Depth=3.66"
Flow Length=125' Tc=6.0 min CN=82 Runoff=1.62 cfs 0.119 af

Subcatchment S13: 13S Pemeable Lot Runoff Area=4,546 sf 97.12% Impervious Runoff Depth>4.31"
Tc=790.0 min CN=97 Runoff=0.04 cfs 0.038 af

Subcatchment S14: 14S Pemeable Lot Runoff Area=5,300 sf 97.42% Impervious Runoff Depth>4.31"
Tc=790.0 min CN=97 Runoff=0.05 cfs 0.044 af

Subcatchment S15: S15 Runoff Area=11,655 sf 34.71% Impervious Runoff Depth=3.66"
Flow Length=80' Slope=0.0600 '/' Tc=6.0 min CN=82 Runoff=1.12 cfs 0.082 af

Subcatchment S16R: Banfield Road Runoff Area=28,040 sf 13.54% Impervious Runoff Depth=3.17"
Flow Length=425' Tc=15.0 min CN=77 Runoff=1.80 cfs 0.170 af

Subcatchment S17: S11 Runoff Area=12,628 sf 37.42% Impervious Runoff Depth=3.66"
Flow Length=210' Tc=7.4 min CN=82 Runoff=1.16 cfs 0.088 af

Subcatchment S18: S11 Runoff Area=20,093 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=150' Tc=8.6 min CN=73 Runoff=1.35 cfs 0.107 af

Subcatchment S20: Flat Roof Runoff Area=2,890 sf 91.35% Impervious Runoff Depth=5.17"
Tc=6.0 min CN=96 Runoff=0.35 cfs 0.029 af

Subcatchment S21: Entrance Side Runoff Area=2,040 sf 0.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=80 Runoff=0.19 cfs 0.013 af

Subcatchment S22: New Parking Runoff Area=5,020 sf 73.31% Impervious Runoff Depth>3.80"
Tc=790.0 min CN=92 Runoff=0.04 cfs 0.036 af

Subcatchment S23: Raingarden B Runoff Area=5,790 sf 8.64% Impervious Runoff Depth=2.98"
Tc=6.0 min UI Adjusted CN=75 Runoff=0.45 cfs 0.033 af

Subcatchment S7A: 4S-Northwest Runoff Area=2,646 sf 87.68% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=95 Runoff=0.32 cfs 0.026 af

Subcatchment S8: S8-Northwest Runoff Area=15,025 sf 30.25% Impervious Runoff Depth=3.56"
Flow Length=280' Tc=14.3 min CN=81 Runoff=1.10 cfs 0.102 af

Subcatchment S8B: ROOF DRAIN Runoff Area=2,190 sf 100.00% Impervious Runoff Depth>5.40"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment S9: Pemeable Lot by ballfield Runoff Area=9,372 sf 95.85% Impervious Runoff Depth>4.31"
Tc=790.0 min CN=97 Runoff=0.08 cfs 0.077 af

Reach 1R: REACH 1 Avg. Flow Depth=0.17' Max Vel=4.07 fps Inflow=2.50 cfs 0.118 af
n=0.022 L=70.0' S=0.0500 '/' Capacity=77.07 cfs Outflow=2.48 cfs 0.118 af

Reach R5: R5 - Pre-Treatment Swale 1 Avg. Flow Depth=0.10' Max Vel=1.67 fps Inflow=1.41 cfs 0.104 af
n=0.022 L=70.0' S=0.0143 '/' Capacity=187.45 cfs Outflow=1.37 cfs 0.104 af

Reach R8: R8- Banfield Rd Avg. Flow Depth=0.21' Max Vel=2.75 fps Inflow=1.79 cfs 0.170 af
n=0.035 L=290.0' S=0.0500 '/' Capacity=238.60 cfs Outflow=1.74 cfs 0.170 af

Reach R9: REACH 9 Inflow=0.05 cfs 0.044 af
Outflow=0.05 cfs 0.044 af

Pond 1P: PYD 1&4 Peak Elev=51.12' Storage=4 cf Inflow=2.66 cfs 0.193 af
12.0" Round Culvert n=0.012 L=65.0' S=0.0054 '/' Outflow=2.66 cfs 0.193 af

Pond 2P: PYD2 Peak Elev=50.92' Storage=4 cf Inflow=3.01 cfs 0.221 af
12.0" Round Culvert n=0.012 L=30.0' S=0.0050 '/' Outflow=3.01 cfs 0.221 af

Pond 3P: PCB1 Peak Elev=51.45' Storage=27 cf Inflow=4.44 cfs 0.449 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0067 '/' Outflow=4.45 cfs 0.449 af

Pond 4P: PDMH1 Peak Elev=50.69' Storage=24 cf Inflow=4.45 cfs 0.449 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0287 '/' Outflow=4.45 cfs 0.449 af

Pond 5P: PYD3 Peak Elev=47.79' Storage=1 cf Inflow=0.70 cfs 0.029 af
15.0" Round Culvert n=0.012 L=35.0' S=0.0057 '/' Outflow=0.69 cfs 0.029 af

Pond 6P: PDMH2 Peak Elev=46.02' Storage=24 cf Inflow=4.52 cfs 0.664 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0210 '/' Outflow=4.51 cfs 0.664 af

Pond 7P: Roof Dripline Filter & Cleanout Peak Elev=56.02' Storage=293 cf Inflow=0.81 cfs 0.084 af
Discarded=0.03 cfs 0.032 af Primary=0.04 cfs 0.023 af Secondary=0.74 cfs 0.029 af Outflow=0.81 cfs 0.084 af

Pond 10P: Retention Pond Peak Elev=53.35' Storage=2,531 cf Inflow=3.01 cfs 0.260 af
Discarded=0.16 cfs 0.142 af Primary=2.50 cfs 0.118 af Outflow=2.66 cfs 0.260 af

Pond 11P: Raingarden B -900sf Peak Elev=48.03' Storage=2,523 cf Inflow=2.96 cfs 0.217 af
Outflow=2.39 cfs 0.215 af

Pond OS1: Outlet Structure 1 Peak Elev=42.71' Storage=47 cf Inflow=8.15 cfs 0.927 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0750 '/' Outflow=8.22 cfs 0.927 af

Pond OS4: Outlet Structure 4 Peak Elev=43.08' Storage=10 cf Inflow=2.89 cfs 0.234 af
12.0" Round Culvert n=0.012 L=110.0' S=0.0377 '/' Outflow=2.89 cfs 0.234 af

Pond P11: Roof Drip Edge Peak Elev=54.01' Storage=172 cf Inflow=0.51 cfs 0.041 af
Discarded=0.03 cfs 0.026 af Secondary=0.52 cfs 0.015 af Outflow=0.54 cfs 0.041 af

Pond P2: CB P3 Peak Elev=53.58' Storage=1 cf Inflow=0.32 cfs 0.026 af
12.0" Round Culvert n=0.011 L=72.0' S=0.0236 '/' Outflow=0.32 cfs 0.026 af

Pond P3: CB P3 Peak Elev=52.22' Storage=9 cf Inflow=1.50 cfs 0.150 af
12.0" Round Culvert n=0.011 L=98.0' S=0.0051 '/' Outflow=1.50 cfs 0.150 af

Pond P4: YD P4 Peak Elev=49.15' Storage=1 cf Inflow=0.50 cfs 0.037 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0060 '/' Outflow=0.50 cfs 0.037 af

Pond P5: YD P5 Peak Elev=49.14' Storage=2 cf Inflow=1.41 cfs 0.104 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0077 '/' Outflow=1.41 cfs 0.104 af

Pond P8: Driveway Crossing Peak Elev=47.48' Storage=157 cf Inflow=1.80 cfs 0.170 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0344 '/' Outflow=1.79 cfs 0.170 af

Pond RG1: Raingarden 1 Peak Elev=42.24' Storage=3,088 cf Inflow=5.61 cfs 0.745 af
Outflow=5.31 cfs 0.693 af

Pond RG4: Raingarden 4 Peak Elev=46.83' Storage=1,484 cf Inflow=2.98 cfs 0.260 af
Outflow=2.89 cfs 0.234 af

Link POA1: POA #1 Inflow=11.76 cfs 1.336 af
Primary=11.76 cfs 1.336 af

Link POA2: POA #2 - Driveway Crossing Inflow=4.51 cfs 0.664 af
Primary=4.51 cfs 0.664 af

Total Runoff Area = 5.529 ac Runoff Volume = 1.617 af Average Runoff Depth = 3.51"
69.31% Pervious = 3.832 ac 30.69% Impervious = 1.697 ac

Summary for Subcatchment 1S: Roof

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
500	80	>75% Grass cover, Good, HSG D
3,680	98	Roofs, HSG D
4,180	96	Weighted Average
500		11.96% Pervious Area
3,680		88.04% Impervious Area

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

Summary for Subcatchment 9S: Roof

Runoff = 0.81 cfs @ 12.19 hrs, Volume= 0.084 af, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
360	74	>75% Grass cover, Good, HSG C
6,930	98	Roofs, HSG C
1,030	98	Roofs, HSG D
0	98	Unconnected pavement, HSG C
8,320	97	Weighted Average
360		4.33% Pervious Area
7,960		95.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10: North Ballfield

Runoff = 2.23 cfs @ 12.21 hrs, Volume= 0.208 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
37,360	74	>75% Grass cover, Good, HSG C
0	98	Roofs, HSG C
0	98	Roofs, HSG D
400	98	Unconnected pavement, HSG C
37,760	74	Weighted Average
37,360		98.94% Pervious Area
400		1.06% Impervious Area
400		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10B: South Ballfield

Runoff = 2.66 cfs @ 12.09 hrs, Volume= 0.193 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
29,980	74	>75% Grass cover, Good, HSG C
2,590	98	Roofs, HSG C
240	98	Unconnected pavement, HSG C
32,810	76	Weighted Average
29,980		91.37% Pervious Area
2,830		8.63% Impervious Area
240		8.48% Unconnected

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

Summary for Subcatchment S11A: S11A

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.067 af, Depth= 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 1.62 cfs @ 12.09 hrs, Volume= 0.119 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.04 cfs @ 21.94 hrs, Volume= 0.038 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.05 cfs @ 21.94 hrs, Volume= 0.044 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 1.12 cfs @ 12.09 hrs, Volume= 0.082 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16R: Banfield Road

Runoff = 1.80 cfs @ 12.21 hrs, Volume= 0.170 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
22,900	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
28,040	77	Weighted Average
24,242		86.46% Pervious Area
3,798		13.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
2.1	325	0.0300	2.60		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	425	Total			

Summary for Subcatchment S17: S11

Runoff = 1.16 cfs @ 12.11 hrs, Volume= 0.088 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 1.35 cfs @ 12.13 hrs, Volume= 0.107 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S20: Flat Roof

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
250	74	>75% Grass cover, Good, HSG C
2,640	98	Roofs, HSG C
2,890	96	Weighted Average
250		8.65% Pervious Area
2,640		91.35% Impervious Area

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

Summary for Subcatchment S21: Entrance Side

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
2,040	80	>75% Grass cover, Good, HSG D
0	98	Roofs, HSG D
2,040	80	Weighted Average
2,040		100.00% Pervious Area

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

Summary for Subcatchment S22: New Parking

Runoff = 0.04 cfs @ 21.95 hrs, Volume= 0.036 af, Depth> 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	1,340	74	>75% Grass cover, Good, HSG C
*	2,380	98	Permeable Pavement, HSG D
	1,300	98	Unconnected pavement, HSG D
	5,020	92	Weighted Average
	1,340		26.69% Pervious Area
	3,680		73.31% Impervious Area
	1,300		35.33% Unconnected

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

Summary for Subcatchment S23: Raingarden B

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Adj	Description
5,290	74		>75% Grass cover, Good, HSG C
0	98		Roofs, HSG C
500	98		Unconnected pavement, HSG C
5,790	76	75	Weighted Average, UI Adjusted
5,290			91.36% Pervious Area
500			8.64% Impervious Area
500			100.00% Unconnected

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

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 1.10 cfs @ 12.20 hrs, Volume= 0.102 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.08 cfs @ 21.94 hrs, Volume= 0.077 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.64"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	550	98	Unconnected pavement, HSG C
	9,372	97	Weighted Average
	389		4.15% Pervious Area
	8,983		95.85% Impervious Area
	1,328		14.78% Unconnected

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

Summary for Reach 1R: REACH 1

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 1.34" for 10-Year event
Inflow = 2.50 cfs @ 12.29 hrs, Volume= 0.118 af
Outflow = 2.48 cfs @ 12.30 hrs, Volume= 0.118 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.07 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 0.8 min

Peak Storage= 43 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 77.07 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 11.00'
Length= 70.0' Slope= 0.0500 '/'
Inlet Invert= 53.00', Outlet Invert= 49.50'

‡

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 4.00" for 10-Year event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af
Outflow = 1.37 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.67 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 2.1 min

Peak Storage= 59 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

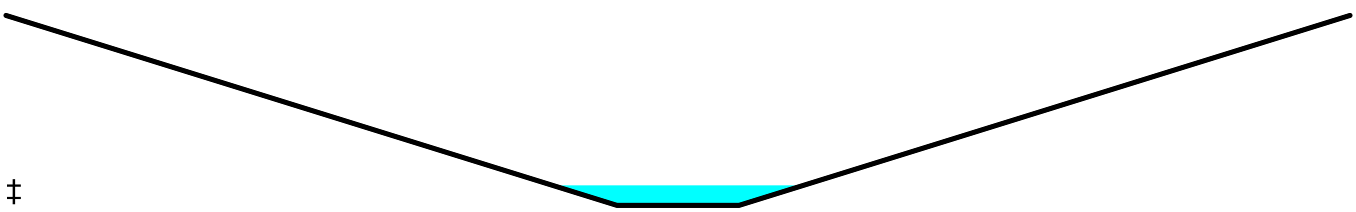
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.644 ac, 13.54% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 1.79 cfs @ 12.22 hrs, Volume= 0.170 af
Outflow = 1.74 cfs @ 12.28 hrs, Volume= 0.170 af, Atten= 3%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.75 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 5.1 min

Peak Storage= 187 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 4.31" for 10-Year event
Inflow = 0.05 cfs @ 21.94 hrs, Volume= 0.044 af
Outflow = 0.05 cfs @ 21.94 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PYD 1&4

Inflow Area = 0.753 ac, 8.63% Impervious, Inflow Depth = 3.07" for 10-Year event
Inflow = 2.66 cfs @ 12.09 hrs, Volume= 0.193 af
Outflow = 2.66 cfs @ 12.09 hrs, Volume= 0.193 af, Atten= 0%, Lag= 0.0 min
Primary = 2.66 cfs @ 12.09 hrs, Volume= 0.193 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 51.12' @ 12.09 hrs Surf.Area= 3 sf Storage= 4 cf

Plug-Flow detention time= 0.1 min calculated for 0.192 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (826.8 - 826.8)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	53.50'	200 cf	**Custom Stage Data** Listed below
		211 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
53.50	0
54.00	200

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 50.00' / 49.65' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.62 cfs @ 12.09 hrs HW=51.10' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.62 cfs @ 3.77 fps)

Summary for Pond 2P: PYD2

Inflow Area = 0.820 ac, 15.32% Impervious, Inflow Depth = 3.24" for 10-Year event
Inflow = 3.01 cfs @ 12.09 hrs, Volume= 0.221 af
Outflow = 3.01 cfs @ 12.09 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.09 hrs, Volume= 0.221 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 50.92' @ 12.10 hrs Surf.Area= 3 sf Storage= 4 cf

Plug-Flow detention time= 0.1 min calculated for 0.221 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (818.2 - 818.2)

Volume	Invert	Avail.Storage	Storage Description
#1	49.55'	12 cf	**2.00'D x 3.90'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.55'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 49.55' / 49.40' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.92 cfs @ 12.09 hrs HW=50.90' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.92 cfs @ 3.72 fps)

Summary for Pond 3P: PCB1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 3.62" for 10-Year event
Inflow = 4.44 cfs @ 12.10 hrs, Volume= 0.449 af
Outflow = 4.45 cfs @ 12.10 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.1 min
Primary = 4.45 cfs @ 12.10 hrs, Volume= 0.449 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 51.45' @ 12.10 hrs Surf.Area= 13 sf Storage= 27 cf

Plug-Flow detention time= 0.2 min calculated for 0.448 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (899.9 - 899.8)

Volume	Invert	Avail.Storage	Storage Description
#1	49.30'	63 cf	**4.00'D x 5.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.30'	**12.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 49.30' / 48.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.41 cfs @ 12.10 hrs HW=51.42' (Free Discharge)
└─**1=Culvert** (Barrel Controls 4.41 cfs @ 5.62 fps)

Summary for Pond 4P: PDMH1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 3.62" for 10-Year event
Inflow = 4.45 cfs @ 12.10 hrs, Volume= 0.449 af
Outflow = 4.45 cfs @ 12.11 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.1 min
Primary = 4.45 cfs @ 12.11 hrs, Volume= 0.449 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 50.69' @ 12.11 hrs Surf.Area= 13 sf Storage= 24 cf

Plug-Flow detention time= 0.2 min calculated for 0.448 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (900.1 - 899.9)

Volume	Invert	Avail.Storage	Storage Description
#1	48.80'	58 cf	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.80'	**12.0" Round Culvert** L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 48.80' / 44.20' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.39 cfs @ 12.11 hrs HW=50.65' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.39 cfs @ 5.59 fps)

Summary for Pond 5P: PYD3

Inflow Area = 0.143 ac, 59.16% Impervious, Inflow Depth = 2.41" for 10-Year event
Inflow = 0.70 cfs @ 12.10 hrs, Volume= 0.029 af
Outflow = 0.69 cfs @ 12.09 hrs, Volume= 0.029 af, Atten= 1%, Lag= 0.0 min
Primary = 0.69 cfs @ 12.09 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.79' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (773.3 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	47.35'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**
#2	50.45'	56 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		66 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.45	5	0	0
51.00	200	56	56

Device	Routing	Invert	Outlet Devices
#1	Primary	47.35'	**15.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 47.35' / 47.15' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.68 cfs @ 12.09 hrs HW=47.79' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.68 cfs @ 2.65 fps)

Summary for Pond 6P: PDMH2

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 2.71" for 10-Year event
Inflow = 4.52 cfs @ 12.11 hrs, Volume= 0.664 af
Outflow = 4.51 cfs @ 12.11 hrs, Volume= 0.664 af, Atten= 0%, Lag= 0.1 min
Primary = 4.51 cfs @ 12.11 hrs, Volume= 0.664 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.02' @ 12.11 hrs Surf.Area= 13 sf Storage= 24 cf

Plug-Flow detention time= 0.2 min calculated for 0.663 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (936.1 - 936.0)

Volume	Invert	Avail.Storage	Storage Description
#1	44.10'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.10'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 44.10' / 42.00' S= 0.0210 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.44 cfs @ 12.11 hrs HW=45.98' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.44 cfs @ 5.65 fps)

Summary for Pond 7P: Roof Dripline Filter & Cleanout

Inflow Area = 0.191 ac, 95.67% Impervious, Inflow Depth = 5.29" for 10-Year event
Inflow = 0.81 cfs @ 12.19 hrs, Volume= 0.084 af
Outflow = 0.81 cfs @ 12.19 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.03 cfs @ 12.19 hrs, Volume= 0.032 af
Primary = 0.04 cfs @ 12.19 hrs, Volume= 0.023 af
Secondary = 0.74 cfs @ 12.19 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 56.02' @ 12.19 hrs Surf.Area= 360 sf Storage= 293 cf

Plug-Flow detention time= 28.2 min calculated for 0.084 af (100% of inflow)
Center-of-Mass det. time= 28.2 min (789.4 - 761.2)

Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	321 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.50	360	0.0	0	0
54.00	360	33.0	178	178
55.50	360	10.0	54	232
56.25	360	33.0	89	321

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**6.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 53.00' / 52.00' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	56.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Device 1	52.50'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'
#4	Discarded	52.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'

Discarded OutFlow Max=0.03 cfs @ 12.19 hrs HW=56.02' (Free Discharge)
└─**4=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 12.19 hrs HW=56.02' (Free Discharge)
└─**1=Culvert** (Passes 0.04 cfs of 1.57 cfs potential flow)
  └─**3=Exfiltration** (Controls 0.04 cfs)

Secondary OutFlow Max=0.57 cfs @ 12.19 hrs HW=56.02' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.57 cfs @ 0.30 fps)

Summary for Pond 10P: Retention Pond

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 2.95" for 10-Year event
Inflow = 3.01 cfs @ 12.20 hrs, Volume= 0.260 af
Outflow = 2.66 cfs @ 12.29 hrs, Volume= 0.260 af, Atten= 12%, Lag= 5.1 min
Discarded = 0.16 cfs @ 12.29 hrs, Volume= 0.142 af
Primary = 2.50 cfs @ 12.29 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.35' @ 12.29 hrs Surf.Area= 2,268 sf Storage= 2,531 cf

Plug-Flow detention time= 107.1 min calculated for 0.260 af (100% of inflow)
Center-of-Mass det. time= 107.2 min (931.5 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	52.00'	3,290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	1,160	0.0	0	0
53.75	2,600	100.0	3,290	3,290

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	52.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.16 cfs @ 12.29 hrs HW=53.34' (Free Discharge)
└─**2=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=2.47 cfs @ 12.29 hrs HW=53.34' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.47 cfs @ 1.44 fps)

Summary for Pond 11P: Raingarden B -900sf

Inflow Area = 1.449 ac, 25.70% Impervious, Inflow Depth > 1.79" for 10-Year event
Inflow = 2.96 cfs @ 12.29 hrs, Volume= 0.217 af
Outflow = 2.39 cfs @ 12.42 hrs, Volume= 0.215 af, Atten= 19%, Lag= 8.1 min
Primary = 2.39 cfs @ 12.42 hrs, Volume= 0.215 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 48.03' @ 12.42 hrs Surf.Area= 2,027 sf Storage= 2,523 cf

Plug-Flow detention time= 141.7 min calculated for 0.215 af (99% of inflow)
Center-of-Mass det. time= 133.7 min (1,011.0 - 877.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.25'	3,358 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.25	1,100	0.0	0	0
45.25	1,100	40.0	440	440
45.50	1,100	33.0	91	531
47.00	1,100	10.0	165	696
48.50	2,450	100.0	2,663	3,358

Device	Routing	Invert	Outlet Devices
#1	Primary	44.25'	**12.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.25' / 44.15' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	47.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	44.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	44.25'	**2.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.30 cfs @ 12.42 hrs HW=48.02' (Free Discharge)
└─**1=Culvert** (Passes 2.30 cfs of 6.84 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 2.19 cfs @ 1.71 fps)
  └─**3=Orifice/Grate** (Passes 0.12 cfs of 1.77 cfs potential flow)
    └─**4=Exfiltration** (Exfiltration Controls 0.12 cfs)

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 4.012 ac, 34.46% Impervious, Inflow Depth > 2.77" for 10-Year event
Inflow = 8.15 cfs @ 12.13 hrs, Volume= 0.927 af
Outflow = 8.22 cfs @ 12.14 hrs, Volume= 0.927 af, Atten= 0%, Lag= 0.3 min
Primary = 8.22 cfs @ 12.14 hrs, Volume= 0.927 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.71' @ 12.14 hrs Surf.Area= 13 sf Storage= 47 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (940.0 - 940.0)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=8.05 cfs @ 12.14 hrs HW=42.53' (Free Discharge)
└─**1=Culvert** (Inlet Controls 8.05 cfs @ 10.25 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 3.49" for 10-Year event
Inflow = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af
Outflow = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.1 min
Primary = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 43.08' @ 12.12 hrs Surf.Area= 13 sf Storage= 10 cf

Plug-Flow detention time= 0.0 min calculated for 0.234 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (918.1 - 918.0)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.80 cfs @ 12.12 hrs HW=43.05' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.80 cfs @ 3.57 fps)

Summary for Pond P11: Roof Drip Edge

Inflow Area = 0.096 ac, 88.04% Impervious, Inflow Depth = 5.17" for 10-Year event
Inflow = 0.51 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.54 cfs @ 12.10 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.6 min
Discarded = 0.03 cfs @ 12.09 hrs, Volume= 0.026 af
Secondary = 0.52 cfs @ 12.10 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.01' @ 12.09 hrs Surf.Area= 500 sf Storage= 172 cf

Plug-Flow detention time= 30.4 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 30.4 min (790.0 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	500	0.0	0	0
54.00	500	33.0	165	165
54.25	500	100.0	125	290

Device	Routing	Invert	Outlet Devices
#1	Secondary	54.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	53.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 46.00'

Discarded OutFlow Max=0.03 cfs @ 12.09 hrs HW=54.01' (Free Discharge)
└─**2=Exfiltration** (Controls 0.03 cfs)

Secondary OutFlow Max=0.49 cfs @ 12.10 hrs HW=54.01' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 0.29 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 5.05" for 10-Year event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.58' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (765.3 - 765.1)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.31 cfs @ 12.09 hrs HW=53.57' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.31 cfs @ 1.78 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth > 3.96" for 10-Year event
Inflow = 1.50 cfs @ 12.15 hrs, Volume= 0.150 af
Outflow = 1.50 cfs @ 12.15 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.1 min
Primary = 1.50 cfs @ 12.15 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.22' @ 12.15 hrs Surf.Area= 13 sf Storage= 9 cf

Plug-Flow detention time= 0.3 min calculated for 0.150 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (801.1 - 800.8)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.50 cfs @ 12.15 hrs HW=52.22' (Free Discharge)
1=Culvert (Barrel Controls 1.50 cfs @ 3.49 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 4.07" for 10-Year event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.15' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (800.1 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.09 hrs HW=49.14' (Free Discharge)
1=Culvert (Barrel Controls 0.49 cfs @ 2.55 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 4.00" for 10-Year event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af
Outflow = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 1.41 cfs @ 12.09 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 49.14' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (802.0 - 801.9)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.37 cfs @ 12.09 hrs HW=49.13' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.37 cfs @ 3.74 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area = 0.644 ac, 13.54% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 1.80 cfs @ 12.21 hrs, Volume= 0.170 af
Outflow = 1.79 cfs @ 12.22 hrs, Volume= 0.170 af, Atten= 1%, Lag= 0.9 min
Primary = 1.79 cfs @ 12.22 hrs, Volume= 0.170 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.48' @ 12.22 hrs Surf.Area= 147 sf Storage= 157 cf

Plug-Flow detention time= 4.2 min calculated for 0.170 af (100% of inflow)
Center-of-Mass det. time= 4.0 min (836.7 - 832.6)

Volume	Invert	Avail.Storage	Storage Description
#1	46.75'	484 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.75	20	0.0	0	0
49.00	410	100.0	484	484

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.76 cfs @ 12.22 hrs HW=47.47' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.76 cfs @ 2.90 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.207 ac, 31.33% Impervious, Inflow Depth > 2.79" for 10-Year event
Inflow = 5.61 cfs @ 12.10 hrs, Volume= 0.745 af
Outflow = 5.31 cfs @ 12.14 hrs, Volume= 0.693 af, Atten= 5%, Lag= 2.1 min
Primary = 5.31 cfs @ 12.14 hrs, Volume= 0.693 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.24' @ 12.14 hrs Surf.Area= 1,917 sf Storage= 3,088 cf

Plug-Flow detention time= 77.7 min calculated for 0.692 af (93% of inflow)
Center-of-Mass det. time= 24.9 min (947.3 - 922.4)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=5.23 cfs @ 12.14 hrs HW=42.23' (Free Discharge)
├─**1=Orifice/Grate** (Weir Controls 5.19 cfs @ 2.27 fps)
└─**2=Orifice/Grate** (Passes 0.04 cfs of 1.89 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 3.88" for 10-Year event
Inflow = 2.98 cfs @ 12.10 hrs, Volume= 0.260 af
Outflow = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af, Atten= 3%, Lag= 1.2 min
Primary = 2.89 cfs @ 12.12 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.83' @ 12.12 hrs Surf.Area= 1,328 sf Storage= 1,484 cf

Plug-Flow detention time= 102.5 min calculated for 0.233 af (90% of inflow)

Center-of-Mass det. time= 35.4 min (918.0 - 882.7)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.81 cfs @ 12.12 hrs HW=46.82' (Free Discharge)
1=Orifice/Grate (Passes 0.03 cfs of 1.91 cfs potential flow)
3=Exfiltration (Exfiltration Controls 0.03 cfs)
2=Orifice/Grate (Weir Controls 2.78 cfs @ 1.85 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.529 ac, 30.69% Impervious, Inflow Depth > 2.90" for 10-Year event
Inflow = 11.76 cfs @ 12.14 hrs, Volume= 1.336 af
Primary = 11.76 cfs @ 12.14 hrs, Volume= 1.336 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2 - Driveway Crossing

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 2.71" for 10-Year event
Inflow = 4.51 cfs @ 12.11 hrs, Volume= 0.664 af
Primary = 4.51 cfs @ 12.11 hrs, Volume= 0.664 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Roof Runoff Area=4,180 sf 88.04% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=96 Runoff=0.65 cfs 0.053 af

Subcatchment 9S: Roof Runoff Area=8,320 sf 95.67% Impervious Runoff Depth>6.78"
Flow Length=300' Tc=14.5 min CN=97 Runoff=1.02 cfs 0.108 af

Subcatchment S10: North Ballfield Runoff Area=37,760 sf 1.06% Impervious Runoff Depth=4.16"
Flow Length=300' Tc=14.5 min CN=74 Runoff=3.23 cfs 0.301 af

Subcatchment S10B: South Ballfield Runoff Area=32,810 sf 8.63% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=76 Runoff=3.78 cfs 0.275 af

Subcatchment S11A: S11A Runoff Area=8,777 sf 46.10% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=85 Runoff=1.21 cfs 0.090 af

Subcatchment S11B: S11B Runoff Area=4,806 sf 51.81% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=86 Runoff=0.67 cfs 0.051 af

Subcatchment S12: S12 Runoff Area=16,950 sf 32.45% Impervious Runoff Depth=5.05"
Flow Length=125' Tc=6.0 min CN=82 Runoff=2.21 cfs 0.164 af

Subcatchment S13: 13S Pemeable Lot Runoff Area=4,546 sf 97.12% Impervious Runoff Depth>5.55"
Tc=790.0 min CN=97 Runoff=0.05 cfs 0.048 af

Subcatchment S14: 14S Pemeable Lot Runoff Area=5,300 sf 97.42% Impervious Runoff Depth>5.55"
Tc=790.0 min CN=97 Runoff=0.06 cfs 0.056 af

Subcatchment S15: S15 Runoff Area=11,655 sf 34.71% Impervious Runoff Depth=5.05"
Flow Length=80' Slope=0.0600 '/' Tc=6.0 min CN=82 Runoff=1.52 cfs 0.113 af

Subcatchment S16R: Banfield Road Runoff Area=28,040 sf 13.54% Impervious Runoff Depth=4.49"
Flow Length=425' Tc=15.0 min CN=77 Runoff=2.55 cfs 0.241 af

Subcatchment S17: S11 Runoff Area=12,628 sf 37.42% Impervious Runoff Depth=5.05"
Flow Length=210' Tc=7.4 min CN=82 Runoff=1.59 cfs 0.122 af

Subcatchment S18: S11 Runoff Area=20,093 sf 0.00% Impervious Runoff Depth=4.06"
Flow Length=150' Tc=8.6 min CN=73 Runoff=1.98 cfs 0.156 af

Subcatchment S20: Flat Roof Runoff Area=2,890 sf 91.35% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=96 Runoff=0.45 cfs 0.037 af

Subcatchment S21: Entrance Side Runoff Area=2,040 sf 0.00% Impervious Runoff Depth=4.82"
Tc=6.0 min CN=80 Runoff=0.26 cfs 0.019 af

Subcatchment S22: New Parking Runoff Area=5,020 sf 73.31% Impervious Runoff Depth>5.01"
Tc=790.0 min CN=92 Runoff=0.05 cfs 0.048 af

Subcatchment S23: Raingarden B Runoff Area=5,790 sf 8.64% Impervious Runoff Depth=4.27"
Tc=6.0 min UI Adjusted CN=75 Runoff=0.65 cfs 0.047 af

Subcatchment S7A: 4S-Northwest Runoff Area=2,646 sf 87.68% Impervious Runoff Depth=6.55"
Tc=6.0 min CN=95 Runoff=0.41 cfs 0.033 af

Subcatchment S8: S8-Northwest Runoff Area=15,025 sf 30.25% Impervious Runoff Depth=4.94"
Flow Length=280' Tc=14.3 min CN=81 Runoff=1.51 cfs 0.142 af

Subcatchment S8B: ROOF DRAIN Runoff Area=2,190 sf 100.00% Impervious Runoff Depth>6.90"
Tc=6.0 min CN=98 Runoff=0.34 cfs 0.029 af

Subcatchment S9: Pemeable Lot by ballfield Runoff Area=9,372 sf 95.85% Impervious Runoff Depth>5.55"
Tc=790.0 min CN=97 Runoff=0.10 cfs 0.099 af

Reach 1R: REACH 1 Avg. Flow Depth=0.21' Max Vel=4.71 fps Inflow=3.90 cfs 0.210 af
n=0.022 L=70.0' S=0.0500 '/' Capacity=77.07 cfs Outflow=3.89 cfs 0.210 af

Reach R5: R5 - Pre-Treatment Swale 1 Avg. Flow Depth=0.12' Max Vel=1.86 fps Inflow=1.88 cfs 0.141 af
n=0.022 L=70.0' S=0.0143 '/' Capacity=187.45 cfs Outflow=1.83 cfs 0.141 af

Reach R8: R8- Banfield Rd Avg. Flow Depth=0.25' Max Vel=3.03 fps Inflow=2.52 cfs 0.241 af
n=0.035 L=290.0' S=0.0500 '/' Capacity=238.60 cfs Outflow=2.47 cfs 0.241 af

Reach R9: REACH 9 Inflow=0.06 cfs 0.056 af
Outflow=0.06 cfs 0.056 af

Pond 1P: PYD 1&4 Peak Elev=51.82' Storage=6 cf Inflow=3.78 cfs 0.275 af
12.0" Round Culvert n=0.012 L=65.0' S=0.0054 '/' Outflow=3.79 cfs 0.275 af

Pond 2P: PYD2 Peak Elev=51.44' Storage=6 cf Inflow=4.24 cfs 0.312 af
12.0" Round Culvert n=0.012 L=30.0' S=0.0050 '/' Outflow=4.24 cfs 0.312 af

Pond 3P: PCB1 Peak Elev=52.85' Storage=45 cf Inflow=6.16 cfs 0.615 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0067 '/' Outflow=6.14 cfs 0.615 af

Pond 4P: PDMH1 Peak Elev=51.94' Storage=39 cf Inflow=6.14 cfs 0.615 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0287 '/' Outflow=6.14 cfs 0.615 af

Pond 5P: PYD3 Peak Elev=47.85' Storage=2 cf Inflow=0.88 cfs 0.042 af
15.0" Round Culvert n=0.012 L=35.0' S=0.0057 '/' Outflow=0.88 cfs 0.042 af

Pond 6P: PDMH2 Peak Elev=50.59' Storage=57 cf Inflow=8.26 cfs 0.951 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0210 '/' Outflow=8.50 cfs 0.951 af

Pond 7P: Roof Dripline Filter & Cleanout Peak Elev=56.02' Storage=294 cf Inflow=1.02 cfs 0.108 af
Discarded=0.03 cfs 0.036 af Primary=0.04 cfs 0.029 af Secondary=1.00 cfs 0.043 af Outflow=1.07 cfs 0.108 af

Pond 10P: Retention Pond Peak Elev=53.45' Storage=2,733 cf Inflow=4.27 cfs 0.372 af
Discarded=0.16 cfs 0.162 af Primary=3.90 cfs 0.210 af Outflow=4.07 cfs 0.372 af

Pond 11P: Raingarden B -900sf Peak Elev=48.18' Storage=2,789 cf Inflow=4.65 cfs 0.348 af
Outflow=4.46 cfs 0.336 af

Pond OS1: Outlet Structure 1 Peak Elev=46.33' Storage=47 cf Inflow=10.74 cfs 1.338 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0750 '/' Outflow=10.95 cfs 1.338 af

Pond OS4: Outlet Structure 4 Peak Elev=43.58' Storage=17 cf Inflow=3.95 cfs 0.326 af
12.0" Round Culvert n=0.012 L=110.0' S=0.0377 '/' Outflow=3.94 cfs 0.326 af

Pond P11: Roof Drip Edge Peak Elev=54.02' Storage=173 cf Inflow=0.65 cfs 0.053 af
Discarded=0.03 cfs 0.030 af Secondary=0.63 cfs 0.023 af Outflow=0.65 cfs 0.053 af

Pond P2: CB P3 Peak Elev=53.62' Storage=1 cf Inflow=0.41 cfs 0.033 af
12.0" Round Culvert n=0.011 L=72.0' S=0.0236 '/' Outflow=0.41 cfs 0.033 af

Pond P3: CB P3 Peak Elev=52.37' Storage=11 cf Inflow=2.03 cfs 0.204 af
12.0" Round Culvert n=0.011 L=98.0' S=0.0051 '/' Outflow=2.03 cfs 0.204 af

Pond P4: YD P4 Peak Elev=49.22' Storage=1 cf Inflow=0.67 cfs 0.051 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0060 '/' Outflow=0.67 cfs 0.051 af

Pond P5: YD P5 Peak Elev=49.27' Storage=2 cf Inflow=1.88 cfs 0.141 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0077 '/' Outflow=1.88 cfs 0.141 af

Pond P8: Driveway Crossing Peak Elev=47.69' Storage=201 cf Inflow=2.55 cfs 0.241 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0344 '/' Outflow=2.52 cfs 0.241 af

Pond RG1: Raingarden 1 Peak Elev=42.67' Storage=3,837 cf Inflow=9.24 cfs 1.064 af
Outflow=8.21 cfs 1.012 af

Pond RG4: Raingarden 4 Peak Elev=46.90' Storage=1,554 cf Inflow=4.04 cfs 0.353 af
Outflow=3.95 cfs 0.326 af

Link POA1: POA #1 Inflow=15.73 cfs 1.913 af
Primary=15.73 cfs 1.913 af

Link POA2: POA #2 - Driveway Crossing Inflow=8.50 cfs 0.951 af
Primary=8.50 cfs 0.951 af

Total Runoff Area = 5.529 ac Runoff Volume = 2.232 af Average Runoff Depth = 4.84"
69.31% Pervious = 3.832 ac 30.69% Impervious = 1.697 ac

Summary for Subcatchment 1S: Roof

Runoff = 0.65 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 6.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
500	80	>75% Grass cover, Good, HSG D
3,680	98	Roofs, HSG D
4,180	96	Weighted Average
500		11.96% Pervious Area
3,680		88.04% Impervious Area

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

Summary for Subcatchment 9S: Roof

Runoff = 1.02 cfs @ 12.19 hrs, Volume= 0.108 af, Depth> 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
360	74	>75% Grass cover, Good, HSG C
6,930	98	Roofs, HSG C
1,030	98	Roofs, HSG D
0	98	Unconnected pavement, HSG C
8,320	97	Weighted Average
360		4.33% Pervious Area
7,960		95.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10: North Ballfield

Runoff = 3.23 cfs @ 12.20 hrs, Volume= 0.301 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
37,360	74	>75% Grass cover, Good, HSG C
0	98	Roofs, HSG C
0	98	Roofs, HSG D
400	98	Unconnected pavement, HSG C
37,760	74	Weighted Average
37,360		98.94% Pervious Area
400		1.06% Impervious Area
400		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10B: South Ballfield

Runoff = 3.78 cfs @ 12.09 hrs, Volume= 0.275 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
29,980	74	>75% Grass cover, Good, HSG C
2,590	98	Roofs, HSG C
240	98	Unconnected pavement, HSG C
32,810	76	Weighted Average
29,980		91.37% Pervious Area
2,830		8.63% Impervious Area
240		8.48% Unconnected

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

Summary for Subcatchment S11A: S11A

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.05 cfs @ 21.94 hrs, Volume= 0.048 af, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.06 cfs @ 21.94 hrs, Volume= 0.056 af, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 1.52 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16R: Banfield Road

Runoff = 2.55 cfs @ 12.21 hrs, Volume= 0.241 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
22,900	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
28,040	77	Weighted Average
24,242		86.46% Pervious Area
3,798		13.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
2.1	325	0.0300	2.60		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	425	Total			

Summary for Subcatchment S17: S11

Runoff = 1.59 cfs @ 12.11 hrs, Volume= 0.122 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 1.98 cfs @ 12.12 hrs, Volume= 0.156 af, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S20: Flat Roof

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 6.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	250	74	>75% Grass cover, Good, HSG C
	2,640	98	Roofs, HSG C
	2,890	96	Weighted Average
	250		8.65% Pervious Area
	2,640		91.35% Impervious Area

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

Summary for Subcatchment S21: Entrance Side

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 4.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	2,040	80	>75% Grass cover, Good, HSG D
	0	98	Roofs, HSG D
	2,040	80	Weighted Average
	2,040		100.00% Pervious Area

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

Summary for Subcatchment S22: New Parking

Runoff = 0.05 cfs @ 21.95 hrs, Volume= 0.048 af, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	1,340	74	>75% Grass cover, Good, HSG C
*	2,380	98	Permeable Pavement, HSG D
	1,300	98	Unconnected pavement, HSG D
	5,020	92	Weighted Average
	1,340		26.69% Pervious Area
	3,680		73.31% Impervious Area
	1,300		35.33% Unconnected

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

Summary for Subcatchment S23: Raingarden B

Runoff = 0.65 cfs @ 12.09 hrs, Volume= 0.047 af, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Adj	Description
5,290	74		>75% Grass cover, Good, HSG C
0	98		Roofs, HSG C
500	98		Unconnected pavement, HSG C
5,790	76	75	Weighted Average, UI Adjusted
5,290			91.36% Pervious Area
500			8.64% Impervious Area
500			100.00% Unconnected

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

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 1.51 cfs @ 12.20 hrs, Volume= 0.142 af, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 6.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.10 cfs @ 21.94 hrs, Volume= 0.099 af, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=7.14"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	550	98	Unconnected pavement, HSG C
	9,372	97	Weighted Average
	389		4.15% Pervious Area
	8,983		95.85% Impervious Area
	1,328		14.78% Unconnected

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

Summary for Reach 1R: REACH 1

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 2.39" for 25-Year event
Inflow = 3.90 cfs @ 12.24 hrs, Volume= 0.210 af
Outflow = 3.89 cfs @ 12.25 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.71 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.7 min

Peak Storage= 58 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 77.07 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 11.00'
Length= 70.0' Slope= 0.0500 '/'
Inlet Invert= 53.00', Outlet Invert= 49.50'

‡

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 5.43" for 25-Year event
Inflow = 1.88 cfs @ 12.09 hrs, Volume= 0.141 af
Outflow = 1.83 cfs @ 12.11 hrs, Volume= 0.141 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.86 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 2.1 min

Peak Storage= 71 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

‡

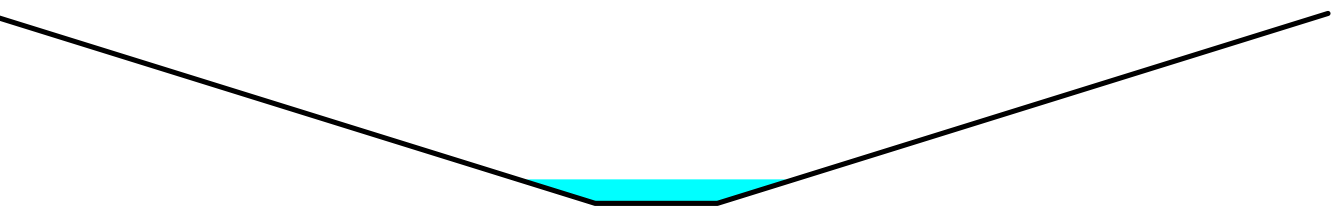
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.644 ac, 13.54% Impervious, Inflow Depth = 4.49" for 25-Year event
Inflow = 2.52 cfs @ 12.23 hrs, Volume= 0.241 af
Outflow = 2.47 cfs @ 12.27 hrs, Volume= 0.241 af, Atten= 2%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 4.6 min

Peak Storage= 239 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



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Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 5.55" for 25-Year event
Inflow = 0.06 cfs @ 21.94 hrs, Volume= 0.056 af
Outflow = 0.06 cfs @ 21.94 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PYD 1&4

Inflow Area = 0.753 ac, 8.63% Impervious, Inflow Depth = 4.38" for 25-Year event
Inflow = 3.78 cfs @ 12.09 hrs, Volume= 0.275 af
Outflow = 3.79 cfs @ 12.09 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min
Primary = 3.79 cfs @ 12.09 hrs, Volume= 0.275 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 51.82' @ 12.09 hrs   Surf.Area= 3 sf   Storage= 6 cf

Plug-Flow detention time= 0.1 min calculated for 0.275 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (816.6 - 816.6)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	53.50'	200 cf	**Custom Stage Data** Listed below
		211 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
53.50	0
54.00	200

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 50.00' / 49.65' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.72 cfs @ 12.09 hrs HW=51.78' (Free Discharge)
1=Culvert (Barrel Controls 3.72 cfs @ 4.73 fps)

Summary for Pond 2P: PYD2

Inflow Area =	0.820 ac, 15.32% Impervious, Inflow Depth = 4.57"	for 25-Year event	
Inflow =	4.24 cfs @ 12.09 hrs, Volume=	0.312 af	
Outflow =	4.24 cfs @ 12.09 hrs, Volume=	0.312 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.24 cfs @ 12.09 hrs, Volume=	0.312 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 51.44' @ 12.09 hrs   Surf.Area= 3 sf   Storage= 6 cf

Plug-Flow detention time= 0.1 min calculated for 0.311 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (809.4 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	49.55'	12 cf	**2.00'D x 3.90'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.55'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 49.55' / 49.40' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.16 cfs @ 12.09 hrs HW=51.40' (Free Discharge)
1=Culvert (Barrel Controls 4.16 cfs @ 5.30 fps)

Summary for Pond 3P: PCB1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 4.95" for 25-Year event
Inflow = 6.16 cfs @ 12.10 hrs, Volume= 0.615 af
Outflow = 6.14 cfs @ 12.10 hrs, Volume= 0.615 af, Atten= 0%, Lag= 0.2 min
Primary = 6.14 cfs @ 12.10 hrs, Volume= 0.615 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.85' @ 12.10 hrs Surf.Area= 13 sf Storage= 45 cf

Plug-Flow detention time= 0.2 min calculated for 0.614 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (887.3 - 887.2)

Volume	Invert	Avail.Storage	Storage Description
#1	49.30'	63 cf	**4.00'D x 5.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.30'	**12.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 49.30' / 48.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=6.09 cfs @ 12.10 hrs HW=52.80' (Free Discharge)
└─**1=Culvert** (Barrel Controls 6.09 cfs @ 7.76 fps)

Summary for Pond 4P: PDMH1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 4.95" for 25-Year event
Inflow = 6.14 cfs @ 12.10 hrs, Volume= 0.615 af
Outflow = 6.14 cfs @ 12.11 hrs, Volume= 0.615 af, Atten= 0%, Lag= 0.2 min
Primary = 6.14 cfs @ 12.11 hrs, Volume= 0.615 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 51.94' @ 12.11 hrs Surf.Area= 13 sf Storage= 39 cf

Plug-Flow detention time= 0.2 min calculated for 0.615 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (887.4 - 887.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.80'	58 cf	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.80'	**12.0" Round Culvert** L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 48.80' / 44.20' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=6.06 cfs @ 12.11 hrs HW=51.87' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.06 cfs @ 7.71 fps)

Summary for Pond 5P: PYD3

Inflow Area = 0.143 ac, 59.16% Impervious, Inflow Depth = 3.54" for 25-Year event
Inflow = 0.88 cfs @ 12.09 hrs, Volume= 0.042 af
Outflow = 0.88 cfs @ 12.09 hrs, Volume= 0.042 af, Atten= 1%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.09 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.85' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.042 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (767.8 - 767.7)

Volume	Invert	Avail.Storage	Storage Description
#1	47.35'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**
#2	50.45'	56 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		66 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.45	5	0	0
51.00	200	56	56

Device	Routing	Invert	Outlet Devices
#1	Primary	47.35'	**15.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 47.35' / 47.15' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.86 cfs @ 12.09 hrs HW=47.85' (Free Discharge)
1=Culvert (Barrel Controls 0.86 cfs @ 2.80 fps)

Summary for Pond 6P: PDMH2

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 3.88" for 25-Year event
Inflow = 8.26 cfs @ 12.26 hrs, Volume= 0.951 af
Outflow = 8.50 cfs @ 12.25 hrs, Volume= 0.951 af, Atten= 0%, Lag= 0.0 min
Primary = 8.50 cfs @ 12.25 hrs, Volume= 0.951 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 50.59' @ 12.25 hrs Surf.Area= 13 sf Storage= 57 cf

Plug-Flow detention time= 0.1 min calculated for 0.950 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (904.8 - 904.7)

Volume	Invert	Avail.Storage	Storage Description
#1	44.10'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.10'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 44.10' / 42.00' S= 0.0210 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=8.41 cfs @ 12.25 hrs HW=50.44' (Free Discharge)
└─**1=Culvert** (Barrel Controls 8.41 cfs @ 10.71 fps)

Summary for Pond 7P: Roof Dripline Filter & Cleanout

Inflow Area =	0.191 ac, 95.67% Impervious, Inflow Depth > 6.78" for 25-Year event			
Inflow =	1.02 cfs @	12.19 hrs, Volume=	0.108 af	
Outflow =	1.07 cfs @	12.20 hrs, Volume=	0.108 af,	Atten= 0%, Lag= 0.3 min
Discarded =	0.03 cfs @	12.20 hrs, Volume=	0.036 af	
Primary =	0.04 cfs @	12.20 hrs, Volume=	0.029 af	
Secondary =	1.00 cfs @	12.20 hrs, Volume=	0.043 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 56.02' @ 12.20 hrs Surf.Area= 360 sf Storage= 294 cf

Plug-Flow detention time= 28.1 min calculated for 0.108 af (100% of inflow)
Center-of-Mass det. time= 28.1 min (785.0 - 756.9)

Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	321 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.50	360	0.0	0	0
54.00	360	33.0	178	178
55.50	360	10.0	54	232
56.25	360	33.0	89	321

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**6.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 53.00' / 52.00' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	56.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Device 1	52.50'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'
#4	Discarded	52.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'

Discarded OutFlow Max=0.03 cfs @ 12.20 hrs HW=56.02' (Free Discharge)
└─**4=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 12.20 hrs HW=56.02' (Free Discharge)
└─**1=Culvert** (Passes 0.04 cfs of 1.57 cfs potential flow)
  └─**3=Exfiltration** (Controls 0.04 cfs)

Secondary OutFlow Max=0.90 cfs @ 12.20 hrs HW=56.02' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.90 cfs @ 0.35 fps)

Summary for Pond 10P: Retention Pond

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 4.23" for 25-Year event
Inflow = 4.27 cfs @ 12.20 hrs, Volume= 0.372 af
Outflow = 4.07 cfs @ 12.24 hrs, Volume= 0.372 af, Atten= 5%, Lag= 2.6 min
Discarded = 0.16 cfs @ 12.24 hrs, Volume= 0.162 af
Primary = 3.90 cfs @ 12.24 hrs, Volume= 0.210 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.45' @ 12.24 hrs Surf.Area= 2,356 sf Storage= 2,733 cf

Plug-Flow detention time= 88.1 min calculated for 0.372 af (100% of inflow)
Center-of-Mass det. time= 88.3 min (904.4 - 816.0)

Volume	Invert	Avail.Storage	Storage Description
#1	52.00'	3,290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	1,160	0.0	0	0
53.75	2,600	100.0	3,290	3,290

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	52.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.16 cfs @ 12.24 hrs HW=53.45' (Free Discharge)
└─**2=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=3.88 cfs @ 12.24 hrs HW=53.45' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 3.88 cfs @ 1.72 fps)

Summary for Pond 11P: Raingarden B -900sf

Inflow Area = 1.449 ac, 25.70% Impervious, Inflow Depth > 2.88" for 25-Year event
Inflow = 4.65 cfs @ 12.23 hrs, Volume= 0.348 af
Outflow = 4.46 cfs @ 12.29 hrs, Volume= 0.336 af, Atten= 4%, Lag= 3.3 min
Primary = 4.46 cfs @ 12.29 hrs, Volume= 0.336 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 48.18' @ 12.29 hrs Surf.Area= 2,161 sf Storage= 2,789 cf

Plug-Flow detention time= 107.4 min calculated for 0.336 af (97% of inflow)
Center-of-Mass det. time= 79.5 min (936.3 - 856.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.25'	3,358 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.25	1,100	0.0	0	0
45.25	1,100	40.0	440	440
45.50	1,100	33.0	91	531
47.00	1,100	10.0	165	696
48.50	2,450	100.0	2,663	3,358

Device	Routing	Invert	Outlet Devices
#1	Primary	44.25'	**12.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.25' / 44.15' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	47.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	44.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	44.25'	**2.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.42 cfs @ 12.29 hrs HW=48.18' (Free Discharge)
└─**1=Culvert** (Passes 4.42 cfs of 7.00 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 4.29 cfs @ 2.14 fps)
  └─**3=Orifice/Grate** (Passes 0.12 cfs of 1.81 cfs potential flow)
    └─**4=Exfiltration** (Exfiltration Controls 0.12 cfs)

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 4.012 ac, 34.46% Impervious, Inflow Depth > 4.00" for 25-Year event
Inflow = 10.74 cfs @ 12.14 hrs, Volume= 1.338 af
Outflow = 10.95 cfs @ 12.12 hrs, Volume= 1.338 af, Atten= 0%, Lag= 0.0 min
Primary = 10.95 cfs @ 12.12 hrs, Volume= 1.338 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.33' @ 12.12 hrs Surf.Area= 13 sf Storage= 47 cf

Plug-Flow detention time= 0.0 min calculated for 1.338 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (909.4 - 909.4)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=10.64 cfs @ 12.12 hrs HW=45.92' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.64 cfs @ 13.55 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 4.86" for 25-Year event
Inflow = 3.95 cfs @ 12.11 hrs, Volume= 0.326 af
Outflow = 3.94 cfs @ 12.12 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.1 min
Primary = 3.94 cfs @ 12.12 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 43.58' @ 12.12 hrs Surf.Area= 13 sf Storage= 17 cf

Plug-Flow detention time= 0.0 min calculated for 0.325 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (897.8 - 897.8)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.83 cfs @ 12.12 hrs HW=43.52' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.83 cfs @ 4.87 fps)

Summary for Pond P11: Roof Drip Edge

Inflow Area = 0.096 ac, 88.04% Impervious, Inflow Depth = 6.66" for 25-Year event
Inflow = 0.65 cfs @ 12.09 hrs, Volume= 0.053 af
Outflow = 0.65 cfs @ 12.09 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.03 cfs @ 12.09 hrs, Volume= 0.030 af
Secondary = 0.63 cfs @ 12.09 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.02' @ 12.09 hrs Surf.Area= 500 sf Storage= 173 cf

Plug-Flow detention time= 29.2 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 29.1 min (783.7 - 754.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	500	0.0	0	0
54.00	500	33.0	165	165
54.25	500	100.0	125	290

Device	Routing	Invert	Outlet Devices
#1	Secondary	54.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	53.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 46.00'

Discarded OutFlow Max=0.03 cfs @ 12.09 hrs HW=54.02' (Free Discharge)
└─**2=Exfiltration** (Controls 0.03 cfs)

Secondary OutFlow Max=0.59 cfs @ 12.09 hrs HW=54.02' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.59 cfs @ 0.30 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 6.55" for 25-Year event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
Primary = 0.41 cfs @ 12.09 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.62' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (759.7 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.09 hrs HW=53.61' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.40 cfs @ 1.90 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth > 5.37" for 25-Year event
Inflow = 2.03 cfs @ 12.15 hrs, Volume= 0.204 af
Outflow = 2.03 cfs @ 12.15 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.1 min
Primary = 2.03 cfs @ 12.15 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.37' @ 12.15 hrs Surf.Area= 13 sf Storage= 11 cf

Plug-Flow detention time= 0.3 min calculated for 0.204 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (794.3 - 794.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.02 cfs @ 12.15 hrs HW=52.37' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.02 cfs @ 3.73 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 5.50" for 25-Year event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 12.09 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.22' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (791.7 - 791.6)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.66 cfs @ 12.09 hrs HW=49.21' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.66 cfs @ 2.72 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 5.43" for 25-Year event
Inflow = 1.88 cfs @ 12.09 hrs, Volume= 0.141 af
Outflow = 1.88 cfs @ 12.09 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min
Primary = 1.88 cfs @ 12.09 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 49.27' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.141 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (793.5 - 793.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.84 cfs @ 12.09 hrs HW=49.26' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.84 cfs @ 3.97 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area =	0.644 ac, 13.54% Impervious, Inflow Depth = 4.49"	for 25-Year event	
Inflow =	2.55 cfs @ 12.21 hrs, Volume=	0.241 af	
Outflow =	2.52 cfs @ 12.23 hrs, Volume=	0.241 af,	Atten= 1%, Lag= 1.1 min
Primary =	2.52 cfs @ 12.23 hrs, Volume=	0.241 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.69' @ 12.23 hrs Surf.Area= 182 sf Storage= 201 cf

Plug-Flow detention time= 3.4 min calculated for 0.241 af (100% of inflow)
Center-of-Mass det. time= 3.5 min (826.1 - 822.6)

Volume	Invert	Avail.Storage	Storage Description
#1	46.75'	484 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.75	20	0.0	0	0
49.00	410	100.0	484	484

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.49 cfs @ 12.23 hrs HW=47.68' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.49 cfs @ 3.28 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.207 ac, 31.33% Impervious, Inflow Depth > 3.98" for 25-Year event
Inflow = 9.24 cfs @ 12.25 hrs, Volume= 1.064 af
Outflow = 8.21 cfs @ 12.32 hrs, Volume= 1.012 af, Atten= 11%, Lag= 4.2 min
Primary = 8.21 cfs @ 12.32 hrs, Volume= 1.012 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 42.67' @ 12.32 hrs Surf.Area= 2,235 sf Storage= 3,837 cf

Plug-Flow detention time= 57.7 min calculated for 1.010 af (95% of inflow)
Center-of-Mass det. time= 19.2 min (913.1 - 893.9)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=8.16 cfs @ 12.32 hrs HW=42.66' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 8.11 cfs @ 4.59 fps)
└─**2=Orifice/Grate** (Passes 0.05 cfs of 1.99 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 5.26" for 25-Year event
Inflow = 4.04 cfs @ 12.10 hrs, Volume= 0.353 af
Outflow = 3.95 cfs @ 12.11 hrs, Volume= 0.326 af, Atten= 2%, Lag= 1.1 min
Primary = 3.95 cfs @ 12.11 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.90' @ 12.11 hrs Surf.Area= 1,381 sf Storage= 1,554 cf

Plug-Flow detention time= 81.3 min calculated for 0.326 af (92% of inflow)

Center-of-Mass det. time= 27.2 min (897.8 - 870.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=3.84 cfs @ 12.11 hrs HW=46.89' (Free Discharge)
—**1=Orifice/Grate** (Passes 0.03 cfs of 1.92 cfs potential flow)
  —**3=Exfiltration** (Exfiltration Controls 0.03 cfs)
—**2=Orifice/Grate** (Weir Controls 3.80 cfs @ 2.05 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.529 ac, 30.69% Impervious, Inflow Depth > 4.15" for 25-Year event
Inflow = 15.73 cfs @ 12.13 hrs, Volume= 1.913 af
Primary = 15.73 cfs @ 12.13 hrs, Volume= 1.913 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2 - Driveway Crossing

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 3.88" for 25-Year event
Inflow = 8.50 cfs @ 12.25 hrs, Volume= 0.951 af
Primary = 8.50 cfs @ 12.25 hrs, Volume= 0.951 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Roof Runoff Area=4,180 sf 88.04% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=96 Runoff=0.78 cfs 0.065 af

Subcatchment 9S: Roof Runoff Area=8,320 sf 95.67% Impervious Runoff Depth>8.21"
Flow Length=300' Tc=14.5 min CN=97 Runoff=1.23 cfs 0.131 af

Subcatchment S10: North Ballfield Runoff Area=37,760 sf 1.06% Impervious Runoff Depth=5.44"
Flow Length=300' Tc=14.5 min CN=74 Runoff=4.20 cfs 0.393 af

Subcatchment S10B: South Ballfield Runoff Area=32,810 sf 8.63% Impervious Runoff Depth=5.68"
Tc=6.0 min CN=76 Runoff=4.87 cfs 0.356 af

Subcatchment S11A: S11A Runoff Area=8,777 sf 46.10% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=85 Runoff=1.50 cfs 0.114 af

Subcatchment S11B: S11B Runoff Area=4,806 sf 51.81% Impervious Runoff Depth=6.88"
Tc=6.0 min CN=86 Runoff=0.83 cfs 0.063 af

Subcatchment S12: S12 Runoff Area=16,950 sf 32.45% Impervious Runoff Depth=6.40"
Flow Length=125' Tc=6.0 min CN=82 Runoff=2.78 cfs 0.208 af

Subcatchment S13: 13S Pemeable Lot Runoff Area=4,546 sf 97.12% Impervious Runoff Depth>6.72"
Tc=790.0 min CN=97 Runoff=0.06 cfs 0.058 af

Subcatchment S14: 14S Pemeable Lot Runoff Area=5,300 sf 97.42% Impervious Runoff Depth>6.72"
Tc=790.0 min CN=97 Runoff=0.07 cfs 0.068 af

Subcatchment S15: S15 Runoff Area=11,655 sf 34.71% Impervious Runoff Depth=6.40"
Flow Length=80' Slope=0.0600 '/' Tc=6.0 min CN=82 Runoff=1.91 cfs 0.143 af

Subcatchment S16R: Banfield Road Runoff Area=28,040 sf 13.54% Impervious Runoff Depth=5.80"
Flow Length=425' Tc=15.0 min CN=77 Runoff=3.27 cfs 0.311 af

Subcatchment S17: S11 Runoff Area=12,628 sf 37.42% Impervious Runoff Depth=6.40"
Flow Length=210' Tc=7.4 min CN=82 Runoff=1.99 cfs 0.155 af

Subcatchment S18: S11 Runoff Area=20,093 sf 0.00% Impervious Runoff Depth=5.32"
Flow Length=150' Tc=8.6 min CN=73 Runoff=2.59 cfs 0.204 af

Subcatchment S20: Flat Roof Runoff Area=2,890 sf 91.35% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=96 Runoff=0.54 cfs 0.045 af

Subcatchment S21: Entrance Side Runoff Area=2,040 sf 0.00% Impervious Runoff Depth=6.16"
Tc=6.0 min CN=80 Runoff=0.32 cfs 0.024 af

Subcatchment S22: New Parking Runoff Area=5,020 sf 73.31% Impervious Runoff Depth>6.17"
Tc=790.0 min CN=92 Runoff=0.06 cfs 0.059 af

Subcatchment S23: Raingarden B Runoff Area=5,790 sf 8.64% Impervious Runoff Depth=5.56"
Tc=6.0 min UI Adjusted CN=75 Runoff=0.84 cfs 0.062 af

Subcatchment S7A: 4S-Northwest Runoff Area=2,646 sf 87.68% Impervious Runoff Depth=7.97"
Tc=6.0 min CN=95 Runoff=0.49 cfs 0.040 af

Subcatchment S8: S8-Northwest Runoff Area=15,025 sf 30.25% Impervious Runoff Depth=6.28"
Flow Length=280' Tc=14.3 min CN=81 Runoff=1.91 cfs 0.181 af

Subcatchment S8B: ROOF DRAIN Runoff Area=2,190 sf 100.00% Impervious Runoff Depth>8.32"
Tc=6.0 min CN=98 Runoff=0.41 cfs 0.035 af

Subcatchment S9: Pemeable Lot by ballfield Runoff Area=9,372 sf 95.85% Impervious Runoff Depth>6.72"
Tc=790.0 min CN=97 Runoff=0.12 cfs 0.121 af

Reach 1R: REACH 1 Avg. Flow Depth=0.25' Max Vel=5.10 fps Inflow=5.07 cfs 0.305 af
n=0.022 L=70.0' S=0.0500 '/' Capacity=77.07 cfs Outflow=5.06 cfs 0.305 af

Reach R5: R5 - Pre-Treatment Swale 1 Avg. Flow Depth=0.13' Max Vel=2.01 fps Inflow=2.33 cfs 0.177 af
n=0.022 L=70.0' S=0.0143 '/' Capacity=187.45 cfs Outflow=2.28 cfs 0.177 af

Reach R8: R8- Banfield Rd Avg. Flow Depth=0.29' Max Vel=3.25 fps Inflow=3.21 cfs 0.311 af
n=0.035 L=290.0' S=0.0500 '/' Capacity=238.60 cfs Outflow=3.15 cfs 0.311 af

Reach R9: REACH 9 Inflow=0.07 cfs 0.068 af
Outflow=0.07 cfs 0.068 af

Pond 1P: PYD 1&4 Peak Elev=52.58' Storage=8 cf Inflow=4.87 cfs 0.356 af
12.0" Round Culvert n=0.012 L=65.0' S=0.0054 '/' Outflow=4.87 cfs 0.356 af

Pond 2P: PYD2 Peak Elev=52.09' Storage=8 cf Inflow=5.41 cfs 0.401 af
12.0" Round Culvert n=0.012 L=30.0' S=0.0050 '/' Outflow=5.41 cfs 0.401 af

Pond 3P: PCB1 Peak Elev=54.71' Storage=63 cf Inflow=7.79 cfs 0.778 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0067 '/' Outflow=7.84 cfs 0.777 af

Pond 4P: PDMH1 Peak Elev=54.10' Storage=58 cf Inflow=7.84 cfs 0.777 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0287 '/' Outflow=7.83 cfs 0.777 af

Pond 5P: PYD3 Peak Elev=47.91' Storage=2 cf Inflow=1.08 cfs 0.056 af
15.0" Round Culvert n=0.012 L=35.0' S=0.0057 '/' Outflow=1.08 cfs 0.056 af

Pond 6P: PDMH2 Peak Elev=58.19' Storage=57 cf Inflow=12.07 cfs 1.240 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0210 '/' Outflow=12.02 cfs 1.240 af

Pond 7P: Roof Dripline Filter & Cleanout Peak Elev=56.02' Storage=294 cf Inflow=1.23 cfs 0.131 af
Discarded=0.03 cfs 0.039 af Primary=0.04 cfs 0.034 af Secondary=1.15 cfs 0.057 af Outflow=1.22 cfs 0.131 af

Pond 10P: Retention Pond Peak Elev=53.53' Storage=2,877 cf Inflow=5.39 cfs 0.484 af
Discarded=0.17 cfs 0.179 af Primary=5.07 cfs 0.305 af Outflow=5.25 cfs 0.484 af

Pond 11P: Raingarden B -900sf Peak Elev=48.27' Storage=2,956 cf Inflow=6.04 cfs 0.481 af
Outflow=5.97 cfs 0.463 af

Pond OS1: Outlet Structure 1 Peak Elev=59.91' Storage=47 cf Inflow=17.85 cfs 1.746 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0750 '/' Outflow=17.76 cfs 1.746 af

Pond OS4: Outlet Structure 4 Peak Elev=44.20' Storage=24 cf Inflow=4.95 cfs 0.416 af
12.0" Round Culvert n=0.012 L=110.0' S=0.0377 '/' Outflow=4.94 cfs 0.416 af

Pond P11: Roof Drip Edge Peak Elev=54.02' Storage=174 cf Inflow=0.78 cfs 0.065 af
Discarded=0.03 cfs 0.033 af Secondary=0.76 cfs 0.032 af Outflow=0.78 cfs 0.065 af

Pond P2: CB P3 Peak Elev=53.65' Storage=1 cf Inflow=0.49 cfs 0.040 af
12.0" Round Culvert n=0.011 L=72.0' S=0.0236 '/' Outflow=0.49 cfs 0.040 af

Pond P3: CB P3 Peak Elev=52.53' Storage=13 cf Inflow=2.53 cfs 0.256 af
12.0" Round Culvert n=0.011 L=98.0' S=0.0051 '/' Outflow=2.53 cfs 0.256 af

Pond P4: YD P4 Peak Elev=49.28' Storage=2 cf Inflow=0.83 cfs 0.063 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0060 '/' Outflow=0.83 cfs 0.063 af

Pond P5: YD P5 Peak Elev=49.39' Storage=3 cf Inflow=2.33 cfs 0.177 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0077 '/' Outflow=2.33 cfs 0.177 af

Pond P8: Driveway Crossing Peak Elev=47.97' Storage=262 cf Inflow=3.27 cfs 0.311 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0344 '/' Outflow=3.21 cfs 0.311 af

Pond RG1: Raingarden 1 Peak Elev=44.44' Storage=4,413 cf Inflow=13.52 cfs 1.383 af
Outflow=14.04 cfs 1.330 af

Pond RG4: Raingarden 4 Peak Elev=46.97' Storage=1,615 cf Inflow=5.05 cfs 0.443 af
Outflow=4.95 cfs 0.416 af

Link POA1: POA #1 Inflow=24.15 cfs 2.485 af
Primary=24.15 cfs 2.485 af

Link POA2: POA #2 - Driveway Crossing Inflow=12.02 cfs 1.240 af
Primary=12.02 cfs 1.240 af

Total Runoff Area = 5.529 ac Runoff Volume = 2.835 af Average Runoff Depth = 6.15"
69.31% Pervious = 3.832 ac 30.69% Impervious = 1.697 ac

Summary for Subcatchment 1S: Roof

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.065 af, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
500	80	>75% Grass cover, Good, HSG D
3,680	98	Roofs, HSG D
4,180	96	Weighted Average
500		11.96% Pervious Area
3,680		88.04% Impervious Area

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

Summary for Subcatchment 9S: Roof

Runoff = 1.23 cfs @ 12.19 hrs, Volume= 0.131 af, Depth> 8.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
360	74	>75% Grass cover, Good, HSG C
6,930	98	Roofs, HSG C
1,030	98	Roofs, HSG D
0	98	Unconnected pavement, HSG C
8,320	97	Weighted Average
360		4.33% Pervious Area
7,960		95.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10: North Ballfield

Runoff = 4.20 cfs @ 12.20 hrs, Volume= 0.393 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
37,360	74	>75% Grass cover, Good, HSG C
0	98	Roofs, HSG C
0	98	Roofs, HSG D
400	98	Unconnected pavement, HSG C
37,760	74	Weighted Average
37,360		98.94% Pervious Area
400		1.06% Impervious Area
400		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.6	200	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.5	300	Total			

Summary for Subcatchment S10B: South Ballfield

Runoff = 4.87 cfs @ 12.09 hrs, Volume= 0.356 af, Depth= 5.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
29,980	74	>75% Grass cover, Good, HSG C
2,590	98	Roofs, HSG C
240	98	Unconnected pavement, HSG C
32,810	76	Weighted Average
29,980		91.37% Pervious Area
2,830		8.63% Impervious Area
240		8.48% Unconnected

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

Summary for Subcatchment S11A: S11A

Runoff = 1.50 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
4,731	74	>75% Grass cover, Good, HSG C
1,530	98	Unconnected pavement, HSG C
2,516	98	Paved parking, HSG C
8,777	85	Weighted Average
4,731		53.90% Pervious Area
4,046		46.10% Impervious Area
1,530		37.82% Unconnected

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

Summary for Subcatchment S11B: S11B

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 6.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
2,316	74	>75% Grass cover, Good, HSG C
530	98	Unconnected pavement, HSG C
1,960	98	Paved parking, HSG C
4,806	86	Weighted Average
2,316		48.19% Pervious Area
2,490		51.81% Impervious Area
530		21.29% Unconnected

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

Summary for Subcatchment S12: S12

Runoff = 2.78 cfs @ 12.09 hrs, Volume= 0.208 af, Depth= 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
11,450	74	>75% Grass cover, Good, HSG C
5,500	98	Paved parking, HSG C
16,950	82	Weighted Average
11,450		67.55% Pervious Area
5,500		32.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	75	0.0700	0.27		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
0.4	50	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.1	125	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S13: 13S Pemeable Lot

Runoff = 0.06 cfs @ 21.94 hrs, Volume= 0.058 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	1,425	98	Paved parking, HSG C
	131	74	>75% Grass cover, Good, HSG C
*	2,990	98	Permeable Pavement, HSG C
	4,546	97	Weighted Average
	131		2.88% Pervious Area
	4,415		97.12% Impervious Area

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

Summary for Subcatchment S14: 14S Pemeable Lot

Runoff = 0.07 cfs @ 21.94 hrs, Volume= 0.068 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	1,723	98	Paved parking, HSG C
	137	74	>75% Grass cover, Good, HSG C
*	3,440	98	Permeable Pavement, HSG C
	5,300	97	Weighted Average
	137		2.58% Pervious Area
	5,163		97.42% Impervious Area

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

Summary for Subcatchment S15: S15

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.143 af, Depth= 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
7,610	74	>75% Grass cover, Good, HSG C
4,045	98	Paved parking, HSG C
11,655	82	Weighted Average
7,610		65.29% Pervious Area
4,045		34.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	80	0.0600	0.25		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.3	80	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment S16R: Banfield Road

Runoff = 3.27 cfs @ 12.20 hrs, Volume= 0.311 af, Depth= 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
22,900	74	>75% Grass cover, Good, HSG C
3,798	98	Paved roads w/curbs & sewers, HSG C
1,342	70	Woods, Good, HSG C
28,040	77	Weighted Average
24,242		86.46% Pervious Area
3,798		13.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
2.1	325	0.0300	2.60		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	425	Total			

Summary for Subcatchment S17: S11

Runoff = 1.99 cfs @ 12.11 hrs, Volume= 0.155 af, Depth= 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
4,048	74	>75% Grass cover, Good, HSG C
3,330	98	Paved roads w/curbs & sewers, HSG C
1,395	98	Paved parking, HSG C
3,855	70	Woods, Good, HSG C
12,628	82	Weighted Average
7,903		62.58% Pervious Area
4,725		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	70	0.0400	0.21		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
1.8	140	0.0650	1.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	210	Total			

Summary for Subcatchment S18: S11

Runoff = 2.59 cfs @ 12.12 hrs, Volume= 0.204 af, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
14,716	74	>75% Grass cover, Good, HSG C
5,377	70	Woods, Good, HSG C
20,093	73	Weighted Average
20,093		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	60	0.1000	0.29		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.23"
5.0	40	0.1200	0.13		**Sheet Flow, sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.2	50	0.0800	4.24		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.6	150	Total			

Summary for Subcatchment S20: Flat Roof

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
250	74	>75% Grass cover, Good, HSG C
2,640	98	Roofs, HSG C
2,890	96	Weighted Average
250		8.65% Pervious Area
2,640		91.35% Impervious Area

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

Summary for Subcatchment S21: Entrance Side

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
2,040	80	>75% Grass cover, Good, HSG D
0	98	Roofs, HSG D
2,040	80	Weighted Average
2,040		100.00% Pervious Area

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

Summary for Subcatchment S22: New Parking

Runoff = 0.06 cfs @ 21.95 hrs, Volume= 0.059 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	1,340	74	>75% Grass cover, Good, HSG C
*	2,380	98	Permeable Pavement, HSG D
	1,300	98	Unconnected pavement, HSG D
	5,020	92	Weighted Average
	1,340		26.69% Pervious Area
	3,680		73.31% Impervious Area
	1,300		35.33% Unconnected

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

Summary for Subcatchment S23: Raingarden B

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.062 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Adj	Description
5,290	74		>75% Grass cover, Good, HSG C
0	98		Roofs, HSG C
500	98		Unconnected pavement, HSG C
5,790	76	75	Weighted Average, UI Adjusted
5,290			91.36% Pervious Area
500			8.64% Impervious Area
500			100.00% Unconnected

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

Summary for Subcatchment S7A: 4S-Northwest

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
326	74	>75% Grass cover, Good, HSG C
1,420	98	Roofs, HSG C
900	98	Roofs, HSG B
2,646	95	Weighted Average
326		12.32% Pervious Area
2,320		87.68% Impervious Area

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

Summary for Subcatchment S8: S8-Northwest

Runoff = 1.91 cfs @ 12.19 hrs, Volume= 0.181 af, Depth= 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
10,480	74	>75% Grass cover, Good, HSG C
2,635	98	Roofs, HSG C
1,910	98	Unconnected pavement, HSG C
15,025	81	Weighted Average
10,480		69.75% Pervious Area
4,545		30.25% Impervious Area
1,910		42.02% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	280	Total			

Summary for Subcatchment S8B: ROOF DRAIN

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

Area (sf)	CN	Description
2,190	98	Roofs, HSG B
2,190		100.00% Impervious Area

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

Summary for Subcatchment S9: Pemeable Lot by ballfield

Runoff = 0.12 cfs @ 21.94 hrs, Volume= 0.121 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.57"

	Area (sf)	CN	Description
	778	98	Unconnected pavement, HSG C
	389	74	>75% Grass cover, Good, HSG C
*	7,655	98	Permeable Pavement, HSG C
	550	98	Unconnected pavement, HSG C
	9,372	97	Weighted Average
	389		4.15% Pervious Area
	8,983		95.85% Impervious Area
	1,328		14.78% Unconnected

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

Summary for Reach 1R: REACH 1

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 3.46" for 50-Year event
Inflow = 5.07 cfs @ 12.23 hrs, Volume= 0.305 af
Outflow = 5.06 cfs @ 12.24 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.10 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.81 fps, Avg. Travel Time= 0.6 min

Peak Storage= 70 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 77.07 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 11.00'
Length= 70.0' Slope= 0.0500 '/'
Inlet Invert= 53.00', Outlet Invert= 49.50'

‡

Summary for Reach R5: R5 - Pre-Treatment Swale 1

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 6.81" for 50-Year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.28 cfs @ 12.10 hrs, Volume= 0.177 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 2.0 min

Peak Storage= 81 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.50' Flow Area= 23.3 sf, Capacity= 187.45 cfs

8.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 23.00'
Length= 70.0' Slope= 0.0143 '/'
Inlet Invert= 48.00', Outlet Invert= 47.00'

‡

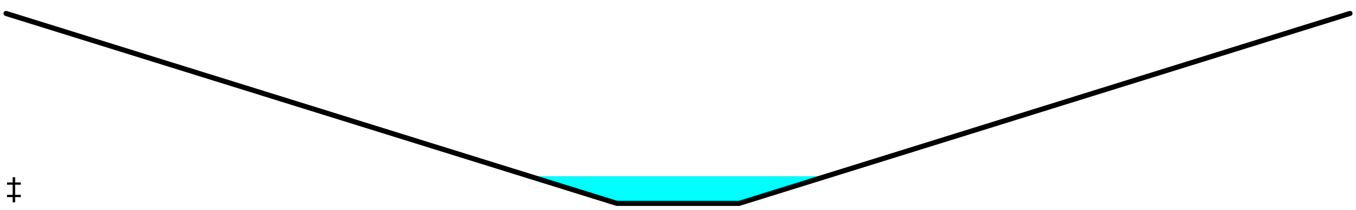
Summary for Reach R8: R8- Banfield Rd

Inflow Area = 0.644 ac, 13.54% Impervious, Inflow Depth = 5.80" for 50-Year event
Inflow = 3.21 cfs @ 12.23 hrs, Volume= 0.311 af
Outflow = 3.15 cfs @ 12.28 hrs, Volume= 0.311 af, Atten= 2%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.25 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 4.4 min

Peak Storage= 286 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 238.60 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 22.00'
Length= 290.0' Slope= 0.0500 '/'
Inlet Invert= 50.50', Outlet Invert= 36.00'



‡

Summary for Reach R9: REACH 9

Inflow Area = 0.122 ac, 97.42% Impervious, Inflow Depth > 6.72" for 50-Year event
Inflow = 0.07 cfs @ 21.94 hrs, Volume= 0.068 af
Outflow = 0.07 cfs @ 21.94 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PYD 1&4

Inflow Area = 0.753 ac, 8.63% Impervious, Inflow Depth = 5.68" for 50-Year event
Inflow = 4.87 cfs @ 12.09 hrs, Volume= 0.356 af
Outflow = 4.87 cfs @ 12.09 hrs, Volume= 0.356 af, Atten= 0%, Lag= 0.0 min
Primary = 4.87 cfs @ 12.09 hrs, Volume= 0.356 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 52.58' @ 12.09 hrs Surf.Area= 3 sf Storage= 8 cf

Plug-Flow detention time= 0.0 min calculated for 0.356 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (809.3 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1	50.00'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	53.50'	200 cf	**Custom Stage Data** Listed below
		211 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
53.50	0
54.00	200

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 50.00' / 49.65' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.09 hrs HW=52.51' (Free Discharge)
└─**1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 2P: PYD2

Inflow Area = 0.820 ac, 15.32% Impervious, Inflow Depth = 5.87" for 50-Year event
Inflow = 5.41 cfs @ 12.09 hrs, Volume= 0.401 af
Outflow = 5.41 cfs @ 12.09 hrs, Volume= 0.401 af, Atten= 0%, Lag= 0.0 min
Primary = 5.41 cfs @ 12.09 hrs, Volume= 0.401 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.09' @ 12.09 hrs Surf.Area= 3 sf Storage= 8 cf

Plug-Flow detention time= 0.1 min calculated for 0.401 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (802.8 - 802.8)

Volume	Invert	Avail.Storage	Storage Description
#1	49.55'	12 cf	**2.00'D x 3.90'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.55'	**12.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 49.55' / 49.40' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=5.30 cfs @ 12.09 hrs HW=52.03' (Free Discharge)
└─**1=Culvert** (Barrel Controls 5.30 cfs @ 6.75 fps)

Summary for Pond 3P: PCB1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 6.26" for 50-Year event
Inflow = 7.79 cfs @ 12.10 hrs, Volume= 0.778 af
Outflow = 7.84 cfs @ 12.10 hrs, Volume= 0.777 af, Atten= 0%, Lag= 0.2 min
Primary = 7.84 cfs @ 12.10 hrs, Volume= 0.777 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.71' @ 12.10 hrs Surf.Area= 13 sf Storage= 63 cf

Plug-Flow detention time= 0.2 min calculated for 0.776 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (878.5 - 878.3)

Volume	Invert	Avail.Storage	Storage Description
#1	49.30'	63 cf	**4.00'D x 5.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.30'	**12.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 49.30' / 48.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=7.79 cfs @ 12.10 hrs HW=54.64' (Free Discharge)
└—**1=Culvert** (Barrel Controls 7.79 cfs @ 9.92 fps)

Summary for Pond 4P: PDMH1

Inflow Area = 1.491 ac, 36.20% Impervious, Inflow Depth > 6.26" for 50-Year event
Inflow = 7.84 cfs @ 12.10 hrs, Volume= 0.777 af
Outflow = 7.83 cfs @ 12.11 hrs, Volume= 0.777 af, Atten= 0%, Lag= 0.2 min
Primary = 7.83 cfs @ 12.11 hrs, Volume= 0.777 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.10' @ 12.10 hrs Surf.Area= 13 sf Storage= 58 cf

Plug-Flow detention time= 0.2 min calculated for 0.776 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (878.6 - 878.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.80'	58 cf	**4.00'D x 4.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.80'	**12.0" Round Culvert** L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 48.80' / 44.20' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=7.75 cfs @ 12.11 hrs HW=53.94' (Free Discharge)
└—**1=Culvert** (Barrel Controls 7.75 cfs @ 9.87 fps)

Summary for Pond 5P: PYD3

Inflow Area = 0.143 ac, 59.16% Impervious, Inflow Depth = 4.68" for 50-Year event
Inflow = 1.08 cfs @ 12.09 hrs, Volume= 0.056 af
Outflow = 1.08 cfs @ 12.09 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 1.08 cfs @ 12.09 hrs, Volume= 0.056 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.91' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.056 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (764.3 - 764.2)

Volume	Invert	Avail.Storage	Storage Description
#1	47.35'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**
#2	50.45'	56 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		66 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.45	5	0	0
51.00	200	56	56

Device	Routing	Invert	Outlet Devices
#1	Primary	47.35'	**15.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 47.35' / 47.15' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.06 cfs @ 12.09 hrs HW=47.91' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.06 cfs @ 2.94 fps)

Summary for Pond 6P: PDMH2

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 5.06" for 50-Year event
Inflow = 12.07 cfs @ 12.16 hrs, Volume= 1.240 af
Outflow = 12.02 cfs @ 12.16 hrs, Volume= 1.240 af, Atten= 0%, Lag= 0.1 min
Primary = 12.02 cfs @ 12.16 hrs, Volume= 1.240 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 58.19' @ 12.16 hrs Surf.Area= 13 sf Storage= 57 cf

Plug-Flow detention time= 0.1 min calculated for 1.238 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (887.5 - 887.4)

Volume	Invert	Avail.Storage	Storage Description
#1	44.10'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.10'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 44.10' / 42.00' S= 0.0210 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=11.92 cfs @ 12.16 hrs HW=57.94' (Free Discharge)
└─**1=Culvert** (Barrel Controls 11.92 cfs @ 15.18 fps)

Summary for Pond 7P: Roof Dripline Filter & Cleanout

Inflow Area = 0.191 ac, 95.67% Impervious, Inflow Depth > 8.21" for 50-Year event
Inflow = 1.23 cfs @ 12.19 hrs, Volume= 0.131 af
Outflow = 1.22 cfs @ 12.19 hrs, Volume= 0.131 af, Atten= 1%, Lag= 0.0 min
Discarded = 0.03 cfs @ 12.19 hrs, Volume= 0.039 af
Primary = 0.04 cfs @ 12.19 hrs, Volume= 0.034 af
Secondary = 1.15 cfs @ 12.19 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 56.02' @ 12.19 hrs Surf.Area= 360 sf Storage= 294 cf

Plug-Flow detention time= 27.5 min calculated for 0.131 af (100% of inflow)
Center-of-Mass det. time= 27.5 min (781.4 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	321 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.50	360	0.0	0	0
54.00	360	33.0	178	178
55.50	360	10.0	54	232
56.25	360	33.0	89	321

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**6.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 53.00' / 52.00' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	56.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Device 1	52.50'	**3.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'
#4	Discarded	52.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 48.00'

Discarded OutFlow Max=0.03 cfs @ 12.19 hrs HW=56.02' (Free Discharge)
└─**4=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 12.19 hrs HW=56.02' (Free Discharge)
└─**1=Culvert** (Passes 0.04 cfs of 1.57 cfs potential flow)
  └─**3=Exfiltration** (Controls 0.04 cfs)

Secondary OutFlow Max=1.11 cfs @ 12.19 hrs HW=56.02' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.11 cfs @ 0.38 fps)

Summary for Pond 10P: Retention Pond

Inflow Area = 1.058 ac, 18.14% Impervious, Inflow Depth = 5.49" for 50-Year event
Inflow = 5.39 cfs @ 12.20 hrs, Volume= 0.484 af
Outflow = 5.25 cfs @ 12.23 hrs, Volume= 0.484 af, Atten= 3%, Lag= 2.1 min
Discarded = 0.17 cfs @ 12.23 hrs, Volume= 0.179 af
Primary = 5.07 cfs @ 12.23 hrs, Volume= 0.305 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.53' @ 12.23 hrs Surf.Area= 2,419 sf Storage= 2,877 cf

Plug-Flow detention time= 76.7 min calculated for 0.483 af (100% of inflow)
Center-of-Mass det. time= 77.1 min (887.2 - 810.1)

Volume	Invert	Avail.Storage	Storage Description
#1	52.00'	3,290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	1,160	0.0	0	0
53.75	2,600	100.0	3,290	3,290

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	52.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.17 cfs @ 12.23 hrs HW=53.53' (Free Discharge)
└─**2=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=5.02 cfs @ 12.23 hrs HW=53.53' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 5.02 cfs @ 1.91 fps)

Summary for Pond 11P: Raingarden B -900sf

Inflow Area = 1.449 ac, 25.70% Impervious, Inflow Depth > 3.99" for 50-Year event
Inflow = 6.04 cfs @ 12.22 hrs, Volume= 0.481 af
Outflow = 5.97 cfs @ 12.25 hrs, Volume= 0.463 af, Atten= 1%, Lag= 1.8 min
Primary = 5.97 cfs @ 12.25 hrs, Volume= 0.463 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 48.27' @ 12.25 hrs Surf.Area= 2,246 sf Storage= 2,956 cf

Plug-Flow detention time= 86.7 min calculated for 0.463 af (96% of inflow)
Center-of-Mass det. time= 55.5 min (902.1 - 846.6)

Volume	Invert	Avail.Storage	Storage Description
#1	44.25'	3,358 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.25	1,100	0.0	0	0
45.25	1,100	40.0	440	440
45.50	1,100	33.0	91	531
47.00	1,100	10.0	165	696
48.50	2,450	100.0	2,663	3,358

Device	Routing	Invert	Outlet Devices
#1	Primary	44.25'	**12.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.25' / 44.15' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	47.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	44.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	44.25'	**2.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=5.96 cfs @ 12.25 hrs HW=48.27' (Free Discharge)
└─**1=Culvert** (Passes 5.96 cfs of 7.10 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 5.83 cfs @ 2.37 fps)
  └─**3=Orifice/Grate** (Passes 0.13 cfs of 1.84 cfs potential flow)
    └─**4=Exfiltration** (Exfiltration Controls 0.13 cfs)

Summary for Pond OS1: Outlet Structure 1

Inflow Area = 4.012 ac, 34.46% Impervious, Inflow Depth > 5.22" for 50-Year event
Inflow = 17.85 cfs @ 12.18 hrs, Volume= 1.746 af
Outflow = 17.76 cfs @ 12.18 hrs, Volume= 1.746 af, Atten= 1%, Lag= 0.0 min
Primary = 17.76 cfs @ 12.18 hrs, Volume= 1.746 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 59.91' @ 12.18 hrs Surf.Area= 13 sf Storage= 47 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (892.4 - 892.4)

Volume	Invert	Avail.Storage	Storage Description
#1	38.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 37.50' / 36.00' S= 0.0750 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=17.24 cfs @ 12.18 hrs HW=58.77' (Free Discharge)
└─**1=Culvert** (Inlet Controls 17.24 cfs @ 21.95 fps)

Summary for Pond OS4: Outlet Structure 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 6.20" for 50-Year event
Inflow = 4.95 cfs @ 12.11 hrs, Volume= 0.416 af
Outflow = 4.94 cfs @ 12.11 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.2 min
Primary = 4.94 cfs @ 12.11 hrs, Volume= 0.416 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 44.20' @ 12.11 hrs Surf.Area= 13 sf Storage= 24 cf

Plug-Flow detention time= 0.0 min calculated for 0.416 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (885.9 - 885.9)

Volume	Invert	Avail.Storage	Storage Description
#1	42.25'	47 cf	**4.00'D x 3.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**12.0" Round Culvert** L= 110.0' Ke= 0.500 Inlet / Outlet Invert= 42.00' / 37.85' S= 0.0377 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.81 cfs @ 12.11 hrs HW=44.12' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.81 cfs @ 6.12 fps)

Summary for Pond P11: Roof Drip Edge

Inflow Area = 0.096 ac, 88.04% Impervious, Inflow Depth > 8.09" for 50-Year event
Inflow = 0.78 cfs @ 12.09 hrs, Volume= 0.065 af
Outflow = 0.78 cfs @ 12.09 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.03 cfs @ 12.09 hrs, Volume= 0.033 af
Secondary = 0.76 cfs @ 12.09 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 54.02' @ 12.09 hrs Surf.Area= 500 sf Storage= 174 cf

Plug-Flow detention time= 28.2 min calculated for 0.065 af (100% of inflow)
Center-of-Mass det. time= 28.2 min (779.3 - 751.1)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	290 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	500	0.0	0	0
54.00	500	33.0	165	165
54.25	500	100.0	125	290

Device	Routing	Invert	Outlet Devices
#1	Secondary	54.00'	**125.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	53.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 46.00'

Discarded OutFlow Max=0.03 cfs @ 12.09 hrs HW=54.02' (Free Discharge)
└─**2=Exfiltration** (Controls 0.03 cfs)

Secondary OutFlow Max=0.71 cfs @ 12.09 hrs HW=54.02' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.71 cfs @ 0.32 fps)

Summary for Pond P2: CB P3

Inflow Area = 0.061 ac, 87.68% Impervious, Inflow Depth = 7.97" for 50-Year event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.09 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 53.65' @ 12.09 hrs Surf.Area= 3 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.040 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (755.7 - 755.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.30'	9 cf	**2.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.30'	**12.0" Round Culvert** L= 72.0' Ke= 0.500 Inlet / Outlet Invert= 53.30' / 51.60' S= 0.0236 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=53.64' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.48 cfs @ 2.00 fps)

Summary for Pond P3: CB P3

Inflow Area = 0.456 ac, 45.59% Impervious, Inflow Depth > 6.73" for 50-Year event
Inflow = 2.53 cfs @ 12.15 hrs, Volume= 0.256 af
Outflow = 2.53 cfs @ 12.15 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.1 min
Primary = 2.53 cfs @ 12.15 hrs, Volume= 0.256 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 52.53' @ 12.15 hrs Surf.Area= 13 sf Storage= 13 cf

Plug-Flow detention time= 0.3 min calculated for 0.255 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (789.2 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	35 cf	**4.00'D x 2.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**12.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 51.50' / 51.00' S= 0.0051 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.52 cfs @ 12.15 hrs HW=52.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.52 cfs @ 3.90 fps)

Summary for Pond P4: YD P4

Inflow Area = 0.110 ac, 51.81% Impervious, Inflow Depth = 6.88" for 50-Year event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af
Outflow = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 49.28' @ 12.09 hrs Surf.Area= 3 sf Storage= 2 cf

Plug-Flow detention time= 0.1 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (785.6 - 785.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	10 cf	**2.00'D x 3.25'H Vertical Cone/Cylinder**
#2	52.00'	150 cf	**Custom Stage Data** Listed below
		160 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
52.00	0
53.00	150

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 48.75' / 48.60' S= 0.0060 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.81 cfs @ 12.09 hrs HW=49.27' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.81 cfs @ 2.86 fps)

Summary for Pond P5: YD P5

Inflow Area = 0.312 ac, 48.12% Impervious, Inflow Depth = 6.81" for 50-Year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min
Primary = 2.33 cfs @ 12.09 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 49.39' @ 12.09 hrs Surf.Area= 3 sf Storage= 3 cf

Plug-Flow detention time= 0.1 min calculated for 0.177 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (787.3 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.50'	11 cf	**2.00'D x 3.50'H Vertical Cone/Cylinder**
#2	52.00'	592 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		603 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.00	10	0	0
53.00	680	345	345
53.30	970	247	592

Device	Routing	Invert	Outlet Devices
#1	Primary	48.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 48.50' / 48.00' S= 0.0077 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.27 cfs @ 12.09 hrs HW=49.38' (Free Discharge)
└─**1=Culvert** (Barrel Controls 2.27 cfs @ 4.14 fps)

Summary for Pond P8: Driveway Crossing

Inflow Area =	0.644 ac, 13.54% Impervious, Inflow Depth = 5.80" for 50-Year event			
Inflow =	3.27 cfs @	12.20 hrs, Volume=	0.311 af	
Outflow =	3.21 cfs @	12.23 hrs, Volume=	0.311 af,	Atten= 2%, Lag= 1.6 min
Primary =	3.21 cfs @	12.23 hrs, Volume=	0.311 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 47.97' @ 12.23 hrs Surf.Area= 232 sf Storage= 262 cf

Plug-Flow detention time= 3.4 min calculated for 0.311 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (818.6 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	46.75'	484 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.75	20	0.0	0	0
49.00	410	100.0	484	484

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**12.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 46.75' / 44.00' S= 0.0344 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.18 cfs @ 12.23 hrs HW=47.96' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.18 cfs @ 4.05 fps)

Summary for Pond RG1: Raingarden 1

Inflow Area = 3.207 ac, 31.33% Impervious, Inflow Depth > 5.17" for 50-Year event
Inflow = 13.52 cfs @ 12.15 hrs, Volume= 1.383 af
Outflow = 14.04 cfs @ 12.19 hrs, Volume= 1.330 af, Atten= 0%, Lag= 2.8 min
Primary = 14.04 cfs @ 12.19 hrs, Volume= 1.330 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 44.44' @ 12.19 hrs Surf.Area= 2,480 sf Storage= 4,413 cf

Plug-Flow detention time= 47.0 min calculated for 1.328 af (96% of inflow)
Center-of-Mass det. time= 16.4 min (894.4 - 878.0)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	4,413 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
38.00	1,000	0.0	0	0
39.00	1,000	33.0	330	330
40.50	1,000	33.0	495	825
40.75	1,000	10.0	25	850
41.00	1,000	33.0	83	933
43.00	2,480	100.0	3,480	4,413

Device	Routing	Invert	Outlet Devices
#1	Primary	41.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	38.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	38.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=13.69 cfs @ 12.19 hrs HW=44.32' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 13.64 cfs @ 7.72 fps)
└─**2=Orifice/Grate** (Passes 0.06 cfs of 2.33 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond RG4: Raingarden 4

Inflow Area = 0.805 ac, 46.90% Impervious, Inflow Depth > 6.60" for 50-Year event
Inflow = 5.05 cfs @ 12.10 hrs, Volume= 0.443 af
Outflow = 4.95 cfs @ 12.11 hrs, Volume= 0.416 af, Atten= 2%, Lag= 1.0 min
Primary = 4.95 cfs @ 12.11 hrs, Volume= 0.416 af

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 46.97' @ 12.11 hrs Surf.Area= 1,427 sf Storage= 1,615 cf

Plug-Flow detention time= 68.2 min calculated for 0.415 af (94% of inflow)

Center-of-Mass det. time= 23.7 min (885.9 - 862.2)

Volume	Invert	Avail.Storage	Storage Description
#1	42.50'	1,646 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.50	400	0.0	0	0
43.50	400	33.0	132	132
43.75	400	33.0	33	165
45.25	400	10.0	60	225
45.50	400	33.0	33	258
47.00	1,450	100.0	1,388	1,646

Device	Routing	Invert	Outlet Devices
#1	Primary	42.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	42.50'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.83 cfs @ 12.11 hrs HW=46.96' (Free Discharge)
└─**1=Orifice/Grate** (Passes 0.03 cfs of 1.94 cfs potential flow)
  └─**3=Exfiltration** (Exfiltration Controls 0.03 cfs)
└─**2=Orifice/Grate** (Weir Controls 4.79 cfs @ 2.22 fps)

Summary for Link POA1: POA #1

Inflow Area = 5.529 ac, 30.69% Impervious, Inflow Depth > 5.39" for 50-Year event
Inflow = 24.15 cfs @ 12.17 hrs, Volume= 2.485 af
Primary = 24.15 cfs @ 12.17 hrs, Volume= 2.485 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POA2: POA #2 - Driveway Crossing

Inflow Area = 2.939 ac, 31.03% Impervious, Inflow Depth > 5.06" for 50-Year event
Inflow = 12.02 cfs @ 12.16 hrs, Volume= 1.240 af
Primary = 12.02 cfs @ 12.16 hrs, Volume= 1.240 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs

SITE-SPECIFIC

SOIL MAP REPORT

FOR

SAINT PATRICK SCHOOL FACILITY
BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

PREPARED FOR:

ALTUS ENGINEERING, INC.
133 COURT STREET
PORTSMOUTH, NEW HAMPSHIRE 03801

PREPARED BY:

JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908

DECEMBER 21, 2016
JWN #16-92

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CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR

INTRODUCTION

In November and December of 2016, a 10+/- acre parcel located off of Banfield Road in Portsmouth, New Hampshire (proposed parcel 266-5) was soil mapped following *Site-Specific Soil Mapping Standards for New Hampshire and Vermont* (Society of Soil Scientists of Northern New England, Version 4.0, February 2011). This type of soil map uses soil series names and is within the technical standards of the National Cooperative Soil Survey. The purpose of the soil map is to comply with the soil mapping requirements of RSA 485-A:17 and NH DES Env-Wq 1500, Alteration of Terrain for the proposed Saint Patrick School Facility. The estimated maximum size of limiting inclusions (i.e., soils that are appreciable more limiting for use) is 2,000 square feet. The soil mapping legend conforms to the New Hampshire State-Wide Numerical Soils Legend.

Fifteen backhoe-excavated test pits were conducted by the undersigned on November 11, 2016. These test pits were solely for mapping purposes and no detailed test pit logs were completed. A wetland investigation was also conducted in September of 2016 using the methodology described in the *Corps of Engineers Wetlands Delineation Manual* (1987). A base map was provided by Altus Engineering, Inc. that contained: 1-foot contours, existing conditions, and the wetland flagging. This map was used for ground control and to assist in generating the Site-Specific Soil Survey.

A portion of the soil survey area has been developed for a playing field. The balance of the property contains forested uplands and wetlands. The site is a nearly level to gently sloping knoll of glacial till, with finer textures soils in the wetlands. There are also some small areas that have been excavated/regraded. The hydrologic soil groups for the soil map were taken from the NRCS Web Soil Survey on December 5, 2016.

SOIL MAP UNITS

Map Symbol: 40
Soil Series: Chatfield (well drained)-Hollis (well drained) complex

This mapping unit represents a complex of two soil series that are similar in nature that could not be mapped separately (i.e., Chatfield and Hollis soils).

The Chatfield and Hollis series in this mapping complex consist of well drained soils. These soils formed in a thin mantle of glacial till overlying bedrock. It occurs on some of the knolls and sideslopes but is of limited extent. Bedrock ranges from 10 to 40 inches. Textures typically range from fine sandy loam to sandy loam. It is gently to moderately sloped with some limited areas that are steeper. Slopes range from 3-25%. The hydrologic soil group is B due to the Chatfield being the higher component percentage of the complex. These map units may contain up to 5% of the Scituate soil series.

Map Symbol: 299
Soil Series: Udorthents, smoothed

This represents areas that contain the existing playing field, adjacent lawned locations, and rock/metal debris area. Textures typically range from a fine sandy loam to loamy sand regraded topsoil material over a dense substratum. Bedrock is typically greater than 60 inches on these soils. It is found in three mapping units within the mapping area and was most likely the Scituate soil series prior to disturbance. The drainage class is moderately well drained. The hydrologic soil group is C. Slope ranges are 0-15%. These map units may contain up to 15% inclusions of Scituate soils. This mapping unit is further separated into using the five components of the Disturbed Soil Mapping Unit Supplement:

299A/dccdc

Symbol 1: Drainage Class (current)	Moderately Well Drained
Symbol 2: Parent Material (of naturally formed soil only, if present)	Glacial Till
Symbol 3: Restrictive/Impervious Layers	Mineral restrictive horizon within 40"
Symbol 4: Estimated Ksat (most restrictive layer excluding 3h)	Not determined
Symbol 5: Hydrologic Soil Group	C

Map Symbol: 448
Soil Series: Scituate

This series consists of moderately well drained soils that formed in dense sandy loam to loamy sand glacial till. This is the predominant soil type found in the mapping area. It is located on high to mid-slope positions on the landscape. The textures range from fine sandy loam to sandy loam to loamy fine sand. Scituate soils have a compact densipan and may have a perched watertable at between 16 and 30 inches below the surface in the spring. The hydrologic soil group is C. The slope ranges are 0-25%. These map units may contain up to 10% inclusions of somewhat poorly drained Raynham and somewhat poorly drained Ridgebury soils.

Map Symbol: 533
Soil Series: Raynham (poorly drained)

This mapping unit consists of very deep, poorly drained soils that formed in fine textured estuarine/marine deposits. It is found in one area and is of limited extent. It is nearly level to gently sloping with textures ranging from very fine sandy loam to silt loam. It usually classifies as a hydric soil. The slopes range from 0-3%. The hydrologic soil group is D. This map unit may contain 10% inclusions of the somewhat poorly drained Raynham (non-hydric).

Map Symbol: 926
Soil Series: Ridgebury (somewhat poorly drained)

This mapping unit consists of somewhat poorly drained soils that formed in dense glacial till. It is found along the western side of the mapping limits adjacent to the poorly drained Raynham and the moderately well drained Scituate soils. It is nearly level to gently sloping with textures ranging from fine sandy loam to very fine sandy loam to sandy loam. The slopes range from 0-8%. The hydrologic soil group is D. This map unit may contain 10% inclusions of the somewhat poorly drained Raynham and moderately well drained Scituate soils.

Map Symbol: **931**
Soil Series: **Raynham (somewhat poorly drained)**

This mapping unit consists of somewhat poorly drained soils that formed in fine textured estuarine/marine deposits. It is found in one area near Banfield Road. It is nearly level to gently sloping. The slopes range from 0-3%. The surface horizon to 8 inches is a dark grayish brown (2.5Y 4/2) very fine sandy loam with a subsoil that is 3 inches thick of a light olive brown (2.5Y 5/3) with a substratum of light olive brown (2.5Y 5/4) silt loam. The vegetation in this map unit is mixed with both upland and wetland vegetation but the representative soil description above (backhoe excavated test pit conducted on November 11, 2016) does not classify as a hydric soil and therefore this map unit is located in an upland area. The hydrologic soil group is D. This map unit may contain 5% inclusions of the somewhat poorly drained Ridgebury soils.

CLOSING

Inaccuracies or deficiencies in the base map may be unknowingly reflected in the soil survey, particularly in the boundary line placement between soil map units. This map was designed to provide soil information for the proposed St. Patrick School facility and to meet Alteration of Terrain requirements and may not be adequate for other purposes.

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New Hampshire Certified Soil Scientist #017
New Hampshire Certified Wetland Scientist #086

State of New Hampshire
Joseph W. Noël
No. 017
Certified Soil Scientist

State of New Hampshire
Joseph W Noël
No. 086
Certified Wetland Scientist

Soil Map—Rockingham County, New Hampshire
(St Patrick Academy)

Map Scale: 1:2,030 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 30, 60, 120, 180

Feet: 0, 50, 100, 200, 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 18, Sep 15, 2016

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

Date(s) aerial images were photographed: Jun 20, 2010—Jul 18, 2010

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.

Map Unit Legend

Rockingham County, New Hampshire (NH015)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	9.4	93.1%
538A	Squamscott fine sandy loam, 0 to 5 percent slopes	0.7	6.9%
Totals for Area of Interest		**10.1**	**100.0%**

CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	205.94	605.00	19°35'54"	N 50°21'26" E	205.94

LINE	BEARING	DISTANCE
L1	N 60°09'23" E	3.17
L2	N 58°21'59" W	16.75
L3	N 60°18'16" W	20.77

LEGEND

- 90.20 / N 55°33'18" W — PROPERTY LINE
- B 33 / B 32 — WETLAND/SOILS BOUNDARY
- 50 — EXISTING CONTOUR
- GC — EXISTING PAVEMENT/CURB
- TREELINE
- SSS SOIL BOUNDARY (2016)

SITE-SPECIFIC SOIL MAP NOTES

1) THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR USE BY ALTUS ENGINEERING, INC. FOR THE PROPOSED SAINT PATRICK FACILITY AND ALTERATION OF TERRAIN REQUIREMENTS. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP.

2) THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE-SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT".

3) THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485-A:17 AND NH DES ENV-WQ 1500, ALTERATION OF TERRAIN.

4) THE BASE MAP WAS PRODUCED BY JAMES VERRA AND ASSOCIATES, INC. AND ALTUS ENGINEERING, INC. IT CONTAINS THE EXISTING CONDITIONS AND WETLAND DELINEATION CONDUCTED BY THE UNDERSIGNED IN SEPTEMBER OF 2016. SOIL MAPPING FIELDWORK WAS CONDUCTED IN NOVEMBER AND DECEMBER OF 2016. IF ADDITIONAL TEST PITS ARE CONDUCTED, THE SOIL MAP MAY BE REVISED, IF NECESSARY.

SOIL LEGEND

NUMERICAL SYMBOL	SOIL MAP UNIT NAME	HSG
40	CHATFIELD (WELL DRAINED)-HOLLIS (WELL DRAINED) COMPLEX	B
299	UDORTHENTS, SMOOTHED	C
448	SCITUATE	C
533	RAYNHAM (POORLY DRAINED)	D
926	RIDGEBURY (SOMEWHAT POORLY DRAINED)	D
931	RAYNHAM (SOMEWHAT POORLY DRAINED)	D

ALPHA SLOPE SYMBOL	RANGE
A	0-3%
B	3-8%
C	8-15%
D	15-25%

DISTURBED SOIL MAPPING UNIT SUPPLEMENT

THE FIVE COMPONENTS OF THE DISTURBED SOIL MAPPING UNIT SUPPLEMENT ON THIS MAP ARE AS FOLLOWS:

SYMBOL 1: DRAINAGE CLASS
d-MODERATELY WELL DRAINED

SYMBOL 2: PARENT MATERIAL (OF NATURALLY FORMED SOIL ONLY, IF PRESENT)
c-GLACIAL TILL MATERIAL

SYMBOL 3: RESTRICTIVE/IMPERVIOUS LAYERS
c-MINERAL RESTRICTIVE LAYER(S) ARE PRESENT IN THE SOIL PROFILE LESS THAN 40" BELOW THE SOIL SURFACE

SYMBOL 4: ESTIMATED KSAT* (MOST LIMITING LAYER EXCLUDING SYMBOL 3h ABOVE)
d-UNDETERMINED

SYMBOL 5: HYDROLOGIC SOIL GROUP*
c-GROUP C

*EXCLUDING MAN-MADE SURFACE IMPERVIOUS/RESTRICTIVE LAYERS

Joseph W. Noel 1/5/17
JOSEPH W. NOEL
NH CERTIFIED SOIL SCIENTIST #017

JOSEPH W. NOEL No. 017 CERTIFIED SOIL SCIENTIST

P4801

ENGINEER:

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ISSUED FOR: APPROVAL

ISSUE DATE: DECEMBER 28, 2016

REVISIONS NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	12/28/16

DRAWN BY: RLH
APPROVED BY: EDW
DRAWING FILE: 4801EC.DWG

SCALE:
22" x 34" – 1" = 40'
11" x 17" – 1" = 80'

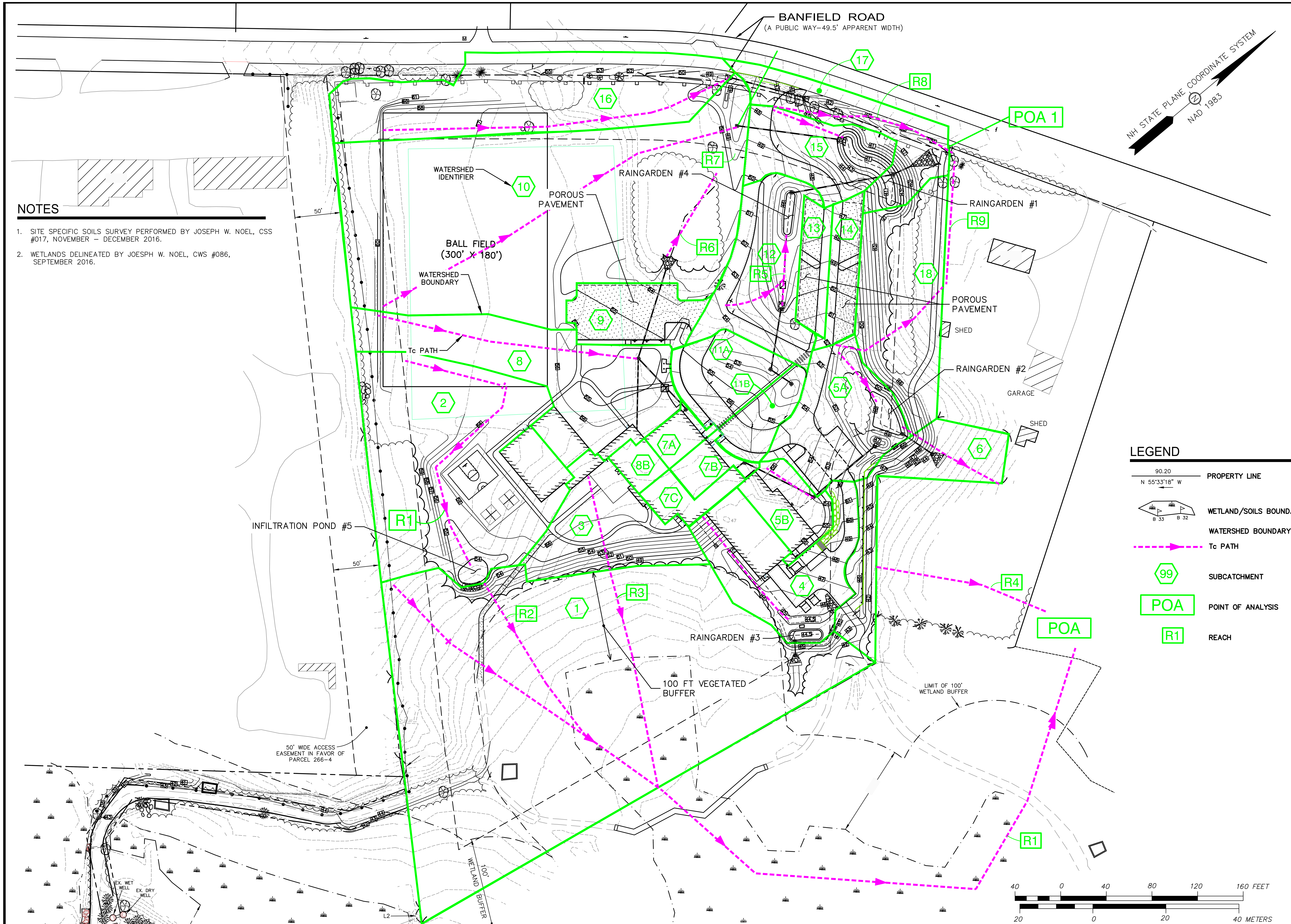
OWNER:
HOPE FOR TOMORROW FOUNDATION
COVE SPACE
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:
SAINT PATRICK ACADEMY
AUSTIN STREET
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
335 BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:
SITE SPECIFIC SOILS PLAN

SHEET NUMBER:
1 OF 1



NOTES

1. SITE SPECIFIC SOILS SURVEY PERFORMED BY JOSEPH W. NOEL, CSS #017, NOVEMBER – DECEMBER 2016.
2. WETLANDS DELINEATED BY JOESPH W. NOEL, CWS #086, SEPTEMBER 2016.

LEGEND

90.20 N 55°33'18" W	PROPERTY LINE
B 33 B 32	WETLAND/SOILS BOUNDARY
	WATERSHED BOUNDARY
	Tc PATH
99	SUBCATCHMENT
POA	POINT OF ANALYSIS
R1	REACH

ENGINEER:

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ISSUED FOR: DRAINAGE STUDY

ISSUE DATE: DECEMBER 23, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	CDB	12/23/19

DRAWN BY: CDB
APPROVED BY: EDW
DRAWING FILE: 4801EC.DWG

SCALE:
22" x 34" – 1" = 40'
11" x 17" – 1" = 80'

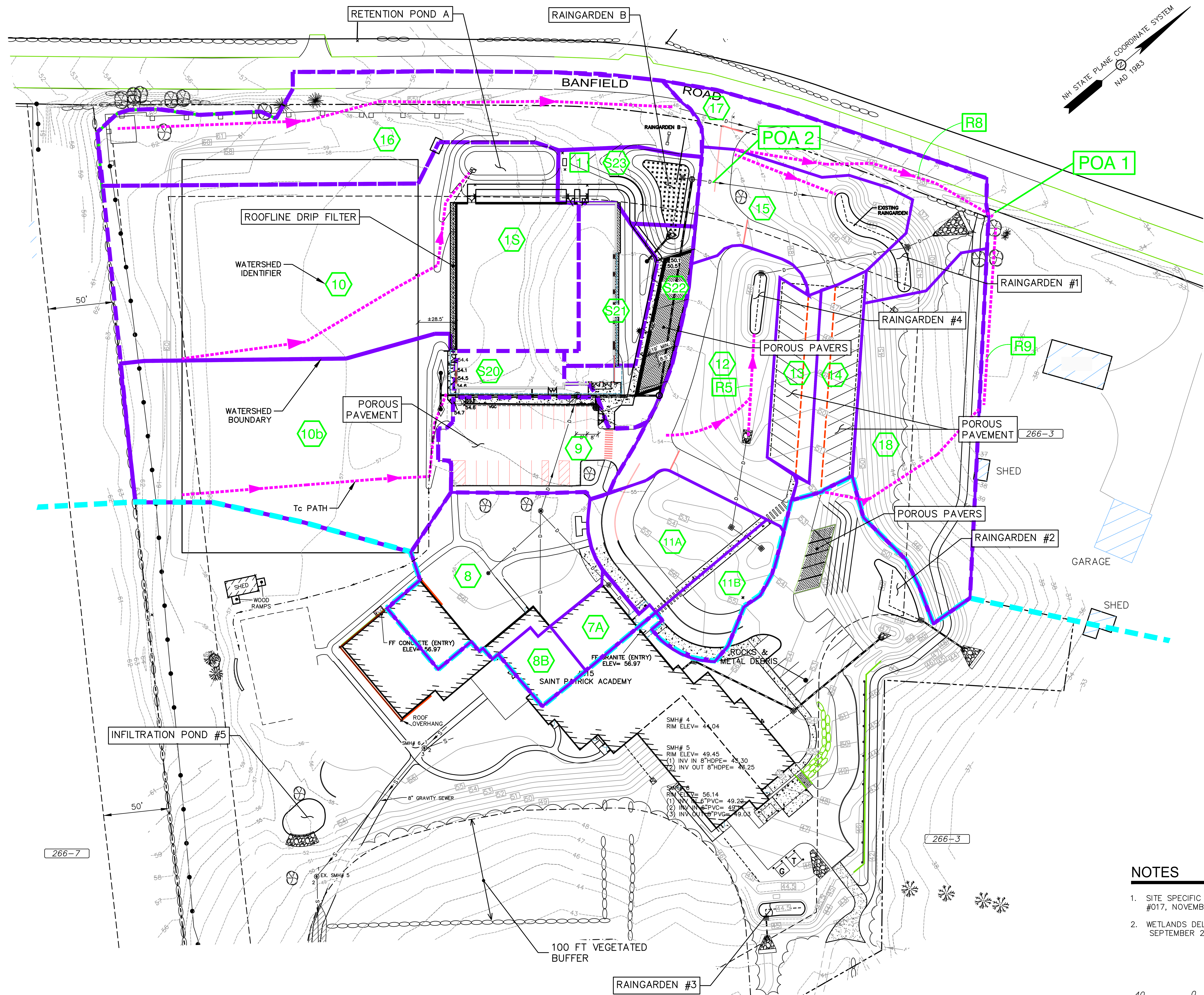
OWNER:
FOUNDATION FOR SEACOAST HEALTH
100 CAMPUS DRIVE–SUITE 1
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCELS
266–4, 266–5 & 266–6

APPLICANT:
HOPE FOR TOMORROW FOUNDATION
36 MAPLEWOOD AVENUE
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCELS
266–4, 266–5 & 266–6

TITLE:
PRE-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER:
W-1



LEGEND

90.20
N 55°33'18" W PROPERTY LINE

WETLAND/SOILS BOUNDARY

WATERSHED BOUNDARY

Tc PATH

SUBCATCHMENT

POND

REACH

WATERSHED DIVISION LINE

NOTES

1. SITE SPECIFIC SOILS SURVEY PERFORMED BY JOSEPH W. NOEL, CSS #017, NOVEMBER – DECEMBER 2016.
2. WETLANDS DELINEATED BY JOESPH W. NOEL, CWS #086, SEPTEMBER 2016.

40 0 40 80 120 160 FEET

20 0 20 40 METERS

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR: DRAINAGE STUDY

ISSUE DATE: JANUARY 29, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	CDB	12/23/19
1	TAC REVISIONS	CDB	01/29/20

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APPROVED BY: EDW
DRAWING FILE: 4801EC.DWG

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HOPE FOR TOMORROW FOUNDATION
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PROJECT:

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BANFIELD ROAD
PORTSMOUTH, N.H.
ASSESSOR'S PARCELS
266–4, 266–5 & 266–6

TITLE:

POST-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER: W-2

INSPECTION AND MAINTENANCE MANUAL
FOR
STORMWATER MANAGEMENT / BMP FACILITIES

Saint Patrick Academy

315 Banfield Road
Portsmouth, NH
Assessor's Parcel 266-5

Proper inspection, maintenance, and repair are key elements in maintaining a successful stormwater management program on a developed property. Routine inspections ensure permit compliance and reduce the potential for deterioration of infrastructure or reduced water quality. The following responsible parties shall be in charge of managing the stormwater facilities:

RESPONSIBLE PARTIES:

Owner:____
Name *Company* *Phone*

Inspection:____
Name *Company* *Phone*

Maintenance:____
Name *Company* *Phone*

NOTE: Inspection and maintenance responsibilities transfer to future property owners.

Included in this Inspection and Maintenance Manual are the following components:

- Drainage Features and Site BMP Functions and Maintenance Descriptions
- Inspection and Maintenance Checklist
- Stormwater System Operations and Maintenance Report Form
- Smart Salting Practices Form
- Site De-Icing Log
- Site Watershed Map

RAINGARDENS, STORMWATER PONDS, AND INFILTRATION BASINS

Function – Raingardens and infiltration ponds provide treatment to runoff prior to directing it to stormwater systems by filtering sediment and suspended solids, trapping them in the bottom of the garden and in the filter media itself. Additional treatment is provided by the native water-tolerant vegetation which removes nutrients and other pollutants through bio-uptake. Stormwater detention and infiltration can also be provided as the filtering process slows runoff, decreases the peak rate of discharge and promotes groundwater recharge.

Detention ponds temporarily store runoff and allow for its controlled release during and after a storm event, decreasing peak rates of runoff and minimizing flooding.

Raingardens, infiltration ponds, and detention ponds shall be managed (Per AGR 3800 and RSA 430:53) to: prevent and control the spread of invasive plant, insect, and fungal species; minimize the adverse environmental and economic effects invasive species cause to agriculture, forests, wetlands, wildlife, and other natural resources of the state; and protect the public from potential health problems attributed to certain invasive species.

Maintenance

- Inspect annually and after significant rainfall event.
- If a raingarden does not completely drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore its filtration and/or infiltration function(s), including but not limited to removal of accumulated sediments and/or replacement or reconstruction of the filter media.
- Replace any riprap dislodged from spillways, inlets and outlets.
- Remove any obstructions, litter and accumulated sediment or debris as warranted but no less than once a year.
- Mowing of any grassed area in or adjacent to a raingarden shall be performed on a monthly basis (when areas are not inundated) to keep the vegetation in vigorous condition. The cut grass shall be removed to prevent the decaying organic litter from clogging the filter media or choking other vegetation.
- Select vegetation should be maintained in healthy condition. This may include pruning, removal and replacement of dead or diseased vegetation.
- Remove any invasive species, Per AGR 3800 and RSA 430:53.

CULVERTS AND DRAINAGE PIPES

Function – Culverts and drainage pipes convey stormwater away from buildings, walkways, and parking areas and to surface waters or closed drainage systems.

Maintenance

- Culverts and drainage pipes shall be inspected semi-annually, or more often as needed, for accumulation of debris and structural integrity. Leaves and other debris shall be removed from the inlet and outlet to insure the functionality of drainage structures. Debris shall be disposed of on site where it will not concentrate back at the drainage structures or at a solid waste disposal facility.

- Riprap Areas - Culvert outlets and inlets shall be inspected during annual maintenance and operations for erosion and scour. If scour or creek erosion is identified, the outlet owner shall take appropriate means to prevent further erosion. Increased lengths of riprap may require a NHDES Wetlands Permit modification.

CATCH BASINS

Function – Catch basins collect stormwater, primarily from paved surfaces and roofs. Stormwater from paved areas often contains sediment and contaminants. Catch basin sumps serve to trap sediment, trace metals, nutrients and debris. Hooded catch basins trap hydrocarbons and floating debris.

Maintenance

- Remove leaves and debris from structure grates on an as-needed basis.
- Sumps shall be inspected and cleaned (as needed) on an annual basis to protect water quality and infiltration capacity. Catch basin debris shall be disposed of at a solid waste disposal facility.

VEGETATIVE SWALES

Function – Vegetative swales filter sediment from stormwater, promote infiltration, and the uptake of contaminates. They are designed to treat runoff and dispose of it safely into the natural drainage system.

Maintenance

- Timely maintenance is important to keep a swale in good working condition. Mowing of grassed swales shall be monthly to keep the vegetation in vigorous condition. The cut vegetation shall be removed to prevent the decaying organic litter from adding pollutants to the discharge from the swale.

- Fertilizing shall be bi-annual or as recommended from soil testing.

- Inspect swales following significant rainfall events.

- Woody vegetation shall not be allowed to become established in the swales or rock riprap outlet protection and if present shall be removed.

- Accumulated debris disrupts flow and leads to clogging and erosion. Remove debris and litter as necessary.

- Inspect for eroded areas. Determine cause of erosion and correct deficiency as required. Monitor repaired areas.

LEVEL SPREADERS AND VEGETATED BUFFERS

Function – Level spreaders covert concentrated stormwater flows into less-erosive sheet flow, minimizing erosion and maximizing the treatment capabilities of associated buffers. Vegetated buffers, either forested or meadow, slow runoff which promotes and reduced peak rates of runoff. The reduced velocities and the presence of vegetation encourage the filtration of sediment and the limited bio-uptake of nutrients.

Maintenance

- Inspect level spreaders and buffers at least annually for signs of erosion, sediment buildup, or vegetation loss.

- If a meadow buffer, provide periodic mowing as needed to maintain a healthy stand of herbaceous vegetation.

- If a forested buffer, then the buffer should be maintained in an undisturbed condition, unless erosion occurs.

- If erosion of the buffer (forested or meadow) occurs, eroded areas should be repaired and replanted with vegetation similar to the remaining buffer. Corrective action should include eliminating the source of the erosion problem and may require retrofit or reconstruction of the level spreader.

- Remove debris and accumulated sediment and dispose of properly.

POROUS PAVEMENT

Function – Porous pavement is designed to capture rainwater runoff containing suspended solids, nutrients and pollutants. Proper maintenance of porous pavement is crucial for ensuring its longevity and functionality to infiltrate runoff.

Maintenance

- Signs shall be installed indicating the location of porous pavement and the special maintenance required.
- New porous pavement shall be inspected several times in the first month after construction and at least annually thereafter. Inspections shall be conducted after major storms to check for surface ponding that might indicate possible clogging.
- Inspect annually for pavement deterioration or spalling.
- Vacuum sweeping shall be performed 2-4 times a year. Power washing may be required prior to vacuum sweeping to dislodge trapped particles.
- Sand and abrasives shall not be used for winter maintenance, as they will clog the pores; de-icing materials shall be used instead.
- Never reseal or repave with impermeable materials. If the porous pavement is damaged, it can be repaired using conventional, non-porous patching mixes as long as the cumulative area repaired does not exceed 10 percent of the paved area.

ROOF DRIP EDGE FILTERS

Function – Drip edge filters provide treatment to runoff prior to directing it to stormwater systems by filtering sediment and suspended solids, trapping them and filter media itself. Stormwater detention and infiltration can also be provided as the filtering process slows runoff, decreases the peak rate of discharge and promotes groundwater recharge

Maintenance

- Inspect annually and after significant rainfall event.
- Remove any obstructions, litter and accumulated sediment or debris as warranted but no less than once a year.
- Inspect for eroded areas. Determine cause of erosion and correct deficiency as required. Monitor repaired areas.

LANDSCAPED AREAS - FERTILIZER MANAGEMENT

Function – Fertilizer management involves controlling the rate, timing and method of fertilizer application so that the nutrients are taken up by the plants thereby reducing the chance of polluting the surface and ground waters. Fertilizer management can be effective in reducing the amounts of phosphorus and nitrogen in runoff from landscaped areas, particularly lawns.

Maintenance

- Have the soil tested by your landscaper or local Soil Conservation Service for nutrient requirements and follow the recommendations.
- Do not apply fertilizer to frozen ground.
- Clean up any fertilizer spills.
- Do not allow fertilizer to be broadcast into water bodies.
- When fertilizing a lawn, water thoroughly, but do not create a situation where water runs off the surface of the lawn.

LANDSCAPED AREAS - LITTER CONTROL

Function – Landscaped areas tend to filter debris and contaminates that may block drainage systems and pollute the surface and ground waters.

Maintenance

- Litter Control and lawn maintenance involves removing litter such as trash, leaves, lawn clippings, pet wastes, oil and chemicals from streets, parking lots, and lawns before materials are transported into surface waters.
- Litter control shall be implemented as part of the grounds maintenance program.

DE-ICING CHEMICAL USE AND STORAGE

Function – Sand and salt are used for de-icing of drives.

<u>**The project is located within a watershed of a chloride-impaired waterbody. Therefore, Salt use shall be minimized for de-icing activities.**</u>

The responsible party shall employ a <u>**New Hampshire Certified Salt Applicator**</u> for winter snow and ice management activities.

Maintenance

- **Salt use shall be minimized.** Sand shall be used for de-icing activities when possible. Salt is highly water-soluble. Contamination of fresh water wetlands and other sensitive areas can occur when salt is stored in open areas. Owner shall not store salt piles on site.

- **Smart Salting Practices.** Owner's representative shall review and complete the Smart Salting Practices form included in the appendix annually prior to de-icing activities.

- Salt is highly water-soluble. Contamination of fresh water wetlands and other sensitive areas can occur when salt is stored in open areas. Salt piles shall be covered at all times if not stored in a shed. Runoff from stockpiles shall be contained to keep the runoff from entering the drainage system.

CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

GENERAL CLEAN UP

Upon completion of the project, the contractor shall remove all temporary stormwater structures (i.e., temporary stone check dams, silt fence, temporary diversion swales, catch basin inlet basket, etc.). Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared, and seeded. Remove any sediment in catch basins and clean drain pipes that may have accumulated during construction.

Once in operation, all paved areas of the site should be swept at least once annually, preferably at the end of winter prior to significant spring rains.

Inspection & Maintenance Checklist

BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/ Cleanout Threshold
Paved surfaces:			
Pavement Sweeping	Routinely	N/A	N/A
Litter & Trash Removal	Routinely	N/A	Parcel will be free of litter/trash.
Deicing Agents	N/A	Keep De-Icing Log	**Low Salt**
Closed Drainage System:			
Drainage Pipes	1 time per 2 years	Check for sediment accumulation & clogging.	Less than 2" sediment depth
Catch Basins	Annually	Check for sediment accumulation (Less than 24" sediment), blocked hood, and floating debris.	Clean Sumps. Remove all floating debris.
Drain Manhole	Annually	Check for sediment, debris, and obstructions.	Remove all Obstructions.

BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
BMPs:			
Raingardens or Infiltration Pond	Annually	• Check infiltration rates and filter media. • Check for trash & debris. • Check for sediment buildup. • Check for vegetation stability. • Check for excess woody vegetation growth. • Check for invasive species.	Remove trash & debris, sediment, woody vegetation, and invasive species. Side slopes and berm are to be mowed. Replant vegetation if required.
Vegetated Swale	Annually	Check for sediment buildup, vegetation loss and invasive species, debris, and damage.	Remove sediment, debris and invasive species, repair damage, and mow grass monthly to a depth of 4 inches.
Riprap Outlet Protection	Annually	Check for sediment buildup and structure damage.	Remove excess sediment and repair damage.
Stone Berm Level Spreader	Annually	Check for sediment buildup, debris and signs of erosion.	Remove sediment and debris. Immediately repair.

STORM WATER SYSTEM OPERATION AND MAINTENANCE REPORT

General Information	
Project Name	
Owner	
Inspector's Name(s)	
Inspector's Contact Information	
Date of Inspection	**Start Time:** **End Time:**
Type of Inspection: ☐ Annual Report ☐ Post-storm event ☐ Due to a discharge of significant amounts of sediment	
Notes:	

General Site Questions and Discharges of Significant Amounts of Sediment			
Subject		**Status**	**Notes**
A discharge of significant amounts of sediment may be indicated by (but is not limited to) observations of the following. Note whether any are observed during this inspection:			*Notes/ Action taken:*
1	Do the current site conditions reflect the attached site plan?	❑Yes ❑No	
2	Is the site permanently stabilized, temporary erosion and sediment controls are removed, and stormwater discharges from construction activity are eliminated?	❑Yes ❑No	
3	Is there evidence of the discharge of significant amounts of sediment to surface waters, or conveyance systems leading to surface waters?	❑Yes ❑No	
4	Is there evidence of concentrated flows of stormwater such as rills or channels that cause erosion when such flows are not filtered, settled or otherwise treated to remove sediment?	❑Yes ❑No	
5	Is there evidence of deposits of sediment from the site on any adjacent property or stormwater system.	❑Yes ❑No	
6	Is there evidence of discharges from the site to streams running through or along the site where visual observations indicate significant amounts of sediment present in them.	❑Yes ❑No	
7	Is there evidence of invasive species within the stormwater treatment areas?	❑Yes ❑No	

Permit Coverage and Plans				
#	**BMP/Facility**	**Inspected**	**Corrective Action Needed and Notes**	**Date Corrected**
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		□Yes □No		
		□Yes □No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
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		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		

ATTACHMENT B – SMART SALTING PRACTICES

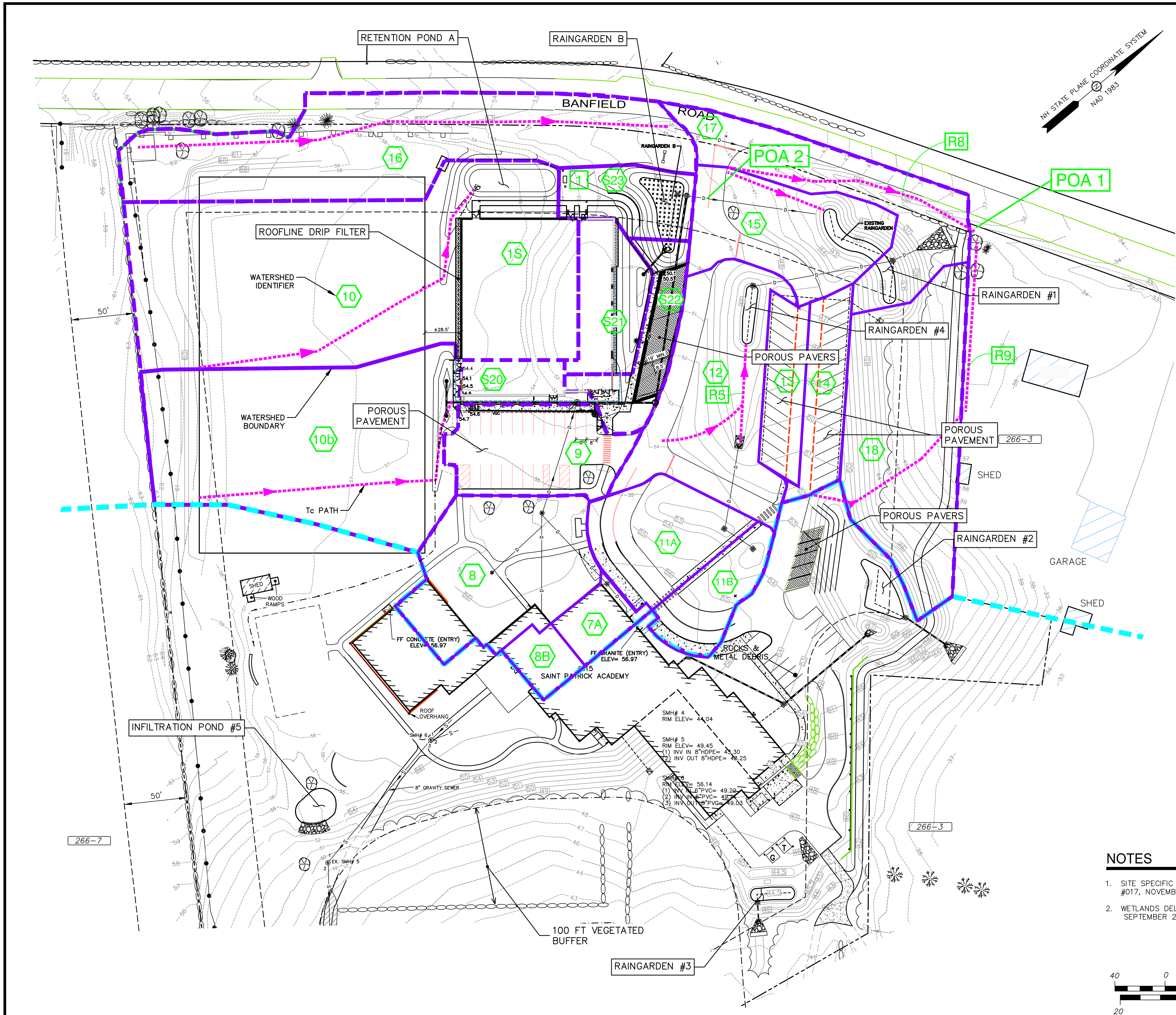
A checklist for snow and ice maintenance contractors.

Recommended practice	Check which response applies to current practices and anticipated site maintenance activities for job site.				
	Already do	**Will do**	**Might do**	**Will not do**	**If "will not do"….why not?**
Use an application rate chart.					
Calibrate equipment each year.					
Learn about the deicer ingredients and use the appropriate one for the condition.					
Look for reasons if and why materials are leaking or spilling from vehicles and fix them (e.g. gaps, overfilling, etc).					
Develop a comprehensive winter maintenance policy. Follow your policy.					
Measure and use pavement temperatures.					
Use anti-icing appropriately prior to the storm.					
Plow before applying deicers.					
Use wet materials (pre-wet or pre-treated).					
Don't apply sodium chloride (road salt) for pavement temperatures below 15ºF.					
Don't apply deicers for pavement temps under -10º F. It's too cold.					
Separate salt and sand. Use salt for melting. Use sand for traction.					
Apply deicers in the center of the road or on the high side of the curve.					
Store the salt in a building or under secure cover.					
Store salt away from water flow and direct the water away from storage area.					
Store snow away from lakes, ponds and wetlands.					
Sweep up sand, dispose of properly.					
For each event, document what you did and how well it worked. Use this information to make improvements.					

Checklist is adapted from worksheet created by Fortin Consulting as a part of the Minnesota Pollution Control Agency Smart Salting Voluntary Certification Program.

SITE DE-ICING LOG

Permit Coverage and Plans			
The owner or owner's representative shall keep a log of de-icing activities to track the amount of de-icing materials applied to the site.			
Date	**De-Icing Material Used**	**Amount Used**	**Notes:**



LEGEND

90.20 N 55°33'18" W	PROPERTY LINE
B 33 B 32	WETLAND/SOILS BOUNDARY
	WATERSHED BOUNDARY
	Tc PATH
1	SUBCATCHMENT
1	POND
1	REACH
	WATERSHED DIVISION LINE

NOTES

1. SITE SPECIFIC SOILS SURVEY PERFORMED BY JOSEPH W. NOEL, CSS #017, NOVEMBER – DECEMBER 2016.
2. WETLANDS DELINEATED BY JOESPH W. NOEL, CWS #086, SEPTEMBER 2016.

40 0 40 80 120 160 FEET

20 0 20 40 METERS

P4801

ENGINEER:

ALTUS ENGINEERING, INC.

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(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR: DRAINAGE STUDY

ISSUE DATE: JANUARY 29, 2019

REVISIONS

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PORTSMOUTH, N.H.
ASSESSOR'S PARCELS
266–4, 266–5 & 266–6

TITLE:

POST-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER: W-2

TRAFFIC IMPACT ASSESSMENT UPDATE

ST. PATRICK ACADEMY – PROPOSED GYMNASIUM

Portsmouth, New Hampshire

December 2019

Prepared for

Hope for Tomorrow Foundation

Stephen G. Pernaw
& Company, Inc.

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& Company, Inc.
P.O. Box 1721 • Concord, NH 03302
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Transportation: Engineering • Planning • Design

TRAFFIC IMPACT ASSESSMENT UPDATE
ST. PATRICK ACADEMY PROPOSED GYMNASIUM
PORTSMOUTH, NEW HAMPSHIRE
December 19, 2019

BACKGROUND

On January 31, 2017 this office published the report entitled *"Traffic Impact Assessment - Proposed St. Patrick Academy"* on behalf of the Hope for Tomorrow Foundation. Now that the Academy is in full operation, the Foundation desires to construct a standalone gymnasium building on their property for physical education classes and athletic events. The purpose of this update is to quantify the current trip generating characteristics of the existing school, the anticipated changes in traffic demand due to the proposed gymnasium, and to evaluate the Banfield Road / Existing Site Driveway intersection in terms of traffic operations, capacity, and safety.

CURRENT PROPOSAL

The current development proposal calls for the construction of a 17,000 square-foot gymnasium building on the south side of the subject site. This building will be used primarily for after-school practices (typically from 3-6 PM) and athletic events (typically from 6-8 PM). The building will also be used for occasional concerts, science fairs, dances, and pep rallies.

On typical "practice" days, fewer parents will retrieve their children during the normal pick-up time (2-3 PM) since practices generally end at 6 PM, well after the peak traffic hour of the adjacent street system. It is reasonable to expect that parent arrivals will occur between 3-6 PM, as some will arrive early to watch the practice.

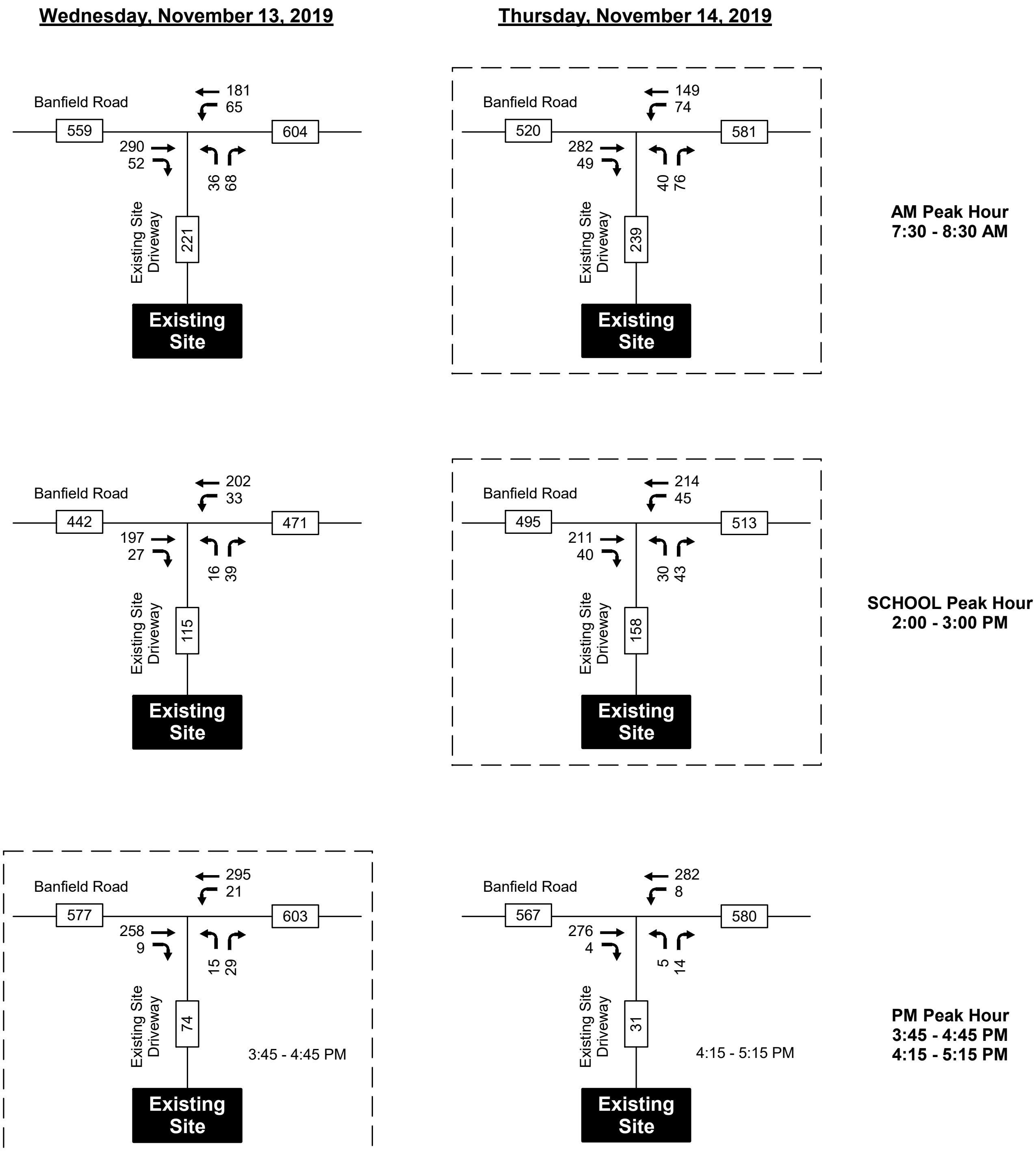
On typical "event" days traffic will be affected in several different ways: 1) traveling visitors and referees will arrive before 6 PM and depart after 8 PM, 2) Academy staff will remain on site and depart after 8 PM rather than during the late afternoon, and 3) parents will arrive later in the day in either one or two vehicles to watch the event and then depart after 8 PM.

Additional on-site parking is proposed adjacent to the new gymnasium building. Vehicular access to the gymnasium site will be provided via the existing two-way driveway that currently intersects the south side of Banfield Road. Attachment 1 shows the location of the proposed building with respect to the site and the adjacent street system.

EXISTING TRAFFIC VOLUMES

To quantify the traffic demand and the travel patterns at the Banfield Road / Existing Site Driveway intersection, Pernaw & Company, Inc. conducted turning movement and vehicle classification counts at the intersection on two typical weekdays: Wednesday, November 13, 2019 and Thursday, November 14, 2019. These counts were conducted from 7:00 to 9:00 AM and from 2:00 to 6:00 PM, similar to the original traffic study. Figure 1 summarizes this data for the three analysis periods: the weekday AM Street Peak Hour, the School Peak Hour, and the PM Street Peak Hour.

Pernaw & Company, Inc



NORTH

1978A

Figure 1

2019 Existing Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

Several facts and conclusions are evident from this data:

- The Thursday traffic volumes were generally higher than the Wednesday volumes, except for the weekday PM peak hour period. Data from the higher of the two count days were selected for traffic projection and analysis purposes.

- The two-way traffic volume on Banfield Road (east of the subject site) totaled 581 (AM), 513 (School), and 603 (PM) vehicles during the three peak hour periods. The predominant travel direction was eastbound during the AM peak hour; the directional flows were relatively balanced during the school and PM peak hour periods.

- On the higher count days the existing school generated 239 (AM), 158 (School) and 74 (PM) vehicle-trips during the three peak hour periods. The majority of school traffic (56-68%) traveled to/from points east on Banfield Road, depending upon the specific hour.
- During the School peak hour period from 2:00 to 3:00 PM the traffic volumes on Banfield Road are typically lower than during the typical AM and PM commuter peak hour periods.

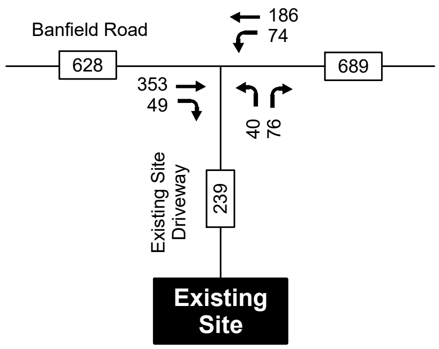
The detail sheets summarizing the raw turning movement count data are found on Attachments 2-11.

CRASH HISTORY

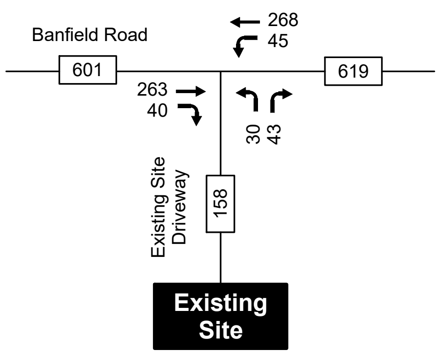
According to the Portsmouth Police Department there have been no reported crashes at the Banfield Road/Existing Site Driveway intersection since the Academy began operations (see, Attachment 12). The closest crashes on Banfield Road occurred at #470 (approximately 1,400 feet west of the Academy site) and #225 (approximately 1,325 feet east of the Academy site).

NO-BUILD TRAFFIC PROJECTIONS

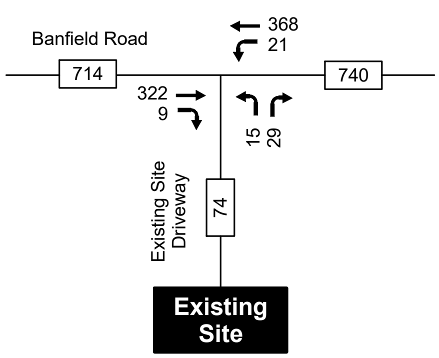
The No-Build traffic volumes for the 2030 horizon year are summarized schematically on Figure 2. These projections are based on the November 2019 traffic volumes, a one-percent annual background traffic growth rate (compounded annually) to account for normal growth in through traffic in the area, and a peak-month seasonal adjustment factor of 1.12 (see Attachment 13).



AM Peak Hour



SCHOOL Peak Hour



PM Peak Hour

NORTH

1978A

Figure 2

2030 No-Build Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

SITE GENERATED TRAFFIC

To estimate the quantity of vehicle-trips that will be produced by the proposed gymnasium, Pernaw & Company, Inc. typically utilizes the trip generation rates published by the Institute of Transportation Engineers (ITE) [1]. Unfortunately, there is no applicable ITE land use category. Consequently, the trip estimates contained herein are based upon the manual derivation that reflects the unique circumstances that will occur on a typical “practice” day and “event” day.

Table 1 summarizes the results of this analysis and it shows that on “practice” days there will be a decrease in site traffic during the weekday School peak hour, and a slight increase during the PM peak hour period. On “event” days there will be decreases during both peak hour periods, as most traffic will be exiting from the site after 8 PM, when the traffic volumes on Banfield Road are well below peak levels.

The proposed gymnasium will not alter the traffic flow during the AM Street Peak Hour period.

The additional traffic associated with the gymnasium is expected to mirror the traffic patterns observed at the existing intersection. Attachment 14 shows the distribution of site traffic at this intersection on a typical practice day and event day. The derivation of the trip generation estimates is found on Attachment 15.

BUILD TRAFFIC PROJECTIONS

The Build traffic volumes for the horizon year 2030 are summarized schematically on Figure 3. These projections are based on the No-Build projections, the trip generation estimates contained in Table 1, and the expectation that the additional trips will mirror the travel patterns observed at the existing intersection.

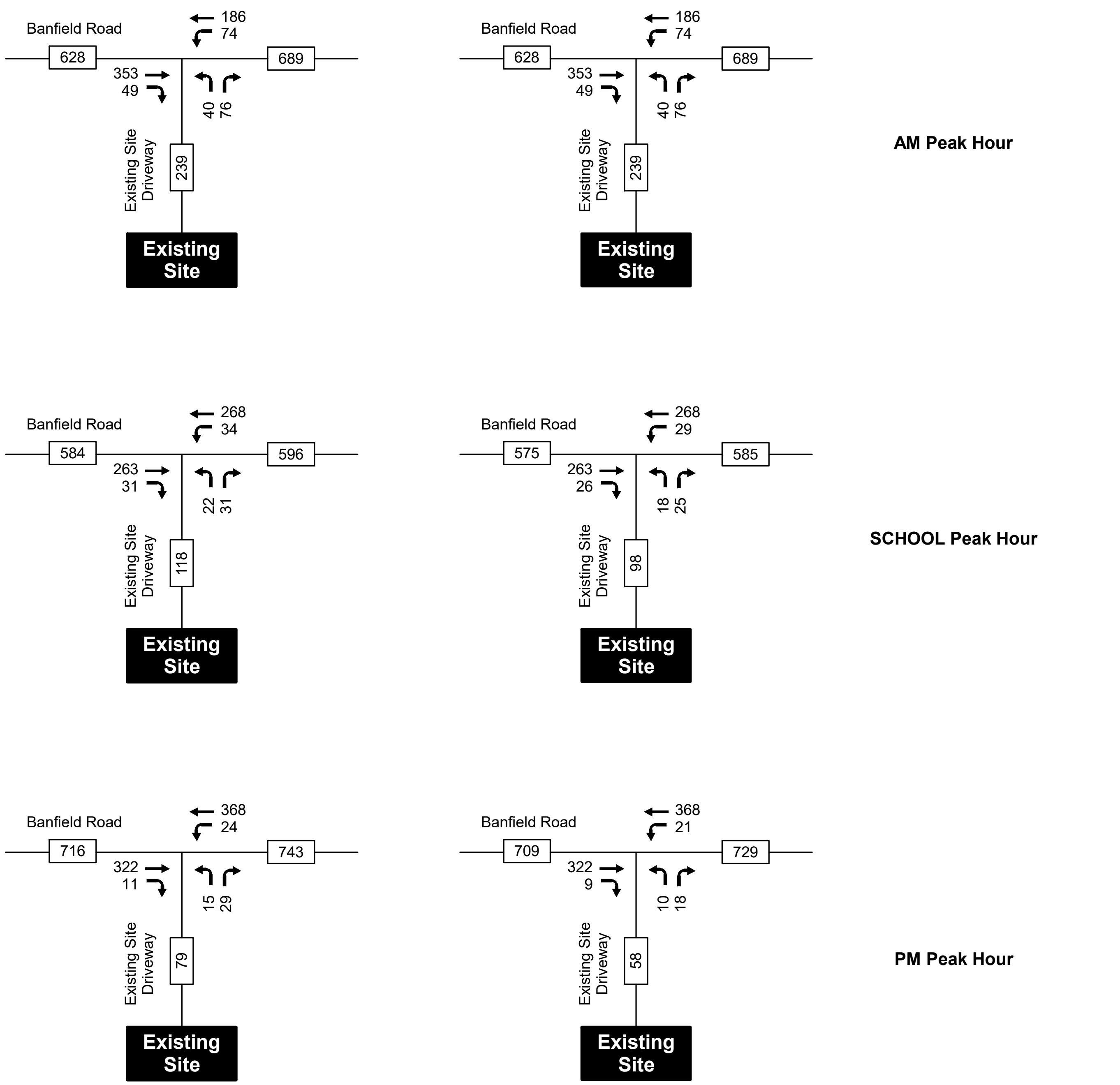
[1] Institute of Transportation Engineers, *Trip Generation*, ninth edition (Washington, D.C., 2012).

Table 1 — Trip Generation Summary
Proposed Gymnasium at St. Patrick Academy

	Existing School[1]	Proposed Gymnasium: Typical Practice Day[2]	Proposed Gymnasium: Typical Event Day[3]	Post-Development Volumes: Typical Practice Day	Post-Development Volumes: Typical Event Day
Weekday AM Street Peak Hour (7:30 - 8:30 AM)					
Entering	123 veh	0 veh	0 veh	123 veh	123 veh
Exiting	116 veh	0 veh	0 veh	116 veh	116 veh
Total	239 trips	0 trips	0 trips	239 trips	239 trips
Weekday School Peak Hour (2:00 - 3:00 PM)					
Entering	85 veh	-20 veh	-30 veh	65 veh	55 veh
Exiting	73 veh	-20 veh	-30 veh	53 veh	43 veh
Total	158 trips	-40 trips	-60 trips	118 trips	98 trips
Weekday PM Street Peak Hour (4:00 - 5:00 PM +/-)					
Entering	30 veh	5 veh	0 veh	35 veh	30 veh
Exiting	44 veh	0 veh	-16 veh	44 veh	28 veh
Total	74 trips	5 trips	-16 trips	79 trips	58 trips
Weekday Total					
Entering	NA	NA	NA	NA	NA
Exiting	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA

[1] Driveway counts conducted on 11/13/19 and 11/14/19.
[2] Typical practices run from 3-6 PM. Approximately 20 fewer parents take students at normal time (2-3 PM), and arrive between 3-6 PM to watch and take their children home after 6 PM.
[3] Typical events run from 6-8 PM. Approximately 24 staff remain on-site and depart after 8 PM, approximately 30 fewer parents take students at normal time (2-3 PM) and arrive in 1 or 2 vehicles before/after 6 PM to watch and retrieve, approximately 40 travelling visitors & referees arrive before 6 PM and depart after 8 PM.

2030 (Practice Day) **2030 (Event Day)**



1978A

Figure 3

2030 Build Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

TRAFFIC OPERATIONS AND SAFETY

INTERSECTION CAPACITY – UNSIGNALIZED INTERSECTIONS

The long-range traffic projections were utilized to assess traffic operations at the existing site driveway intersection on Banfield Road. This intersection was analyzed according to the methodologies of the *Highway Capacity Manual*[2] as replicated by the latest edition of the *Synchro Traffic Signal Timing Software (Version 9)*, which also performs unsignalized intersection capacity analyses.

Capacity and Level of Service (LOS) calculations pertaining to unsignalized intersections address the quality of service for those vehicles turning into and out of intersecting side streets. The availability of adequate gaps in the traffic stream on the major street actually controls the potential capacity for vehicle movements to and from the minor approach. Levels of Service are simply letter grades (A-F), which categorize the vehicle delays associated with specific turning maneuvers. Table 2 describes the criteria used in this analysis. Calculations pertaining to these analyses are included as Attachments 16-27.

Table 2 — Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Control Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: Transportation Research Board, Highway Capacity Manual 2010.

The results of the analysis for the **Banfield Road/Existing Site Driveway** intersection are summarized in Table 3 and confirm that vehicle departures from the Existing Site Driveway will continue to operate <u>below</u> capacity through 2030 with the proposed gymnasium in use on typical "practice" and "event" days. By 2030 long delays (LOS F) should be expected during the morning peak hour period as much of the school traffic is concentrated during the peak 15-minute interval prior to the start of the school day. Favorably, the proposed gymnasium does not affect the driveway volumes during the morning peak hour period.

The analysis also confirms that shorter delays will be encountered during the school peak hour and evening peak hour periods in 2030. The westbound left-turn arrival movement from Banfield Road on to the site driveway will operate at LOS A and with minimal delay during all hours of the day through 2030, with the school gymnasium in full operation.

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[2] Transportation Research Board, *Highway Capacity Manual* (Washington, D.C., 2010).

Stephen G. Pernaw & Company, Inc.

Table 3	STOP-Controlled Intersection Capacity Analysis Banfield Road / Existing Site Driveway												
		Weekday AM Peak Hour				School Peak Hour				Weekday PM Peak Hour			
		Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]
Typical Practice Day													
Existing Site Driveway - L & R-Turn Departures													
	2030 No-Build	54.2	0.86	F	8	15.9	0.36	C	2	13.9	0.15	B	1
	2030 Build	54.2	0.86	F	8	14.1	0.26	B	1	14.0	0.15	B	1
Banfield Road - WB Left Turns													
	2030 No-Build	9.2	0.11	A	<1	8.1	0.04	A	<1	8.2	0.02	A	<1
	2030 Build	9.2	0.11	A	<1	8.1	0.03	A	<1	8.2	0.02	A	<1
Typical Event Day													
Existing Site Driveway - L & R-Turn Departures													
	2030 No-Build	54.2	0.86	F	8	15.9	0.36	C	2	13.9	0.15	B	1
	2030 Build	54.2	0.86	F	8	13.4	0.20	B	1	13.5	0.10	B	<1
Banfield Road - WB Left Turns													
	2030 No-Build	9.2	0.11	A	<1	8.1	0.04	A	<1	8.2	0.02	A	<1
	2030 Build	9.2	0.11	A	<1	8.0	0.03	A	<1	8.2	0.02	A	<1

[1] HCM Control Delay (seconds per vehicle), [2] HCM Volume to Capacity Ratio, [3] HCM Level of Service, [4] HCM 95th Percentile Queue (vehicles)

AUXILIARY TURN LANE WARRANTS ANALYSIS

Left-Turn Treatment - The type of treatment needed to accommodate left-turning vehicles from any street or highway to an intersecting side street (or driveway) can range from no treatment, where turning volumes are low; to the provision of a bypass lane for through traffic to travel around left-turning vehicles; to the addition of a formal center turn lane used exclusively by left-turning vehicles for deceleration and storage while waiting to complete their maneuvers.

Analysis of the 2030 Build traffic volumes at the Banfield Road/Existing Site Driveway intersection using NCHRP 457 guidelines confirmed that left-turn treatment is not warranted on Banfield Road for westbound vehicles entering the site driveway. This means that the existing westbound travel lane on Banfield Road will continue to function adequately as a shared left-through lane. Table 4 summarizes the findings of this analysis (see Attachments 28-33).

Table 4 — **Left-Turn Lane Warrants Analysis**
Banfield Road / Existing Site Driveway

	2030 AM Build Volumes	2030 School Build Volumes	2030 PM Build Volumes
Typical Practice Day			
Peak Hour Inputs			
Left-Turn Volume (WB)	74	34	24
Advancing Volume (WB)	260	302	392
Opposing Volume (EB)	402	294	333
Percent Lefts	28.5%	11.3%	6.1%
Speed (mph)	30	30	30
Limiting Advancing Volume (veh/h)	273	437	553
Conclusion			
Left-Turn Treatment Warranted	**NO**	**NO**	**NO**
Typical Event Day			
Peak Hour Inputs			
Left-Turn Volume (WB)	74	29	21
Advancing Volume (WB)	260	297	389
Opposing Volume (EB)	402	289	331
Percent Lefts	28.5%	9.8%	5.4%
Speed (mph)	30	30	30
Limiting Advancing Volume (veh/h)	273	468	588
Conclusion			
Left-Turn Treatment Warranted	**NO**	**NO**	**NO**

Right-Turn Treatment - The type of treatment needed to accommodate right-turning vehicles from any street or highway to any intersecting side street (or driveway) can range from a radius only, where turning volumes are low; to the provision of a short 10:1 right-turn taper; to the addition of an exclusive right-turn lane, where turning volumes and through traffic volumes are significant.

Analysis of the 2030 Build traffic volumes at the Banfield Road/Existing Site Driveway intersection using NCHRP 457 guidelines confirmed that right-turn treatment is not warranted on Banfield Road for eastbound vehicles entering the existing site driveway. This means that the existing eastbound travel lane on Banfield Road will continue to function adequately as a shared through-right lane. The results of these analyses are summarized on Table 5 (see Attachments 34-39).

Table 5 — **Right-Turn Lane Warrants Analysis Banfield Road / Existing Site Driveway**

	2030 AM Build Volumes	2030 School Build Volumes	2030 PM Build Volumes
Typical Practice Day			
Peak Hour Inputs			
Right-Turn Volume (EB)	49	31	11
Total Approach Volume (EB)	402	294	333
Speed (mph)	30	30	30
Limiting Right-Turn Volume (veh/h)	>1000	>1000	>1000
Conclusion			
Add Right-Turn Bay	**NO**	**NO**	**NO**
Typical Event Day			
Peak Hour Inputs			
Right-Turn Volume (EB)	49	26	9
Total Approach Volume (EB)	402	289	331
Speed (mph)	30	30	30
Limiting Right-Turn Volume (veh/h)	>1000	>1000	>1000
Conclusion			
Add Right-Turn Bay	**NO**	**NO**	**NO**

Minor-Road Approach Treatment – The type of treatment needed to accommodate exiting vehicles from the minor-road approach at a stop-controlled intersection can range from a single lane (shared left-right lane) in low-volume conditions, to two exit lanes (exclusive left-turn lane and exclusive right-turn lane) where turning volumes and through traffic volumes are significant, to multiple exit lanes in extreme cases.

Analysis of the 2030 Build traffic volumes using NCHRP 457 guidelines confirmed that a shared left-right lane on the existing site driveway approach to Banfield Road is sufficient for the anticipated traffic volumes. The results of these analyses are summarized on Table 6 (see Attachments 40-45).

Table 6	Minor-Road Approach Geometry Banfield Road / Existing Site Driveway		
	2030 AM Build Volumes	2030 School Build Volumes	2030 PM Build Volumes
Typical Practice Day			
Peak Hour Inputs			
Major-Road Volume (EB-WB)	662	596	725
% Right-Turns on Minor (NB)	66	59	66
Minor-Road Approach Volume	116	53	44
Limiting Minor-Road Volume (veh/h)	344	346	324
Conclusion			
Consider TWO Approach Lanes	**NO**	**NO**	**NO**
Typical Event Day			
Peak Hour Inputs			
Major-Road Volume (EB-WB)	662	586	720
% Right-Turns on Minor (NB)	66	58	64
Minor-Road Approach Volume	116	43	28
Limiting Minor-Road Volume (veh/h)	344	349	320
Conclusion			
Consider TWO Approach Lanes	**NO**	**NO**	**NO**

STUDY UPDATE FINDINGS AND RECOMMENDATIONS

Based on the existing conditions data collected at the Banfield Road/Existing Site Driveway, the anticipated traffic increases from the proposed gymnasium, and the analysis of the 2030 horizon year traffic volumes, Pernaw & Company, Inc. concludes that:

1. During the morning peak hour, traffic levels were highest from 7:30 to 9:30 AM on both count days. The higher driveway volume occurred on Thursday, November 14, 2019 when a total of 239 vehicles was observed arriving/departing from the site driveway. The majority of school vehicles traveled to/from points east on Banfield Road.
2. During the school peak hour (2:00 to 3:00 PM), the higher driveway volume occurred on Thursday, November 14, 2019 when a total of 158 vehicles was observed arriving/departing from the site driveway. Similarly, the majority of school vehicles traveled to/from points east on Banfield Road.
3. During the evening peak hour, traffic levels were highest from 3:45 to 4:45 PM on Wednesday, November 13, 2019 when a total of 74 vehicles was observed arriving/departing from the site driveway. Again, the majority of school vehicles traveled to/from points east on Banfield Road.
4. The trip generation analysis indicates that on "practice" days the proposed gymnasium will result in traffic <u>decreases</u> during the weekday School peak hour, and a slight <u>increase</u> during the PM peak hour period. This is primarily due to fewer student "pick-ups" immediately after school; with more site departures occurring after 6:00 PM when practices have ended. On "event" days there will be <u>decreases</u> during both the school and evening peak hour periods, as most traffic will be arriving prior to 6:00 PM and departing after 8:00 PM, when most events typically end.
5. The intersection capacity and Level of Service analyses indicate that all applicable traffic movements will operate <u>below</u> capacity through 2030 on both practice days and event days. Long delays will continue to be encountered during the morning peak hour as most traffic is concentrated during the 15-minute interval prior to the start of the school day. Favorably, the proposed gymnasium will not alter the traffic demand during the AM peak hour period.
6. The 2030 horizon year auxiliary turn lane warrants analyses confirmed that this intersection will continue to operate safely and efficiently with one shared general-purpose travel lane on each approach to this intersection.

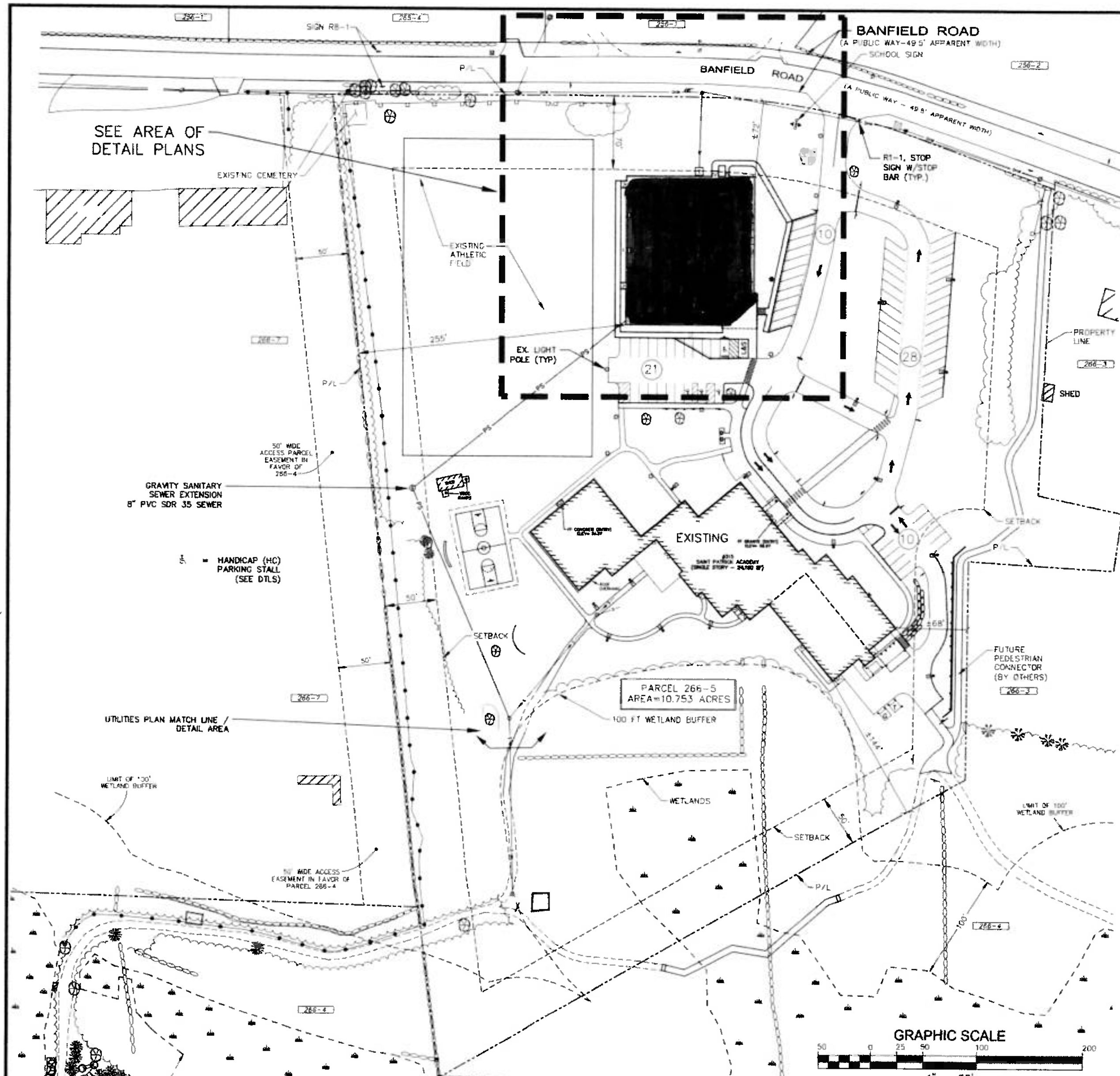
To conclude, the recent traffic counts, future projections and technical analyses contained herein demonstrate that the Banfield Road/Existing Site Driveway intersection is capable of accommodating the anticipated traffic changes as a result of the proposed gymnasium project, and that physical modifications to the subject intersection are not necessary.

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER
STEPHEN G. PERNAW No. 5234 LICENSED

12/19/19

Attachments

ATTACHMENTS



SITE NOTES

1. ON SEPTEMBER 30, 2016 THE PORTSMOUTH BOARD OF ADJUSTMENT GRANTED THE FOLLOWING:
   - A VARIANCE FROM SECTIONS 10.440 and 10.335 OF THE PORTSMOUTH ZONING ORDINANCE TO ALLOW A LAWFUL NONCONFORMING USE TO BE CHANGED TO ANOTHER NONCONFORMING USE.
   - A VARIANCE FROM SECTION 10.440.3.21 TO ALLOW A PRIMARY OR SECONDARY SCHOOL IN A DISTRICT WHERE THE USE IS NOT PERMITTED.

   ON MARCH 21, 2017 THE PORTSMOUTH BOARD OF ADJUSTMENT GRANTED THE FOLLOWING:
   - A VARIANCE FROM SECTION 10.1113.20 TO ALLOW OFF-STREET PARKING SPACES TO BE LOCATED BETWEEN A PRINCIPAL BUILDING AND A STREET.
2. ALL BONDS AND FEES SHALL BE PAID/POSTED PRIOR TO INITIATING CONSTRUCTION.
3. ALL CONDITIONS OF THIS APPROVAL SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
4. ALL CONSTRUCTION SHALL MEET THE MINIMUM CONSTRUCTION STANDARDS OF THE CITY OF PORTSMOUTH & NHDOT'S STANDARD SPECIFICATIONS FOR ROAD & BRIDGE, LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL GOVERN.
5. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAWCUT LINE WITH RS-1 IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
6. THE CONTRACTOR SHALL VERIFY ALL BENCHMARKS AND TOPOGRAPHY IN THE FIELD PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PRIOR TO CONSTRUCTION. ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER FOR RESOLUTION.
8. AREA OF DISTURBANCE IS OVER 43,560 SF. COVERAGE UNDER EPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT REQUIRED (NOI TO BE PREPARED AND SUBMITTED BY CONTRACTOR, SWPPP AND INSPECTIONS TO BE PREPARED AND PERFORMED BY CONTRACTOR). AMENDMENT TO EXISTING NHDES ALTERATION OF TERRAIN PERMIT IS REQUIRED.
9. SNOW SHALL BE STORED AT THE EDGE OF PAVEMENT, IN UPLAND AREAS SHOWN THEREON, AND IN AREAS A MINIMUM OF 100-FEET FROM THE WETLANDS. NO SNOW STORAGE SHALL BE PROVIDED WITHIN 25' OF THE LANDSCAPED ISLAND BETWEEN THE DRIVEWAY ENTRANCE THAT WOULD RESTRICT SITE VEHICULAR AND PEDESTRIAN SIGHT DISTANCE. IF ADEQUATE ON-SITE SNOW STORAGE IS NOT AVAILABLE, THE SNOW SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED.
10. PAVEMENT MARKINGS SHALL BE CONSTRUCTED USING WHITE, YELLOW, OR BLUE TRAFFIC PAINT (WHERE SPECIFIED) MEETING THE REQUIREMENTS OF AASHTO M248, TYPE F OR EQUAL. PAINTED ISLANDS AND LOADING ZONES SHALL BE 4"-WIDE DIAGONAL WHITE LINES 3'-0" O.C. BORDERED BY 4"-WIDE WHITE LINES. PARKING STALLS SHALL BE SEPARATED BY 4"-WIDE WHITE LINES. SEE DETAILS FOR HANDICAP SYMBOLS, SIGNS AND SIGN DETAILS. PAVEMENT MARKINGS SHALL BE INSTALLED AT LEAST 14-DAYS AFTER INSTALLATION OF WEARING COURSE PAVEMENT. CONTRACTOR SHALL APPLY TWO (2) COATS OF ALL PAVEMENT MARKINGS.
11. PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC DEVICES," "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AND THE AMERICANS WITH DISABILITIES ACT (ADA), LATEST EDITIONS.
12. UNLESS OTHERWISE NOTED, ALL NEW CURBING SHALL BE VERTICAL GRANITE WITH A MINIMUM RADIUS OF 4'.
13. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY AND ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF BOTH THE ARCHITECT AND CIVIL ENGINEER FOR RESOLUTION.
14. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
15. THE SITE PLAN & LANDSCAPE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
16. SITEWORK CONTRACTOR SHALL PREPARE A LICENSED LAND SURVEYOR (LLS) STAMPED AS-BUILT SITE PLAN & PROVIDE A DIGITAL (CAD FORMAT) COPY FOR THE CITY'S G.I.S. DATA BASE.

ZONING REQUIREMENTS:

PARCEL IS LOCATED IN THE INDUSTRIAL (I) ZONE

ZONING DIMENSIONS	REQUIRED	PROVIDED
MINIMUM LOT SIZE:	87,120 SF (2.0 ACRES)	468,400 SF (10.75 ACRES)
MINIMUM FRONTAGE	200'	695.6'
MINIMUM SETBACKS		
FRONT YARD:	70'	±72'
SIDE YARD:	50'	67.8'
REAR YARD:	50'	±144'
MINIMUM LOT DEPTH	100'	587'
MINIMUM OPEN SPACE:	20%	±79%
MAXIMUM STRUCTURE COVERAGE:	50%	8.85%
MAX. LENGTH OF BUILDING:	160'	±281.2'
MAX. HEIGHT OF BUILDING:	70'	<70'

EXISTING BUILDING FOOTPRINT:	±24,150 SF
EXISTING SHED:	±290 SF
PROPOSED BUILDING:	±17,000 SF
TOTAL BUILDING AREA:	±41,440 SF

CITY OF PORTSMOUTH, PLANNING BOARD

CHAIRMAN DATE

ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR: TAC WORK SESSION

ISSUE DATE: OCTOBER 8, 2019

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	CDB	-

DRAWN BY: CDB

APPROVED BY: EDW

DRAWING FILE: 4801.2-SITE.DWG

SCALE: 22" x 34" - 1" = 50'
11" x 17" - 1" = 100'

OWNER:
HOPE FOR TOMORROW FOUNDATION
1950 LAFAYETTE ROAD
2ND FLOOR
PORTSMOUTH, N.H. 03801
ASSESSOR'S PARCEL 266-5

APPLICANT:
SAINT PATRICK ACADEMY
315 BANFIELD ROAD
PORTSMOUTH, N.H. 03801

PROJECT:
SAINT PATRICK ACADEMY
GYMNASIUM PROJECT
PORTSMOUTH, N.H.
ASSESSOR'S PARCEL 266-5

TITLE:
OVERALL SITE PLAN

SHEET NUMBER: C-1

P4801

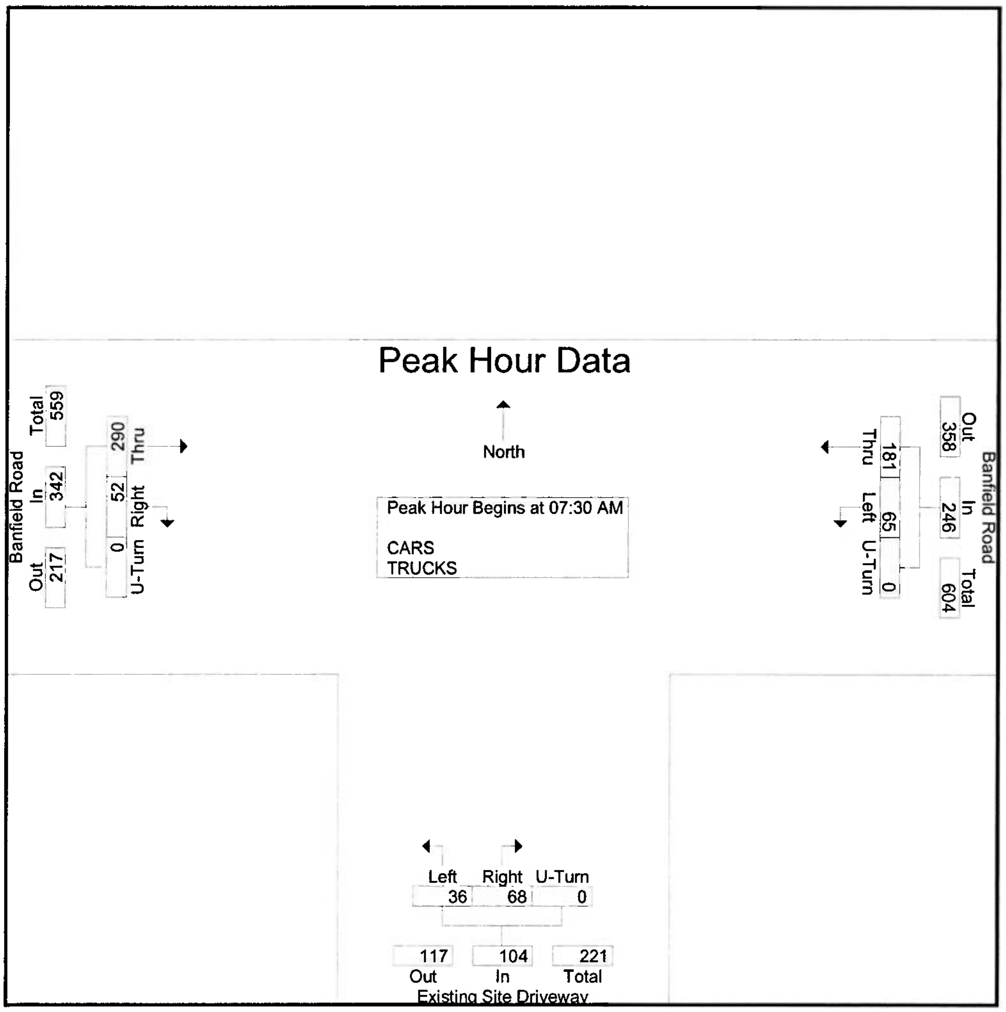
Attachment 2

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 2

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	38	15	0	53	6	2	0	8	7	64	0	71	132
07:45 AM	**50**	**37**	0	**87**	**38**	**24**	0	**62**	**38**	**90**	0	**128**	**277**
08:00 AM	44	11	0	55	22	8	0	30	5	80	0	85	170
08:15 AM	49	2	0	51	2	2	0	4	2	56	0	58	113
Total Volume	181	65	0	246	68	36	0	104	52	290	0	342	692
% App. Total	73.6	26.4	0		65.4	34.6	0		15.2	84.8	0		
PHF	.905	.439	.000	.707	.447	.375	.000	.419	.342	.806	.000	.668	.625



Attachment 3

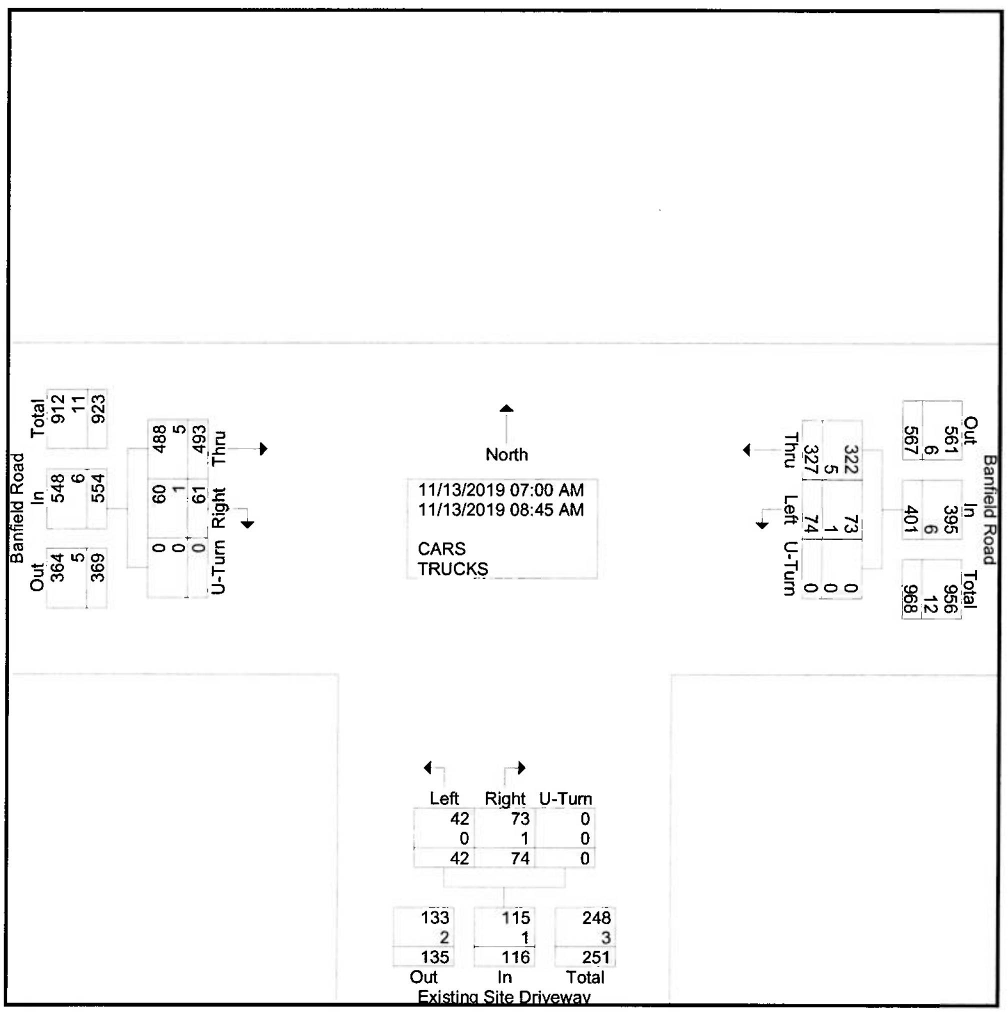
Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	21	5	0	26	1	1	0	2	3	28	0	31	59
07:15 AM	38	3	0	41	3	2	0	5	4	53	0	57	103
07:30 AM	38	15	0	53	6	2	0	8	7	64	0	71	132
07:45 AM	50	37	0	87	38	24	0	62	38	90	0	128	277
Total	147	60	0	207	48	29	0	77	52	235	0	287	571
08:00 AM	44	11	0	55	22	8	0	30	5	80	0	85	170
08:15 AM	49	2	0	51	2	2	0	4	2	56	0	58	113
08:30 AM	49	0	0	49	2	1	0	3	0	50	0	50	102
08:45 AM	38	1	0	39	0	2	0	2	2	72	0	74	115
Total	180	14	0	194	26	13	0	39	9	258	0	267	500
Grand Total	327	74	0	401	74	42	0	116	61	493	0	554	1071
Apprch %	81.5	18.5	0		63.8	36.2	0		11	89	0		
Total %	30.5	6.9	0	37.4	6.9	3.9	0	10.8	5.7	46	0	51.7	
CARS	322	73	0	395	73	42	0	115	60	488	0	548	1058
% CARS	98.5	98.6	0	98.5	98.6	100	0	99.1	98.4	99	0	98.9	98.8
TRUCKS	5	1	0	6	1	0	0	1	1	5	0	6	13
% TRUCKS	1.5	1.4	0	1.5	1.4	0	0	0.9	1.6	1	0	1.1	1.2



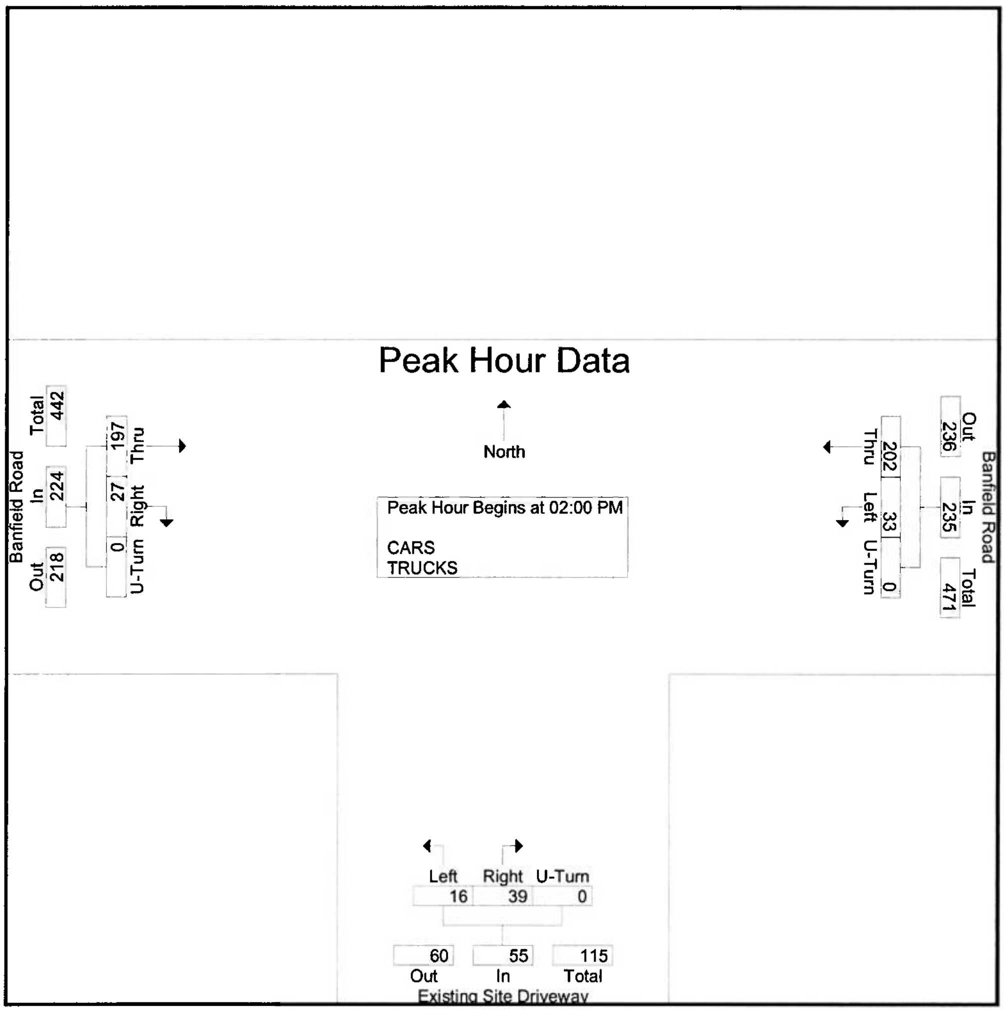
Attachment 4

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 2

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	**56**	1	0	57	1	0	0	1	0	45	0	45	103
02:15 PM	45	4	0	49	0	0	0	0	3	**59**	0	62	111
02:30 PM	54	**15**	0	**69**	16	**8**	0	24	**13**	50	0	**63**	**156**
02:45 PM	47	13	0	60	**22**	8	0	**30**	11	43	0	54	144
Total Volume	202	33	0	235	39	16	0	55	27	197	0	224	514
% App. Total	86	14	0		70.9	29.1	0		12.1	87.9	0		
PHF	.902	.550	.000	.851	.443	.500	.000	.458	.519	.835	.000	.889	.824



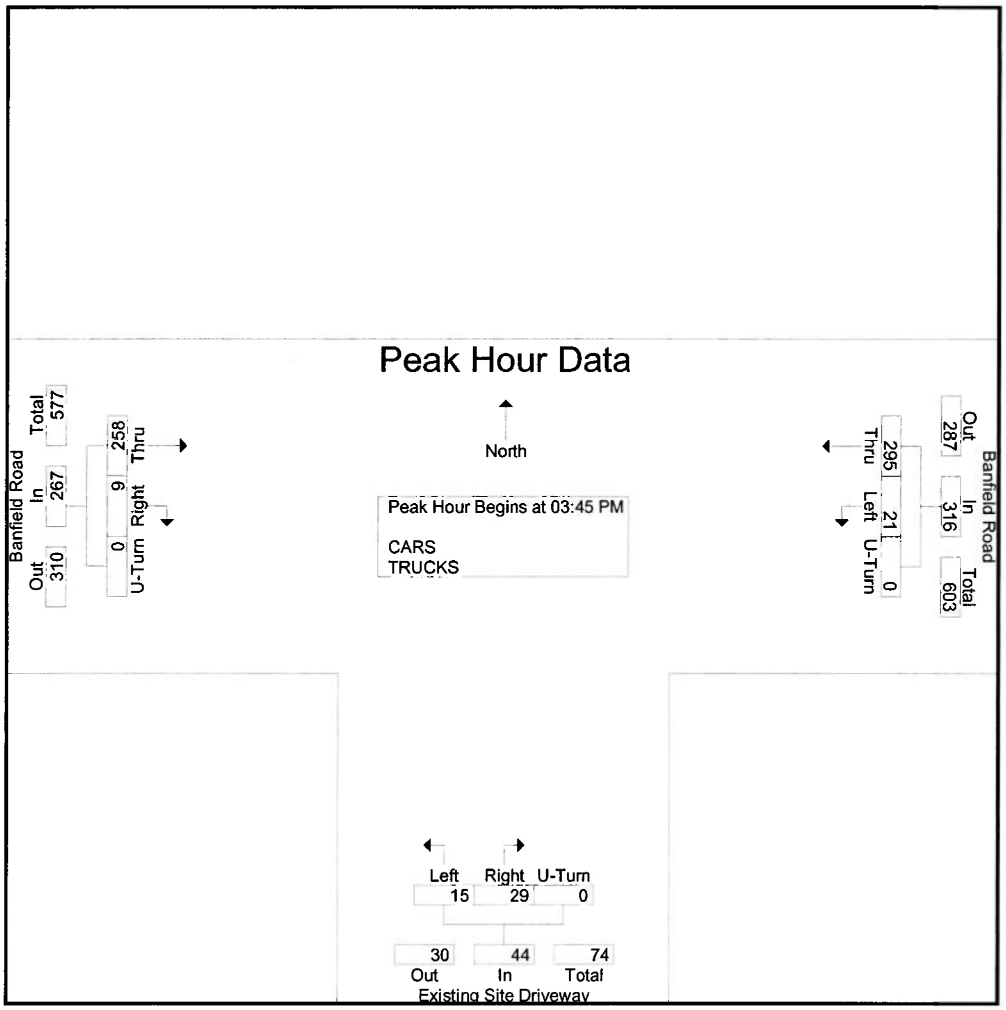
Attachment 5

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 3

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:45 PM													
03:45 PM	71	**11**	0	82	7	3	0	10	**6**	54	0	60	152
04:00 PM	**81**	7	0	**88**	**15**	3	0	**18**	2	57	0	59	**165**
04:15 PM	75	1	0	76	6	**6**	0	12	0	63	0	63	151
04:30 PM	68	2	0	70	1	3	0	4	1	**84**	0	**85**	159
Total Volume	295	21	0	316	29	15	0	44	9	258	0	267	627
% App. Total	93.4	6.6	0		65.9	34.1	0		3.4	96.6	0		
PHF	.910	.477	.000	.898	.483	.625	.000	.611	.375	.768	.000	.785	.950



Attachment 6

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM_723788_11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
03:00 PM	54	5	0	59	9	3	0	12	0	45	0	45	116
03:15 PM	67	3	0	70	1	2	0	3	2	68	0	70	143
03:30 PM	88	4	0	92	5	0	0	5	0	56	0	56	153
03:45 PM	71	11	0	82	7	3	0	10	6	54	0	60	152
Total	280	23	0	303	22	8	0	30	8	223	0	231	564
04:00 PM	81	7	0	88	15	3	0	18	2	57	0	59	165
04:15 PM	75	1	0	76	6	6	0	12	0	63	0	63	151
04:30 PM	68	2	0	70	1	3	0	4	1	84	0	85	159
04:45 PM	73	0	0	73	4	1	0	5	1	59	0	60	138
Total	297	10	0	307	26	13	0	39	4	263	0	267	613
05:00 PM	81	2	0	83	1	2	0	3	0	81	0	81	167
05:15 PM	93	0	0	93	2	3	0	5	2	60	0	62	160
05:30 PM	62	0	0	62	1	0	0	1	1	47	0	48	111
05:45 PM	47	0	0	47	2	1	0	3	1	62	0	63	113
Total	283	2	0	285	6	6	0	12	4	250	0	254	551
Grand Total	860	35	0	895	54	27	0	81	16	736	0	752	1728
Apprch %	96.1	3.9	0		66.7	33.3	0		2.1	97.9	0		
Total %	49.8	2	0	51.8	3.1	1.6	0	4.7	0.9	42.6	0	43.5	
CARS	846	35	0	881	54	27	0	81	15	731	0	746	1708
% CARS	98.4	100	0	98.4	100	100	0	100	93.8	99.3	0	99.2	98.8
TRUCKS	14	0	0	14	0	0	0	0	1	5	0	6	20
% TRUCKS	1.6	0	0	1.6	0	0	0	0	6.2	0.7	0	0.8	1.2

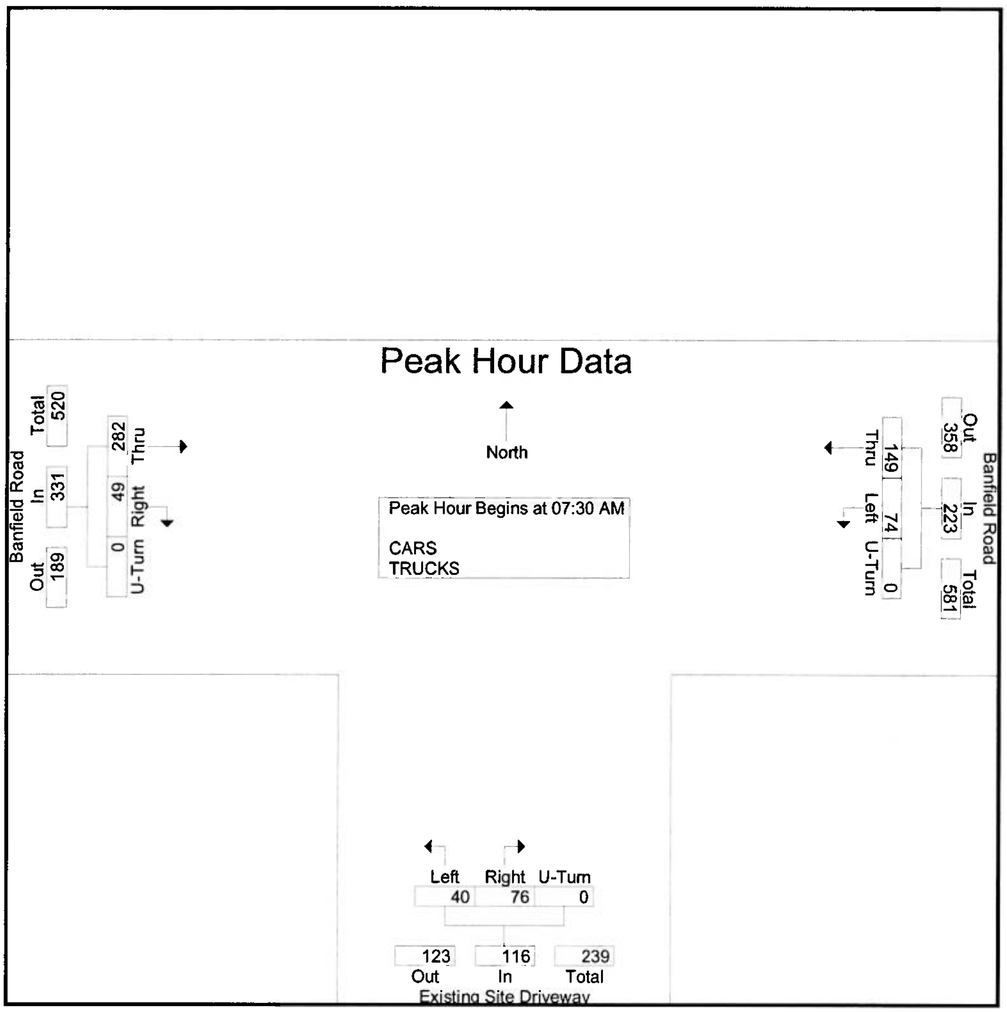
Attachment 7

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	34	13	0	47	4	6	0	10	11	56	0	67	124
07:45 AM	32	**45**	0	**77**	**53**	**22**	0	**75**	**29**	**103**	0	**132**	**284**
08:00 AM	40	14	0	54	18	9	0	27	7	68	0	75	156
08:15 AM	**43**	2	0	45	1	3	0	4	2	55	0	57	106
Total Volume	149	74	0	223	76	40	0	116	49	282	0	331	670
% App. Total	66.8	33.2	0		65.5	34.5	0		14.8	85.2	0		
PHF	.866	.411	.000	.724	.358	.455	.000	.387	.422	.684	.000	.627	.590



Attachment 8

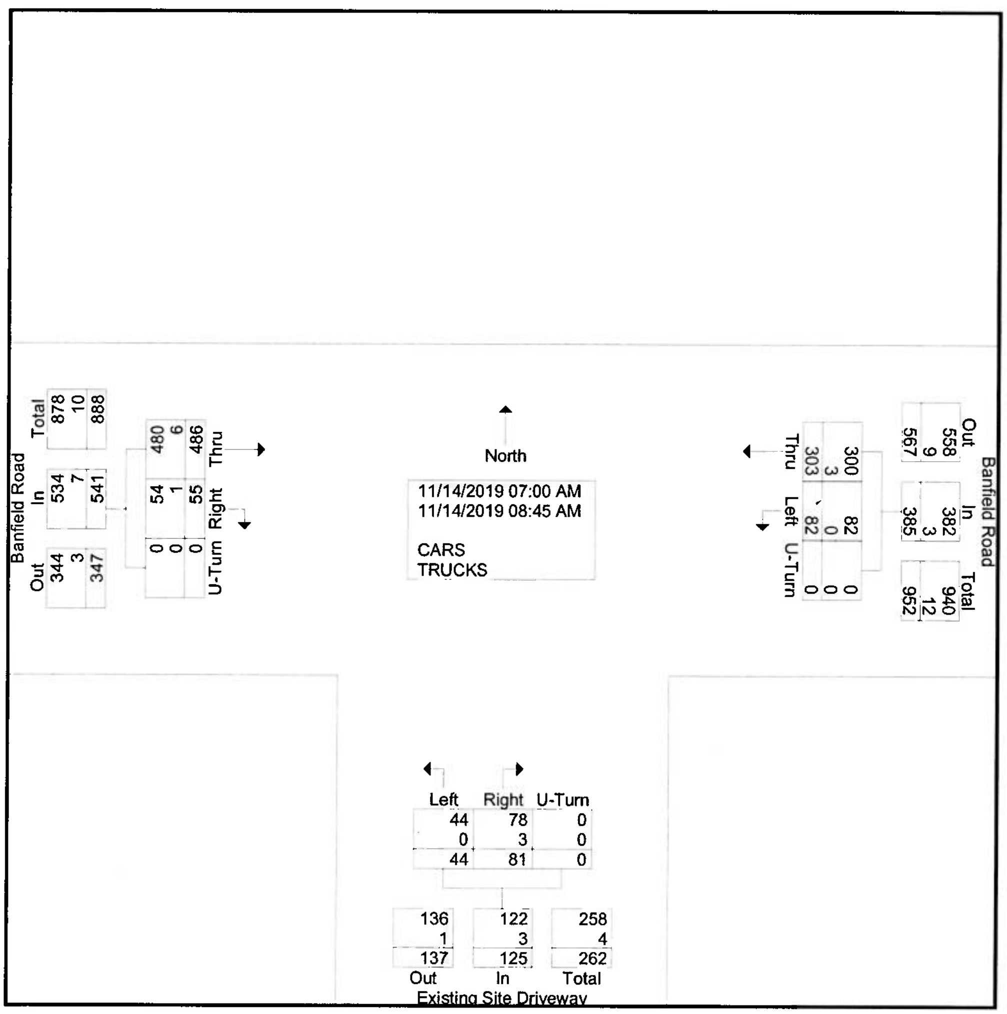
Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	27	2	0	29	0	1	0	1	2	25	0	27	57
07:15 AM	33	4	0	37	1	1	0	2	3	56	0	59	98
07:30 AM	34	13	0	47	4	6	0	10	11	56	0	67	124
07:45 AM	32	45	0	77	53	22	0	75	29	103	0	132	284
Total	126	64	0	190	58	30	0	88	45	240	0	285	563
08:00 AM	40	14	0	54	18	9	0	27	7	68	0	75	156
08:15 AM	43	2	0	45	1	3	0	4	2	55	0	57	106
08:30 AM	48	1	0	49	1	1	0	2	1	65	0	66	117
08:45 AM	46	1	0	47	3	1	0	4	0	58	0	58	109
Total	177	18	0	195	23	14	0	37	10	246	0	256	488
Grand Total	303	82	0	385	81	44	0	125	55	486	0	541	1051
Apprch %	78.7	21.3	0		64.8	35.2	0		10.2	89.8	0		
Total %	28.8	7.8	0	36.6	7.7	4.2	0	11.9	5.2	46.2	0	51.5	
CARS	300	82	0	382	78	44	0	122	54	480	0	534	1038
% CARS	99	100	0	99.2	96.3	100	0	97.6	98.2	98.8	0	98.7	98.8
TRUCKS	3	0	0	3	3	0	0	3	1	6	0	7	13
% TRUCKS	1	0	0	0.8	3.7	0	0	2.4	1.8	1.2	0	1.3	1.2



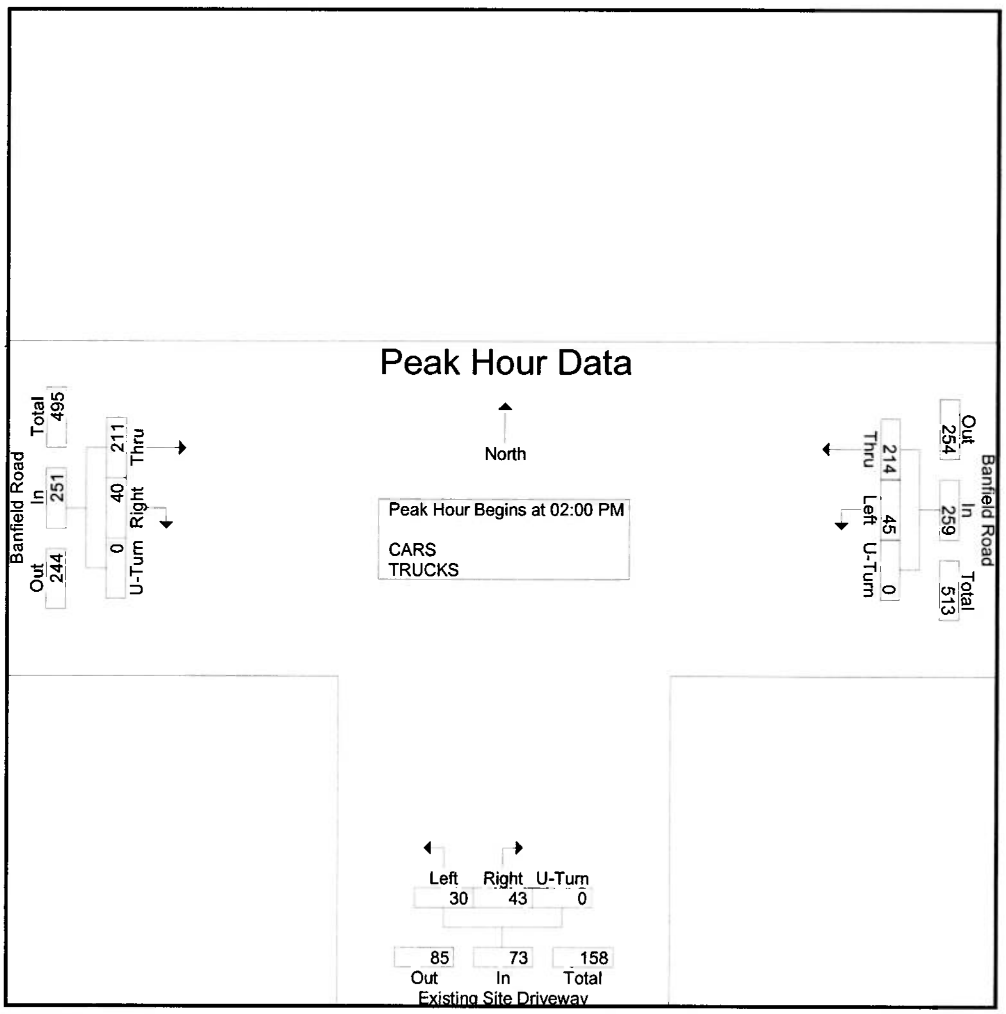
Attachment 9

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 2

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	50	1	0	51	1	0	0	1	0	57	0	57	109
02:15 PM	**65**	9	0	**74**	2	0	0	2	3	50	0	53	129
02:30 PM	51	16	0	67	15	8	0	23	10	**58**	0	68	158
02:45 PM	48	**19**	0	67	**25**	**22**	0	**47**	**27**	46	0	**73**	**187**
Total Volume	214	45	0	259	43	30	0	73	40	211	0	251	583
% App. Total	82.6	17.4	0		58.9	41.1	0		15.9	84.1	0		
PHF	.823	.592	.000	.875	.430	.341	.000	.388	.370	.909	.000	.860	.779

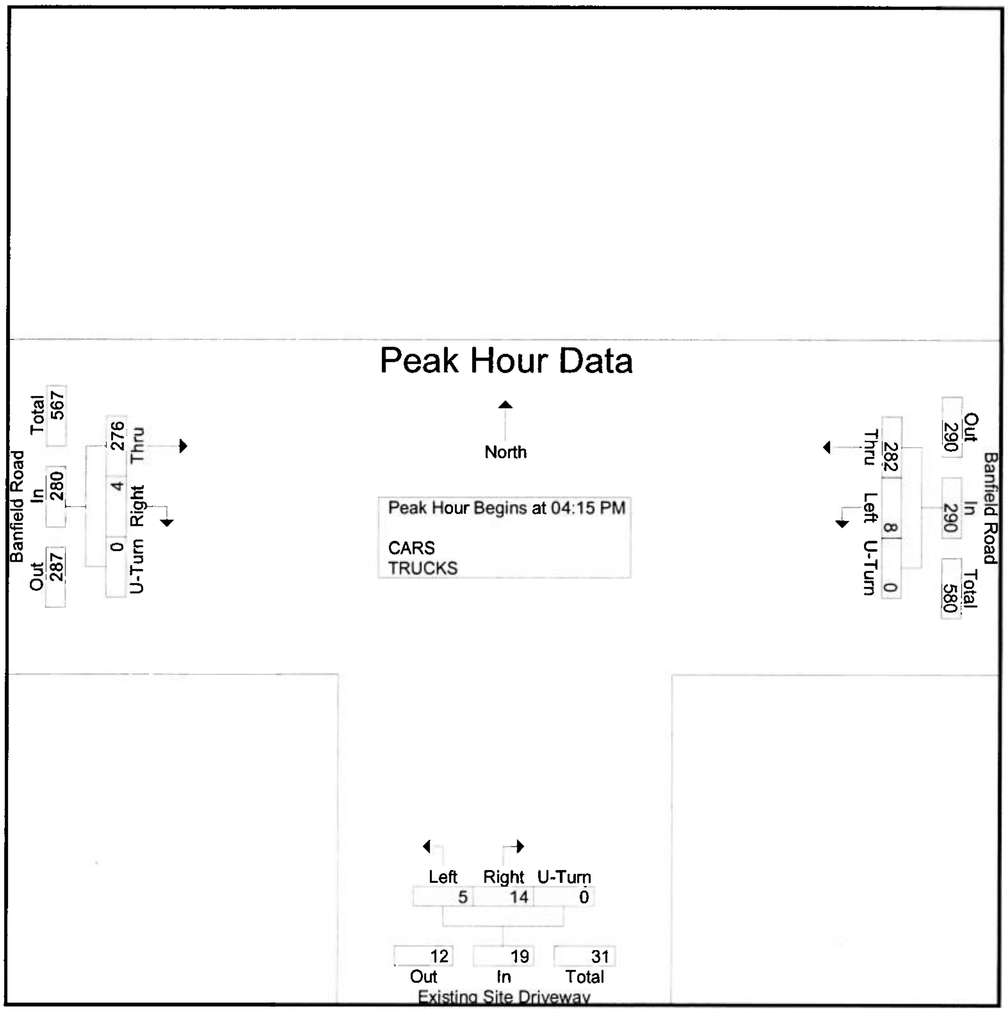


Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 3

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	72	2	0	74	**7**	**2**	0	**9**	**2**	61	0	63	146
04:30 PM	66	**4**	0	70	5	1	0	6	1	70	0	71	147
04:45 PM	67	2	0	69	2	0	0	2	0	68	0	68	139
05:00 PM	**77**	0	0	**77**	0	2	0	2	1	**77**	0	**78**	**157**
Total Volume	282	8	0	290	14	5	0	19	4	276	0	280	589
% App. Total	97.2	2.8	0		73.7	26.3	0		1.4	98.6	0		
PHF	.916	.500	.000	.942	.500	.625	.000	.528	.500	.896	.000	.897	.938



Attachment 11

Stephen G. Pernaw & Co., Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Thurs_AM_&_PM_723792_11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
03:00 PM	67	4	0	71	10	4	0	14	0	54	1	55	140
03:15 PM	74	1	0	75	1	0	0	1	0	67	0	67	143
03:30 PM	98	2	0	100	8	2	0	10	1	54	0	55	165
03:45 PM	68	1	0	69	5	1	0	6	1	56	0	57	132
Total	307	8	0	315	24	7	0	31	2	231	1	234	580
04:00 PM	71	5	0	76	3	4	0	7	2	58	0	60	143
04:15 PM	72	2	0	74	7	2	0	9	2	61	0	63	146
04:30 PM	66	4	0	70	5	1	0	6	1	70	0	71	147
04:45 PM	67	2	0	69	2	0	0	2	0	68	0	68	139
Total	276	13	0	289	17	7	0	24	5	257	0	262	575
05:00 PM	77	0	0	77	0	2	0	2	1	77	0	78	157
05:15 PM	67	3	0	70	4	3	0	7	0	63	0	63	140
05:30 PM	56	0	0	56	0	0	0	0	0	55	0	55	111
05:45 PM	41	0	0	41	0	0	0	0	0	54	0	54	95
Total	241	3	0	244	4	5	0	9	1	249	0	250	503
Grand Total	824	24	0	848	45	19	0	64	8	737	1	746	1658
Apprch %	97.2	2.8	0		70.3	29.7	0		1.1	98.8	0.1		
Total %	49.7	1.4	0	51.1	2.7	1.1	0	3.9	0.5	44.5	0.1	45	
CARS	809	24	0	833	45	19	0	64	8	730	1	739	1636
% CARS	98.2	100	0	98.2	100	100	0	100	100	99.1	100	99.1	98.7
TRUCKS	15	0	0	15	0	0	0	0	0	7	0	7	22
% TRUCKS	1.8	0	0	1.8	0	0	0	0	0	0.9	0	0.9	1.3

Stephen G. Pernaw

From:	eric weinrieb <eric@altusengineering2.onmicrosoft.com>
Sent:	Wednesday, December 4, 2019 8:41 AM
To:	sgp@pernaw.com
Subject:	FW: St Patricks Academy crash data

Eric

Altus Engineering, Inc.
133 Court Street
Portsmouth, NH 03801

From: Nicole Pappaioanou <NPappaioanou@cityofportsmouth.com>
Sent: Thursday, November 14, 2019 1:58 PM
To: eric weinrieb <eric@altusengineering2.onmicrosoft.com>
Subject: RE: St Patricks Academy crash data

I ran a query for accidents on Banfield Rd from 4/1/2018 to today. I have no idea where 300 feet from the St Pat's driveway is on the road so I guessed. I had 2 accidents. One was located at 225 Banfield and the other was located at 470 Banfield.

Nicole Pappaioanou
Portsmouth Police Department
Office Manager
Records Unit
Phone (603)610-7446
Fax (603)610-7670

From: eric weinrieb [mailto:eric@altusengineering2.onmicrosoft.com]
Sent: Wednesday, November 13, 2019 4:21 PM
To: Nicole Pappaioanou <NPappaioanou@cityofportsmouth.com>
Cc: James Broom <jpatrickbroom@gmail.com>
Subject: St Patricks Academy crash data

Nichole,

Thank you for taking the time to talk to me earlier today.

As suggested attached is a request on letterhead asking for crash data for the Banfield Road area near the new St Patricks Academy.

Thank you for your time.

Seasonal Adjustment Factors
NHDOT Group 4 (Urban Highways)

Stephen G. Pernaw & Company, Inc.

Year 2018 Monthly Data - Urban

Month	ADT	Adjustment to Average	Adjustment to Peak
Jan	11,282	1.13	1.24
Feb	11,848	1.08	1.18
Mar	11,828	1.08	1.18
Apr	12,491	1.02	1.12
May	13,587	0.94	1.03
Jun	13,911	0.92	1.00
Jul	13,765	0.93	1.01
Aug	13,945	0.92	1.00
Sep	13,168	0.97	1.06
Oct	13,367	0.96	1.04
Nov	12,215	1.05	1.14
Dec	11,963	1.07	1.17

Year 2017 Monthly Data - Urban

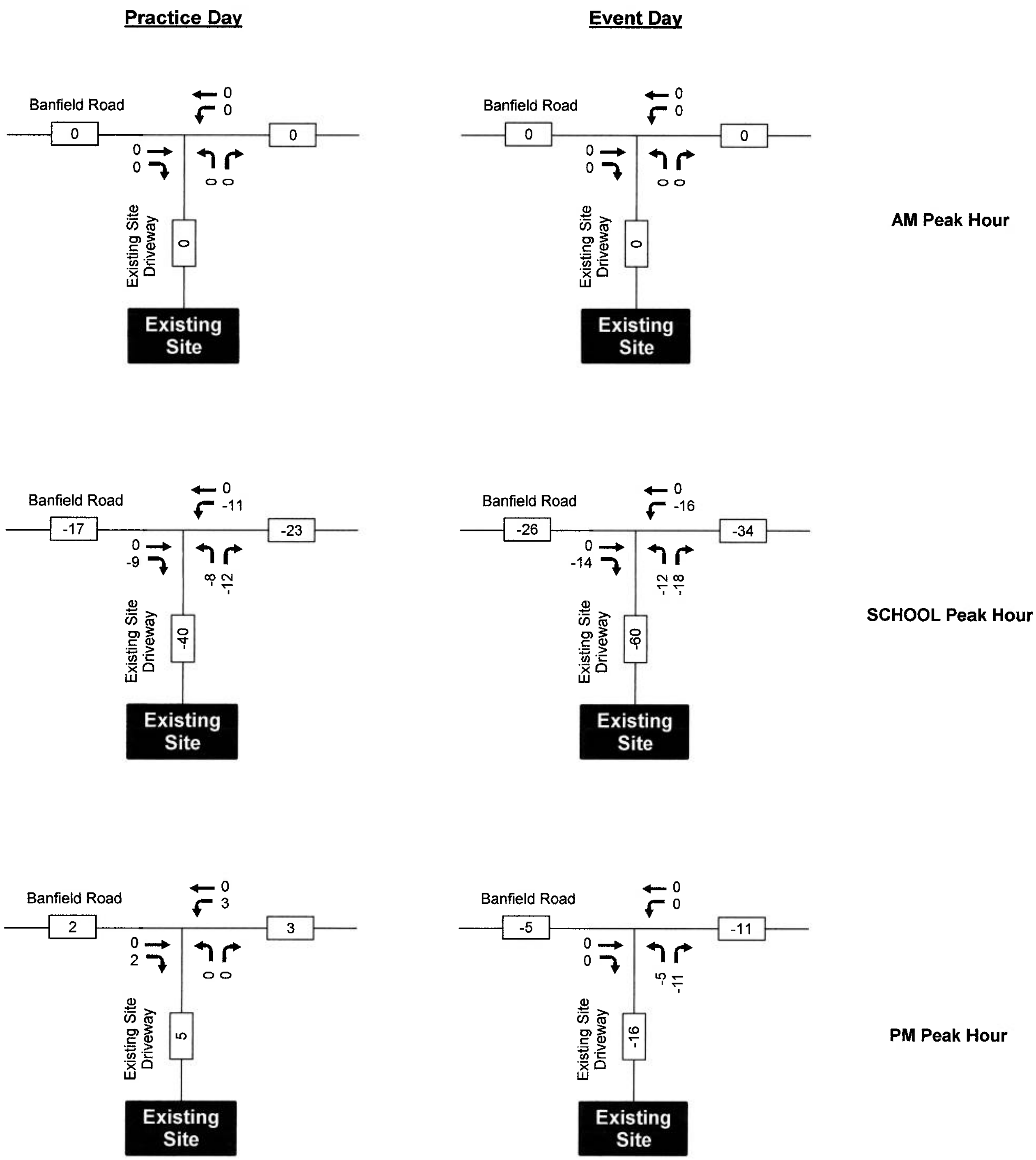
Month	ADT	Adjustment to Average	Adjustment to Peak
Jan	12254	1.21	1.33
Feb	13494	1.10	1.21
Mar	14335	1.03	1.14
Apr	15004	0.99	1.09
May	15547	0.95	1.05
Jun	16310	0.91	1.00
Jul	15523	0.95	1.05
Aug	15974	0.93	1.02
Sep	15546	0.95	1.05
Oct	15104	0.98	1.08
Nov	14544	1.02	1.12
Dec	14151	1.05	1.15

Year 2016 Monthly Data - Urban

Month	ADT	Adjustment to Average	Adjustment to Peak
Jan	13573	1.16	1.25
Feb	14038	1.12	1.21
Mar	15731	1.00	1.08
Apr	16139	0.97	1.05
May	15705	1.00	1.08
Jun	16766	0.94	1.01
Jul	15752	1.00	1.08
Aug	16529	0.95	1.03
Sep	17007	0.92	1.00
Oct	16598	0.94	1.02
Nov	15649	1.00	1.09
Dec	14638	1.07	1.16

Average Peak-Month Factor 1.12

Pernaw & Company, Inc



1978A

NORTH

Attachment

Site Generated Traffic Volumes

Traffic Impact Assessment Update, St. Patrick Academy - Proposed Gymnasium, Portsmouth, NH

Trip Generation Derivation - Proposed Gymnasium

	Parent Pick-Ups [1]		Visitors/Refs [2]		Staff [3]		TOTAL TRIPS		
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Total
Typical Event Days									
2-3 PM	-30	-30					-30	-30	-60
3-4 PM						-8	0	-8	-8
4-5 PM						-16	0	-16	-16
5-6 PM	40		40				80	0	80
6-7 PM	5						5	0	5
7-8 PM							0	0	0
8-9 PM		45		40		24	0	109	109
Total:	15	15	40	40		0	55	55	110
Typical Practice Days									
2-3 PM	-20	-20					-20	-20	-40
3-4 PM	5						5	0	5
4-5 PM	5						5	0	5
5-6 PM	5						5	0	5
6-7 PM	5	20					5	20	25
7-8 PM							0	0	0
8-9 PM							0	0	0
Total:	0	0	0	0	0	0	0	0	0

[1] Event Days: Approximately 30 fewer parents take students at normal time (2-3 PM) and arrive in 1 or 2 vehicles before/after 6 PM to watch and retrieve.

Practice Days: Approximately 20 fewer parents take student at normal time (2-3 PM) and arrive between 3-6 PM to watch and retreive.

[2] Event Days: Approximately 40 travelling visitors & referees arrive before 6 PM and depart after 8 PM.

[3] Event Days: Approximatley 24 staff from St. Patrick remain on-site and depart after 8 PM.

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	13.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	13.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↰	Y	
Traffic Vol, veh/h	263	40	45	268	30	43
Future Vol, veh/h	263	40	45	268	30	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	47	51	305	77	110

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	737	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	407	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1206	-	389	716
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	676	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	369	716
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	516	-	-	1206	-
HCM Lane V/C Ratio	0.363	-	-	0.042	-
HCM Control Delay (s)	15.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection						
Int Delay, s/veh	2.7					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	263	31	34	268	22	31
Future Vol, veh/h	263	31	34	268	22	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	36	39	305	56	79

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	707	324
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1217	-	405	722
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1217	-	389	722
Mov Cap-2 Maneuver	-	-	-	-	389	-
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	667	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	533	-	-	1217	-
HCM Lane V/C Ratio	0.255	-	-	0.032	-
HCM Control Delay (s)	14.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	9	21	368	15	29
Future Vol, veh/h	322	9	21	368	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	11	23	409	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	869	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1151	-	325	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1151	-	317	643
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	476	-	-	1151	-
HCM Lane V/C Ratio	0.152	-	-	0.02	-
HCM Control Delay (s)	13.9	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	11	24	368	15	29
Future Vol, veh/h	322	11	24	368	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	14	27	409	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	422	0	878	415
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	463	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1148	-	321	642
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1148	-	311	642
Mov Cap-2 Maneuver	-	-	-	-	311	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	619	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1148	-
HCM Lane V/C Ratio	0.153	-	-	0.023	-
HCM Control Delay (s)	14	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection						
Int Delay, s/veh	13.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	13.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	353	49	74	186	40	76
Future Vol, veh/h	353	49	74	186	40	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	72	72	39	39
Heavy Vehicles, %	1	2	0	1	0	1
Mvmt Flow	560	78	103	258	103	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	638	0	1063	599
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	464	-
Critical Hdwy	-	-	4.1	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	956	-	249	503
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	956	-	218	503
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	54.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	956	-
HCM Lane V/C Ratio	0.857	-	-	0.108	-
HCM Control Delay (s)	54.2	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.9	-	-	0.4	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↘			↖↑	↖↗	
Traffic Vol, veh/h	263	40	45	268	30	43
Future Vol, veh/h	263	40	45	268	30	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	47	51	305	77	110

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	737	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	407	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1206	-	389	716
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	676	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	369	716
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	516	-	-	1206	-
HCM Lane V/C Ratio	0.363	-	-	0.042	-
HCM Control Delay (s)	15.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	263	26	29	268	18	25
Future Vol, veh/h	263	26	29	268	18	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	39	39
Heavy Vehicles, %	1	3	2	2	0	0
Mvmt Flow	306	30	33	305	46	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	336	0	692	321
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	-	-	4.12	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1223	-	413	724
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1223	-	400	724
Mov Cap-2 Maneuver	-	-	-	-	400	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	680	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	541	-	-	1223	-
HCM Lane V/C Ratio	0.204	-	-	0.027	-
HCM Control Delay (s)	13.4	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	9	21	368	15	29
Future Vol, veh/h	322	9	21	368	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	11	23	409	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	869	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1151	-	325	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1151	-	317	643
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	476	-	-	1151	-
HCM Lane V/C Ratio	0.152	-	-	0.02	-
HCM Control Delay (s)	13.9	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 TWSC
1: Existing Site Driveway & Banfield Road

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	322	9	21	368	10	18
Future Vol, veh/h	322	9	21	368	10	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	90	90	61	61
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	408	11	23	409	16	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	869	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1151	-	325	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1151	-	317	643
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	470	-	-	1151	-
HCM Lane V/C Ratio	0.098	-	-	0.02	-
HCM Control Delay (s)	13.5	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Stephen G. Pernaw & Company, Inc.

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

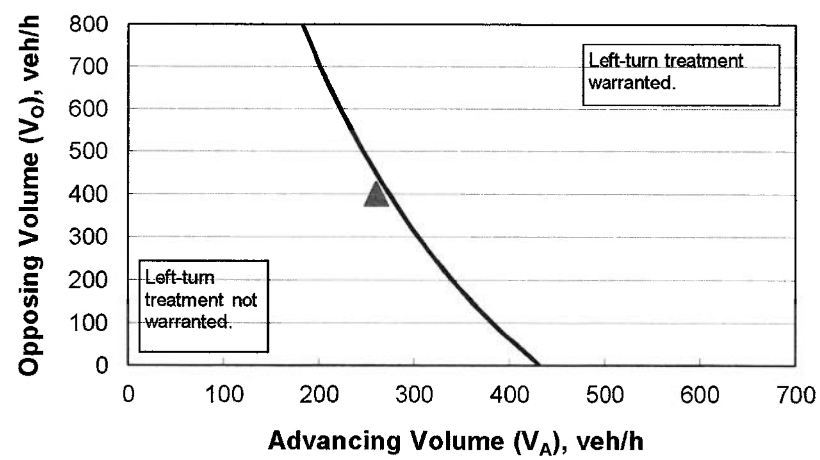
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	28%
Advancing volume (V_A), veh/h:	260
Opposing volume (V_O), veh/h:	402

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	273
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

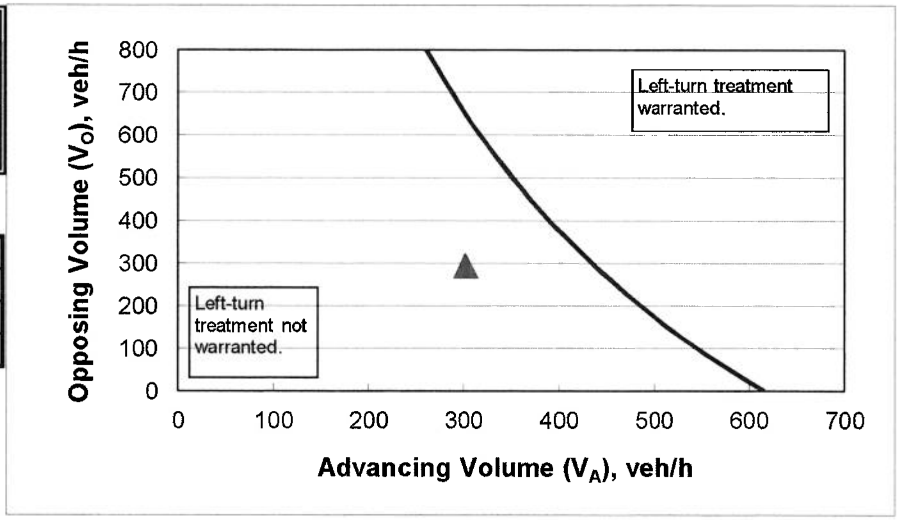
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	11%
Advancing volume (V_A), veh/h:	302
Opposing volume (V_O), veh/h:	294

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	437
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

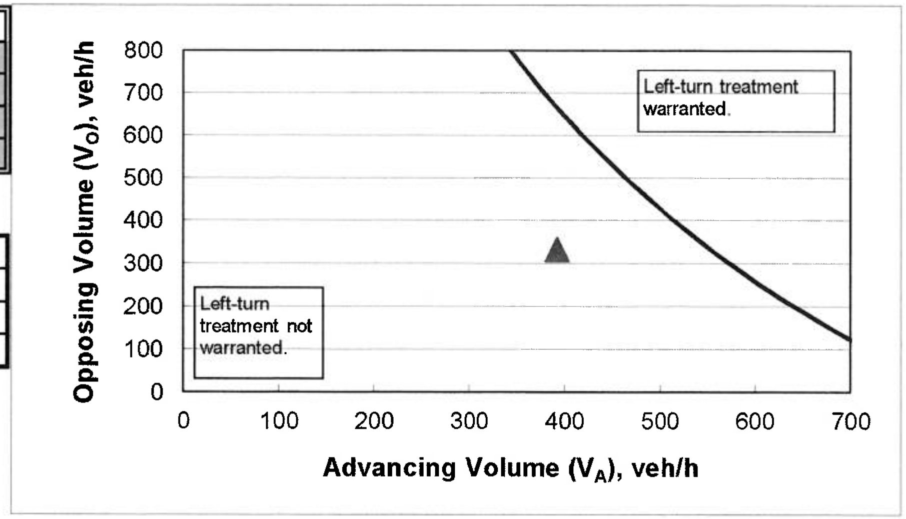
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	6%
Advancing volume (V_A), veh/h:	392
Opposing volume (V_O), veh/h:	333

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	553
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

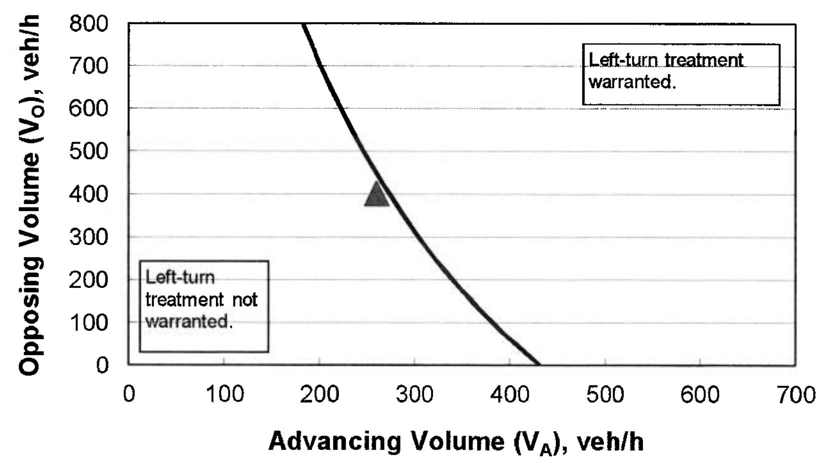
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	28%
Advancing volume (V_A), veh/h:	260
Opposing volume (V_O), veh/h:	402

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	273
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

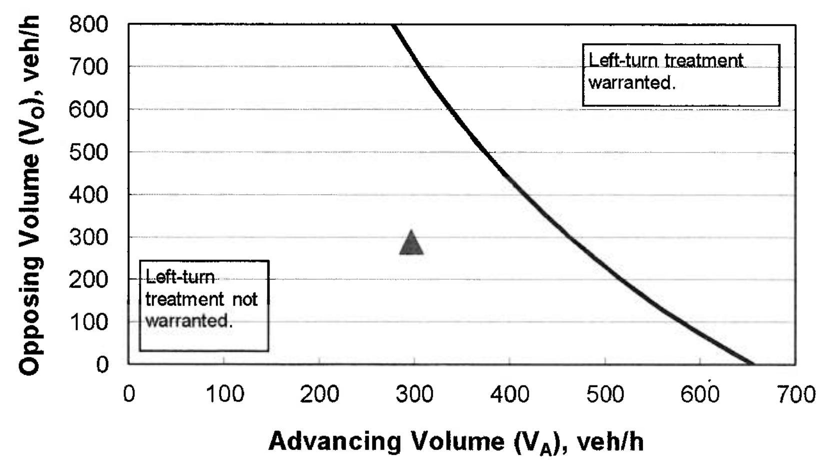
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	10%
Advancing volume (V_A), veh/h:	297
Opposing volume (V_O), veh/h:	289

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	468
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

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Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

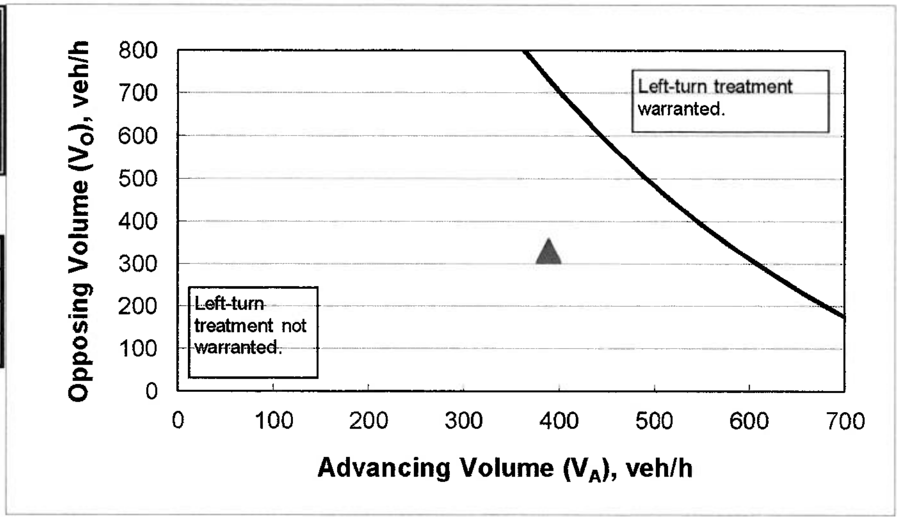
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	5%
Advancing volume (V_A), veh/h:	389
Opposing volume (V_O), veh/h:	331

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	588
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadw ay

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	402
Right-turn volume, veh/h:	49

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	1578
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

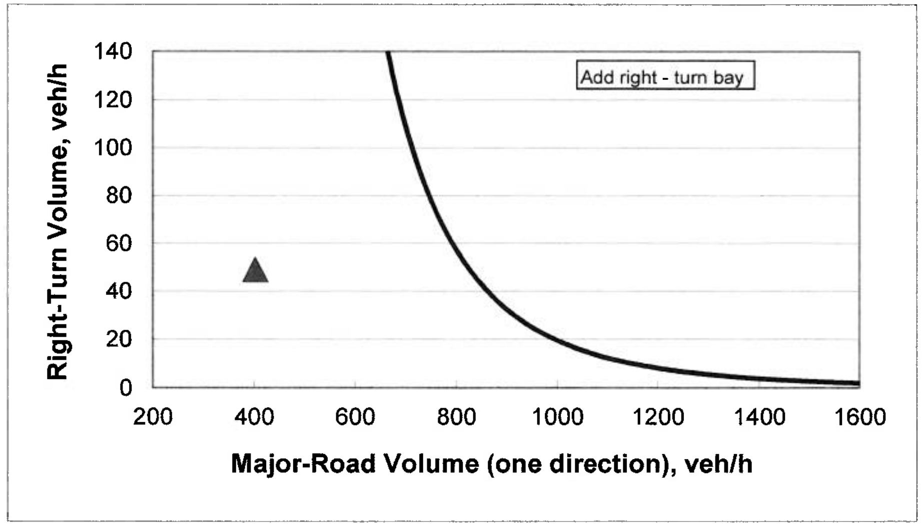


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadw ay

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	294
Right-turn volume, veh/h:	31

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	7128
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

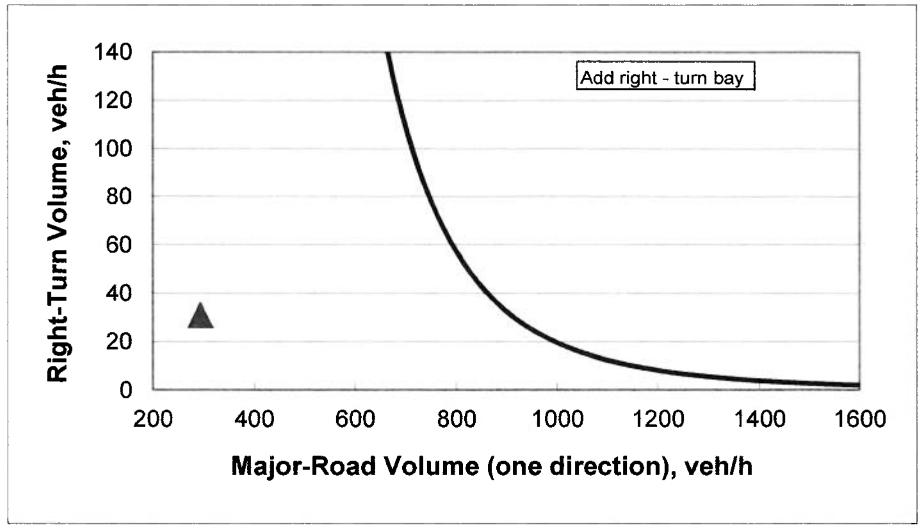


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	333
Right-turn volume, veh/h:	11

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	3911
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

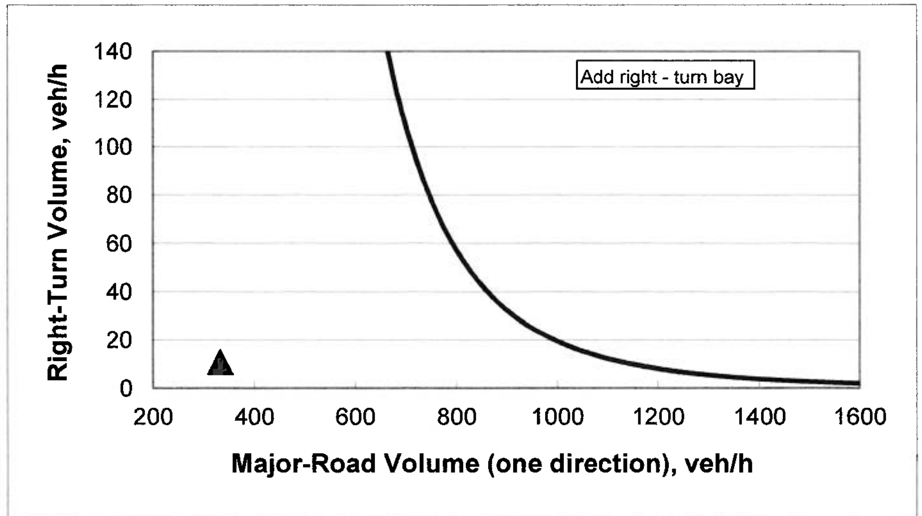


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Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadw ay

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	402
Right-turn volume, veh/h:	49

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	1578
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

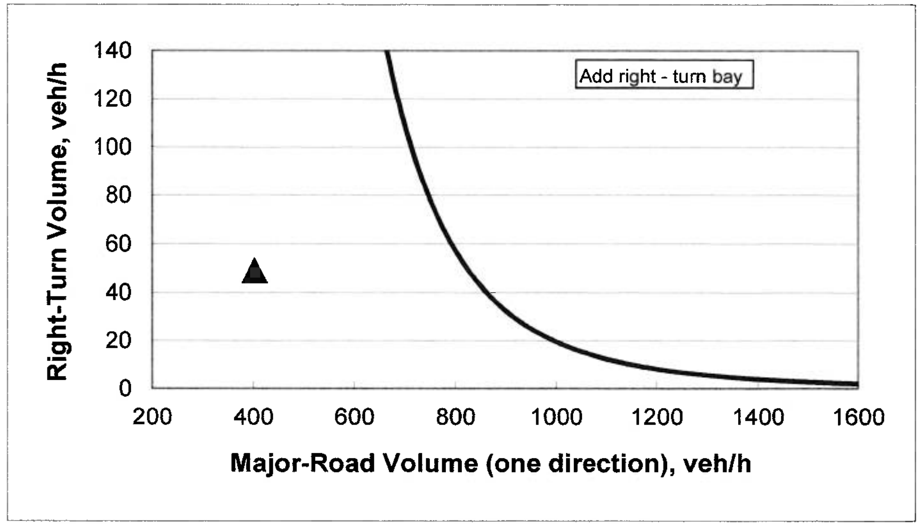


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadw ay

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	289
Right-turn volume, veh/h:	26

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	7742
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

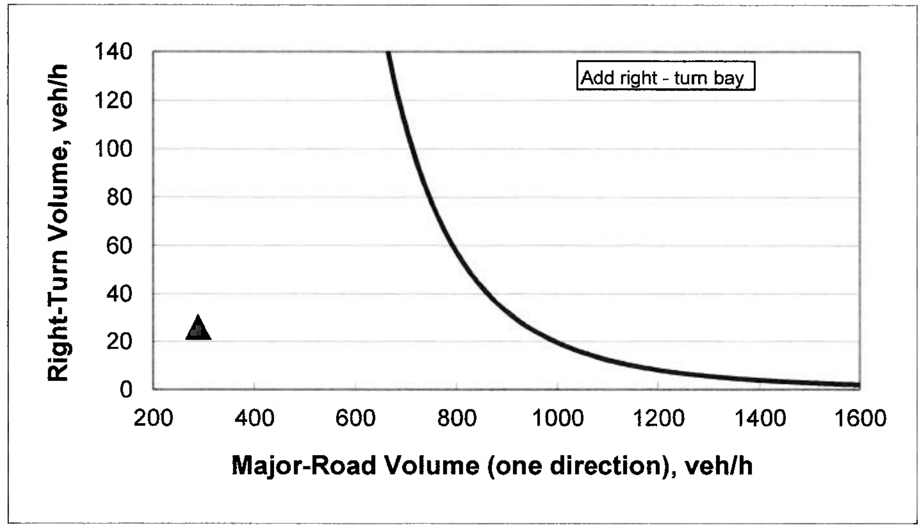


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	331
Right-turn volume, veh/h:	9

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	4026
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

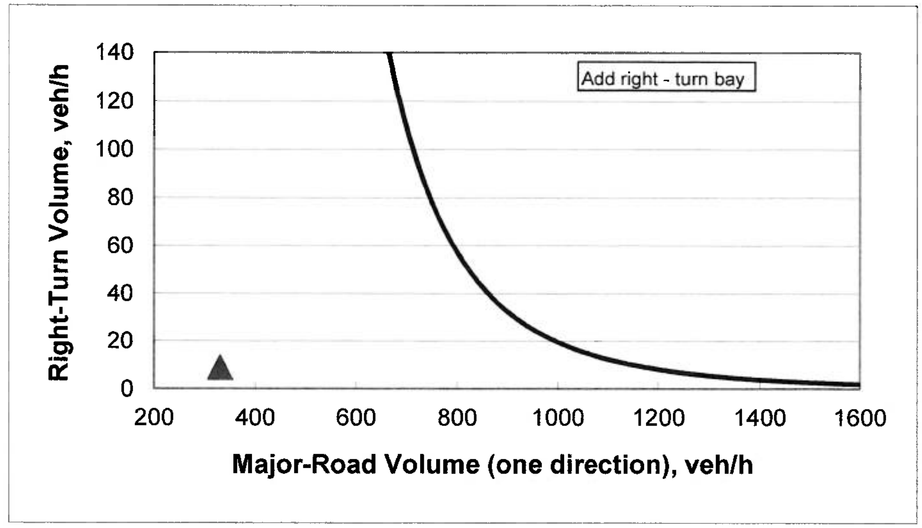


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	662
Percentage of right-turns on minor road, %:	66%
Minor-road volume (one direction), veh/h:	116

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	344
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

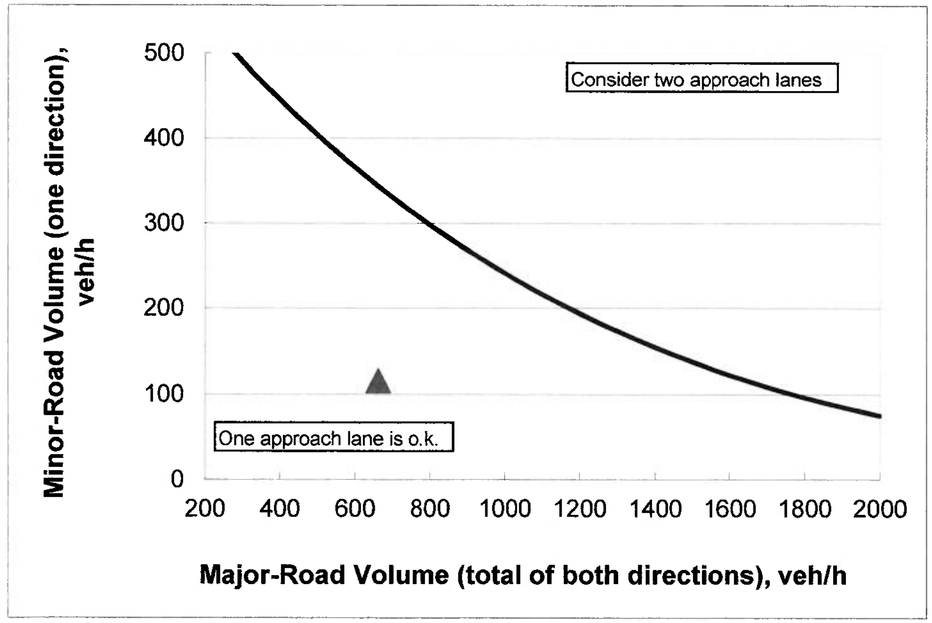


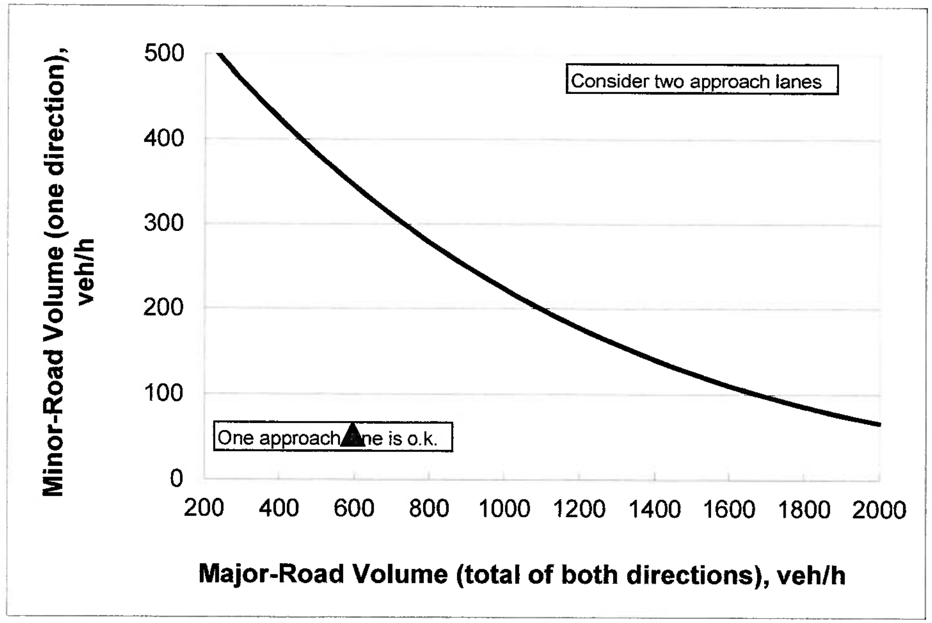
Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	596
Percentage of right-turns on minor road, %:	59%
Minor-road volume (one direction), veh/h:	53

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	346
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	



CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	725
Percentage of right-turns on minor road, %:	66%
Minor-road volume (one direction), veh/h:	44

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	324
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

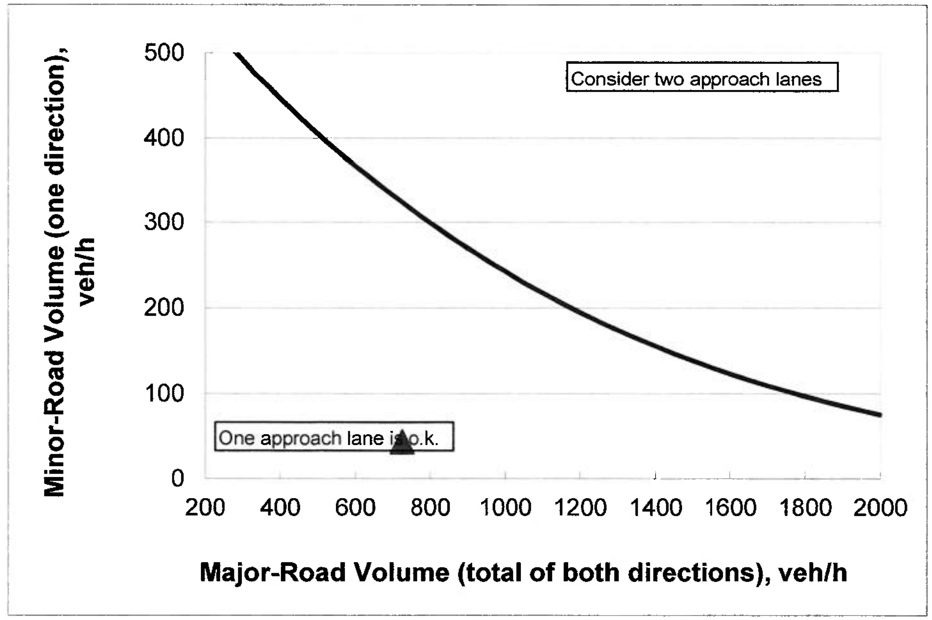


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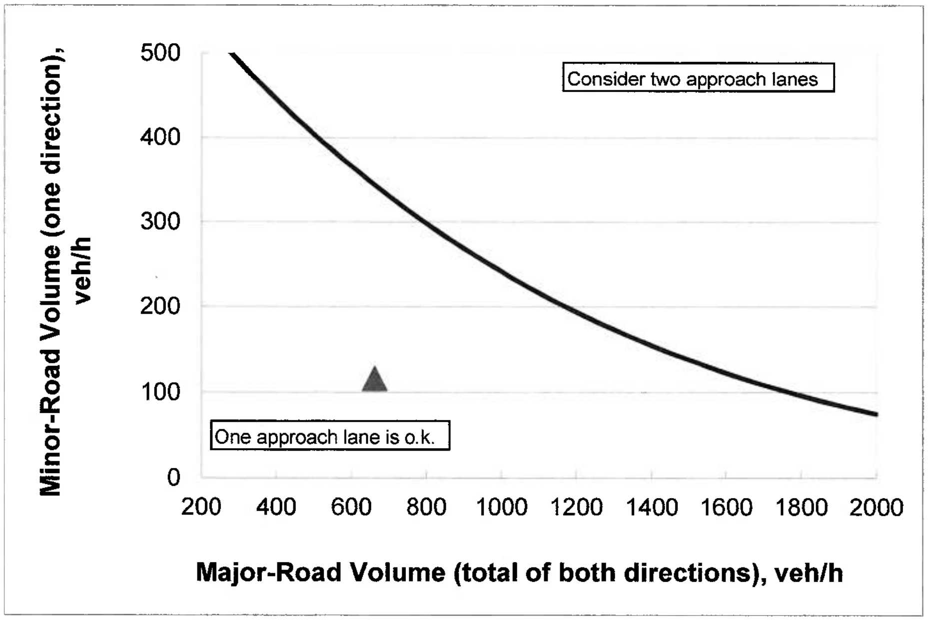
Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	662
Percentage of right-turns on minor road, %:	66%
Minor-road volume (one direction), veh/h:	116



OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	344
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	586
Percentage of right-turns on minor road, %:	58%
Minor-road volume (one direction), veh/h:	43

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	349
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

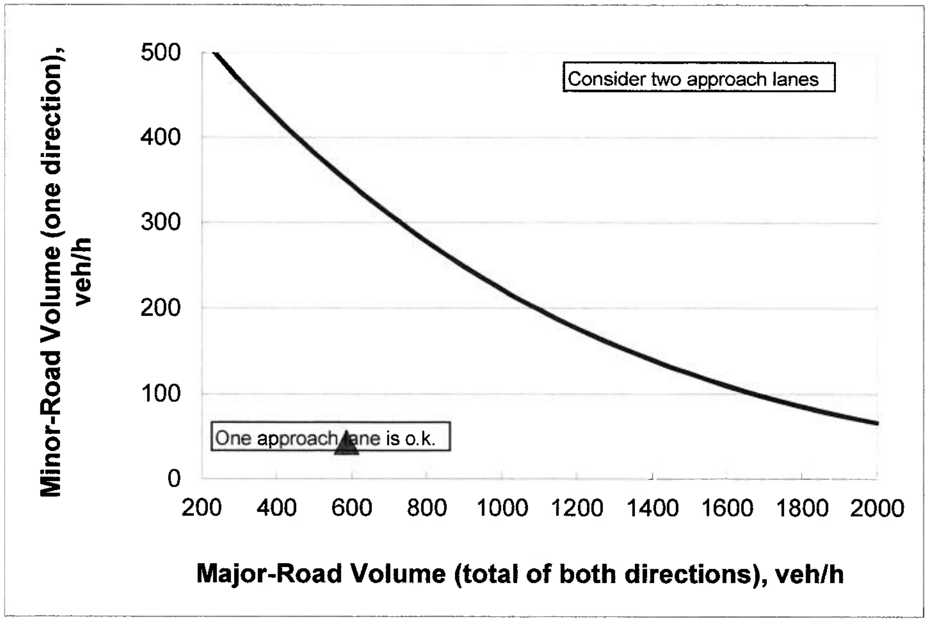


Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	720
Percentage of right-turns on minor road, %:	64%
Minor-road volume (one direction), veh/h:	28

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	320
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM